

*Full Length Research Paper*

# Vegetation structure and composition in Guru Ghasidas Vishwavidyalaya in Central India

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**Diversity of plants includes their presence and habit in specific ecological area. Plants' adaptability, genetic makeup and related environment influence their composition. This present study aims to assess vegetation on campus. A total number of 273 plant species belonging to 84 families were recorded, in which Fabaceae registered as the largest family with 38 plant species. Herbs showed their maximum presence (65.93%) followed by trees (19.05%), herb/climbers (6.96%) and shrubs (8.06%). Rich presence of phanerophytes showed tropical moist humid climatic condition. Conservation practices and sustainable management strategies are essential steps for protection of natural resources, especially for the diverse vegetational group. Recorded major families of vegetation composition were Fabaceae (42.85%), Asteraceae (21.42%), Apocynaceae, Solanaceae (11.90%), Amaranthaceae and Poaceae (10.71%), while other families showed intermediate number of species. The campus is rich with diverse plant species, and by obtaining proper information about it, prime efforts can be made to conserve it.**

**Key words:** Diversity, habit, plant species, university campus.

## INTRODUCTION

Information of plant diversity is needed for the study of dynamic nature of vegetation under specific eco-environmental situation. Ecology, which is the study of diversity of species, has been used for the analysis of pattern, causes of extinction and management practices (Huston, 1994). Awareness and understanding of environment as well as biological diversity is increasing daily due to its rapid and significant role in maintaining ecosystem. Most vegetational diversity and dynamics found in tropical moist area are due to availability of better environment to the plant species. Guru Ghasidas Vishwavidyalaya GGV-Bilaspur (CV) is a central university in Central India of around 700 acres area. The site has rich diversity of plant species.

Biological resources provided by nature are not only the source of ecosystem balance, but also useful to social communities (Heywood, 1995). Vegetation of a specified ecosystem leads to and regulates the process of sustainability of the ecosystem. Bio-species may vary due to climatic condition as well as the tolerance capacity

of the species in their natural habitat followed by their mode of propagation in next generation.

Species diversity and ecosystem fluctuation is regulated by human activities, deforestation, environmental changes, etc. Local climate of the area leads to the presence of the plant species followed by several environmental parameters, namely, temperature, pH, moisture, soil, biological pressure, etc. So, it becomes urgent to protect the biodiversity using effective methods.

Vegetational diversity of an area is influenced by local environmental and geographical situation and rainfall (Arora, 1995). Effect of climate change on the flora of mountains is noticed by Stanisci et al. (2005). Land management of ecosystem is a remarkable and key part of conservation of biodiversity. Odland and Birks (1999) reported that the population of vascular plants decreases with increase in altitude.

Tropical moist area includes rich species diversity. Many studies have been carried out on plant diversity of

different parts of the world (Shimizu, 1991; Hussain et al., 2000; Aparajita et al., 2002; Banda et al., 2006; Kumar et al., 2006; De, 2007; Stanisci et al., 2005). Plant species respond to their environment (Harrison et al., 2001). Plant species are in high risk due to variable morphological structures (Daehler, 1998). Wilby (2007) focused on the problems of management of aquatic plants.

The aim of this study is to record the plant diversity on GGV campus for exploration of the variation in plant species based on field observations. It is a prime attempt to assess and have inventory knowledge of the plant species on GGV-Bilaspur campus (CG). Current study will be helpful for further studies in the related field.

## MATERIALS AND METHODS

The present research was conducted during September 2009 to October 2010. Multiple random field observation was carried out for assessment of plants diversity (Phyto-sociological analysis) distributed on the campus. Bilaspur (CG) is a major city of Chhattisgarh State and GGV is a central university (area around 700 acres). The area is situated between 21°47' and 23°8' north latitudes and 81°14' and 83°15' east latitudes. It has an average elevation of 264 m (866 ft) near the banks of the rain-fed Arpa River with black-sandy soil (Figure 1). The climate of the area is tropical. It is hot and humid, because of its proximity to the Tropic of Cancer and depending on the monsoons for rains. There are medium rains in the monsoon season. Its summer is very hot with temperature between 30 and 47°C and between 5 and 25°C in winter.

Identification of plants was done by experts, literature, flora, and herbarium (Haines flora) and the plants were documented by following their botanical name, family, habits, and propagation method of the individual plants.

## RESULTS

A total number of 273 plant species belonging to varied families (84) with different habits were recorded (Table 1). They were the major vegetation in the university campus.

Out of these plants species, herbs (180), herb/climber (19), shrubs (22), and trees (52) were noticed. Maximum plant species were recorded for Fabaceae family, whereas 39 families include single species in the university campus. Observed plant species with their family, habit, and propagation methods are listed in Table 1. Table 2 shows the family wise distributions of plants and in Table 3, the number of different habits is given. Table 4 shows plant species range belonging to their family, and in Table 5, propagation methods of different plant species are listed.

## DISCUSSION

On the basis of the present findings, it is concluded that the university campus is enriched with various plants of different habits, and the knowledge about the plant

species is essential for assessing them, though further strategy is needed to conserve them.

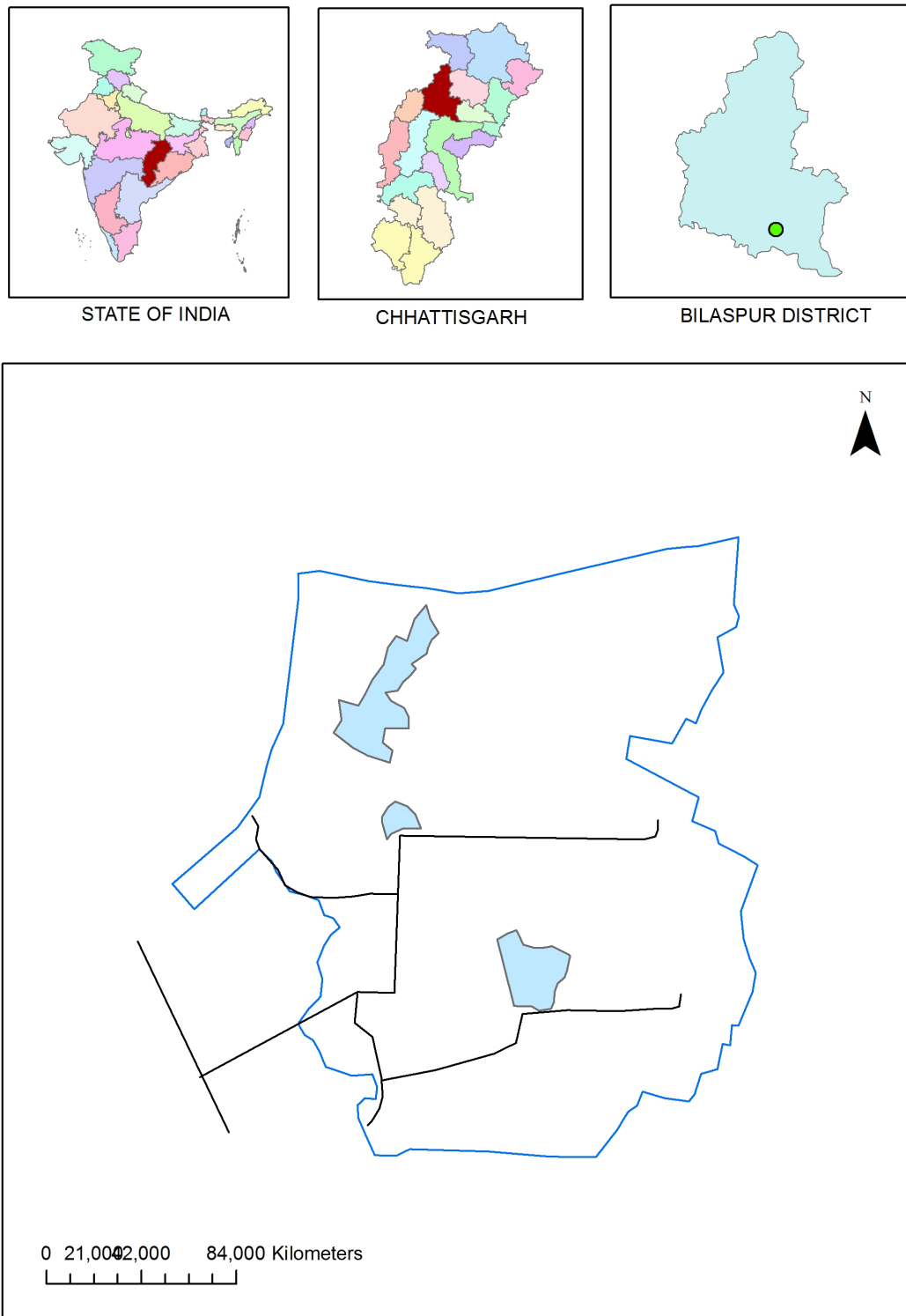
Plant species diversity (Shrubs) in Central Himalayan Region was recorded by Rikhari et al. (1997) and Ram et al. (2004). Pant and Samant (2007) reported that high biodiversity is due to variation in habitats and related environmental situations. Conserving the genetic diversity of plants is beneficial for current and also for coming generations (Olowokudejo, 1987). Carrying capacity of each ecosystem has a significant impact on long term basis and it sustains the utilization of available natural resources. Proper monitoring of the ecosystem is required for protecting the plant species.

This study indicates their rich diversity, followed by various habits (herbs, shrubs, and trees) due to suitable climatic condition as well as their survival capacity in the university campus. In the campus, herbaceous plants are mostly seen as they cover a larger part of the area (180 species of 65.93%), and are closely followed by trees (52 species of 19.05%), shrub (22 species of 8.06%) and herb/climber (19 species of 6.96%), the least of them all (Figure 2). The range base distribution related to their families was also investigated. The maximum number of plant species was recorded for a range of 0 to 5, with the plant species having a total of 67 families, whereas the single family Fabaceae which has the largest plant species has a range number of 38.

The most frequent plant species families were found in order of Fabaceae (38) > Asteraceae (18) > Euphorbiaceae, Lemnaceae (11) > Apocynaceae, Solanaceae (10) > Amaranthaceae, Poaceae (9) > Agavaceae, Araceae, Malvaceae (7) > Liliaceae, Moringaceae, Verbenaceae, Zingiberaceae (6) > Asclepiadaceae, Convolvulaceae (5) > Acanthaceae, Myrtaceae, Rubiaceae, Rutaceae (4) > Annonaceae, Comminaceae, Cucurbitaceae, Nyctaginaceae, Oxalidaceae, Polygonaceae (3) > Anacardiaceae, Apiaceae, Bixaceae, Combrataceae, Cypraceae, Hydrocharitaceae, Lytharaceae, Oleaceae, Palmae, Piperaceae, Rhmanaceae, Rosaceae, Scrophulariaceae, Vitaceae (2). The rest of the families listed in Table 2 includes single plant species.

This study also focused on the regeneration pattern of individual plant species as they propagate in new season/year for maintaining their existence in the campus. 67.40% of the studied plants show their propagation by seeds. 0.73 to 11.72% of the plants were propagated through seed/stem cutting, seed/tuber, rhizome, corm, bulb, bud, and tuber. Minimum percentage (0.38) of propagation by leaf was shown by *Kalanchoe pinnata* (Lam.) Pers.

Within the recorded mixed plant population, 11 species of the plants were aquatic in nature, recorded from water bodies in the campus. The aquatic plants are floating (*Azolla pinnata* R. Br., *Ipomoea aquitica* Forssk., *Lemna minor* Linn, *Nymphaea nouchali* Burm. F., *Pistia stratiotes* Linn, and *Trapa bispinosa* Roxb.) and submerged



**Figure 1.** Location of university campus.

(*Ceratophyllum demersum* Linn., *Hydrilla verticillata* (L. F.) Royle., *Marsilea quadrifolia* Linn., *Vallisneria spiralis* Linn., and *Utricularia bifida* Linn.) in nature.

One species of Bryophyta (*Riccia fluitans* Linn.), one

Pteridophyta (*Pteridium aquilinum* (L.) Kuhn.), two Gymnosperm (*Araucaria columaris* J. R. Forsk. Hook. and *Thuja occidentalis* Linn.), one Epiphyte (*Vanda tessellate* (Roxb.) were also recorded during the course

**Table 1.** Diversity of plants in the G.G.V. (A Central University) Campus, Bilaspur, Chhattisgarh in Central India.

S/N	Botanical name	Family	Habit	Propagation
1	<i>Abrus precatorius</i> Linn.	Fabaceae	Herb/Climber	Seed
2	<i>Abutilon indicum</i> (L.) Sw.	Malvaceae	Herb	Seed
3	<i>Acacia catechu</i> (L.F.) Willd.	Fabaceae	Tree	Seed
4	<i>Acacia nilotica</i> (L.) Willd.	Fabaceae	Tree	Seed
5	<i>Acacia pycnantha</i> Benth.	Fabaceae	Tree	Seed
6	<i>Acalypha indica</i> Linn.	Euphorbiaceae	Herb	Seed
7	<i>Achyranthes aspera</i> Linn.	Amaranthaceae	Herb	Seed
8	<i>Acorus calamus</i> Linn.	Araceae	Herb	Rhizome
9	<i>Adhatoda vasica</i> Linn.	Acanthaceae	Shrub	Stem cutting
10	<i>Aegle marmelos</i> (L.) Corr.	Rutaceae	Tree	Seed
11	<i>Aeschynomene indica</i>	Fabaceae	Herb	Seed
12	<i>Agave sesalana</i> Perr.	Agavaceae	Herb	Rhizome
13	<i>Ageratum conyzoides</i> Linn.	Asteraceae	Herb	Seed
14	<i>Ailanthus altissima</i> (Mill) Swingle.	Simaroubaceae	Tree	Seed
15	<i>Albizia lebbek</i> Benth.	Fabaceae	Tree	Seed
16	<i>Allium cepa</i> Linn.	Liliaceae	Herb	Bulb
17	<i>Allium sativum</i> Linn.	Liliaceae	Herb	Bulb
18	<i>Aloe barbadensis</i> Mill	Liliaceae	Herb	Bud
19	<i>Alstonia scholaris</i> L.R.Br.	Apocynaceae	Herb	Seed
20	<i>Alternanthera philoxeroides</i> Griseb.	Amaranthaceae	Herb	Seed
21	<i>Alternanthera tenella</i> Moq.	Amaranthaceae	Herb	Seed
22	<i>Amaranthus caudatus</i> Linn.	Amaranthaceae	Herb	Seed
23	<i>Amaranthus spinosus</i> Linn.	Amaranthaceae	Herb	Seed
24	<i>Amorphophallus bubius</i> (Roxb.) Blume.	Araceae	Herb	Corn
25	<i>Anacardium occidentale</i> Linn.	Anacardiaceae	Tree	Seed
26	<i>Anacyclus pyrethrum</i> Linn.	Asteraceae	Herb	Seed
27	<i>Ananas comosus</i> Linn.	Bromeliaceae	Herb	Bud
28	<i>Andrographis paniculata</i> Nees.	Acanthaceae	Herb	Seed
29	<i>Annona squamosa</i> Linn.	Annonaceae	Tree	Seed
30	<i>Anthocephalus cadamba</i> Roxb.	Rubiaceae	Tree	Seed
31	<i>Antigonon leptopus</i> Hook & Arn.	Polygonaceae	Herb/Climber	Bulb
32	<i>Araucaria columaris</i> J. R. Forsk. Hook.	Araucariaceae	Herb	Seed
33	<i>Areva lanata</i> (Linn.) Juss. Ex Schult.	Amaranthaceae	Herb	Seed
34	<i>Argemone Mexicana</i> Linn.	Papaveraceae	Herb	Seed
35	<i>Asparagus racemosus</i> Willd.	Liliaceae	Herb	Seed/Tuber
36	<i>Atrocarpus heterophyllus</i> Lam.	Moraceae	Tree	Seed
37	<i>Azadirachta indica</i> A. Juss.	Meliaceae	Tree	Seed
38	<i>Azolla pinnata</i> R. Br.	Salviniaceae	Herb	Bud
39	<i>Bacopa monnieri</i> Linn.	Scrophulariaceae	Herb	Stem cutting
40	<i>Bambusa bambos</i> Aka.	Poaceae	Shrub	Seed
41	<i>Barleria prionitis</i> Linn.	Acanthaceae	Herb	Seed
42	<i>Basella alba</i> Linn.	Basellaceae	Herb/Climber	Seed/Stem cutting
43	<i>Bauhinia variegata</i> Linn.	Fabaceae	Tree	Seed
44	<i>Biophytum sensitivum</i> (L.) DC.	Oxalidaceae	Herb	Seed
45	<i>Bixa orellana</i> Linn.	Bixaceae	Shrub	Seed
46	<i>Blumea lacera</i> (Burm. F.) DC.	Asteraceae	Herb	Seed
47	<i>Boerhaavia diffusa</i> Linn.	Nyctaginaceae	Herb	Seed
48	<i>Bombax ceiba</i> Linn.	Bombacaceae	Tree	Seed
49	<i>Bougainvillea glabra</i> Choisy	Nyctaginaceae	Herb/Climber	Stem cutting
50	<i>Brassica campestris</i> Linn.	Cruciferae	Herb	Seed
51	<i>Butea monosperma</i> (Lamk.) Taub.	Fabaceae	Tree	Seed

Table 1. Continued.

52	<i>Caesalpinia crista</i> Linn.	Fabaceae	Shrub	Seed
53	<i>Caesalpinia pulchirima</i> Linn.	Fabaceae	Shrub	Seed
54	<i>Cajanus cajan</i> (L.) Millsp.	Fabaceae	Herb	Seed
55	<i>Caladium bicolor</i> Vent.	Araceae	Herb	Bulb
56	<i>Calistimon lanciolate</i> (Sm.) Sweet.	Myrtaceae	Shrub	Stem cutting
57	<i>Calotropis gigantean</i> (L.) Ait.F.	Asclepiadaceae	Shrub	Seed
58	<i>Calotropis procera</i> Aiton.	Asclepiadaceae	Shrub	Seed
59	<i>Canna indica</i> Linn.	Cannaceae	Herb	Rhizome
60	<i>Capsicum annuum</i> Linn.	Solanaceae	Herb	Seed
61	<i>Carica papaya</i> Linn.	Caracaceae	Herb	Seed
62	<i>Carissa carandas</i> Linn.	Apocynaceae	Shrub	Seed
63	<i>Cassia alata</i> Linn.	Fabaceae	Herb	Seed
64	<i>Cassia angustifolia</i> Vahl.	Fabaceae	Herb	Seed
65	<i>Cassia fistula</i> Linn.	Fabaceae	Tree	Seed
66	<i>Cassia occidentalis</i> Linn.	Fabaceae	Herb	Seed
67	<i>Cassia siamea</i> Lam.	Fabaceae	Tree	Seed
68	<i>Cassia tora</i> Linn.	Fabaceae	Herb	Seed
69	<i>Catharanthus roseus</i> (L.) G. Don.	Apocynaceae	Herb	Seed
70	<i>Ceiba pentandra</i> (L.) Gaertn.	Bombacaceae	Tree	Seed
71	<i>Celosia argentea</i> Linn.	Amaranthaceae	Herb	Seed
72	<i>Centella asiatica</i> (L.) Urban.	Apiaceae	Herb	Stem cutting
73	<i>Ceratophyllum demersum</i> Linn.	Ceratophyllaceae	Herb	Bud
74	<i>Cestrum nocturnum</i> Linn.	Solanaceae	Herb	Stem cutting
75	<i>Chenopodium album</i> Linn.	Chenopodiaceae	Herb	Seed
76	<i>Chlorophytum borivillianum</i> San. & Fer.	Liliaceae	Herb	Tuber
77	<i>Chrysanthemum indicum</i> Linn.	Asteraceae	Herb	Stem cutting
78	<i>Cicer arietinum</i> Linn.	Fabaceae	Herb	Seed
79	<i>Cissus quadrangularis</i> Linn.	Vitaceae	Herb	Stem cutting
80	<i>Citrus lemon</i> (L.) Burm.F.	Rutaceae	Tree	Seed
81	<i>Cleome viscosa</i> Linn.	Cleomaceae	Herb	Seed
82	<i>Cleosia cristata</i> Linn.	Amaranthaceae	Herb	Seed
83	<i>Clerodendrum serratum</i> (L.) Moon.	Verbenaceae	Herb	Seed
84	<i>Clitoria ternatea</i> Linn.	Fabaceae	Herb/Climber	Seed
85	<i>Cocus nucifera</i> Linn.	Palmae	Tree	Seed
86	<i>Coleus forskholli</i> (Willd.) Briq.	Lamiaceae	Herb	Bulb
87	<i>Coleus blumei</i> Benth.	Lamiaceae	Herb	Seed/Stem cutting
88	<i>Colocasia esculenta</i> (L.) Schott.	Araceae	Herb	Corm
89	<i>Convolvulus arvensis</i> Linn.	Convolvulaceae	Herb	Seed
90	<i>Coriandrum sativum</i> Linn.	Apiaceae	Herb	Seed
91	<i>Costus speciosus</i> (J. Konig) Sm.	Zingiberaceae	Herb	Seed
92	<i>Crinum latifolium</i> Linn.	Liliaceae	Herb	Bulb
93	<i>Crotalaria juncea</i> Linn.	Fabaceae	Herb	Seed
94	<i>Croton sparciflorus</i> (Morung.)	Euphorbiaceae	Herb	Seed
95	<i>Cucumis melo</i> Linn.	Cucurbitaceae	Herb	Seed
96	<i>Curculigo orchioides</i> Gaerth.	Hypoxidaceae	Herb	Rhizome
97	<i>Curcuma angustifolia</i> Roxb.	Zinziberaceae	Herb	Rhizome
98	<i>Curcuma aromatica</i> Linn.	Zingiberaceae	Herb	Rhizome
99	<i>Curcuma longa</i> Linn.	Zinziberaceae	Herb	Rhizome
100	<i>Cuscuta reflexa</i> Roxb.	Convolvulaceae	Herb/Climber	Seed
101	<i>Cymbopogon flexuosus</i> (Nees ex Steu) Wat.	Poaceae	Herb	Seed
102	<i>Cymbopogon martinii</i> (Roxb) Wats.	Poaceae	Herb	Seed
103	<i>Cynodon dactylon</i> Linn.	Poaceae	Herb	Seed/Stem cutting

Table 1. Continued.

104	<i>Cyperus iria</i> Linn.	Cyperaceae	Herb	Seed
105	<i>Cyperus rotundus</i> Linn.	Cyperaceae	Herb	Rhizome
106	<i>Dahelia coccinea</i> Cav.	Asteraceae	Herb	Bulb
107	<i>Dalbergia sissoo</i> Roxb.	Fabaceae	Tree	Seed
108	<i>Datura innoxia</i> Mill.	Solanaceae	Herb	Seed
109	<i>Datura metel</i> Linn.	Solanaceae	Herb	Seed
110	<i>Datura stramonium</i> Linn.	Solanaceae	Herb	Seed
111	<i>Deffenbachia bowmannii</i> Carriere.	Araceae	Herb	Stem cutting
112	<i>Delonix regia</i> (Boj. Ex Hook) Raf.	Fabaceae	Herb	Seed
113	<i>Dendrocalamus strictus</i> (Roxb) Nees.	Poaceae	Shrub	Seed
114	<i>Desmodium triflorum</i> Linn.	Fabaceae	Herb	Seed
115	<i>Desmodium motorium</i> (Houtt.)H.Ohashi.	Fabaceae	Herb	Seed
116	<i>Dioscoria bulbifera</i> Linn.	Dioscoriaceae	Herb	Tuber
117	<i>Diplocyclos palmatus</i> (L.) C. Jeffery.	Cucurbitaceae	Herb/Climber	Seed
118	<i>Dolichos lublub</i> Linn.	Fabaceae	Herb/Climber	Seed
119	<i>Dracaena dermemensis</i> Cvs.Engl.	Agavaceae	Herb	Stem cutting
120	<i>Dracaena fragrans</i> (L.) Ker. Gawl.	Agavaceae	Herb	Stem cutting
121	<i>Duranta erecta</i> Linn.	Verbenaceae	Herb	Seed/Stem cutting
122	<i>Echinochloa colona</i> Linn.	Poaceae	Herb	Seed
123	<i>Eclipta alba</i> (L.)Hassk.	Asteraceae	Herb	Seed
124	<i>Eclipta prostrata</i> Linn.	Asteraceae	Herb	Seed
125	<i>Emblia officinalis</i> Gaertn.	Euphorbiaceae	Tree	Seed
126	<i>Emilia sonchifolia</i> (L.) DC. exWeight.	Asteraceae	Herb	Seed
127	<i>Epipremnum aureum</i> (L.) Engl.	Araceae	Herb/Climber	Seed
128	<i>Eucalyptus globules</i> Labill.	Myrtaceae	Tree	Seed
129	<i>Euphorbia heterophylla</i> Linn.	Euphorbiaceae	Herb	Seed
130	<i>Euphorbia hirta</i> Linn.	Euphorbiaceae	Herb	Seed
131	<i>Euphorbia tirucalli</i> Linn.	Euphorbiaceae	Herb	Seed
132	<i>Evolvulus alsinoides</i> Linn.	Convolvulaceae	Herb	Seed
133	<i>Ficus bengalensis</i> Linn.	Moraceae	Tree	Seed
134	<i>Ficus pumila</i> Linn.	Moraceae	Herb/ Climber	Seed
135	<i>Ficus glomerata</i> Roxb.	Moraceae	Tree	Seed
136	<i>Ficus religiosa</i> Linn.	Moraceae	Tree	Seed
137	<i>Funaria hygrometrica</i> Hedw.	Funariaceae	Herb	Bud
138	<i>Galinsoga parviflora</i> Cav.	Asteraceae	Herb	Seed
139	<i>Garbera lanuginose</i> (DC) Schu.	Asteraceae	Herb	Seed
140	<i>Gmelina arboria</i> (Roxb.)	Verbenaceae	Tree	Seed
141	<i>Gossypium hirsutum</i> Linn.	Malvaceae	Herb	Seed
142	<i>Gymnema sylvestre</i> (Retz) R. Br.	Asclepiadaceae	Herb/ Climber	Stem cutting
143	<i>Hedychium coronarium</i> J. Koenig.	Zingiberaceae	Herb	Seed
144	<i>Hedyotis corymbosa</i> (L.) Lam.	Rubiaceae	Herb	Seed
145	<i>Helicterus isora</i> Linn.	Sterculiaceae	Tree	Seed/Stem cutting
146	<i>Hemidesmus indicus</i> (Linn.)R. Br.	Asclepiadaceae	Herb/Climber	Stem cutting
147	<i>Hibiscus cannabinus</i> Linn.	Malvaceae	Herb	Seed
148	<i>Hibiscus rosa- sinensis</i> Linn.	Malvaceae	Shrub	Stem cutting
149	<i>Hydrilla verticillata</i> (L. F.)Royle.	Hydrocharitaceae	Herb	Bud
150	<i>Hygrophylla spinosa</i> T.	Acanthaceae	Herb	Seed
151	<i>Hyophorbe lagenicaulis</i> (L. Bailey) H. E. Moore.	Palmae	Tree	Seed
152	<i>Hyptis suaveolens</i> (L.) Poit.	Lamiaceae	Herb	Seed
153	<i>Impatiens balsamina</i> Linn.	Balsaminaceae	Herb	Seed
154	<i>Ipomoea aquitica</i> Forssk.	Convolvulaceae	Herb	Seed/Stem cutting
155	<i>Ipomoea fistulosa</i> Mart.	Convolvulaceae	Herb	Seed/Stem cutting

Table 1. Continued.

156	<i>Ixora coccinea</i> Linn.	Rubiaceae	Herb	Stem cutting
157	<i>Jasminum sambac</i> (L.) Aiton.	Oleaceae	Herb	Stem cutting
158	<i>Jatropha curcus</i> Linn.	Euphorbiaceae	Shrub	Seed/Stem cutting
159	<i>Jatropha gossypifolia</i> Linn.	Euphorbiaceae	Herb	Seed/Stem cutting
160	<i>Kalanchoe pinnata</i> (Lam.) Pers.	Crassulaceae	Herb	Leaf
161	<i>Lagestroemia indica</i> (L.) Pers.	Lythraceae	Tree	Seed
162	<i>Lantana camara</i> Linn.	Verbenaceae	Shrub	Seed
163	<i>Lawsonia inermis</i> Linn.	Lythraceae	Shrub	Seed
164	<i>Lemna minor</i> Linn.	Lemnaceae	Herb	Bud
165	<i>Leucas aspera</i> Willd.	Lamiaceae	Herb	Seed
166	<i>Leucena lucocephala</i> (Lam.) de Wit.	Fabaceae	Tree	Seed
167	<i>Linum usitatissimum</i> Linn.	Liniaceae	Herb	Seed
168	<i>Madhuca indica</i> Gmel.	Sapotaceae	Tree	Seed
169	<i>Mangifera indica</i> Linn.	Anacardiaceae	Tree	Seed
170	<i>Marsilea quadrifolia</i> Linn.	Marsileaceae	Herb	Seed/Stem cutting
171	<i>Martynia annua</i> Linn.	Martyniaceae	Shrub	Seed
172	<i>Mentha piperata</i> Linn.	Lamiaceae	Herb	Seed
173	<i>Mentha arvensis</i> Linn.	Lamiaceae	Herb	Seed
174	<i>Mimosa pudica</i> Linn.	Fabaceae	Herb	Seed
175	<i>Mirabilis jalapa</i> Linn.	Nyctaginaceae	Herb	Seed/Tuber
176	<i>Mitragyna parvifolia</i> (Roxb) Korth.	Rubiaceae	Tree	Seed
177	<i>Momordica charantia</i> Descourt.	Cucurbitaceae	Herb/Climber	Seed
178	<i>Moras alba</i> Linn.	Moraceae	Tree	Seed/Stem cutting
179	<i>Moringa oleifera</i> Lamk.	Moringaceae	Tree	Seed
180	<i>Mucuna pruriens</i> (L.) DC.	Fabaceae	Herb/Climber	Seed
181	<i>Muehlenbeckia platyclada</i> ( F. Muell.) Meisn.	Polygonaceae	Herb	Seed
182	<i>Murraya koenigii</i> Spreng.	Rutaceae	Tree	Seed
183	<i>Murraya paniculata</i> (L.) Jack.	Rutaceae	Tree	Seed
184	<i>Musa paradiscia</i> Linn.	Araceae	Herb	Seed
185	<i>Nerium indicum</i> F. Le. Makino.	Apocynaceae	Herb	Seed/Stem cutting
186	<i>Nyctanthes arbour-tristis</i> Linn.	Oleaceae	Shrub	Seed/Stem cutting
187	<i>Nymphoea nouchali</i> Burm. F.	Nymphaeaceae	Herb	Rhizome
188	<i>Ocimum basilicum</i> Linn.	Lamiaceae	Herb	Seed
189	<i>Ocimum canum</i> Sims.	Lamiaceae	Herb	Seed
190	<i>Ocimum gratissimum</i> Linn.	Lamiaceae	Herb	Seed
191	<i>Ocimum sanctum</i> Linn.	Lamiaceae	Herb	Seed
192	<i>Opuntia stricta</i> Haw.	Cactaceae	Shrub	Stem cutting
193	<i>Opuntia elatior</i> Mill.	Cactaceae	Herb	Stem cutting
194	<i>Oryza sativa</i> Linn.	Poaceae	Herb	Seed
195	<i>Oxalia reticulata</i> Linn.	Oxalidaceae	Herb	Seed
196	<i>Oxalis corniculata</i> Linn.	Oxalidaceae	Herb	Seed
197	<i>Parthenium hysterophorus</i> Linn.	Asteraceae	Herb	Seed
198	<i>Passiflora foetida</i> Linn.	Passifloraceae	Herb/Climber	Stem cutting
200	<i>Peltaforum pterocarpum</i> (D.C.) K. Heyne.	Fabaceae	Tree	Seed
201	<i>Pergularia daemia</i> Forsk.	Asclepiadaceae	Herb	Seed
202	<i>Phyllanthus amarus</i> Linn.	Euphorbiaceae	Herb	Seed
203	<i>Phyllanthus niruri</i> Linn.	Euphorbiaceae	Herb	Seed
204	<i>Physalis minima</i> Linn.	Solanaceae	Herb	Seed
205	<i>Piper betel</i> Linn.	Piperaceae	Herb/Climber	Stem cutting
206	<i>Piper longam</i> Linn.	Piperaceae	Herb	Stem cutting
207	<i>Pistia stratiotes</i> Linn.	Araceae	Herb	Bud
208	<i>Pithecellobium dulce</i> (Roxb.) Benth.	Fabaceae	Tree	Seed

Table 1. Continued.

209	<i>Plumbago zeylanica</i> Linn.	Plumbaginaceae	Herb	Seed/Stem cutting
210	<i>Plumeria rubra</i> Linn.	Apocynaceae	Tree	Stem cutting
211	<i>Polianthes tuberosa</i> Linn.	Agavaceae	Herb	Seed
212	<i>Polyalthia longiflora</i> Sonn.	Annonaceae	Herb	Seed
213	<i>Polygonum barbetum</i> Linn.	Polygonaceae	Herb	Seed
214	<i>Pongamia pinnata</i> (L.) Merr.	Fabaceae	Tree	Seed
215	<i>Populus deltoids</i> Bartr.	Salicaceae	Tree	Seed
216	<i>Portulaca oleracea</i> Linn.	Portulacaceae	Herb	Stem cutting
217	<i>Prunus amygdalus</i> Batsch.	Rosaceae	Tree	Seed
218	<i>Psidium guajava</i> Linn.	Myrtaceae	Tree	Seed
219	<i>Psium sativum</i> Linn.	Fabaceae	Herb	Seed
220	<i>Pteridium aquilinum</i> (L.) Kuhn.	Dennstaedtiaceae	Herb	Bud
221	<i>Pterocarpus santalinus</i> L.F.	Fabaceae	Tree	Seed
222	<i>Punica granatum</i> Linn.	Punicaceae	Tree	Seed
223	<i>Quisqualis indica</i> Linn.	Combretaceae	Herb/Climber	Stem cutting
224	<i>Rauvolfia tetraphylla</i> Linn.	Apocynaceae	Herb	Seed
225	<i>Rauvolfia serpentina</i> Benth.ex Kurz.	Apocynaceae	Herb	Seed
226	<i>Riccia fluitans</i> Linn.	Ricciaceae	Herb	Bud
227	<i>Ricinus communis</i> Linn.	Euphorbiaceae	Herb	Seed
228	<i>Rosa indica</i> Linn.	Rosaceae	Shrub	Stem cutting
229	<i>Salicornia virginica</i> Fern & Brack.	Amaranthaceae	Herb	Seed
230	<i>Sansevieria roxburghiana</i> Schult. & Schult. F.	Agavaceae	Herb	Rhizome
231	<i>Scoparia dulcis</i> Linn.	Scrophulariaceae	Herb	Seed
232	<i>Sensiveria cylindrical</i> Bojer.	Agavaceae	Herb	Rhizome
233	<i>Sensiveria trifaciata</i> Prain.	Agavaceae	Herb	Rhizome
234	<i>Sesamum indicum</i> Linn.	Pedaliaceae	Herb	Seed
235	<i>Sesbania sesban</i> (Jacq) W. Wight.	Fabaceae	Herb	Seed
236	<i>Sida cordifolia</i> Linn.	Malvaceae	Herb	Seed
237	<i>Sida acuta</i> Burm. F.	Malvaceae	Herb	Seed
238	<i>Solanum indicum</i> Linn.	Solanaceae	Herb	Seed
239	<i>Solanum nigrum</i> Linn.	Solanaceae	Herb	Seed
240	<i>Solanum xanthocarpum</i> Linn.	Solanaceae	Herb	Seed
241	<i>Sonchus asper</i> Linn.	Asteraceae	Herb	Seed
242	<i>Sphaeranthus indicus</i> Linn.	Asteraceae	Herb	Seed
243	<i>Stevia rebaudiana</i> (Bert.) Bertoni.	Asteraceae	Herb	Stem cutting
244	<i>Syzygium cumini</i> (L.) Skeels.	Myrtaceae	Tree	Seed
245	<i>Tabernimontana coronaria</i> Br.	Apocynaceae	Shrub	Stem cutting
246	<i>Tabernimontana diverticata</i> (L.) R. Br. ex Roem & Schutt.	Apocynaceae	Shrub	Stem cutting
247	<i>Tagetes erecta</i> Linn.	Asteraceae	Herb	Seed
248	<i>Tagetes paluta</i> Linn.	Asteraceae	Herb	Seed
249	<i>Tamarindus indica</i> Linn.	Fabaceae	Tree	Seed
250	<i>Tectona grandis</i> Linn.	Verbenaceae	Tree	Seed
251	<i>Tephrosia purpurea</i> (L.) Pers.	Fabaceae	Herb	Seed
252	<i>Terminalia arjuna</i> Roxb.	Combretaceae	Tree	Seed
253	<i>Thuja occidentalis</i> Linn.	Cupressaceae	Herb	Stem cutting
254	<i>Tinospora cordifolia</i> (Willd.) Miers.	Menispermaceae	Herb	Stem cutting
255	<i>Tradeschantia fluminensis</i> Vell.	Commelinaceae	Herb	Bud
256	<i>Tradischantia pallida</i> (Rose D. R.) Hunt.	Commelinaceae	Herb	Bud
257	<i>Tradischantia spathacea</i> Swartz	Commelinaceae	Herb	Bud
258	<i>Trapa bispinosa</i> Roxb.	Trapaceae	Herb	Stem cutting
259	<i>Tridax procumbens</i> Linn.	Asteraceae	Herb	Seed
260	<i>Triticum aestivum</i> Linn.	Poaceae	Herb	Seed



Table 1. Continued.

261	<i>Typha angustifolia</i> Linn.	Typhaceae	Herb	Seed
262	<i>Urena lobata</i> Linn.	Malvaceae	Shrub	Seed
263	<i>Urtica parviflora</i> Roxb.	Urticaceae	Herb	Seed
264	<i>Utricularia bifida</i> Linn.	Utriculariaceae	Herb	Seed
265	<i>Vallisneria spiralis</i> Linn.	Hydrocharitaceae	Herb	Bud
266	<i>Vanda tessellate</i> (Roxb.)	Orchidaceae	Herb/Climber	Seed/Stem cutting
267	<i>Vitex negundo</i> Linn.	Verbenaceae	Shrub	Seed/Stem cutting
268	<i>Vitis vinifera</i> Linn.	Vitaceae	Herb/Climber	Stem cutting
269	<i>Withania somnifera</i> Dunal.	Solanaceae	Herb	Seed
270	<i>Xanthium strumarium</i> Linn.	Asteraceae	Herb	Seed
271	<i>Zea mays</i> Linn.	Poaceae	Herb	Seed
272	<i>Zinziber officinale</i> Rose.	Zingiberaceae	Herb	Rhizome
273	<i>Ziziphus jujuba</i> Miller.	Rhamnaceae	Tree	Seed
274	<i>Ziziphus mauritiana</i> Lam.	Rhamnaceae	Tree	Seed

Table 2. Plant species distribution according to their families.

S/N	Family	Number of species
1	Acanthaceae	4
2	Agavaceae	7
3	Amaranthaceae	9
4	Anacardiaceae	2
5	Annonaceae	3
6	Apiaceae	2
7	Apocynaceae	10
8	Araceae	7
9	Araucariaceae	1
10	Asclepiadaceae	5
11	Asteraceae	18
12	Balsaminaceae	1
13	Basellaceae	1
14	Bixaceae	1
15	Bombacaceae	2
16	Bromeliaceae	1
17	Cactaceae	2
18	Cannaceae	1
19	Caracaceae	1
20	Ceratophyllaceae	1
21	Chenopodiaceae	1
22	Cleomaceae	1
23	Combretaceae	2
24	Commelinaceae	3
25	Convolvulaceae	6
26	Crassulaceae	1
27	Cruciferae	1
28	Cucurbitaceae	3
29	Cupressaceae	1
30	Cyperceae	2
31	Dennstaedtiaceae	1
32	Dioscoriaceae	1

Table 2. Continued.

33	Euphorbiaceae	12
34	Fabaceae	36
35	Funariaceae	1
36	Hydrocharitaceae	2
37	Hypoxidaceae	1
38	Lamiaceae	11
39	Lemnaceae	1
40	Liliaceae	6
41	Linaceae	1
42	Lythraceae	2
43	Malvaceae	7
44	Marsiliaceae	1
45	Martyniaceae	1
46	Meliaceae	1
47	Menispermaceae	1
48	Moraceae	6
49	Moringaceae	1
50	Myrtaceae	4
51	Nyctaginaceae	3
52	Nymphaceae	1
53	Oleaceae	2
54	Orchidaceae	1
55	Oxalidaceae	3
56	Palmae	2
57	Papaveraceae	1
58	Passifloraceae	1
59	Pedaliaceae	1
60	Piperaceae	2
61	Plumbaginaceae	1
62	Poaceae	9
63	Polygonaceae	3
64	Portulacaceae	1
65	Punicaceae	1
66	Rhamnaceae	2
67	Ricciaceae	1
68	Rosaceae	2
69	Rubiaceae	4
70	Rutaceae	4
71	Salicaceae	1
72	Salviniaceae	1
73	Sapotaceae	1
74	Scrophulariaceae	2
75	Simaroubaceae	1
76	Solanaceae	10
77	Sterculiaceae	1
78	Trapaceae	1
79	Typhaceae	1
80	Utricaceae	1
81	Utriculariaceae	1
82	Verbenaceae	6
83	Vitaceae	2
84	Zingiberaceae	6

**Table 3.** Distribution of plants as per their habit.

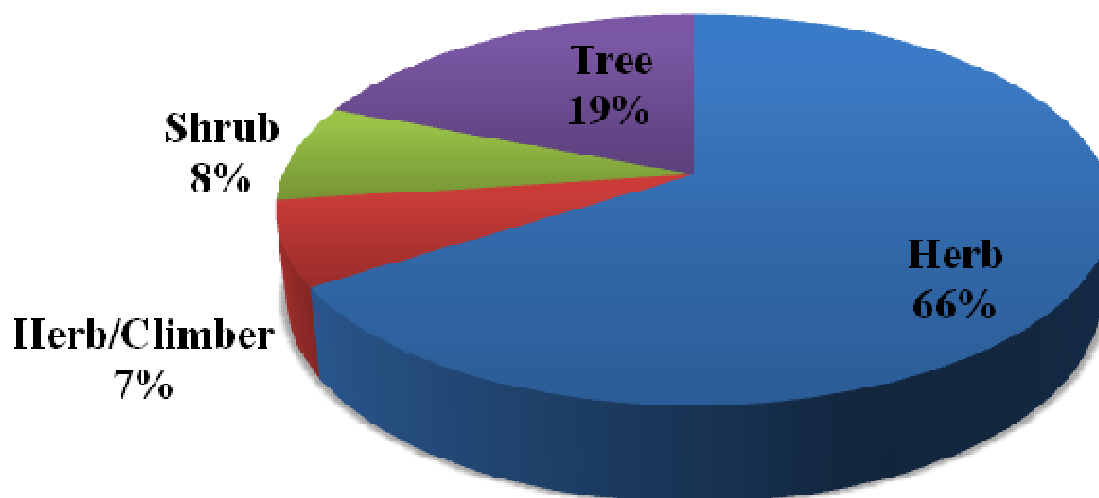
S/N	Habit	Number of plant species	Distribution (%)
1	Herb	180	65.93
2	Herb/Climber	19	6.96
3	Shrub	22	8.06
4	Tree	52	19.05
5	Total	273	100.00

**Table 4.** Range of distributed plant species with their family.

S/N	Plant species number range	Number of belonging family
1	0 - 5	69
2	6 - 10	11
3	11 - 15	02
4	16 - 20	01
5	20 - 40	01
	Total family	84

**Table 5.** Propagation methods of different plants.

S/N	Method	Number of plant species	Percentage
1	Seed	184	67.40
2	Seed/Stem cutting	016	05.86
3	Stem cutting	032	11.72
4	Seed/Tuber	002	0.73
5	Rhizome	013	4.76
6	Corm	002	0.73
7	Bulb	008	2.93
8	Leaf	001	0.38
9	Bud	013	4.76
10	Tuber	002	0.73
	Total	273	100.00

**Figure 2.** Habit of plants in percentage.

of the research.

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