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Enumeration of Angiosperm Plants in Sir M.V. Government Science College Campus Bhadravathi, Karnataka

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Abstract

The present study is conducted to document the plants present in the Sir. M. V. Government Science College campus located in Bommanakatte, Bhadravathi. In this study we recorded a total of 233 species of angiosperm plant community of 201 genera belonging to 70 families. Dicotyldedons form the major plant community in the college campus represented by 196 species of 164 genera comes under 56 families. A total of 14 families of monocot were identified with 37 genera and 37 species. 16 families of dicotyledons were dominated with more than 4 species. Liliaceae and poaceae of monocotyledons dominated with 4 and 14 species. Floristic composition is dominated by herbs (42%) followed by shrubs (27%), trees (22%) and climbers (9%). The most dominated families are Acanthaceae (12 genera, 14 species), Asteraceae (12 genera, 12 species) of dicots and Poaceae (14 genera, 14 species), Liliaceae (4 Genera, 4 species) of Monocot were identified. Present study could be useful in conserving the existing the plants since many plants are used as medicine.

Keywords: Angiosperms, College, Dicotyleodons, Acantahceae, Monocotyledons, Poaceae.

Introduction

The plant kingdom plays an important role in the life of humans and animals. They form the basis for the biological food web and perform a number of environmental services. Plants have played an integral part in the evolution of human cultures, their physical and chemical properties providing not only an invaluable source of food, but also a whole range of material benefits in the form of shelter, clothing and medicine, thus remaining fundamental to their physical, spiritual and social well-being. Angiosperms or the flowering plants are the largest and most diversified group in the plant world. They have tremendous evolutionary plasticity and have become adapted to the most diverse environmental conditions and also exists in very diverse mode of life from green photosynthetic plants to saprophytes, epiphytes and parasites (Singh et.al., 2014). These diverse group of land plants are distributed in 64 orders, 416 families, approximately 13,000 known genera and 300,000 known species (Christenhusz and Byng, 2016).

The Indian biodiversity is very rich with 7% of world's flora and has been included as one of the 12 mega diversity centers. The varied eco-climatic conditions coupled with unique geological and cultural features have contributed to an amazing diversity of habitats, which harbor and sustain immense biological diversity at all levels (Agrawal, 2000). Human beings concentrated on cultivation of many plants useful to him. The cultivation practices fulfilled needs of mankind as food, medicine, fodder for domestic animals, clothing, shelter etc., these plants are categorized under cultivating plants. Many species grow naturally in open area are termed as weeds. These species which grow on their own, without human efforts and are in general harmful to the crops and can dominate the vegetation if not cared for (Thirumala and Kiran, 2017). Many weeds are categorized under different groups of economic botany after the exploitation and estimation of active compounds. Floristic study of an area provides the data on existing wealth of plant community and also understand the economic and ecological status of an ecosystem. Most of the weeds are recognized as medicinal plants used in different system of medicine like Ayurveda, siddha, unani, and in many traditional healing systems. The present work was aimed to document the plants growing naturally around the college campus and also few cultivated plant exists in

botanical garden, which also helpful to understand the economic wealth of the flora.

Materials and Methods

Study Area

Bhadravathi is an industrial city or Steel town and taluk of Shivamogga district. Geographically, Bhadravathi taluk lies in the central parts of the Karnataka state, in the south-east corner of the Shivamogga district. The latitude and longitude coordinates of Bhadravathi town are 13° 50' N and 75° 42'E (Fig.1). The city is at an altitude of 597 metres (1,959 ft) above sea level. Bhadravathi lies between Western Ghats (Malnad) and AreMalenad region. (Tourism. Bhadravati city Municipal Council. Retrieved 2010-08-01.; Google. "Bhadravati" (Map). Google Maps.).



Fig.1: Map Showing the study area.

College campus

Sir. M. Visveshwaraya Government Science College was started in 1968 in the name of Sir. M. Vishveshvaraya, Dewan of Mysore state and well known engineer of India. In 1984 the College was shifted to the existing campus located at Bommanakatte area of Bhadravathi city. The college is offering B.Sc, B.C.A., and M. Sc., Chemsitry courses affiliated to Kuvempu University, Shankaraghatta, Shivamogga. The college is located at latitude 13°42' N and longitude 75°38'20" E. The College encompasses a well maintained lush green campus spread over 10.22 acres of land ensuring adequate availability and optimal utilization of physical infrastructure for teaching learning activities.

Collection of Data

The present investigation was conducted by repeated field visits during August 2016 to July 2017. Field visits were conducted at an interval of fortnight to explore the plant species appeared in different season. A regular survey was conducted to identify the specimens at different time intervals of flowering and fruiting stages. Identification of plant species were carried out by using the existing floras like flora of Shimoga district, flora of Udupi district and flora of the presidency of Madras (Ramaswamy et. Al., 2001; Gopalakrishna Bhat. 2003; Gamble, 1967) and also confirmation was carried out by comparing the specimens with available data in the digital flora of Karnataka (India flora online). The college campus was divided into many quadrats, the floristic composition of each quadrat was documented. Based on the habit, the plants were categorized into herbs, shrubs, climbers and trees.

Results and Discussion

Present study explores diversified group of plants which were used as medicine, ornamentals, timber, dye, fodder, edibles and others. Floristic analysis of Sir. M. V. Government Science College shows the dominance of herbs (42%) followed by shrubs (27%), trees (22%) and climbers (9%) (Fig. 2). In the current enumeration 70 families were identified, the families were listed according to Bentham and Hooker system of classification and results were tabulated in Table.1. Out of 70 families, 56 are dicot families and monocots are represented in 14 families. (Fig. 3).

The current investigation recorded dicots as dominant plant community of the college campus with 164 genera under 56 families (Fig.4) followed by monocot species with 37 genera under 14 families (Fig. 5). Among 56 families of dicots 16 families are comprising more than 04 genera, Acanthaceae and Asteraceae stands first with 12 genera, followed by Verbenaceae 8 genera, Papilionoideae, Rubiaceae, Lamiaceae and Euphorbiaceae with 7 genera, Malvaceae, Caesalpinoideae, Asclepiadeaceae and Amaranthaceae with 6 genera, Solanaceae and Scrophulariaceae with 5 genera, Mimosoideae, Apocyanaceae and Bignoniaceae with 4 genera. Poaceae with 14 genera and Liliaceae with 4 Genera are the dominant families of monocots, remaining families of monocots and dicots are represented by single or 2 or 3 genera.



Fig.2: Percentage wise distribution of plant groups based on habit.



Fig.3: Map Showing the Number of Identified families

Table. 1: List of plant species with family and habit

Sl. No.	Botanical Name	Family	Habit	No. of Genera	No. of Species
1.	Michalia champaka	Magnoliaceae	Tree	1	01
2.	Annona reticulata		Tree		
3.	Annona squamosa	Annonaceae	Tree	2	03
4.	Polyalthia longifolia		Tree		
5.	Cyclea peltata	Maria	Climber	2	02
6.	Tinospora cordifolia	Menispermaceae	Climber	Z	02
7.	Carica papaya	Caricaceae	Tree	1	01
8.	Brassica juncea	Brassicaceae	Herb	1	01
9.	Cleome viscosa	Companida accas	Herb	C	02
10.	Gyanandropsis pentaphylla	Capparidaceae	Shrub	L Z	02
11.	Papaver somnifrum	Papaveraceae	Herb	1	01
12.	Ionodium suffruticosum	Violaceae	Herb	1	01
13.	Portulaca oleracea	Portulacaceae	Herb	1	01
14.	Abutilon indicum		Shrub	6	07
15.	Hibiscus rosa-sinensis		Shrub		
16.	Malvastrum coromandalianum	Malanaaa	Herb		
17.	Sida rhombifolia	Maivaceae	Herb		00
18.	Pavonia zeylanica		Herb		
19.	Thespesia populnea		Tree		
20.	Waltheria indica	Sterculiaceae	Herb	1	01
21.	Triumfetta rhomboidea	Tiliaceae	Shrub	1	01
22.	Muntingia calabura	Elaeocarpaceae	Tree	1	01
23.	Biophytum sensitivum		Herb		
24.	Oxalis corniculata	Oxalidaceae	Herb	2	03
25.	Oxalis latifolia		Herb		
26.	Impatiens balsamina	Balsaminaceae	Herb	1	01
27.	Toddalia asiatica	Dutaccac	Shrub	n	02
28.	Murraya koenigii	Kutaceae	Tree	2	02
29.	Azadiracta indica	Maliaaaaa	Tree	2	02
30.	Swietenia mahogany	Menaceae	Tree	2	02
31.	Zyziphus mauratiana	Rhamnaceae	Tree	1	01
32.	Vitis quadrangularis	Vitaceae	Climber	1	01
33.	Mangifera indica	Anacardiaceae	Tree	1	01
34.	Sapindus mukorossi	Sanindagaaa	Tree		02
35.	Cardiospermum helicacabum	Sapindaceae	Climber	۷.	02

36.	Alysicarpus longifolius		Herb	7	
37.	Butea frondosa		Tree		
38.	Clitoria ternacea		Climber		
39.	Crotolaria verrucosa		Shrub		09
40.	Crotolaria juncea	Papilionatae	Shrub		
41.	Crotolaria retusa		Herb		
42.	Dalbergia latifolia		Tree		
43.	Indigofera tinctoria		Shrub		
44.	Pongamia pinnata		Tree		
45.	Bauhinia variegata		Tree		
46.	Bauhinia tomentosa		Tree		
47.	Cassia fistula		Tree		
48.	Cassia sophera		Shrub	- 6	10
49.	Cassia auriculata		Shrub		
50.	Cassia obtusifolia	Caesalpinoideae	Shrub		
51.	Caesalpinia pulcherrima		Tree		
52.	Chamaecrista momosoides		Herb		
53.	Delonix regia		Tree		
54.	Tamarindus indica		Tree		
55.	Leucaena leucocephala		Tree		
56.	Acacia auriculiformis		Tree	4	05
57.	Acacia arabica	Mimosoideae	Herb		
58.	Enterolobium saman		Tree		
59.	Mimosa pudica		Tree		
60.	Terminalia arjuna		Tree	1	02
61.	Terminalia catapa	Combretaceae	Tree		02
62.	Syzygium cuminii		Tree		
63.	Eucalyptus lanceolatus	Myrtaceae	Tree	3	03
64.	Psidium guajava		Tree		
65.	Coccinea indica		Climber		
66.	Bryonopsis laciniosa	Cucurbitaceae	Climber	3	03
67.	Mukia maderaspatana		Climber		
68.	Opuntia spp.	Cactaceae	Shrub	1	01
69.	Trianthema portulacastrum	Aizoaceae	Herb	1	01
70.	Centella asiatica	Apiaceae	Herb	1	01

71.	Canthium parviflora		Shrub	7	
72.	Ixora coccinea		Shrub		
73.	Mussaenda erythrophylla		Shrub		07
74.	Hedyotis corymbosa	Rubiaceae	Herb		
75.	Mitracarpus hirtus		Herb		
76.	Spermacoce hispida		Herb		
77.	Coffea arabica		Shrub		
78.	Ageratum conyziodes		Herb		
79.	Bidens pilosa		Herb		
80.	Blumea mollis		Herb		
81.	Crassocephalum crepidioides		Herb		
82.	Emilia sonchifolia		Herb		
83.	Eupatorium odoratum	A	Shrub	10	10
84.	Parthenium hysterophorus	Asteraceae	Herb	12	12
85.	Synedrella nodiflora		Herb		
86.	Tithonia diversiflolia		Shrub		
87.	Tridax procumbens		Herb		
88.	Vernonia cinerea		Herb		
89.	Wedelia trilobata		Herb		
90.	Allamanda cathartica		Shrub	4	
91.	Vinca rosea	Δηρογρηφορο	Shrub		04
92.	Holarrhena pubescens	Apocyanaceae	Tree		
93.	Thevetia peruviana		Tree		
94.	Asclepias curassavica		Herb	6	
95.	Calotropis gigantea		Shrub		07
96.	Calotropis procera		Shrub		
97.	Hemidesmus indicus	Asclepiadaceae	Climber		
98.	Pergularia daemia		Climber		
99.	Tylophora indica		Climber		
100.	Gymnema sylvestre		Climber		
101.	Heliotropium indicum	Boraginaceae	Shrub	2	02
102.	Trichodesma indicum	Doraginaceae	Shrub		
103.	Argyreia nervosa		Climber		
104.	Evolvulus alsinoides		Herb		
105.	Evolvulus nummularius		Herb		
106.	Ipomoea hederifolia		Climber		
107.	Ipomoea quamoclit	Convolvulaceae	Climber	2	10
108.	Ipomoea carnea	Convolvulaceae	Shrub	5	10
109.	Ipomoea campanulata		Climber		
110.	Ipomoea obscura		Climber		
111.	Ipomoea nil		Climber		
112.	Ipomoea triloba		Climber		

113.	Datura metel		Shrub		
114.	Withania somnifera		Shrub	5	07
115.	Solanum xanthocarpum		Shrub		
116.	Solanum torvum	Solanaceae	Shrub		
117.	Solanum nigrum		Shrub		
118.	Physalis peruviana		Shrub		
119.	Lycopersicon esculentum		Shrub		
120.	Bacopa monnieri		Herb		
121.	Lindernia ciliata		Herb		
122.	Russelia equisetiformis	Scrophulariaceae	Shrub	5	05
123.	Scoparia dulcis		Herb		
124.	Striga lutea		Herb		
125.	Jacaranda mimosifolia		Tree		
126.	Spathodea campanulata	D	Tree	4	0.4
127.	Markhamia platycalyx	Bignoniaceae	Tree	- 4	04
128.	Millingtonia hortensis		Tree		
129.	Martynia annua	Pedaliaceae	Shrub	1	01
130.	Andrographis paniculata		Shrub	12	14
131.	Adhatoda vasica		Shrub		
132.	Asystasia gangetica		Herb		
133.	Asterocantha longifolia		Shrub		
134.	Barleria buxifolia		Shrub		
135.	Barleria cristata		Shrub		
136.	Blepharis maderaspatensis	A 1	Herb		
137.	Ecbolium ligustrinum	Acanthaceae	Herb		14
138.	Justicia simplex		Herb		
139.	Peristrophe bicalyculata		Shrub		
140.	Ruellia tuberosa		Herb		
141.	Ruellia prostrata		Herb		
142.	Rungia pectinata		Herb		
143.	Thunbergia alata		Climber		
144.	Clerodendrum inerme		Shrub		
145.	Duranta erecta		Shrub	- 8	
146.	Gmelina arborea		Tree		
147.	Lantana camara	-	Shrub		00
148.	Lippia nodiflora	Verbenaceae	Herb		08
149.	Phryma leptostachya	1	Herb		
150.	Stachytarpheta indica		Shrub		
151.	Tectona grandis]	Tree		

152.	Coleus aromaticus		Herb		
153.	Hyptis suaveolens		Shrub		
154.	Leonotis nepetifolia		Shrub		
155.	Leucas aspera		Herb		
156.	Ocimum grattissimum	Lamiaceae	Shrub	7	09
157.	Ocimum sanctum		Shrub		
158.	Ocimum americanum		Herb		
159.	Plectranthus mollis		Shrub		
160.	Salvia coccinea		Herb		
161.	Boerhaavia diffusa		Herb		0.2
162.	Mirabilis jalapa	Nyctaginaceae	Shrub	2	02
163.	Achyranthes aspera		Shrub		
164.	Alternanthera sessilis		Shrub		
165.	Amaranthus spinosus		Shrub		
166.	Amaranthus viridis	Amaranthaceae	Shrub	6	07
167.	Aerva lanata		Herb		
168.	Cyathula prostrata		Herb	-	
169.	Gomphrena globosa		Herb		
170.	Aristolochia indica	Aristolochiaceae	Climber	1	01
171.	Peporomia pellucida	Piperaceae	Herb	1	01
172.	Myristica sp.	Myristicaceae	Tree	1	01
173.	Cinnamomum sp.	Lauraceae	Tree	1	01
174.	Grevellia robusta	Proteaceae	Tree	1	01
175.	Dendrophthoe falcata	T d	Shrub	2	02
176.	Viscum album	Loranthaceae	Shrub	2	02
177.	Santalum album	Santalaceae	Tree	1	01
178.	Acalypha indica		Shrub		
179.	Croton sparsiflorus		Shrub	-	
180.	Euphorbia heterophylla (E. geniculata)		Herb		
181.	Euphorbia hirta		Herb		
182.	Euphorbia nerifolia		Herb		
183.	Euphorbia thymifolia		Herb	-	
184.	Euphorbia milli	Euphorbiaceae	Herb	7	13
185.	Euphorbia tirucalli		Shrub		
186.	Jatropha curcas		Shrub	-	
187.	Mallotus philippensis		Tree		
188.	Phyllanthus amarus (P. niruri)		Herb		
189.	Phyllanthus reticulatus (Kirganelia reticulata)		Shrub		
190.	Ricinus communis		Tree		

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191.	Ficus benghalensis		Tree	3	04
192.	Ficus glomerata		Tree		
193.	Artocarpus integrifolia	Moraceae	Tree		
194.	Morus alba	-	Tree		
195.	Laportea interrupta	Urticaceae	Shrub	1	01
196.	Casuarina equisetifolia	Casuarinaceae	Tree	1	01
197.	Vanda roxburghii	Orchidaceae	Herb	1	01
198.	Hedechium coronarium	Zingiberaceae	Herb	1	01
199.	Canna indica	Cannaceae	Herb	1	01
200.	Crinum asiaticum	Amaryllidaceae	Herb	1	01
201.	Curculigo orchioides	Hypoxidaceae	Herb	1	01
202.	Dracaena sp.	Agavaceae	Herb	2	0.2
203.	Sansevieria sp		Herb	2	02
204.	Dioscorea sp.	Dioscoreaceae	Herb	1	01
205.	Aloe vera		Herb		
206.	Asparagus racemosus	T '1'	Herb	4	0.4
207.	Ruscus sp.	Liliaceae	Herb	- 4	04
208.	Yucca sp.		Herb		
209.	Commelina benghalensis	C 1'	Herb	2	02
210.	Tradescantia spathacea	Commelinaceae	Herb		02
211.	Areca catechu		Tree	3	
212.	Cocos nucifera	Arecaceae	Tree		03
213.	Borassus flabellifer		Tree		
214.	Colocasia esculenta		Herb		
215.	Caladium bicolor	Araceae	Herb	3	03
216.	Dieffenbachia sp.		Herb		
217.	Eriocaulon sp.	Eriocaulaceae	Herb	1	01
218.	Bulbostylis barbata	Crimento a casa	Herb	2	02
219.	Cyperus rotundus	Cyperaceae	Herb	Z	02
220.	Alloteropsis cimicina		Herb		
221.	Arundinella pumila		Herb		
222.	Bothriochloa sp.		Herb		
223.	Brachiaria ramosa		Herb		
224.	Chloris virgata		Herb		
225.	Cynodon dactylon		Herb		
226.	Dactyloctenium aegyptium	Daaaaaa	Herb	14	14
227.	Dichanthium annulatum	Poaceae	Herb	14	14
228.	Digitaria ciliaris		Herb		
229.	Dimeria ornithopoda		Herb		
230.	Echinochloa colona		Herb		
231.	Eleusine indica		Herb	1	
232.	Eragrostis tenella		Herb		
233.	Setaria pumila		Herb		





Fig.4: Total number of Dicot families with representing genera



Fig.5: Total number of Monocot families with representing genera

A total of 233 plant species forms the angiosperm flora of Sir. M. V. Government Science College (Table.1). Among 233 species, 196 species are dicots and 37 species are monocots. Major floristic composition is contributed by 15 families of dicots which include more than 5 species, out of these Acanthaceae stands first with 14 species of 12 genera, followed by Euphorbiaceae with 13 species of 7 genera, Asteraceae with 12 species of 12 genera,

Caesalpinoideae 10 species of 6 genera and Convolvulaceae 10 species of 3 genera, Papilionoideae and Lamiaceae with 9 species of 7 genera, Verbenaceae with 8 species of 8 genera, Rubiaceae with 7 species of 7 genera, Asclepiadaceae and Amaranthaceae with 7 species of 6 genera, Solanaceae with 7 species of 5 genera, Malvaceae with 6 species of 6 genera Scrophulariaceae with 5 species of 5 genera and Mimosoideae with 5 species of 4 genera.

In monocots, 14 species under 14 genera of Poaceae family recorded followed by 4 species of Liliaceae under 4 genera. Rest of the families are represented by less than 5 species.

The campus is spread in 10.22 acres of land and the buildup area present in 18679.4 sq. mtrs. The floristic survey was conducted in entire campus excluding buildup area. The vast area of campus enriched with undisturbed natural vegetation, only few ornamentals cultivated in an 40x40 botanical garden situated inside the building quadrangle. The natural vegetation of the campus offers various ecological service to the fauna and local people. It also serves as natural botanical garden to the botany student to experience the outdoor practical knowledge of various diversified group of plants. Most of the documented plants are naturally occurring weeds with medicinal value. Many of the weeds are found to be medicinally important (Gambhire and Biradar, 2016). In India weed plants are recognized for their medicinal values and being used in various traditional systems of medicines. Most of the medicinal weeds growing in this region remains undocumented, although, their use is locally in vogue (Tirumala and Kiran, 2017)

The present data confirmed the dominance of herbs and many species are weeds of medicinal importance, fruit yielding plants, dye yielding plants, timber plants and fodder plants as reported in the flora of a V.V.M Sri Pushpam College campus (Durairaj Rekha and Annamalai Paneerselvam, 2014), flora of Mahajana College PG campus (Renukarya et.al, 2015) and flora of Karnataka college campus (Agadi et.al., 2017) and also the reports recorded the dominance of families like Acanthaceae, Euphorbiaceae, Papilionoideae, Asteraceae, Asclepiadaceae, Solanaceae, Verbenaceae, Lamiaceae, Malvaceae, Amaranthaceae and Poaceae.

The present work attempted to document the flora and the type of vegetation in the college campus, the data base may be useful to future estimation and analytical studies of weeds since they are medicinally valuable. It also emphasis the college administration to conserve these genetic resources from the destruction of anthropogenic activities because these weeds are composition of various drugs in herbal medicine systems.

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