



Original Article

**Biodiversity of Medicinal Plants of Panjab University, Chandigarh,
India-A Review**

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Abstract

The Present survey reveals the occurrence of 364 taxa belonging to 282 genera and 92 families. Majority of these are from to family Fabaceae [38 species], followed by Asteraceae [32 species], Euphorbiaceae [18 species] and Moraceae [13 species], Malvaceae, Solanaceae and Verbenaceae [12 species each], Acanthaceae, Apocynaceae and Scrophulariaceae comprised of 10 species each whereas other families such as Acoraceae, Anacardiaceae, Campanulaceae, Fumariaceae, Papaveraceae, Phytolacaceae, Proteaceae etc. are represented by only one species. Majority of the species are herbs. Out of total 364 species, 349 are known to be used for medicinal purposes. Evidences suggested that the study area is rich in medicinal plant diversity which may be due to favourable ecological conditions and variable habitats. In this investigation, the richest floral diversity present in Panjab University Campus has been recorded.

Keywords: Medicinal plants, angiosperms, biodiversity

INTRODUCTION

India is one of the twelve mega-biodiversity countries in the world, which has very rich floral vegetation with variety of plants of high economic value including plants of medicinal importance [Patrick, 2002]. Nature has blessed India with a wealth of medicinal plants, thus being designated as “Medicinal Garden of the World” [Kalia, 2005]. Since ancient times human health was taken care through traditional plant medicines [Hamayun et al, 2006; Balakrishnan et al, 2009]. Even today some communities in the Asian countries manufacture and sell medicinal plants/products for their basic needs [Mitalaya et al, 2003]. Indian floral diversity may be due to variety of habitats and variable environmental and geographical conditions [Chattopadhyay et al, 2004]. Areas rich in vegetation with significant diversity provide raw material for traditional medicines as well as for pharmaceutical companies [Myers et al, 2000]. A large number of plant species is being used as traditional/folk medicines in different parts of the world [Manandhar, 1998; Bussmann and Sharon, 2006; Saad et al, 2006; Yineger and Yewhalaw, 2007; Yusuf et al, 2007]. The study area “Panjab

University Campus” is located at Chandigarh. The campus has many flourishing gardens viz., P. N. Mehra Botanical Garden, Prof. R. C. Paul Rose Garden, Trifla Garden, Palm Garden, Medicinal Plant Garden, Prof. G. P. Sharma Herbal Park, Meadow Garden etc. Besides these gardens, various types of herbs, shrubs and trees find their place along roadsides, play grounds and green spaces in the campus. Majority of the plant species growing in the investigated site have contributed greatly to make this campus pollution free. This has also helped to make this particular area rich in biodiversity. Existing flora is of great economic importance. Some species are of very high medicinal value. Keeping in view the richness of floral diversity in this particular area of Chandigarh i. e. Panjab University Campus, the present study was planned to explore the availability of various plant species and their use in traditional / folk / medicinal remedies. This study was mainly focused on the identification of the existing plant species and their photography. Medicinal value for these plant species has been consulted from the available literature.

MATERIAL & METHODS

Present survey was conducted in the Panjab University Campus, Chandigarh, India between January to April, 2010. This campus covers areas in Sector 14 and 25 of Chandigarh. Study material consists of plant species growing in their natural habitats like grounds, roadsides, parks, open land, cultivated in gardens or even in home gardens. Plant specimens were collected [depending upon their availability] from the area under investigation. These specimens were identified and photographed. Maximum plants have been photographed in their natural habitat whereas others in the laboratory conditions. Their medicinal value has been extracted from the literature available. All species have been designated to their corresponding families. Further analysis has been made to determine whether a disease is cured by using a single plant species or a multiple number of species are required. Plant species were also differentiated on the basis of their habit. During the survey, main emphasis was laid on the wild species, but some common cultivated species have also been included in the investigation. Only those plant species which were available during January to April have been included in this investigation. In the present investigation, occurrence of 364 plant species has been listed.

RESULTS & DISCUSSION

A total of 364 plant species have been identified and photographed during this investigation. On the basis of the available literature, these plant species are indicated as of high medicinal importance. They fall into 282 genera and 92 families [Fig. 1]. The best represented families are Fabaceae [38 species], Asteraceae [32 species], Euphorbiaceae [18 species], Moraceae and Lamiaceae [13 species each] followed by Malvaceae, Solanaceae, and Verbenaceae [12 species each, Table 1]. Forty four families are represented by only single species each. Muthu et al. [2006] worked on medicinal plants at Kancheepuram District of Tamil Nadu, India and found Euphorbiaceae as the dominating family followed by Verbenaceae. Recently Reddy et al. [2009] while studying the traditional medicinal plants in Seshachalam hills in Andhra Pradesh, India, noticed that most of the plants used in the preparation of traditional medicines were from family Asclepiadaceae. This difference in dominance of various families at different places is because of inconsistent environmental and climatic conditions. Among 364 plant species that has been listed, there are

354 angiosperms, 8 gymnosperms and 2 pteridophytes [Fig. 2]. The majority [43.68%] of species are herbs followed by trees 26.62%, shrubs 24.72% and climbers 4.94% [Fig. 3]. Similar trend has also been observed from Tamil Nadu during investigation on medicinal plants used by traditional healers [Muthu et al., 2006].

Plant as a whole or a specific plant part[s] have been used in the preparation of various medicinal formulations. It varies from species to species. From the collected data it has been estimated that leaves of 27.96% species are used for ethno medicinal purposes [Table 2]. Roots [the underground part of the plant] are second in preference [15.24%]. About 10.32% plant species are used in medicines as a whole. Some other parts such as bark, seeds, fruits and flowers have also been used in traditional medicines. Husk, resin, wood and female cones are the other least preferred parts in various medicinal preparations. Yousaf et al. [2004] worked on the medicinal flora of Dhibbia Karsal Village [Punjab] and found that most of the medicines are prepared from the leaves [23% species] and fruits [21% species]. Bapuji and Ratnam [2009] also found leaves [32%] to be the most used part for medicinal preparations, followed by roots [23%]. Besides leaves and roots, some other plant parts used in traditional medicines include stem bark [17%], seeds [7%], latex [4%], root bark [3%], flowers [2%] and gums [1%].

Among all the species, 349 are known to have medicinal properties to cure 102 ailments. According to Sajem and Gosai [2006], 39 medicinal species were used to cure 30 types of ailments. Recently Bapuji and Ratnam [2009] recorded 47 ailments which could be cured by 90 plant species. It has been indicated that different numbers of plant species are used for the treatment of variable number of health problems in different regions. It has been also noted that a single species can cure number of diseases or conversely a large number of species are suitable for the treatment of a single disease. For instance, 197 species are available for use against gastrointestinal disorders followed by 153 species to provide relief from various skin diseases. Furthermore, 104 species can act as laxative/purgative and 78 plant species for the treatment of fever. Cancer a very serious disease can be taken care of by 20 plant species found growing in the study area. Fifty eight different species can fight against respiratory and rheumatic problems. Thirty plant species have been recorded to act as anti-diabetic. However, 16 diseases can be encountered by single different species [Table

3]. Besides the use of these plant species in curing various human diseases, three species have found their place in the treatment of veterinary diseases. This data shows the significance of floral diversity in the treatment of health related problems. The data has also disclosed the importance of wild growing plant species for the treatment of various human as well as animal diseases. For the sake of convenience, some of the very common or similar diseases are grouped together in one category.

Going through the flora of the area, it has been observed that this area is rich in biodiversity. Many rare plant species of high medicinal importance are also growing here. Establishment of new gardens adds up to the species diversity of the area. The need of the hour is to conserve this valuable flora. To the best of our knowledge, medicinal value of the species like *Allium rubellum* M. Bieb., *Araucaria cookii* R. Br. ex Endl., *Bambusa vulgaris* var. *Striata*, *Barleria alba*, *Bryophyllum tubiflorum* Harv., *Campanula canescens* Wallich ex A. DC., *Chenopodium alba*, *Ephedra foliata* Boiss., *Ficus krishnae* C. DC., *Jasminum primulinum* Hesml., *Koelreutria paniculata* Laxm., *Malcolmia africana* [L.] W. T. Ait., *Phalaris minor* Retz. *Veronica agrestis* L. and *Vicia odorata* is not clear in the available literature. Efforts are underway to further investigate the medicinal significance of these species.

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Table 1: Distribution of species to different families

Family	No. of species	%age	Family	No. of species	%age
Acanthaceae	10	2.75	Caricaceae	1	0.27
Acoriaceae	1	0.27	Caryophyllaceae	2	0.55
Adiantaceae	1	0.27	Casuarinaceae	1	0.27
Agavaceae	3	0.82	Celastraceae	1	0.27
Amaranthaceae	9	2.47	Chenopodiaceae	5	1.37
Amaryllidaceae	1	0.27	Combricaceae	4	1.10
Anacardiaceae	1	0.27	Commelinaceae	1	0.27
Amnaceae	3	0.82	Convolvulaceae	6	1.65
Apocynaceae	10	2.75	Crassulaceae	2	0.55
Araceae	2	0.55	Cucurbitaceae	2	0.55
Asclepiadaceae	1	0.27	Cupressaceae	1	0.27
Asteraceae	4	1.10	Cycadaceae	2	0.55
Berberidaceae	32	8.79	Cyperaceae	1	0.27
Berberidaceae	1	0.27	Dilleniaceae	1	0.27
Bigoniaceae	5	1.37	Dioscoreaceae	1	0.27
Bombacaceae	1	0.27	Ephedraceae	1	0.27
Borragiaceae	2	0.55	Euphorbiaceae	18	4.95
Brassicaceae	7	1.92	Fumariaceae	1	0.27
Campulidaceae	1	0.27	Geraniaceae	1	0.27
Cannabaceae	1	0.27	Ginkgoaceae	1	0.27
Caprifoliaceae	1	0.27	Hypoxidaceae	1	0.27
Caprifoliaceae	1	0.27	Lamiaceae	13	3.57
Lauraceae	2	0.55	Piperaceae	2	0.55
Fabaceae	38	10.44	Poaceae	7	1.92
Liliaceae	5	1.37	Polygonaceae	2	0.55
Loganiaceae	1	0.27	Polyodiaceae	1	0.27
Lycnaceae	3	0.82	Portulacaceae	2	0.55
Magnoliaceae	2	0.55	Primulaceae	1	0.27
Malvaceae	12	3.30	Protaceae	1	0.27
Meliaceae	4	1.10	Ranunculaceae	1	0.27
Menispermaceae	3	0.82	Rhamnaceae	1	0.27
Molluginaceae	1	0.27	Rosaceae	3	0.82
Moraceae	13	3.57	Rubiaceae	7	1.92
Moringaceae	1	0.27	Rutaceae	8	2.2
Musaceae	1	0.27	Sapindaceae	2	0.55
Myrtaceae	8	2.2	Sapotaceae	3	0.82
Nyctaginaceae	3	0.82	Scrophulariaceae	10	2.75
Oleaceae	5	1.37	Smilacaceae	1	0.27
Orchidaceae	1	0.27	Solanaceae	12	3.3
Oxalidaceae	2	0.55	Sterculiaceae	2	0.55
Pandaniaceae	1	0.27	Tiliaceae	2	0.55
Papaveraceae	1	0.27	Tropaeoidaceae	1	0.27
Phytolaccaceae	1	0.27	Umbelliferae	4	1.10
Pinaceae	1	0.27	Verbenaceae	12	3.3
Plantaginaceae	1	0.27	Violaceae	1	0.27
Plumbaginaceae	2	0.55	Zingiberaceae	1	0.27

Table 2: Plant part(s) and their uses

Part used	Number of uses	%age
Aerial parts	7	0.88
Bark	76	9.57
Branches	2	0.25
Buds	5	0.63
Bulb	2	0.25
Female cones	1	0.12
Flowers	56	7.05
Fruits	66	8.31
Gum	5	0.63
Husk	1	0.12
Juice/Sap	3	0.37
Latex	22	2.77
Leaves	222	27.96
Oil	17	2.14
Resin	1	0.12
Rhizome	6	0.75
Roots	121	15.24
Seeds	70	8.82
Stem	25	3.15
Twigs	3	0.37
Whole plant	82	10.32
Wood	1	0.12
TOTAL	794	99.94

Table 3: Various pathological states and the number of plant species available for their treatment.

Pathological state/ Treatment [†]	No. of species	Pathological state/ Treatment [†]	No. of species
Achnes / Warts	7	Blood pressure	14
Allergy	3	Blood purifier [†]	16
Analgesic [†]	27	Bone fractures	8
Anemia	8	Brain Tonic [†]	3
Anorexia	2	Cardiac disorders	13
Anthelmintics / Vermifuge [†]	40	Cardio-tonic [†]	3
Anti-bacterial / Anti-fungal [†]	18	Catarrah	4
Antibiotic [†]	2	Cathartic [†]	9
Anti-carcinogenic [†]	20	Cephalgia	1
Antidepressant / Sedative [†]	17	Cholagogue [†]	3
Anti-diabetic [†]	30	Cholangitis	1
Anti-emetic [†]	2	Cholera	8
Anti-histamine [†]	1	Common cold	31
Anti-inflammatory [†]	38	Dental diseases	34
Anti-septic [†]	22	Deodorant [†]	2
Anti-spasmodic / colic [†]	23	Diaphoretic	15
Aphrodisiac [†]	17	Digestive Tonic [†]	2
Appetizer [†]	5	Diseases of Eye	32
Aromatic/ used in aroma therapy [†]	5	Disorders of Ear	13
Astringent [†]	43	Diuretic [†]	53
Beri – Beri	2	Dropsy / Edema / ascites	12
Blood circulation stimulant [†]	1	Elephantiasis / Filaria	4
Blood disorders	15	Emetic	14
Emollient / Demulcent	17	Intestinal problems	4
Epilepsy / Convulsions	5	Laxative/purgative [†]	104
Espanto	1	Leprosy	19
Expectorant [†]	23	Leukemia	3
Fever	78	Liver disorders	42
Fistula	1	Malaria	18
Gangrene	1	Marasmus	1
General tonic [†]	34	Migraine	2
GI Tract disorders	197	Mouth problems / Stomatitis	3
Gout	8	Narcotics	4
Gynaecological disorders	45	Nausea	4
Hair growth stimulators [†]	4	Nervine tonic [†]	3
Hair lice killer [†]	1	Nervous disorders	11
Hair problems	2	Obesity	3
Hair Tonic [†]	2	Paralysis	3
Headache	23	Pharyngitis / Tonsillitis	15
Hemoptysis	2	Piles	27
Hernia	2	Pneumonia	5
Hydrophobia	1	Prostate problems	3
Hypnotic [†]	1	Remedies for blood deficiency [†]	1
Hypothermic	1	Remedies for Urological disorders [†]	39
Hysteria	1	Remedy in Cachexy [†]	1
Impotence	3	Respiratory diseases	58
Infective Skin Disorders	28	Rheumatic disorders	58
Insect / snake bites	28	Rubifacient / Vesicant	3
Insomnia	3	Scurvy	5
Sexually Transmitted Diseases	25	Tonic in diarrhoea [†]	1
Skin disorders	153	Tuberculosis / Phthisis	9
Small pox / Measles	5	Typhoid	1
Soothners [†]	11	Ulcers / Sores / Abscesses	53
Stimulant [†]	21	Urolithiasis / Urinary stone formation	6
Sudorific [†]	1	Veterinary problems	3
Tetanus	1	Whooping cough	48
Tonic for Liver [†]	2		

Flora of Panjab University Campus:

Abrus precatorius L.; *Abutilon indicum* L.; *Acacia arabica* Willd.; *Acacia catechu* (Willd.); *Achras zapota* L.; *Achyranthes aspera* L.; *Acorus calamus* L.; *Adenocalymma alliaceum* Miers.; *Adhatoda vasica* Nees.; *Adiantum lunulatum* (Roxb.); *Adina cordifolia* (Willd. ex Roxb.) Benth.; *Aegle marmelos* Correa ex Roxb.; *Agave americana* L.; *Ageratum conyzoides* L.; *Albizia lebbeck* L. Benth.; *Allmanda cathartica* L.; *Allium rubellum* M. Bieb.; *Aloe barbadensis* Mill.; *Aloe vera* L.; *Alstonia scholaris* R. Br.; *Alternanthera philoxeroides* (Mart.) Griseb.; *Alternanthera sessilis* (L.) R. Br.; *Amaranthus gracilis* Desf.; *Amaranthus tricolor* L.; *Anagallis arvensis* L.; *Andrographis paniculata* Wall. ex Nees.; *Anethum graveolens* DC.; *Anisomeles indica* (L.) Kuntze; *Anthocephalus cadamba* Miq.; *Antirrhinum orontium* L.; *Apium graveolens* L.; *Apium leptophyllum* (Pers.) F. Muell.; *Araucaria bidwilli* Hook.; *Araucaria cookii* R. Br. ex Endl.; *Argemone maxicana* L.; *Artemisia scoparia* Waldst. & Kit.; *Artemisia vulgaris* L.; *Artocarpus integrifolia* L. f.; *Artocarpus lakoocha* Roxb.; *Asclepias curassavica* L.; *Asparagus racemosus* Willd.; *Atlantia monophylla* (L.) Corr.; *Azadirachta indica* A. Juss.; *Bacopa monnieri* L. Penn.; *Bambusa bambos* (L.) Voss.; *Bambusa vulgaris* var. *Striata*; *Barleria alba*; *Barleria cristata* L.; *Barleria prionitis* L.; *Barringtonia acutangula* L. Gaertn.; *Baugainvillea glabra* L.; *Bauhinia purpurea* L.; *Bauhinia variegata* L.; *Berberis asiatica* Roxb.; *Bidens pilosa* L.; *Bignonia venusta* Ker.; *Blainvillea acmella* L. Philipson; *Blumea membranacea* Wall.; *Blumea mollis* (G. Don.) Merr.; *Boerhaavia diffusa* L.; *Bombax ceiba* L.; *Brassica campestris* L.; *Broussonetia papyrifolia* Vent.; *Bryophyllum pinnatum* Lam. (Kurz.); *Bryophyllum tubiflorum* Harv.; *Buddleja asiatica* Lour.; *Butea monosperma* (Lam.); *Caesalpinia bonducella* Fleming.; *Calendula arvensis* L.; *Calliandra haematocephala* Hassk.; *Callistemon lanceolatus* DC.; *Calotropis gigantea* (L.) W. T. Aiton; *Calotropis procera* (Ait.) R. Br.; *Campanula canescens* Wallich ex A. DC.; *Cananga odorata* (Lam.) Hook. F. & Thoms.; *Canna indica* L.; *Cannabis sativa* L.; *Capsella bursa-pastoris* (L.) Medic.; *Carica papaya* L.; *Carissa carandas* L.; *Cassia fistula* L.; *Cassia glauca* Lam.; *Cassia occidentalis* L.; *Cassia siamea* Lam.; *Casuarina equisetifolia* L.; *Catunaregam spinosa* (Thunb.) Tirveng.; *Cedrela toona* Roxb.; *Celastrus paniculatus* Willd.; *Celosia cristata* L.; *Centaurea cyanus* L.; *Centella asiatica* (L.) Urb.; *Cestrum diurnum* L.; *Chenopodium alba*; *Chenopodium album* L.; *Chenopodium ambrosioides* L.; *Chenopodium murale* L.; *Chrysanthemum americanum* L.; *Cinnamomum camphora* (L.) Nees. & Eberm.; *Cinnamomum tamala* Nees. & Eberm.; *Cissampelos pareira* L.; *Citrus aurantium* L.; *Citrus medica* var. *limonum* Linn.; *Clerodendrum indicum* (L.) Kutze, Rev. Gen.; *Clerodendrum inerme* Gaertn.; *Clerodendrum philippinum* Schauer.; *Clerodendrum splendens* G. Don.; *Cnicus arvensis* (L.) Roth.; *Coccinia indica* W. & A.; *Cocculus hirsutus* L.; *Coleus forskohlii* auct.; *Coleus aromaticus* Benth.; *Convolvulus arvensis* L.; *Convolvulus microphyllus* Sieb. ex Spreng.; *Coolebrokea oppositifolia* J. E. Sm.; *Corchorus aestuans* L.; *Cordia dichotoma* Forst. f.; *Cordylone terminalis* (L.) Kunth. & Planch.; *Coronopus didymus* L.; *Cosmos bipinnatus* Cav.; *Crataeva religiosa* Hook. f. & Thoms. Non Frost.; *Crinaria asiaticum* L.; *Crotalaria juncea* L.; *Crotalaria spectabilis* Roth.; *Croton bonplandianum* Baill.; *Curculigo orchoides* Gaertn.; *Cuscuta reflexa* Roxb.; *Cycas circinalis* L.; *Cycas revoluta* Thunb.; *Cymbidium aloifolium* (L.) Sw.; *Cymbopogon citratus* (DC.) Stapf.; *Cymbopogon martinii* Roxb.; *Cynodon dactylon* (L.) Pers.; *Cyperus rotundus* L.; *Dalbergia sissoo* Roxb.; *Datura metel* L.; *Datura stramonium* L.; *Delonix regia* (Hook.) Raf.; *Desmodium gangeticum* (L.) DC.; *Desmodium triflorum* DC.; *Diplotera roxburghiana* Nees.; *Digera muricata* (L.) Murr.; *Dillenia indica* L.; *Dioscorea bulbifera* L.; *Duranta repens* L.; *Eclipta alba* L.; *Embellica officinalis* L.; *Emilia sonchifolia* (L.) DC.; *Ephedra foliata* Boiss.; *Erigeron bonariensis* L.; *Eriobotrya japonica* Lindl.; *Eucalyptus citriodora* Hook.; *Eucalyptus globulus* Labill.; *Eugenia jambolana* Lam.; *Euphorbia geniculata* Ortega.; *Euphorbia helioscopia* L.; *Euphorbia hirta* L.; *Euphorbia nerifolia* L.; *Euphorbia prostrata* Aiton.; *Euphorbia pulcherrima* Willd. Ex Klotz.; *Euphorbia royleana* Bioss.; *Euphorbia splendens* Bojer ex Hook.; *Evolvulus alsinoides* L.; *Excoecaria bicolor* (Hassk.); *Ficus benghalensis* L.; *Ficus benzamina* L.; *Ficus carica* Forssk.; *Ficus elastica* Roxb.; *Ficus infectoria* Roxb.; *Ficus krishnae* C. DC.; *Ficus racemosa* L.; *Ficus religiosa* L.; *Ficus roxburghii* Wall. ex Steud.; *Fumaria indica* (Hauskn.) Pugsley; *Galium aparine* L.; *Gardenia latifolia* Ait.; *Geranium nepalense* Sweet.; *Ginkgo biloba* L.; *Gnaphalium indicum* L.; *Gomphrina celastoides* Martius.; *Gomphrina globosa* L.; *Grevillea robusta* A. Cunn. ex R. Br.; *Grewia asiatica* L.; *Hamelia patens* Jacq.; *Hibiscus rosa-sinensis* L.; *Hibiscus tiliaceus* L.; *Hibiscus vitifolius* L.; *Holmskioldia sanguine* Retz.; *Iberis amara* L.; *Indigofera linifolia* L.; *Ipomoea carnea* Jacq.; *Ipomoea palmata* L.; *Ixora acuminata* Roxb.; *Jacaranda acutifolia* Humb. & Bonpl.; *Jasminum arborescens* Roxb.; *Jasminum officinale* L.; *Jasminum primulinum* Hesml.; *Jasminum sambac* (L.) Ait.; *Jatropha curcas* L.; *Jatropha pandurifolia* L.; *Justicia gendarussa* Burmf.; *Justicia simplex* Don.; *Kigelia pinnata* DC.; *Kochia indica* Wright.; *Koeleria paniculata* Laxm.; *Lactuca sativa* L.; *Lagerstromia flos-reginae* Retz.; *Lantana camara* L.; *Lathyrus aphaca* L.; *Lathyrus sativus* L.; *Launaea nudicaulis* sensu Hook. f.; *Lawsonia inermis* L.; *Leucaena leucocephala* Lamk.; *Limnophila rugosa* (Roth.) Merr.; *Limonia crenulata* Roxb.; *Lippia nodiflora* A. Rich.; *Luffa cylindrica* (L.) M. Roemd.; *Lycopersicon esculentum* Mill.; *Madhuca indica* J. F. Gmel.; *Magnolia grandiflora* L.; *Malcolmia africana* (L.) W. T. Ait.; *Mallotus philippensis* Muell. Arg.; *Malva rotundifolia* Auct.; *Malvastrum coromandelianum* L.; *Malvaviscus arboreus* Cav.; *Mangifera indica* L.; *Manihot esculenta* Crantz.; *Mazus rugosus* Lour.; *Medicago lupulina* L.; *Melaleuca leucodendron* L.; *Melia azedarach* L.; *Melilotus parviflora* Desf.; *Mentha arvensis* L.; *Melissa champaca* L.; *Milletia ovalifolia* Karz.; *Mimulops elangi* L.; *Mirabilis jalapa* L.; *Mollugo pentaphylla* L.; *Moringa oleifera* L.; *Morus alba* L.; *Murraya koeingii* (L.) Spreng.; *Murraya paniculata* (L.) Jack.; *Musa paradisiaca* L.; *Napeta hindostana* (Roth.) Hanes.; *Nerium oleander* L.; *Nyctanthes arbor-tristis* L.; *Ocimum americanum* L.; *Ocimum basilicum* L.; *Ocimum gratissimum* L.; *Ocimum kilmandscharium* Baker ex Gurke; *Oxalis corniculata* L.; *Oxalis martiana* Zucc.; *Pandanus fascicularis* Lam.; *Parthenium hysterophorus* L.; *Pedilanthus tithymaloides* L. Poit.; *Peristrophe bicalyculata* Nees.; *Petrea volubilis* L.; *Phalaris minor* Retz.; *Physalis minima* L.; *Physochlaina praealta* (DeCaisne) Miers.; *Pinus roxburghii* Sarg.; *Piper brachystachyum* Wall.; *Piper longum* L.; *Plantago ovata* Forssk.; *Pluchea lanceolata* C. B. Clarke.; *Plumbago capensis* Thunb.; *Plumbago zeylanica* L.; *Plumeria acuminata* Ait.; *Polyalthia longifolia* (Sonn.) Thw.; *Polyalthia superba* Roxb.; *Polygonum plebejum* R. Br.; *Pongamia pinnata* Pierre.; *Portulaca grandiflora* L.; *Portulaca quadrifida* Hook.; *Psidium guajava* L.; *Psoralea corylifolia* L.; *Pteris vittata* L.; *Pterospermum acerifolium* L. Willd.; *Putranjiva roxburghii* Wall.; *Pyrus pashia* Buch. Ham. ex D. Don.; *Quisqualis indica* L.; *Ranunculus acris* L.; *Rauwolfia canescens* L.; *Rauwolfia serpentina* L. Benth. Ex Kurz.; *Ricinus communis* L.; *Rivina humilis* L.; *Rosa indica* (Willd.) Kohne.; *Roystonea regia* O. F. Cook; *Ruellia tuberosa* L.; *Rumex nepalensis* Spreng.; *Rusellia sarmentosa* Jacq.; *Ruta graveolens* L.; *Salvia moorcroftiana* Well. ex Bk.; *Salvia plebeia* R. Brown; *Salvia splendens* Ker – Gawl.; *Sambucus nigra* L.; *Saraca asoca* Roxb.; *Saussurea candicans* C. B. Clarke; *Schleichera oleosa* (Lour.) Oken.; *Scoparia dulcis* L.; *Sesbania sesban* L. Merr.; *Sida acuta* Burm.f.; *Sida cordifolia* L.; *Sida rhombifolia* L.; *Silybum marianum* L. Gaertn.; *Sisymbrium indicum* L.; *Sisymbrium irio* L.; *Smilax parvifolia* Lour.; *Solanum indicum* L.; *Solanum nigrum* L.; *Solanum platanifolium* Sims.; *Solanum torvum* Sw.; *Solanum verbascifolium* L.; *Sonchus asper* Hill.; *Spergula arvensis* L.; *Stellaria media* (L.) Vill.; *Sterculia alata* Roxb.; *Stevia rebaudiana* Bertone; *Swietenia macrophylla* King.; *Synedrella nodiflora* (L.) Gaertner; *Syzygium jambos* (Lam.) Aiston.; *Tabernaemontana coronaria* R. Br.; *Tagetes erecta* L.; *Tamarindus indica* L.; *Tecoma stans* L.; *Tectona grandis* L. f.; *Tephrosia purpurea* (L.) Pers.; *Terminalia arjuna* Wight & Arn.; *Terminalia bellarica* (Gaertn.); *Terminalia chebula* Retz.; *Thespesia populnea* Soland ex Correa.; *Thevetia nerifolia* Juss. ex Steud.; *Thuja orientalis* L.; *Tinospora cordifolia* Miers.; *Trichodesma indicum* (L.) R. Br.; *Tridax procumbens* L.; *Trifolium pratense* L.; *Trigonella polycerata* auct. Non L.; *Trigonella foenum graceum* L.; *Tropaeolum majus* L.; *Tylophora indica* (Burm. f.) Merr.; *Urena lobata* L.; *Urginea indica* Roxb. Kunth.; *Verbascum chaixii* Vill.; *Verbascum thapsus* L.; *Verbena officinalis* L.; *Vernonia cinerea* Less.; *Veronica agrestis* L.; *Veronica anagallis-aquatica* L.; *Vetivera zizanoides* L.; *Vicia odorata* L.; *Vicia sativa* L.; *Vicoa indica* (L.) DC.; *Vinca rosea* L.; *Viola betonicifolia* Sm.; *Vitex nigundo* L.; *Wedelia trilobata* (L.) Hitchc.; *Withania somnifera* L.; *Woodfordia fruticosa* L. Kurz.; *Xanthium strumarium* L.; *Youngia japonica* (L.) DC.; *Yucca elata* Engl.; *Zebrina pendula* Schnizl.; *Zizyphus jujuba* Mill. etc.

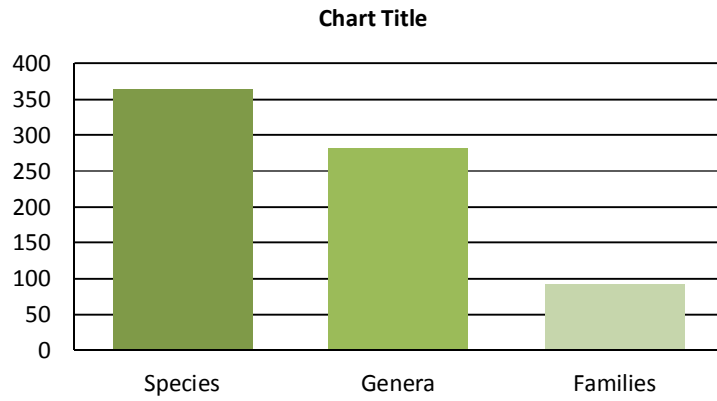


Fig. 1 Species, Genera and Families in the study area

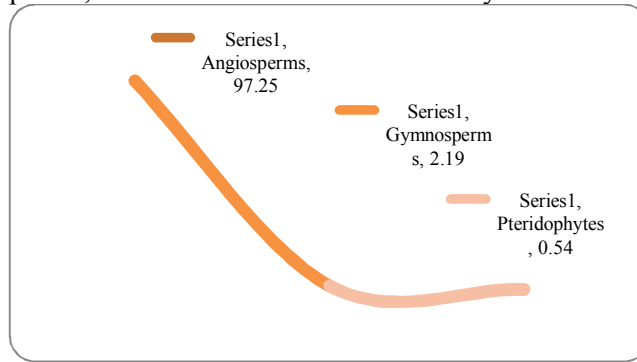


Fig. 2 Percentage of species in different plant groups.

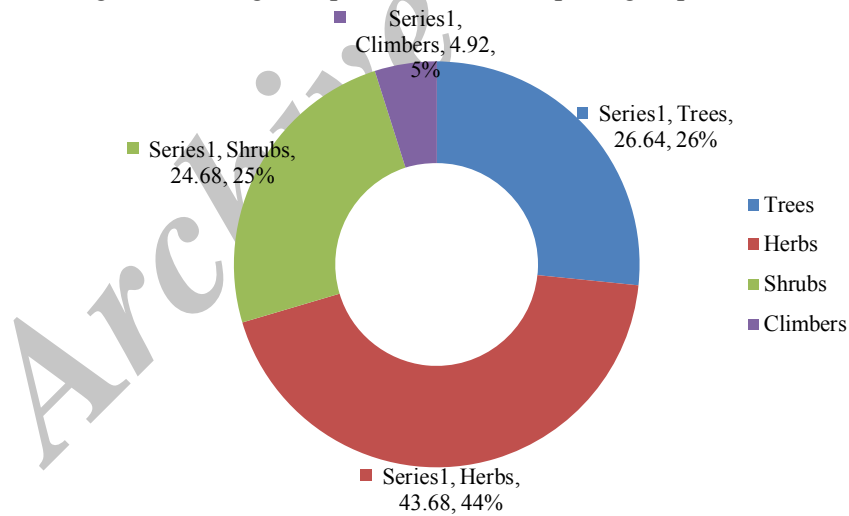


Fig. 3 Depicting the plant habit in the study area