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Study of plant diversity of Karnal District, Haryana, India

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Abstract

This paper presents the result of a study on the diversity of different plant species along with their vernacular names, habit and their occurrence found in Karnal district of Haryana in India. This study is first of its kind conducted in the district showing current status of the plant diversity. In present study, a total of 277 plant species belonging to the 72 families have been recorded from this area. The study also acknowledge the ecological balance is being disturbed due to the very quickly rise in the human population and their increased demand for more utilization of natural resources. Therefore the proper knowledge of plant diversity could play important role in planning for conservation and sustainable use of available resources.

Key-Words: Karnal, Plant Diversity, Taxonomy, Ecological balance

Introduction

India, a land of physical, cultural, social and linguistic diversity endowed by nature with enormous biological diversity. As a result India ranks amongst one of the 12 mega biodiversity countries of the world and consists of 17,000 flowering plant species. It accounts for 8% of the global biodiversity with only 2.4% of the total land area in the world[1, 2]. In India, Haryana is small, prosperous state and has great place in the history.

Karnal district lies on the western bank of the river Yamuna, which forms its eastern boundary and separates Haryana from Uttar Pradesh. Karnal district lies between 29 09' 50" and 29 50' North and 76 31' 15" and 77 12' 45" East; its height above sea level is around 240 meters. The district has an area of 1,967 km². Karnal district is bordered by Kurukshetra district on its north-west, Jind and Kaithal districts on its west, Panipat district on its south and Uttar Pradesh state on the east and average annual rainfall of Karnal district is 696 mm.

Practically Karnal district remains to be explored from the taxonomic point of view considering changes that took place in last few decades owing to heavy agriculture, urbanization, industrialization and other such factors. Here is an attempt to cover the plant biodiversity from this point of view so as to provide information about the plants according to their current status."Taxonomy is the science of the description and classification of organism, essential in theoretical and applied biology"[3].

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Plants represent one of the important element of biodiversity, thus the knowledge of plant species found in the different areas of the world is a pre-requisite to conserve the ecological biodiversity. It helps us to understand the overall structure and function of an ecosystem[4]. For this reason accurate and precise information of the known plant species from a given area is essential. The information is important as it allows us to prevent or avoid the potential chances of biodiversity loss and to plan future policy for the protection of our environment. According to P. K. K. Nair[5] "taxonomy is an integral component of biodiversity protection, remediation and eco-development". The present study aims to highlight the plant diversity of Karnal district from taxonomic point of view, which in turn will provide important source for use in various other fields of biology in general and botany in particular.

Material and Methods

To carry out work on plant diversity in Karnal district of Haryana in India (Figure 1), first of all, the study area was selected and divided into different regions for the sake of convenience and systematic study. A general survey of the vegetation was made and observed different plants such as herbs, shrubs and trees. Extensive field surveys were conducted in the district during different seasons through regular field visits in order to get maximum representation of the different plant species. During our field visits plant samples were collected and took photograph of particular species from agricultural lands, natural habitats, wastelands, road sides, railway tracks, parks,

lawns, ponds, river banks and other relevant localities to cover almost all the district in a systematic manner. Identification was done with the help of various floras[6,7], and with live specimens in the field itself but when it was not found possible then plant samples were identified in the lab.

Results and Discussion

The present study shows that the plant diversity in the Karnal district is now decreasing to loss and less as compare to earlier studies and loss of plant diversity is not only an ethical tragedy but also a great social, economical and cultural loss. During the present works we have noted 277 plant species belonging to 72 families have been reported in that particular zone, and result of the study are placed in Table—1. In all- total of 152 herbs, 40 shrubs, 15 undershrubs, 57 trees, 7 twinners, 5 climbers and 1 woody climber species have been included (Figure 2). The densest families in the present study are Fabaceae (27), Poaceae (21), Euphorbiaceae (14), Malvaceae (12) and Brassicaceae (11), etc. Some of most common plant species which occurred in study area is *Tectona grandis* (Verbenaceae), *Azadirachta indica*, *Melia azedarach* (Meliaceae), *Ficus benghalensis, F. religiosa, F. carica* (Moraceae), *Mangifera indica* (Anacadiaceae), *Ailanthus excelsa* (Simaroubaceae), *Murraya koenigii, Aegle marmelos* (Rutaceae), *Eucalyptus sp.* (Myrtaceae), *Terminalia arjuna* (Combretaceae), *Polyalthia longifolia* (Annonaceae), *Butea monosperma, Delbergia sisso* (Fabaceae), *Cassia fistula* (Caesalpiniaceae), *Psidium gunjava, Syzygium cumini* (Myrtaceae), *Acacia nelotica, Acacia arabica, Albizzia lebbeck* (Mimosaceae), *Derris indica* (Leguminosae), *Morus alba* (Moraceae), *Zizyphus nummularia* (Rhamnaceae), *Alstonia scholaris* (Apocynaceae) *etc.* Some plant species are exotic and show dominancy in this area, these are *Parthenium hysterophorus* L. (Asteraceae), *Eichhornia crassipes* Kunth (Pontedericaceae), *Lantana indica* (Verbenaceae) etc. Number of plant species lost is often most widely used measures of diversity depletion. The overall causes of diversity loss are the same as those responsible for land use and surface of land changed. This study also reveals that the ecological balance is being upset by rapid rise of human population with their increased demand for more utilization of natural resources. The existing natural forests were protecting our living environment.

Conclusion

Knowledge of Taxonomy is a great tool for identification of the different plant species. Taxonomic knowledge is crucial to meet the challenges of biodiversity conservation in the 21st century[8]. It is of fundamental importance for understanding biodiversity and ecosystem functioning, as it provides us with the data to explore and describe biodiversity through scientific analysis. The present study provides the basic information about the different plant species, which are currently found in the Karnal district. Such a list could play an important role for the local and regional authorities interested in to conserve this precious phyto-diversity for batter future use of welfare of forcoming generations and sustainable development of the area.

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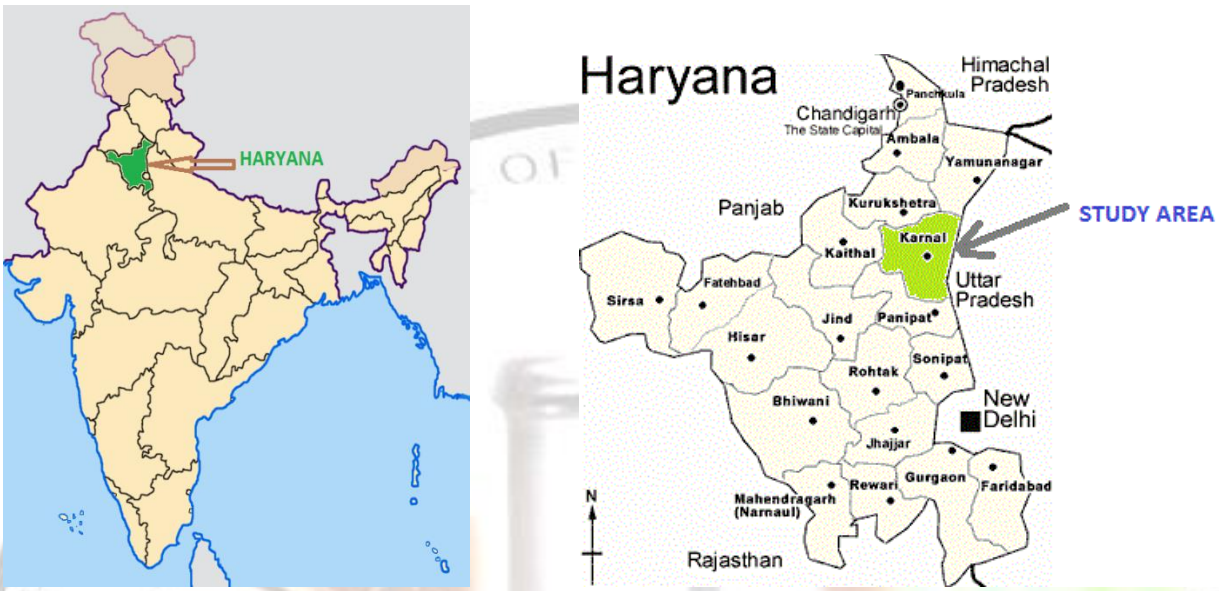

Fig. 1: Map of Study area

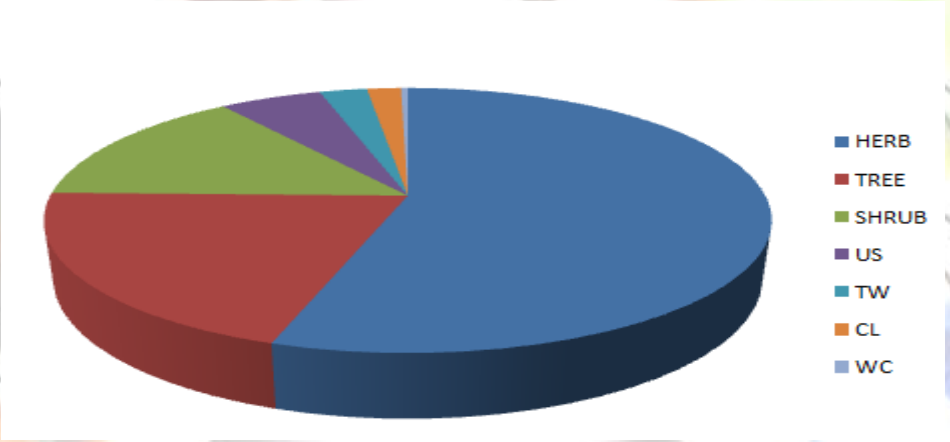

Fig. 2: Distribution of plant species

Table 1: Plant diversity of the study area

S.No.	Family / Species	Vernacular Name	Habit
1.	ANNONACEAE		
	Artabotrys hexapetalus L.f.		T
	Polyalthia longifolia Sonn.	Ashok	T
2.	RANUNCULACEAE		
	Ranunculus cantoniensis DC.		H
	Ranunculus muricatus L.		H
	Ranunculus sceleratus L.		H
3.	MAGNOLIACEAE		
	Michelia champaca L.	Champa	T
4.	MENISPERMACEAE		
	Cissampelos pareira L.		Tw
	Cocculus pendulus J.R.		Tw
	Tinospora cordifolia Wlld.	Giloe	Tw

	Cocclus hirsuta L.		Tw
5.	NYMPHAEACEAE		
	Nymphea nouchali	Chota Kamal	H
6.	PAPAVERACEAE		
	Argemone Mexicana L.	Satyanasi	H
	Papaver hookeri L.		H
7.	BRASSICACEAE		
	Brassica campestris Linn.	Sarso	H
	Brassica juncea L.	Asli Rai	H
	Brassica nigra L.	Kali Sarso	H
	Coronopus didymus L.		H
	Lepidium stivum L.		H
	Rorripa indica L.		H
	Sisymbrium irio L.		H
	Raphanus stivus L.	Muli	H
	Brassica oleracea var. *botrys*	Phoolgobhi	H
	Brassica oleracea var. *capitata*	Bandhgobhi	H
	Nasturtium officinale R.Br.		H
8.	CAPPARACEAE		
	Capparis deciduas L.	Kair	S
	Capparis sepiaria L.	Hins	S
	Capparis zeylanica L.	Hins	S
10.	TAMARICACEAE		
	Tamarix aphylla L.		T
	Tamarix dioica Roxb.	Jhau	T
11.	MALVACEAE		
	Abutilon fruticosum		US
	Abutilon ramosum	Barkanghi	US
	Abelmoschus ficulneus	Jungli bhindi	US
	Malva sylvestris L.		H
	Pavonia procumbens		H
	Sida cordata		US
	Sida cordifolia L.	Bala	US
	Sida rhombifolia L.		US
	Urena lobata L.		US
	Hibiscus rosa-sinensis L.	Gudhal	S
	Gossypium arboretum L.	Rui	S
	Abelmoschus esculentus L.	Bhindi	US
12.	BOMBACACEAE		
	Bombax ceiba L.		T
	Melochia corchorifolia L.	Saimal	T
13.	TILIACEAE		
	Corchorus aestuans L.		H
	Corchorus capsularis L.	Jute	H
	Corchorus olitorius L.		H
14.	ZYGOPHYLLACEAE		
	Balanites roxburghii		H
	Tribulus terrestris	Gokharu	H
15.	RUTACEAE		
	Aegle marmelos L.	Bel	T
	Murraya koenigii L.	Meetha Neem	S

	Murraya paniculata L.		S
	Citrus medica L.	Nimbu	S
16.	MELIACEAE		
	Azadirachta indica A.Juss.	Neem	T
	Melia azedarch	Bakain	T
	Swietenia mahagoni		T
17.	CELASTRACEAE		
	Celastrus paniculatus L.	Halkangni	WC
18.	RHAMNACEAE		
	Zizyphus mauritiana Lam.	Ber	T
	Zizyphus nummularia (Burm.f.)	Jhar	S
	Zizyphus oenoplia L.	Makoh	S
19.	ANACARDIACEAE		
	Mangifera indica L.	Aam	T
20.	MORINGACEAE		
	Moringa oleifera Lam.	Sonjna	T
21.	FABACEAE / LEGUMINOSAE		
	Derris indica	Papdi	T
	Aeschynomene indica		H
	Alysicarpus bupleurifolius L.		H
	Alysicarpus monilifer L.		H
	Alysicarpus vaginalis L.		H
	Butea monosperma Lam.	Dhak	T
	Crotolaria medicagenea Lam.		US
	Crotolaria mysorensis Roth.		US
	Dalbergia sisso L.f.	Sisham	T
	Desmodium triflorum L.		H
	Indigofera tinctoria L.		S
	Indigofera linnaei L.		S
	Sesbania sesban L.		S
	Tephorisia uniflora L.		H
	Teramnus labialis L.f.		H
	Uraria picta (Jacq.)	Dabra	US
	Vicia hirsute L.		H
	Zornia gibbosa		H
	Cicer arietinum L.	Chana	H
	Phaseolus lunatus L.	Lobia	H
	Pisum stivum L.	Matar	H
	Vigna radiata L.	Mung	H
	Cassia fistula L.	Amaltas	T
	Cassia occidentalis L.		US
	Cassia obtusifolia L.		H
	Delonix regia Rafin.	Gulmohar	T
	Tamarindus indica L.	Imli	T
22.	MIMOSOIDEAE		
	Acacia nilotica L.	Kikar	T
	Acacia arabica L.		T
	Albizia lebbeck L.	Saras	T
	Pithecellobium dulce Roxb.	Jungli jlabi	T
	Prosopis cineraria L.		T
	Prosopis juliflora	Phadi kikar	T

	Potentilla supina L.		T
	Prunus persica L.	Aadu	T
23.	COMBRETACEAE		
	Terminalia arjuna Roxb.	Arjun	T
	Terminalia belerica Roxb.	Bahera	T
24.	MYRTACEAE		
	Syzygium cumini L.	Jamun	T
	Eugenia jambolana L.	Jamoa	T
	Eucalyptus paniculata Smith.	Sfeda	T
	Psidium gujava L.	Amrud	T
25.	LYTHRACEAE		
	Ammannia auriculata Willd.		H
	Ammannia baccifera L.		H
	Lawsonia inermis L.	Mehandi	S
26.	PUNICACEAE		
	Punica granatum L.	Anar	US
27.	ONAGRACEAE		
	Ludwigia perennis L.		H
28.	TRAPACEAE		
	Tarapa natans L.	Singhara	H
29.	CUCURBITACEAE		
	*Binincasa hispida (*Thunb.)	Petha	H
	Coccinia grandis L.	Kundru	CL
	Cucumis callosus L.	Kachri	H
	Melothria maderaspatana L.		H
	Trichosanthes dioica Roxb.	Parwal	Tw
	Cucumis melo L.	Kharbuja	H
30.	BEGONIACEAE		
	Begonia picta L.		H
31.	CACTACEAE		
	Opentia dillenii	Naagfani	S
	Opentia monacantha		S
32.	AIZOACEAE		
	Trianthema portulacastrum L.		H
33.	APIACEAE		
	Apium graveolens L.		H
	Coriandrum sativum L.	Dhania	H
	Daucus carota L.	Gajar	H
	Trachyspermum ammi L.	Ajwain	H
34.	RUBIACEAE		
	Mitragyna parviflora Roxb.		T
	Anthocephalus indicus	Kadamb	T
	Oldenlandia corymbosa L.		H
35.	ASTERACEAE		
	Artemisia capillaries Thunb.		H
	Caesulia axillaris Roxb.	Bangra	H
	Centipeda minima L.		H
	Conyza bonariensis L.		H
	Eclipta prostrate L.	Jalmogra	H
	Gnaphalium polycaulon L.		H
	Parthenium hysterophorus L.	Congress ghas	H

	Sonchus asper L.		H
	Vernonia cinerea L.		H
	Xanthium indicum L.	Cocklebur	H
36.	SPOTACEAE		
	Madhuca indica J.Gmelin	Mahua	T
37.	EBENACEAE		
	Diospyros cordifolia Roxb.	Kaindu	T
38.	OLEACEAE		
	Jasminum humile L.		S
39.	SAVADORACEAE		
	Salvadora oleoides L.	Jal	T
40.	APOCYANACEAE		
	Carissa spinarum L.	Jangli karaunda	S
	Rauvolfia serpentine (L.) Benth.	Sarpagandha	US
	Ichnocarpus frutescens L.	Bakkarbel	CL
	Alstonia scholarias L.	Saptpatti	T
	Catharanthus roseus L.	Sadabhar	H
	Nerium indicum Mill.	Kaner	S
	Tabernaemontana divaricata	Chandni	S
41.	ASCLEPIADACEAE		
	Calotropis gigantina L.	Safed aak	S
	Calotropis procera L.	Aak	S
	Leptadenia reticulate	Jivanti	H
	Pentatropis spiralis	Akaribel	CL
	Wattakaka volubilis		CL
	Cryptostegia grandiflora R.Br.		S
42.	HYDROPHYLLACEAE		
	Hydrolea zeylanica L.		H
	Coldenia procumbens L.		H
	Cynoglossum wallichii		H
43.	EHRETIACEAE		
	Cordia dichotoma L.	Lasora	T
44.	CONVOLVULACEAE		
	Convolvulus arvensis L.		H
	Evolvulus alsinoides L.		H
	Ipomoea cairica L.	Railwaycreeper	H
	Ipomoea batatas L.	Shakarkand	H
45.	CUSCUTACEAE		
	Cuscuta hyaline L.		Tw
	Cuscuta reflexa Roxb.	Amarbel	Tw
46.	SOLANACEAE		
	Datura innoxia L.	Dhatura	H
	Datura metel	Kala dhatura	H
	Physalis minima L.	Pilpotan	H
	Solanum nigrum L.	Makoi	H
	Withania somnifera L.	Ashwagandha	US
	Capsicum annuum L.	Mirch	H
	Cestrum nocturnum L.	Rat ki rani	S
	Lycopersicun esculentum Mill.	Tamator	H
	Nicotiana rustica L.	Tobacco	H
47.	SCROPHULARIACEAE		

	Bacopa monnieri L.	Brahmi	H
	Lindernia crustacean L.		H
	Striga angustifolia		H
	Veronica agrestis		H
48.	MARTYNIACEAE		
	Martynia annua L.		H
49.	ACANTHACEAE		
	Adhatoda zeylanica Mill.	Bansa	S
	Dicliptera roxburghiana	Laksmanna	H
	Dipteracanthus prostrates (Poir)		H
	Elytraria acaulis (L.f.)		H
	Justica peploides (Nees)		H
	Barleria cristata	Kala bansa	S
50.	VERBENACEAE		
	Tectona grandis Linn.	Saigon	T
	Clerodendrum phlomidis L.f.		S
	Duranta repens L.		S
	Lantana indica L.		S
	Phyla nodiflora L.	Mokna	H
	Verbena officinalis L.		H
	Vitex negundo L.	Marwah	T
51.	LAMIACEAE		
	Leucas cephalotes	Guldoda	H
	Ocimum basilicum L.	Tulsi	H
	Ocimum sanctum L.		H
	Orthosiphon pallidus Benth.		H
	Mentha piperita L.	Pudina	H
52.	PLANTAGINACEAE		
	Plantago ovate	Isabgol	H
53.	NYCTAGINACEAE		
	Boerhavia diffusa L.		H
	Commicarpus chinensis L.		S
54.	AMARANTHACEAE		
	Achyranthus aspera L.	Puttcanda	H
	Alternanthera sessilis L.		H
	Amaranthus roxburghianus	Cholai	H
	Celosia tricolor L.		H
	Digera muricata L.	Dhofar	H
	Gomphrena celosioides L.		H
	Pupalia lappacea L.		H
55.	CHENOPODIACEAE		
	Atriplex crassifolia L.		S
	Chenopodium ambrosioides L.		H
	Kochia indica		H
	Beta vulgaris L.	Chukandar	H
	Spinacea oleracea L.	Palak	H
56.	POLYGONACEAE		
	Polygonum barbatum L.		H
	Polygonum lapathifolium L.		H
	Polygonum plebeium L.		H
57.	EUPHORBIACEAE		

	Acalypha ciliate L.	Kuppi	H
	Croton bonplandianum L.		H
	Drypetes roxburghii (Wall.)	Putranjiva	T
	Euphorbia dracunculoides Lam.		H
	Euphorbia hirta L.		H
	Euphorbia thymifolia Linn.	Choti dudhi	H
	Euphorbia neriifolia L.	Thohar	S
	Euphorbia royleana Boiss.		S
	Jatropa curcas L.	Diesal plant	S
	Kirganelia reticulate (Poir)		S
	Emblica officinalis L.	Amla	T
	Phyllanthus urinaria		S
	Phyllanthus virgatus		H
	Ricinus communis L.	Arandi	S
58.	CANNABINACEAE		
	Cannabis sativa L.	Bhang	H
59.	MORACEAE		
	Ficus benghalensis L.	Barh	T
	Ficus racemosa L.	Gular	T
	Ficus religiosa L.	Pipal	T
	Ficus virens Ait., Hort.	Pilkhan	T
	Ficus carica L.	Angir	T
	Morus alba L.	Shehtoot	T
	Artocarpus heterophyllus Lam.	Kathal	T
	Ficus elastic L.	Rubber	T
60.	CASUARINACEAE		
	Casuarina equisetifolia L.	Jhau	T
61.	HYDROCHARITACEAE		
	Hydrilla verticillata (L.f.)		H
62.	MUSACEAE		
	Musa paradisiacal L.	Kela	H
63.	AGAVACEAE		
	Agave cantala Roxb.		H
64.	AMARYLLIDACEAE		
	Crinum defixum L.	Sukhdarshni	H
65.	LILIACEAE		
	Allium cepa L.	Pyaj	H
	Alliumsativum L.	Lahsun	H
	Aloe barbadensis	Ghritkumari	S
	Asparagus recemosus Willd.	Satavar	S
	Asphodelus tenuifolius L.	Pyaji	H
66.	PONTEDERIACEAE		
	Eichhornia crassipes Kunth.	Jalkhumbi	H
	Monochoria vaginalis L.		H
67.	ARECACEAE		
	Phoenix sylvestris L.	Khajur	T
68.	POTAMOGETONACEAE		
	Potamogeton crispus L.		H
69.	CYPRACEAE		
	Carex fedia L.	Motha	H
	Cyperus bulbosus L.		H

	Cyperus corymbosus L.		H
	Cyperus rotundus L.		H
	Cyperus triceps L.		H
70.	POACEAE		
	Apluda mutica L.		H
	Aristida adscensionis L.		H
	Brachiaria distachya L.		H
	Brachiaria ramose L.		H
	Cenchrus ciliaris L.	Anjan	H
	Cymbopogon jwarncusa		H
	Cynodon dactylon L.	Doob ghas	H
	Desmostachya bipinnata L.		H
	Digitaria ciliaris (Retz.)		H
	Digitaria stricta		H
	Echinochloa colonum L.		H
	Eleusine indica L.		H
	Heteropogon contortus L.		H
	Lolium temulentum L.		H
	Panicum antidotale L.		H
	Saccharum ravennae L.	Sarkanda	H
	Setaria glauca L.		H
	Oryza sativa L.	Dhan	H
	Saccharum officinarum L.	Ganna	H
	Triticum aestivum L.	Genhu	H
	Zea mays L.	Makka	H
71.	CARICACEAE		
	Carica papaya	Papita	S
72.	SIMAROUBACEAE		
	Ailanthus excels	Mahanimb	T

Abbreviations: CL – Climber, H- Herb, S- Shrub, T- Tree, Tw- Twiner, US- Under Shrub, WC- Woody Climber.