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ORIGINAL ARTICLE **OPEN ACCESS**

Floristic Vegetation Pattern Of Karnal City, Haryana, India

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ABSTRACT
The goal of this research was to describe and analyse the floristic diversity of Karnal city of Haryana,India. This comprehensive research looks at the variety of plant species present in Karnal area as well as their common names, habits, and occurrence. An attempt was made to compile the current state of the region's plant diversity. In the current study a total of 221 plant species, divided into 169 genera and 61 families are identified. Among them are 212 dicotyledon species and 19 monocotyledon species are present. Fabaceae, Asteraceae, Malvaceae and Euphorbiaceae are most dominant families in this area. Plant diversity assessment could be useful in developing conservation plans and ensuring the long-term viability of diversity.
Keywords: *Floristic diversity, flora, conservation, viability..*

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INTRODUCTION

The term "Biological diversity" is referred to Earth's variety of life forms and its natural patterns, or the degree of variation in life forms within a given habitat, biome, or entire world. Warren G. Rosen introduced this term in its portmanteau form in the mid-1980s and has since gained steady popularity.Biodiversity is defined by the United Nations Convention on Biological Diversity as "the variability among living organisms from all sources, including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems" [1].The United Nations Convention on Biological Diversity, the Millennium Development Goals, and other international agreements have all said that biodiversity conservation, poverty reduction, and human wellbeing are all linked [2,3].

Biodiversity includes not only species we consider rare, threatened, or endangered but also every living thing—from humans to organisms we know little about, such as microbes, fungi, and invertebrates. Biodiversity and Conservation, we include humans and human cultural diversity as a part of biodiversity. We use the term "biocultural" to describe the dynamic, continually evolving and interconnected nature of people and place, and the notion that social and biological dimensions are interrelated. This concept recognizes that human use, knowledge, and beliefs influence, and in turn are influenced, by the ecological systems of which human communities are a part. Biodiversity is important to most aspects of our lives. Biodiversity is the resource base on which our future generation's fate is predicated [4]. We value biodiversity for many reasons, some utilitarian, some intrinsic. Utilitarian values include the many basic needs humans obtain from biodiversity. Biodiversity meets human demands for goods such as food, fodder, fuel, medicine, timber, resins, and oil [5]; and services such as climate regulation, pollution control, soil and water purification and conservation, nutrient cycling, pollination, seed dispersal, control of agricultural pests. and recreation [6,7]. To fulfill the aims of poverty reduction and sustainable development, biodiversity must be conserved. Given the changes that have occurred in the Karnal district, it continues to be investigated from a taxonomic standpoint. Due to intensive agriculture practice, urbanization, industrialization, and other causes, this occurred in the previous several decades. This is an attempt to cover plant biodiversity from this perspective in order to give information on plants based on their present status

MATERIAL AND METHODS

Study Area

Karnal district is located in Haryana State, India, and is bordered on the north by latitudes 29°25'05" and 29°59'20" and on the east by longitudes 76°27'40" and 77°13'08". (fig.1). The district has a total size of 1,967 km2. Soil types in various sections of the district include loamy clay, loam, clay, and sandy. The average annual temperature is 25°C, with an average annual rainfall of 696 mm, the majority of which falls during the monsoon season. The area's primary climatic characteristics are frigid winters, scorching summers, and relatively little rainfall.

METHODOLOGY

To conduct research on plant variety in the Karnal district of Haryana, India, the study area was first chosen and split into several sections for ease and methodical investigation. A general survey of the vegetation was conducted, and various species such as herbs, shrubs, and trees were noticed. To achieve the best results, extensive field surveys were done in various regions of the city throughout various seasons through frequent field visits in 2020-2021.

Standard procedures for collecting specimens, preserving them, and gathering information were used across order to acquire the most accurate representation of the diverse plant species, extensive field surveys were undertaken in the region during various seasons through frequent field visits [8]. Plant samples were gathered and photographs of specific species were taken during our field excursions to agricultural fields, natural habitats, wastelands, road sides, railway lines, and parks. Farmers, herbalists, and locals living in and around the research region provided the majority of data. The majority of the material was supplied by persons in their eighties and nineties who had had a lengthy relationship with plants. Informal interviews and discussions were used to gather information. All species were photographed in their native environment and identified using the available floras and other literature. [9 – 14].The data in this research paper is also analyzed with the help of virtual herbaria on different web resources mainly Flowers of India and eflora of India. For systematic arrangement of families Bentham and Hooker system of classification is used. The various species enlisted here are tabulated with latest botanical names, habit and local names in this area.

Fig 1:Map Showing Study Area

RESULT

The study's findings are listed in Table 1. A total of 221 flowering plants from 61 families and 169 genera have been identified in Karnal city (Fig. 2).

Table 1. Enumeration of important vegetation collected from study area

Sr. no.	Family/ Genus	Species	Vernacular Name	Habit of plant
1.	**RANUNCULACEAE**			
	Ranunculus	*Ranunculus sceleratus*L.	Jaldhaniya	Herb
2.	**MENISPERMACEAE**			
	Cocculus	*Cocculus hirsutus*(L.)Diels.	Karta ki Bel	Climber
	Tinospora	*Tinospora cordifolia*(Willd.) Miers	Gulel	Climber
3.	**FUMARIACEAE**			
	Fumaria	*Fumaria indica (Haussk.)* Pugsley	Pitpapra	Herb
4.	**PAPAVERACEAE**			
	Argemone	*Argemone mexicana L.*	Satyanashi	Herb
5.	**BRASSICACEAE**			
	Coronopus	*Coronopus didymus* (L.) Smith	JangliHalon	Herb
	Lepidium	*Lepidium sativum* L	Haleo	Herb
	Sisymbrium	*Sisymbrium irio* L	JangliSarson	Herb
	Rorippa	*Rorippa indica* (L.) Hiern	Khubkalan	Herb
6.	**CAPPARIDACEAE**			
	Capparis	*Capparis decidua* (Forssk.) Edgew	Dela, Karir	Shrub
		C. zeylanica L	Aradanda	Shrub
	Cleome	*Cleome viscosa* L.	Hulhul	Herb
7.	**VIOLACEAE**			
	Viola	*Viola pilosa*Blume	Banafsha	Herb
8.	**CARYOPHYLLACEAE**			
	Spergula	*Spergula arvensis* L	Janglidhania,bandhania	Herb
	Stellaria	*Stellaria media* (L.) Villars	Buchbucha	Herb
9.	**PORTULACACEAE**			
	Portulaca	*Portulaca oleracea* L.	Kulfa, Lunak	Herb
		P. quadrifida L.	Lunak	Herb
10.	**DIPTEROCARPACEAE**			
	Shorea	*Shorea robusta*Gaertn.	Sheesham	Tree
11.	**BOMBACEAE**			
	Bombax	*Bombax ceiba*L.	Semal	Tree
12.	**MALVACEAE**			
	Abelmoschus	*Abelmoschus moschatus*Medik.	Muskdana	Herb
	Abutilon	*Abutilon indicum* (L.) Sweet	Kanghi	Shrub
	Ceiba	*Ceiba pentandra*	Shalmali tantu	Tree
	Corchorus	*Corchorus trilocularis* L	Narcha	Herb
	Alcea	Alcea rosea	Gulkhaira	Herb
	Hibiscus	*Hibiscus vitifolius* L.	Ban Kapas	Herb
	Malva	*Malva parviflora* L	Sonchal	Herb
	Malvastrum	*Malvastrum coromandelianum*(L.) Gar	Khrent	Herb
	Melochia	*Melochia corchorifolia* L	Chitrabeez	Herb
	Sida	*Sida cordifolia* L	Khrent	Herb
		*S. ovata*Forssk.	Dabi	Herb
		S. rhombifolia L	Swetbala	Herb
	Urena	*Urena lobata* L.	Bachita	Shrub
13.	**STERCULIACEAE**			
	Pterospermum	*Pterospermum acerifolium*(L.)Willd.	Kanakchampa	Tree
14.	**TILIACEAE**			
	Corchorus	*Corchoru solitorius L.*	Pat Sag	Shrub
		Corchorus capsularis L.	PattaShaak	Shrub
15.	**ZYGOPHYLLACEAE**			
	Balanites	*Balanites aegyptiaca* (L.) Del.	Hingot	Tree
	Tribulus	*Tribulus terrestris*L.	Gokhru	Herb
16.	**OXALIDACEAE**			
	Oxalis	*Oxalis corniculata* L.	Khattamitha	Herb
		O. debilisKunth var. corymbosa (DC.) Lourteig		Herb
		*O. latifolia*Kunth.	Khatmithi	Herb

	Tamarix	*Tamarix aphylla* (L.) H. Karst	Farash	Tree
		*T. dioica*Roxb. ex Roth	Jhau	Tree
17.	**RUTACEAE**			
	Aegle	*Aegle marmelos* (L.) Correa	Bel Pattar	Tree
	Murraya	*Murraya koenigii* (L.) Spreng	Karipatta	Tree
18.	**MELIACEAE**			
	Azadirachta	*Azadirachta indic*a A. Juss	Neem	Tree
	Melia	*Melia azedarach* L	Bakain	Tree
	Toona	*Toona ciliata*	Tuna	Tree
19.	**RHAMNACEAE**			
	Zizyphus	*Zizyphus jujuba*Lamk.	Ber, Beri	Tree
		Z. nummularia (Burm.)Wt.&Arn	JhadBer	Tree
20.	**VITACEAE**			
	Cayratia	*Cayratia trifolia*(L.)Domin	Ramchana	Shrub
21.	**ANACARDIACEAE**			
	Mangifera	*Mangifera indica*L.	Aam	Tree
22.	**MORINGACEAE**			
	Moringa	*Moringa oleifera*Lamk	Sonjana	Tree
23.	**FABACEAE**			
	Alhagi	*Alhagi pseudalhagi* (Bieb.) Desv.	Bharbharra	Shrub
		A. monilifer (L.) DC	JuhiGhas	Herb
	Bauhinia	*Bauhinia purpurea* L.	Kachnar	Tree
		B. variegata L.	Kachnar	Tree
	Butea	*Butea monosperma* (Lamk.) Taub.	Dhak, Palash	Tree
	Crotalaria	*Crotalaria medicaginea* Lam.		Herb
	Dalbergia	*Dalbergia sissoo*Roxb.;	Shisham	Tree
	Delonix	*Delonix regia*(Boj. Ex Hook) Raf.	Gulmohar	Tree
	Desmodium	*Desmodium gangeticum*(L.) DC	Salpalni	Herb
		D. triflorum (L.) DC.	Kudaliya	Herb
	Erythrina	*Erythrina suberosa*Roxb.	Dhauldhak	Tree
	Indigofera	*Indigofera linifolia* Retz.	Sankhahul	Herb
	Lathyrus	*Lathyrus aphaca* L.	JangliMatar	Herb
	Melilotus	*Melilotus alba*Medik. ex Desv	Safed Ban-methi	Herb
		M. indica (L.) All.	Senji	Herb
	Pongamia	Pongamia pinnata (L.) Pierre	Karanj	Tree
	Sesbania	*Sesbania sesban*(L.) Merr	Dhaincha	Shrub
	Tephrosia	*Tephrosia purpurea*(L.) Pers	Sharpunkha	Herb
	Vicia	*Vicia hirsuta* (L.) Gray	Jhunjhuni	Herb
24.	**CAESALPINACEAE**			
	Caesalpinia	*Caesalpinia bonduc* (L.) Roxb	Kantkranj	Shrub
	Cassia	*Cassia occidentalis* L.	BadiKasondi	Herb
		C. tora L.	Chakvad	Herb
	Parkinsonia	*Parkinsonia aculeata* L.	Vilaytikikar	Shrub
	Tamarindus	*Tamarindus indica* L.	Imli	Tree
25.	**MIMOSACEAE**			
	Acacia	*Acacia nilotica* (L.) Willd. ex Del	Kikar, Babool	Tree
	Albizzia	*Albizzialebbeck* (L.) Benth	Kala Siris	Tree
		A. procera (Roxb.) Benth	Siris	Tree
	Millettia	*Milletti a*peguensis Ali	Tuma	Tree
	Mimosa	*M. pudica* L.	Lajwanti	Herb
	Prosopis	*Prosopis cineraria* (L.) Druce	Jandi	Tree
26.	**COMBRETACEAE**			
	Terminalia	*Terminalia arjuna (*Roxb. ex DC.) Wt. &Arn	Arjun	Tree
		T. bellerica (Gaetn.) Roxb	Baheda	Tree
		T. chebula Retz.	Harad	Tree
27.	**MYRTACEAE**			
	Eucalyptus	*Eucalyptus camaldulensis*Dehnh	Safeda	Tree
	Syzygium	*Syzygium cumini* (L.) Skeels	Jamun	Tree
		S. nervosum DC	Jamoa	Tree
28.	**LYTHRACEAE**			

	Ammannia	*Ammannia baccifera* L	JangliMehandi	Herb
		A. coccinea Rottb.	Aginbuti	Herb
	Lawsonia	*Lawsonia inermis* L.	Mehandi	Shrub
29.	**CUCURBITACEAE**			
	Coccinia	*Coccinia indica* Wt. &Arn	Ram Kachri	Climber
	Cucumis	*Cucumis callosus*L.	Kachri	Climber
30.	**ONAGRACEAE**			
	Ludwigia	*Ludwigia perennis* L.		Herb
		L. octovalvis (Jacq.) P.H. Raven	Banlumga	Herb
31.	**CACTACEAE**			
	Opuntia	*Opuntia elatior* Mill.	Hath-hathoria	Shrub
		O. monacantha (Willd.) Haw.	Nagphani	Shrub
32.	**AIZOACEAE**			
	Trianthema	*Trianthema portulacastrum* L.	Santhi	Herb
33.	**APIACEAE**			
	Apium	*Apium graveolens*L.	Shalari	Herb
34.	**ASTERACEAE**			
	Ageratum	*Ageratum conyzoides*L.	Janglipudina	Herb
	Artemisia.	*Artemisia scoparia*Waldst. & Kit.	Seeta-bani	Herb
	Blumea	*Blume alaciniata*(Roxb.) DC.	Kakranda	Herb
	Cirsium	*Cirsium arvense*(L.) Scop.	Kateli	Herb
	Echinops	*Echinops* echinatusRoxb.	Utakatira	Herb
	Eclipta	*Eclipta prostrata*(L.) L.	Bhringaraj	Herb
	Galinsoga	*Galinsoga parviflora*Cav.		Herb
	Gnaphalium	*Gnaphalium indicum*L.	Buchbucha	Herb
	Launaea	*Launaea procumbens*(Roxb.) Ram. & Raj.	Jangligobhi	Herb
	Parthenium.	*Parthenium hysterophorus*L.	Gajarghas	Herb
	Sonchus	*Sonchus arvensis*L.	BadiSahadevi	Herb
		*S. oleraceus*L.	Pili Dudhi	Herb
	Tridax	*Tridax procumbens*L.	Khal-muriya	Herb
	Xanthium	*Xanthium strumarium*L.	*Chhotadhatura*	Shrub
35.	**PLUMBAGINACEAE**			
	Plumbago	*Plumbago zeylanica* L.	*Chitrak*	Shrub
36.	**PRIMULACEAE**			
	Anagallis	*Anagallis arvensis* L.	Jonkmari	Herb
37.	**APOCYANACEAE**			
	Alstonia	*Alstonia scholaris* (L.) R. Br	Alstonia	Tree
	Calotropis	*Calotropis gigantea* (L.)W.T.Aiton	BadaAak	Shrub
		C. procera (Ait.) R. Br.	Aak	Shrub
	Dregea	*Dregea volubilis* (L. f.) Benth. ex Hook. f.	Hemajivanti	Climber
	Nerium	*Nerium oleander* L.	Kaner	Shrub
	Pergularia	*Pergularia daemia* (Forsk.) Chiov	Aaksan	Climber
	Tabernaemontana	*Tabernaemontana diverticata* (L.) R.Br. ex Roem. &Schult	Chandani	Shrub
38.	**BORAGINACEAE**			
	Cordia	*Cordia dichotoma*Forst f.	Lasura	Tree
	Heliotropium	*Heliotropium europaeum* L.	Hathi-sund	Herb
39.	**CONVOLVULACEAE**			
	Convolvulus	*Convolvulus arvensis* L.	Hiranpag	Climber
		*C. microphyllus*Sieb. ex Spr.	Shankhpushpi	Herb
	Cuscuta	*Cuscuta chinensis* Lam.	Amarbel	Climber
		*C. reflexa*Roxb.	Amarbel	Climber
	Ipomoea	*Ipomoea carnea* Jacq.	Behaya	Climber
		I. obscura(L.) Ker Gawl	Pan bel	Climber
40.	**SOLANACEAE**			
	Datura	*Datura metel* L.	Dhatura	Shrub
		D. stramonium L.	Kala Dhatura	Shrub
	Nicotiana	*Nicotiana plumbaginifolia* Viv.	Ban tamaku	Herb
	Physalis	*Physalis angulata* L.	Palpottan	Herb

	Solanum	*Solanum hispidum* Pers.	Bhurat	Shrub
		S. nigrum L.	Makoi	Herb
		S. torvum Sw.	Bhankatiya	Shrub
	Withania	*Withania somnifera* (L.) Dunal	Asgand	Shrub
41.	**SCROPHULARIACEAE**			
	Antirrhinum	*Antirrhinum orontium* L.		Herb
	Bacopa	*Bacopa monnieri* (L.) Penn	Brahmi	Herb
42.	**PEDALIACEAE**			
	Sesamum	*Sesamum indicum* L.	Til	Herb
43.	**BIGNONIACEAE**			
	Haplophragma	*Haplophragma adenophyllum*(Wall. *ex* G. Don) Dop		Tree
	Jacaranda	*Jacaranda mimosifolia* D. Don	Neela-gulmohar	Tree
	Kigelia	*Kigelia africana*(Lam.) Benth	BalamKheera	Tree
	Tecoma	*Tecoma stans*(L.) Juss.*ex*Kunth	Tecoma	Shrub
44.	**ACANTHACEAE**			
	Barleria	*Barleria prionitis* L.	Kala Bansa	Shrub
	Dicliptera.	*Dicliptera paniculata* (Forssk.) I. Darbysh.	Atrilal	Herb
	Justicia	J*usticia adhatoda*L.	Bansa, Basuti	Shrub
	Peristrophe	*Peristrophe bicalyculata*(Retz.)Nees	Kali Aghedi	Herb
45.	**VERBENACEAE**			
	Clerodendrum	*Clerodendrum indicum*(L.) Kuntze	Bharangi	Shrub
	Duranta	*Duranta erecta*L.	AakashPhul	Shrub
	Gmelina.	*Gmelin aarborea*Roxb.	Bhadraparni	Tree
	Lantana	*Lantana camara*L.	Raimuniya	Shrub
	Tectona	*Tectona grandis*L.f.	Sagwan	Tree
	Verbena	*Verbena officinalis*L.	Pamukh	Herb
	Vitex.	*Vitex negundo*L.	Sambhalu	Shrub
46.	**LAMIACEAE**			
	Anisomeles	*Anisomeles indica*(L.) Kuntze	Kala Bhangra	Herb
	Leucas	*Leucas cephalotes*(Roth) Spreng	Bishkhapru	Herb
	Ocimum	*Ocimum tenuiflorum*L.	Tulsi	Herb
		*Ocimum americanum*L.	Kali tulsi	Herb
		*Ocimum basilicum*L.	Ban tulsi	Herb
47.	**NYCTAGINACEAE**			
	Boerhaavia	*Boerhaavia chinensis* (L.) Rottb.	Punarnava	Herb
		B. diffusa L.	Santhi	Herb
	Mirabilis	*Mirabilis jalapa* L.	Gulabbas	Herb
48.	**AMARANTHACEAE**			
	Achyranthes	*Achyranthes aspera* L	Chirchita, Latjira	Herb
	Alternanthera	*Alternanthera ficoidea* (L.) Sm	Reshamkatha	Herb
		A. sessilis (L.) DC.	Garundi	Herb
	Amaranthus	*Amaranthus spinosus*L.	Kntahauli	Herb
		Amaranthus viridis L.	Chaulai	Herb
	Celosia	*Celosia argentea* L.	Sarwari	Herb
	Digera	*Digera muricata* (L.) Mart.	Tandla	Herb
	Gomphrena	*Gomphrena celosioides* Mart.	Kasia	Herb
49.	**CHENOPODIACEAE**			
	Chenopodium	*Chenopodium album* L.	Bathua	Herb
50.	**POLYGONACEAE**			
	Polygonum	*Polygonum barbatum* L.	Narri	Herb
		*P. glabrum*Willd		Herb
	Rumex	Rumex dentatus L.	JangliPalak	Herb
51.	**EUPHORBIACEAE**			
	Acalypha	*Acalypha indica* L.	Kuppi	Herb
	Croton	*Croton bonplandianum*Baill.	Kala Bhangra	Herb
	Emblica	*Emblica officinalis*L.	Amla	Tree
	Euphorbia	*Euphorbia cyathophora*Murr.	Titliphool	Herb
		E. helioscopia L.	Dudhya	Herb
		Euphorbia heterophylla L.	Badidudhi	Herb

		E. hirta L	Dudhi	Herb
		E. prostrata Ait	DudhiaBooti	Herb
		E. serpens Kunth	Dudhi	Herb
	Jatropha	*Jatropha curcas* L	Ratanjot	Shrub
		J. gossypifolia L	Bherenda	Shrub
	Mallotus	*Mallotus nudiflorus* (L.)Kul.&Wel.;	Pindalu	Tree
	Phylanthus	*Phylanthus leucopyrus*Willd	Shinar	Shrub
		*Phyllanthus amarus*Schum	Jangliamla	Herb
		P. fraternus Web	Dhadhan, Mokh	Herb
	Putranjiva	*Putranjiva roxburghii*Wall	Pitrunjia	Tree
	Ricinus	*Ricinus communis* L	Arandi	Tree
52.	**ULMACEAE**			
	Holoptelea	*Holoptelea integrifolia* (Roxb.) Planch.	Papri	Tree
53.	**CANNABACEAE**			
	Cannabis	*Cannabis sativa* L.	Bhang	Shrub
54.	**MORACEAE**			
	Ficus	*Ficu sbenghalensis* L.	Bargad, Bar	Tree
		F. palmata Forssk	Anjiri	Tree
		F. racemosa L.	Goolar	Tree
		F. religiosa L.	Peepal	Tree
		*F. virens*Aiton	Pilkhan	Tree
	Morus	*Morus alba* L.	Tut, Tutri	Tree
		*M. macroura*Micq	Shahtoot	Tree
55.	**MUSACEAE**			
	Musa	*Musaaurantiaca* G. Mann *ex* Baker	JangliKela	Herb
56.	**AGAVACEAE**			
	Agave	*Agave Americana L.*	Gwarpatha	Herb
57.	**LILIACEAE**			
	Asphodelus	*Asphodelustenuifolius*Cav.	JangliPiyaz	Herb
	Asparagus	*AsparagusracemosusWilld.*	Shatavari	Herb
58.	**COMMELINACEAE**			
	Commelina	*Commelinabenghalensis* L.	Kanteri	Herb
59.	**ARECACEAE**			
	Phoenix	*Phoenixdactylifera*L.	Khajoor	Tree
60.	**CYPERACEAE**			
	Cyperus	*Cyperuscompactus* Retz.	Dila	Herb
		C. iria L.	Motha	Herb
		C. rotundus L.	Bara-nagarmotha	Herb
61.	**POACEAE**			
	Arundo	*Arundodonax* L.	Narsal	Herb
	Cymbopogon	*Cymbopogon martini* (Roxb.) Wats	Sofia	Herb
	Cynodon	*Cynodondactylon* (L.) Pers	Doob	Herb
	Digitaria	*Digitariaciliaris* (Retz.) Koel		Herb
	Eleusine	*Eleusineindica* (L.) Gaertn.	Mandla	Herb
	Phalaris	*Phalaris minor* Retz	Chiriya-bajra	Herb
	Saccharum	*Saccharummunja*Roxb	Sarkanda	Herb
		S. spontaneum L.	Kaans	Herb
	Setaria	*Setariaglauca* (L.) Beauv	Bandra	Herb
		S. verticillata (L.) Beauv	Laptuna	Herb

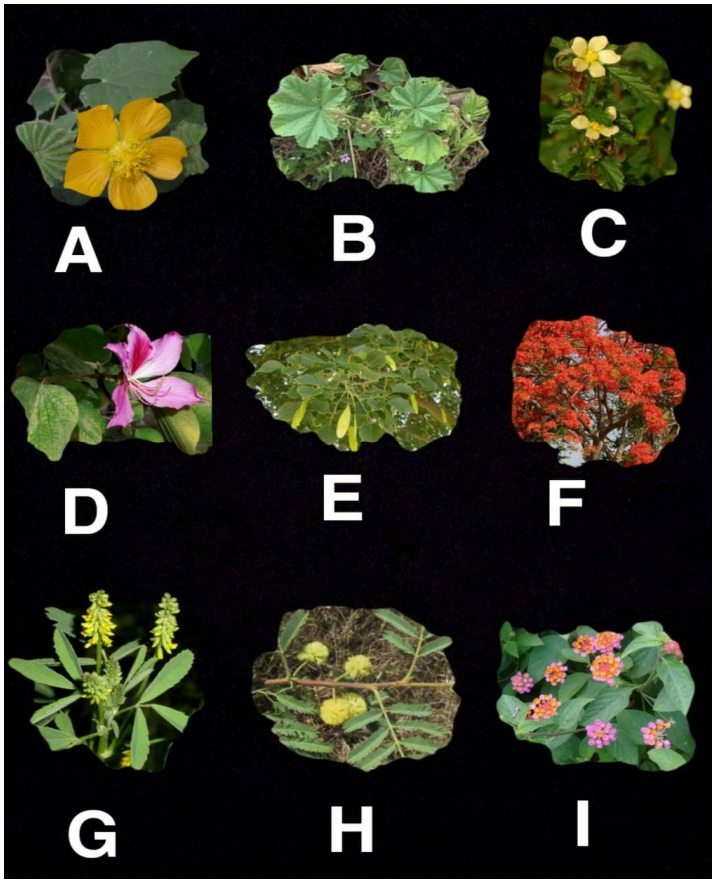

Fig 2 .A. ***Abutilon indicum*****,B.***MalvaparvifloraC. Malvastrumcoromandelium***D.** ***Bauhinia purpurea*****E.** ***Dalbergiasissoo*****F.***Delonixregia* **G.** ***Melilotusindius* H.** ***Acacia nilotia* I.***Lantana camara.*

Fig.3 J. ***Millettiapinnata* K.** ***Ageratum conezoides* L.** ***Partheniumhysterophorus* M.** ***Alstoniascholaris* N.** ***Calotropisprocera* O.** ***Tabernamontanadivericata* P.** ***Withaniasomnifera* Q.** ***Physalis minima* R.** ***Durantaerecta.***

RESULT

There are 212dicotyledon species (154 genera, 54 families) and 19 monocotyledon species among them (15 genera, 7 families)(Fig5 &6). When it comes to habit groupings, herbs make up the largest category with 120 species (54.30 percent) that followed by 54 species (24.43 percent) of trees, 36 species (16.29 percent) of shrubs, and 11 species (4.98 percent) of climbers (Fig. 4).

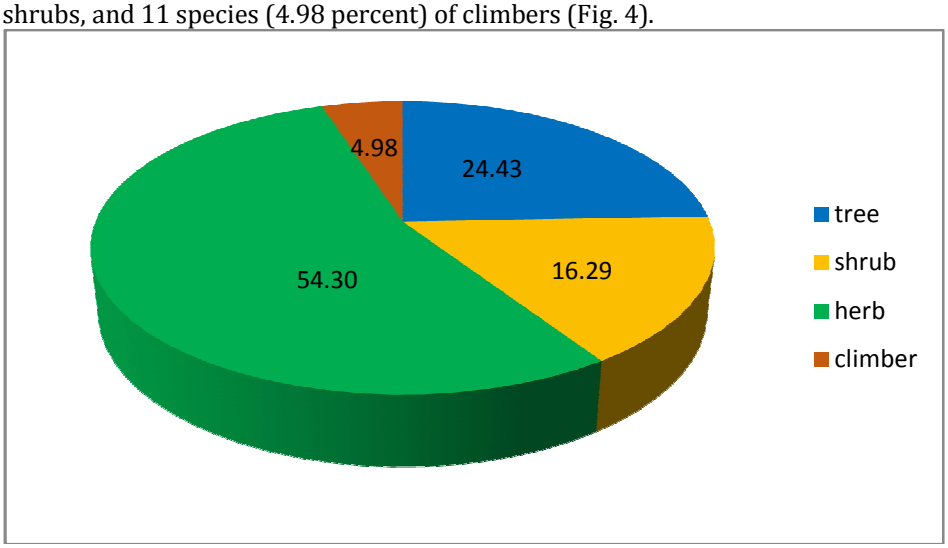

Figure 4: Proportion of Different Habit Groups

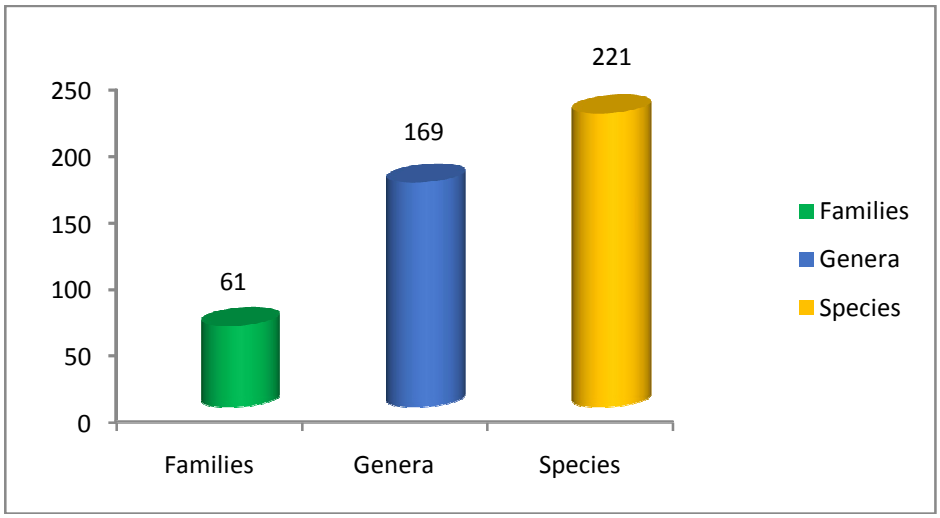

Fig. 5: Total number of families, genera and species recorded.

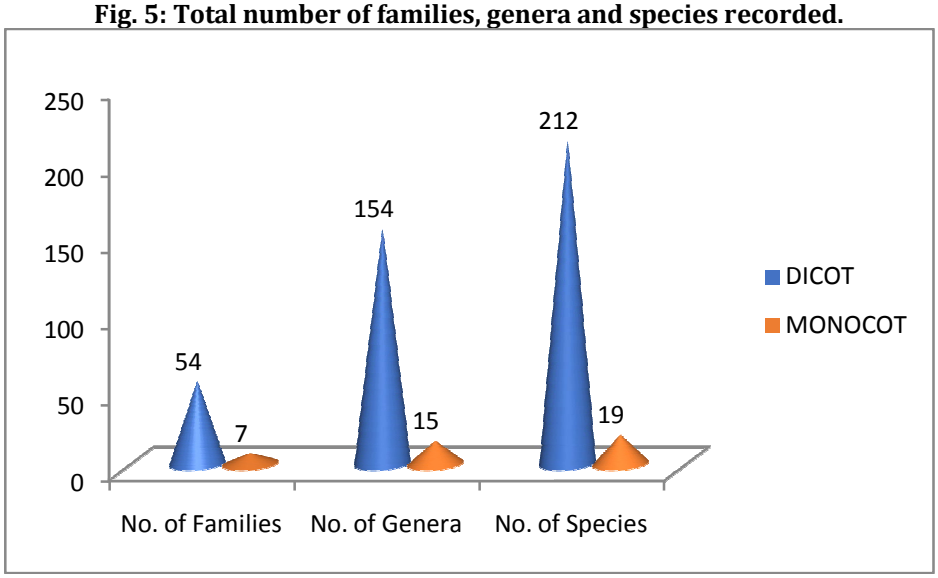

Fig. 6 :Comparison of families, genera, species of Monocotsand Dicots.

Table-2 : Family wise number of genera and species present in the study area

S No.	Family	No. of Genera	No. of Species	S No.	Family	No. of Genera	No. of Species
1.	Ranunculaceae	1	1	32.	Aizoaceae	1	1
2.	Meninspermaceae	2	2	33.	Apiaceae	1	1
3.	Fumariaceae	1	1	34.	Asteraceae	13	14
4.	Papaveraceae	1	1	35.	Plumbaginaceae	1	1
5.	Brassicaceae	4	4	36.	Primulaceae	1	1
6.	Capparidaceae	2	3	37.	Apocynaceae	6	7
7.	Violaceae	1	1	38.	Boranginaceae	2	2
8.	Caryophyllaceae	2	2	39.	Convolvulaceae	3	6
9.	Portulacaceae	1	1	40.	Solanaceae	5	8
10.	Dipterocaepaceae	1	1	41.	Scrophulariaceae	2	2
11.	Bombacaceae	1	1	42.	Pedaliaceae	1	1
12.	Malvaceae	10	13	43.	Bignoniaceaea	4	4
13.	Sterculiaceae	2	2	44.	Acanthaceae	4	4
14.	Tiliaceae	1	2	45.	Verbenaceae	7	7
15.	Zygophyllaceae	2	2	46.	Lamiaceae	3	5
16.	Oxalidaceae	2	5	47.	Nyctanginaceae	2	3
17.	Rutaceae	2	2	48.	Amaranthaceae	6	8
18.	Meliaceae	3	3	49.	Chenopodiaceae	1	1
19.	Rhamnaceae	1	2	50.	Polygonaceae	2	3
20.	Vitaceae	1	1	51.	Euphorbiaceae	9	17
21.	Anacardiaceae	1	1	52.	Ulmaceae	1	1
22.	Moringaceae	1	1	53.	Cannabaceae	1	1
23.	Fabaceae	15	19	54.	Moraceae	2	7
24.	Caesalpinaceae	4	5	55.	Musaceae	1	1
25.	Mimosaceae	5	6	56.	Agavaceae	1	1
26.	Combretaceae	1	3	57.	Liliaceae	2	2
27.	Myrtaceae	2	3	58.	Commelinaceae	1	1
28.	Lythraceae	2	3	59.	Arecaceae	1	1
29.	Cucurbitaceae	2	2	60.	Cyperaceae	1	3
30.	Onagraceae	1	2	61.	Poaceae	8	10
31.	Cactaceae	1	2				

Fig 7 depicts the ten most powerful families. The dominant family is Fabaceae(15 genera, 19 species), which has followed byAsteraceae (13 genera,14 species),Malvaceae (10 genera,13 species), Euphorbiaceae (9 genera,17 species), , Poaceae (8 genera,10 species),Verbenaceae (7 genera,7 species), Amaranthaceae (6 genera, 8 species), Apocynaceae(6 genera,7 species) and Solanaceae (5 genera, 8 species),Mimosaceae (5 genera,6 species),Caesalpinaceae (4 genera,5 species), Brassicaceae, Bignoniaceae and Acanthaceae (4 genera, 4 species each), convolvulaceae (3 genera,6 species), Lamiaceae (3 genera,5 species), Moraceae(2 genera,7 species)and Oxalidaceae (2 genera,5 species), Capparidaceae, Myrtaceae, Lythraceae, Nyctanginaceae, Polygonaceae (2 genera,3 species), Scrophulariaceae, Liliaceae (2genera,2species), Combretaceae, Cyperaceae (1genera,3species), Meninspermaceae, Caryophyllaceae, Sterculiaceae, Zygophyllaceae, Rutaceae, Cucurbitaceae, Boranginaceae, Combretaceae, Cyperaceae (1genera,3species), Tiliaceae, Rhamnaceae, Onagraceae, Cactaceae (1genera,2species), Ranunculaceae, Fumariaceae, Papaveraceae, Violaceae, Portulacaceae, Dipterocaepaceae, Bombacaceae, Vitaceae, Anacardiaceae, Moringaceae, Aizoaceae, Apiaceae, Plumbaginaceae, Primulaceae, Pedaliaceae, Chenopodiaceae, Ulmaceae, Cannabaceae, Musaceae, Agavaceae, Commelinaceae, Arecaceae (1 genera, 1 species).

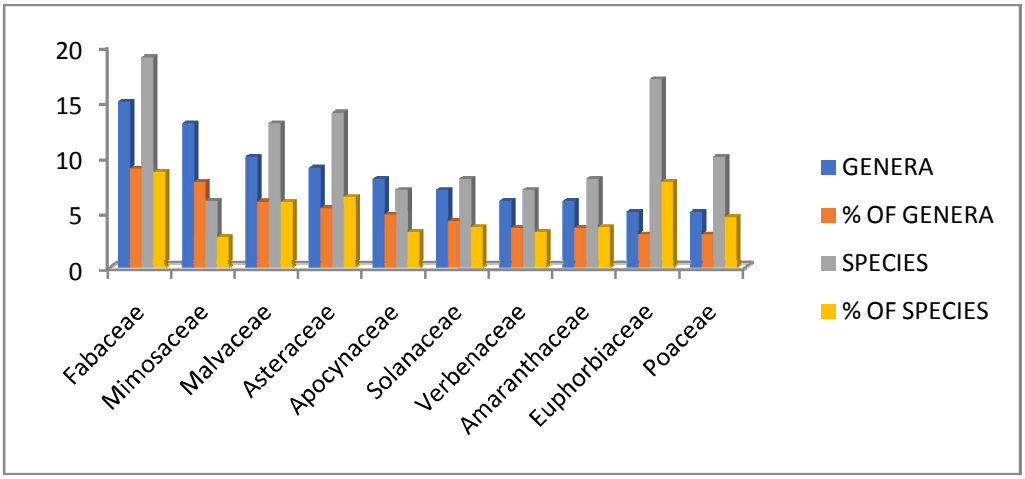

Fig.7: Comparison of species and genera of ten dominant families.

Syzygium cumini is the dominant tree species in Karnal City followed by *Cassia fistula, Cassia occidentalis,Mallotus nudiflora, Delonix regia,Terminalia arjuna, Dalbergia sissoo, Holoptela integrifolia, Alstonia scolaris Toona ciliata, Azadirachta indica, Melia azadirach ,Ficus benghalensis,Ficus religiosa, Acacia nilotica, Eucalyptus spp., Bauhinia varigeta.* Beside these other prominent trees are *Butea monosperma, Zizyphus mauritiana, Albizia leeback, Aegle marmelos, Melettia pinnata, Pterospermum acerifolium, Murraya koengii, Terminalia bellerica, Terminalia chebula, Phyllanthus emblica, Ficus virens, Ficus recimosa* .In our study the most common shrubs presents in city area are *Abutilon indicum , Barleria prionitis , Calotropis procera , Cannabis sativa, Capparis decidua, Clerodendrum indicum, Corchorus capsularis, Datura stramonium, Duranta erecta, Jatropha curcus, Lantana camara, Lawsonia inermis , Nerium olender, Opuntia elatior, Parkinsonia aculeata, Plumbago zeylenica, Rouwolfia , Ricinus communis,Sesbania sesban, Solanum nigrum, Tabernamontana adiverticata, Tecoma stans, Tribulus terrestris, Withania somnifera, Xanthium strumarium*. The most prevalent herbs found in city areas, according to our research, are Ageratum conyzoides , *Alternanthera ficoidea, Amaranthus virdis, Anagalis arvensis, Argemone maxicana, Asparagus, Boerhaavia diffusa, Cassia tora, Chenopodium album, Convolvulus arvensis, Crotolaia medicaginea Cynodon dactylon, Cyperusrotundus, Desmodium gangaticum, Eclipta prostrata, Euphorbia hirta, Fumaria indica, Gomphrena celosioides, Lathyrus aphaca, Launaea, Malva parviflora, Malvastrum coromandelianum, Melilotus, Mirabilis jalapa, Ocimum basilicum, Oxalis corniculata, Parthenium hysterophorus, Phyllanthus niruri, Physalis minima, Portulaca oleracea, Ranunculus scleratus, Rumex dentatus, Saccharum munja ,Sesamum, Setaria virdis, Sida cordifolia, Sisymbrium irio, Solanum nigrum, Sonchus arvensis, Stellaria media, Verbena officinalis.*

DISCUSSION

The intrinsic value of biodiversity refers to its inherent worth, which is independent of its value to anyone or anything else. This is more of a philosophical concept, which can be thought of as the inalienable right to exist. The different values placed on biodiversity are important because they can influence the conservation decisions people make every day. Over the last century, humans have come to dominate the planet, causing rapid ecosystem change and massive loss of biodiversity across the planet. This has led some people to refer to the time we now live in as the "anthropocene." By understanding threats to biodiversity, and how they play out in context, we can be best prepared to manage conservation challenges. The lifestyle choices of individuals and communities can have a large effect on their impacts on biodiversity and the environment. It's also been stated that regional patterns of species richness are the result of a number of interconnected causes, including regional species dynamics, regional species pool, environmental variables, and historical or evolutionary development human endeavor [15].

Major threats to ecosystems and biodiversity are habitat loss and fragmentation, overexploitation, pollution, invasions of alien species, and global climate change with disruption of community structure. The rapid losses in floristic diversity and changing pattern of vegetation due to various biotic and abiotic factors have necessitated the qualitative and quantitative assessment of vegetation. Climate, productivity, biotic interactions, and habitat heterogeneity have all been used to describe variation in species diversity along environmental gradients, which is an important subject in ecological research [16, 17, 18]

For many people, biodiversity is something that is associated with rural areas, where you can see the various species of plants and animals alive and thriving. It's important to remember that biodiversity also exists in cities and other urban areas, and perhaps the reason we don't notice biodiversity so easily in

these places is because we need to help it flourish. Urban ecosystems are much complex social-ecological systems with various functions. Certain areas in these man-made ecosystems have high biological diversity, including both remnant species and species purposefully or unintentionally introduced by human actions. In urban sprawl both common and less common species may be present in various valuable habitats [19,20]. The local populations get benefits from this biodiversity, by getting aesthetic pleasure and information on seasonal changes. The cities have an artificially developed diversified habitat within urban limits which provides shelter and protection to a variety of flora and fauna species. Further, urban green spaces in the form of artificial parks and agricultural fields have the diversity of flora, whereas artificial lakes are the sites of wetland species. Plant diversity and abundance are indicators of the condition of habitats, both terrestrial and wetland [21]. The pattern of biodiversity in an urban area largely determines ecosystem services at that place. To keep these biological indicators healthy, conditions should be managed to encourage survival and growth [22,23]. Further, to support an integrative approach in urban green planning, both ecological and social research has to be incorporated in the planning process.

CONCLUSION

Taxonomy knowledge is an excellent tool for identifying various plant species. To tackle the difficulties of biodiversity conservation in the twenty-first century, taxonomic knowledge is essential. It's crucial for understanding biodiversity and ecosystem functioning because it gives us the data we need to explore and describe biodiversity using scientific methods. The current research offers basic information on the many plant species that may now be found in the Karnal city. Such a list might be useful for local and regional governments interested in preserving this valuable phyto-diversity for better future usage and wellbeing

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