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FLORISTIC DIVERSITY OF DASUYA FOREST DIVISION OF PUNJAB: AN AREA ALONG FOOTHILLS OF SHIVALIK RANGE

Kuljinder Kaur*
Department of Botany, Akal University, Talwandi Sabo, Bathinda, Punjab-151302, India
Email: kuljinder_bot@auts.ac.in

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ABSTRACT

Present study was carried out in the Dasuya Forest Division of Punjab. A total of 16 villages falling under this division was selected to document the floristic diversity of the area under investigation. Frequent field visits were undertaken in different seasons of the financial year 2018-19. Altogether 238 species of vascular plants belonging to71 families and 194 genera were enumerated. Out of these, 234 species belong to angiosperms including 207 dicotyledons and 27 monocotyledons, three species to pteridophytes and only one species to bryophyte. The predominant families of the study area were Asteraceae, Fabaceae, Poaceae and Malvaceae. Nearly 60% of the total flora of this area is native in origin and remaining are exotic plants from varied origins. Some exotic plants were invading, some were introduced and many were completely naturalized in the area. Majority of the taxa were herbs with 102 species followed by trees71, shrubs 39, climbers 22 and lianas with 4 species only. All the plant species with their common name, families, distribution, habit and native status are presented in this paper. This is the first comprehensive list of wild plant species of Dasuya Forest Division which is a solid basis for future management and conservation practices of this area.

***Keywords*:** Dasuya, Forest division, Floristic diversity, Foothills, Shivalik, Vascular plants

INTRODUCTION

Floral diversity refers to the variety of plant species occurring in a given region during particular time period. A total of 3,74,000 known, described and accepted species of plants have been counted in the world, of which approximately 308,312 are vascular plants, with 295,383 flowering plants (Christenhusz & Byng, 2016). In the Annual Report (2017-2018), Botanical Survey of India stated that India harbours total 49,003known species including 18532 species of angiosperms, 81 species of gymnosperms, 1293 species of pteridophytes, 15223 species of fungi, 7396 species of algae, 2754 species of bryophytes, 2528 species of lichens and 1196 species of microbes. On the basis of floristic composition, India is classified into 11 different phytogeographical zones. The floral diversity is mainly concentrated in four phytogeographically unique regions namely Himalayas, Western Ghats, Northeast India and Andaman-Nicobar Islands. The Indian flora accounts for 11.5% of the total recorded plant species of the world and about 28% of the plant species are endemic to India (Botanical Survey of India, 2018).

Punjab state, covering an area of 50,362 km^2 is situated in the North West of India and is divided into Doaba, Malva and Majha regions. It occupies 1.54% of the country's total geographic area. Punjab has 84% of its total area under agriculture and only 6.07% is covered by forests. The major part of this forest cover is in Kandi area of Punjab comprises North-Eastern part of districts Gurdaspur, Pathankot, Hoshiarpur and Ropar. Kandi area is a transition zone between Shivalik hills and plains. Hence, it harbors mixed types of species composition and vegetation structure of two communities. According to Forest Research Institute report, (2016), Hoshiarpur district of which Dasuya Forest Division is a part has the highest forest cover of 20.29%of the total forest area of the state. Dasuya Forest Division is situated in the Kandi area of district Hoshiarpur. The area is sub-mountainous to undulated in nature. The area is dissected by various seasonal streams called 'Choes'.

Various workers (Sharma *et al*., 2009; Manhas *et al*. 2010; Rawat *et al*., 2013; Kaur *et al.,* 2017) have studied the flora of Kandi area of Punjab. No specific work on plants of Dasuya Forest Division was done previously except few reports of forest department. Plant diversity plays a pivotal role in sustainable management by maintaining biodiversity and conserving the environment (Farooquee and Saxena, 1996). As plants provide various direct or indirect services to the human population, it is the people's duty to conserve the surrounding plant wealth which is the product of hundreds of millions of years of evolutionary history. To understand the overall structure and function of any ecosystem, it is important to have knowledge of floristic composition of a plant community. Therefore, present study has been

undertaken to explore the plant species of Dasuya Forest Division which can be used as a baseline for future management, conservation, development and research activities.

MATERIAL AND METHODS

Study area

Present study was conducted in Dasuya Forest Division of Punjab. It is situated between 75º 56' 3" to 75º 55' 54" East Longitude and 31º 52' 30" to 31º 56' 44" North Latitude. It is bounded by Pathankot Forest Division on North, Gurdaspur forest division on west, Hoshiarpur Forest Division on south and Himachal Pradesh on East. A total of 6999.60 hectares of forest area is under this division which include government forest as protected forest and private/panchayat owned areas. In the present study, 16 villages that falls under Dasuya Forest Division were covered. The area of these villages is closed under section 4 & 5 of Punjab Land Preservation Act (PLPA) 1900.These villages fall under Dasuya, Talwara and Hajipur blocks of District Hoshiarpur. The geographical location of each village was recorded using GARMIN eTrex 30x GPS navigator and is shown in Figure 1.

Documentation of wild flora

For the documentation of wild floristic diversity of Dasuya Forest Division, selected villages have been surveyed since 2018-2019. The field visits were carried out in different seasons of the year with the aim of enumerating the diverse plant species prevailing in the area. Seasonal variations and frequency of occurrence of plants were observed in the time of field study. During the period of survey, different locations namely waste lands, bare lands, grass lands, roadsides, playgrounds, agriculture area, forest area, etc., were visited to record every possible plant species of study area. At the time of excursion, botanical name of plants, family, habit, habitat, location, date of collection and other field characters were noted in the field notebook. The information related to their local names, uses and distribution status has also been collected from local inhabitants. Plant species were identified by the author by using herbarium, flora books (Nair, 1978, Jerath*et al.* 2006) and published articles. The nomenclature of taxa was corrected or updated using relevant taxonomic literature and online resources (www.theplantlist.org and http://www.flowersofindia.net). Information related to native and non-native status of documented plant species were consulted from the list of invasive alien species of India given by National Biodiversity Authority. Plants that have not been identified on site have been collected for accurate identification in the laboratory& for herbarium preparation. Herbarium specimens of some selected plants have been prepared using standard method and deposited in the herbarium of Akal University. Photographs of plants in their natural habitat have also been taken for proper identification.

RESULTS AND DISCUSSION

Dasuya Forest Division is a significant part of Shivalik region (locally known as Kandi area) of Punjab which is the only area of state having maximum cover of natural forests. This study is a part of preparation of People Biodiversity Registers of these villages in which whole biodiversity including wild/domesticated flora and fauna and their associated traditional knowledge has been documented. In this paper, the main emphasis is given on the wild flora of Dasuya Forest Division. A total of 238 plant species representing 71 families and 194 genera were recorded, which represented indigenous, naturalised, exotic or introduced plants in the Dasuya Forest Division. Manhas*et al*. (2010) reported 206 wild species belonging to 159 genera and 59 families from Shivalik region of Punjab whereas Rawat *et al*. (2013) reported 176 species of wild plants with 57 families and 133 genera from Kandi region of district Hoshiarpur. All the documented wild plant species with their botanical names, vernacular names, updated families, habit, habitat, distribution and their native or non-native status in India are enumerated in Table 1.

The most diverse group of plants was dicotyledons (87% of the total species recorded), followed by monocotyledons (11.3%), then Pteridophytes (1.3%)and the least diverse was bryophytes (0.4%) of the total taxa recorded (Fig. 2). The top taxa rich families were Fabaceae (12.6%) Asteraceae (8%), Poaceae (8%) and Malvaceae (6.3%) of the total vascular plants recorded (Fig. 3).These dominant families of study area were consistent with other studies done in Punjab, such as Shiwalik region of Punjab (Manhas *et al*., 2010), Kandi area of District Hoshiarpur (Rawat *et al*., 2013) and Doaba region of Punjab (Kaur *et al.,* 2017). These families are the most diverse and widespread in Punjab vegetation (Sharma, 1990). They are also amongst the largest families of plants in Haryana state (Kumar, 2001), Theog Forest Division, Himachal Pradesh (Pal *et al*., 2014) and in the Indian flora (Rana & Ranade, 2009). The most diverse genera were *Acacia* (4), *Ficus* (4), *Grewia* (4), *Ipomoea* (4), *Solanum* (4), *Euphorbia, Senna, Sida and Terminalia* were credited with 3 species each, 20 genera had 2 species each, while remaining genera had only one species. About 60% of plants that occurred in Dasuya Forest Division were native to the country. A total of 97 exotic plant species from varied origins were recorded which were further categorized into invasive, introduced, interfering and naturalized taxa (Fig. 4).

Maximum number of plant species were herbaceous (102) followed by trees (71), shrubs (39) then climbers and lianas with 22 and 4 species, respectively. Hence, herbs were the commonest life form in Dasuya Forest Division which supports the previous observations made by other researchers (Manhas *et al*., 2010; Rawat *et al*., 2013; Kaur *et al.,* 2017). Apart from being a component of forest biodiversity, herbaceous flora influences the ecosystem functions, such as energy flow, nutrient cycling and seedling growth for the over story community and multifaceted response to various disturbance in forest area (Gilliam, 2007). The conservation status of all documented species was screened using IUCN Red List of Threatened Species version 2020-2 and no taxa under threatened categories of red list was recorded, except few which were found to be least concerned globally and now they are stable or increasing in number. All the species were found abundant in nature. No rare plants were encountered during the survey.

Major part of this area was covered with dry deciduous type of forest and bamboo forest. The predominant tree species observed in forest area were *Acacia catechu, Albizia procera, Butea monosperma, Bombax ceiba, Cassia fistula, Ficus glomerata, Holoptelea integrifolia, Mallotus philippensis,* etc. Commonly observed shrub species included *Carissa spinarum, Euphorbia royleana, Justicia adhatoda, Lantana camara, Martynia annua, Murraya koenigii,*

Opuntia dillenii and *Ziziphus nummularia. Lantana camara* was profusely infected this area which may delimit the growth of other native species. Dense growth of *Justicia adhatoda* and *Murraya koenigii* was also observed along the roadsides and on slops of minor hills. Among the climbers *Cayratia trifolia, Cissampelos pareira, Coccinia grandis, Cuscuta reflexa, Diplocyclos palmatus, Ipomoea cairica, Tinospora sinensis, etc* were quite common in the forest area. Herbaceous plant species were growing abundant near agriculture land and open wasteland. There were number of medicinal plants growing in the forest area which were used by local people in traditional medicines to cure common ailments. Among them some important medicinal plants are *Justicia adhatoda, Murraya koenigii, Aegle marmelos, Azadirachta indica*, *Tinospora sinensis, Phyllanthus emblica, Solanum nigrum, Spilanthes acmella, etc.* With the rising popularity of herbal medicines,there is a high risk of over-exploitation of these medicinal plants, hence the urgent need for close monitoring and protection to conserve their population. On the other hand, species such as *Ficus religiosa*, *Ficus benghalensis*, *Ocimum basilicum*, *Datura metel* and *Prosopis cineraria* are considered sacred and they are strictly conserved by the local people living in and around the Dasuya Forest Division.

CONCLUSIONS

The Dasuya Forest Division is a home of diverse flora with abundant native taxa. This is one of the biodiversity rich areas of the state. Present study provides a floristic checklist with up-to-date nomenclature that will assist future research in diversifying and conserving the ecosystem of the area under investigation. Hopefully, the results produced during the current study will lead to the advanced research studies related to bioprospecting, possible impact of changing climate on vegetation, sustainable use of plant resources of this region and the development of adequate strategies and action plan for the management of such biodiversity rich areas.

Table 1 : Wild Floristic Diversity of Dasuya Forest Division

Botanical Name (Vernacular Name)	Family	Habit	Distribution and Habitat	Status in India
Abelmoschus manihot (L.) Medik. (Jangli bhindi)	Malvaceae	Herb	Forests, shrubberies, along roadsides	Native
Abrus precatorius L. (Ratti)	Fabaceae	Climber	Forests, along roadsides	Native
Abutilon indicum (L.) Sweet (Kangi)	Malvaceae	Shrub	Shrubberies, along roadsides	Native
Acacia catechu (L.f.) Willd. (Khair)	Fabaceae	Tree	Forests, along roadsides	Native
Acacia leucophloea (Roxb.) Willd. (Reru)	Fabaceae	Tree	Seen only in forest area	Native
Acacia modesta Wall. (Phalai)	Fabaceae	Tree	Seen only in forest area	Native
Acacia nilotica (L.) Delile (Kikar)	Fabaceae	Tree	Forests, along roadsides	Native
Achyranthes aspera L. (Puthkanda)	Amaranthaceae	Herb	Shrubberies, along roadsides	Native
Adiantum pedatum L.	Pteridaceae	Herb	Grown on building walls and rocks	Non-native
Aegle marmelos (L.) Correa (Beal)	Rutaceae	Tree	Forests, near residential area	Native
Aerva sanguinolenta (L.) Blume (Bui)	Amaranthaceae	Herb	Shrubberies, along roadsides, forests	Non-native
Agave americana L.	Asparagaceae	Shrub	Planted on dry exposed slops, along roadsides	Introduced
Ageratum conyzoides (L.) L. (Pootnabuti)	Asteraceae	Herb	Shrubberies, along roadsides, open forests	Invasive
Albizia lebbeck (L.) Benth. (Kala sirih)	Fabaceae	Tree	Forests, near residential area, along roadsides	Native
Albizia procera (Chittasirih)	Fabaceae	Tree	Forests, near villages, along roadsides	Native
Amaranthus spinosus L. (Kandialichulai)	Amaranthaceae	Herb	Near fields, villages and waste areas	Naturalized
Amaranthus viridis L. (Chulai)	Amaranthaceae	Herb	Near fields, villages and waste areas	Native
Anagallis arvensis L.	Primulaceae	Herb	In fields, villages especially in moist areas	Naturalized
Anisomeles indica (L.) Kuntze	Lamiaceae	Shrub	Shrubberies, along roadsides	Native
Argemone mexicana L. (Kasumbadi/ Satiyanashi)	Papaveraceae	Herb	Shrubberies, along roadsides, open wasteland	Invasive
Argemone ochroleuca Sweet. (Satiyanashi)	Papaveraceae	Herb	Shrubberies, along roadsides, open wasteland	Non-native

Artemisia scoparia Waldst. &Kitam. (Chuankhra)	Asteraceae	Herb	Very common in open wastelands, shrubberies, along roadsides	Native
Artocarpus lacucha Buch.-Ham. (Dhiu)	Moraceae	Tree	Forests, in villages, along roadsides	Native
Asparagus racemosus Willd. (Sat musali)	Asparagaceae	Shrub	Forests, Shrubberies, along roadsides	Native
Asphodelus tenuifolius Cav. (Piazi)	Asphodelaceae (APG IV)	Herb	Farmland, grassland, wastelands	Naturalized
Avena fatua L. (Javi)	Poaceae	Herb	In and around the fields	Naturalized
Azadirachta indica A.Juss. (Neem)	Meliaceae	Tree	Forests, roadsides, in villages	Native
Bambusa bambos (L.) Voss (Baans)	Poaceae	Tree	Common in forests, roadsides	Native
Barleria cristata L. (Kali basuti)	Acanthaceae	Shrub	Forests, Shrubberies, along roadsides	Native
Basella alba L. (Saag)	Basellaceae	Climber	Shrubberies, along roadsides, fields	Non-native
*Bauhinia vahlii*Wight &Arn. (Taur)	Fabaceae	Climber	Forests, Shrubberies, along roadsides	Native
Bauhinia variegata L. (Kachnaar/ Karaal)	Fabaceae	Tree	Forests, in villages, along roadsides	Native
Bidens pilosa L.	Asteraceae	Herb	Along roadsides, cultivated areas, wastelan	Invasive
Boehmeria macrophylla Hornem.	Urticaceae	Shrub	Forests, Shrubberies	Native
Boerhavia diffusa L.	Nyctaginaceae	Climber	Along roadsides, cultivated areas, wastelan	Native
Bombax ceiba L. (Simbal)	Malvaceae	Tree	Forests, along roadsides	Native
Bougainvillea spp.	Nyctaginaceae	Liana	Along roadsides, in villages	Introduced
Broussonetia papyrifera (L.) L'Hér. ex Vent. (Vilayti toot)	Moraceae	Tree	Forests, along roadsides	Introduced
Bryophyllum daigremontianum (Raym.-Hamet& Perrier) A. Berger (Pathachat)	Crassulaceae	Herb	Found growing in walls of houses	Introduced
Butea monosperma (Lam.) Taub. (Palah/ Dhak/ keshu)	Fabaceae	Tree	Forests, along roadsides	Native
Caesalpinia bonduc(L.) Roxb. (Dargadh)	Fabaceae	Liana	Climbing on other woody plants in forests, along roadsides	Native
*Caesulia axillaris*Roxb. (Gharilla)	Asteraceae	Herb	Agricultural fields especially in wet areas	Native
Callistemon lanceolatus (Sm.) Sweet (Bottle brush)	Myrtaceae	Tree	Forests, along roadsides, in villages	Naturalized
Calotropis procera (Aiton) Dryand. (Akk)	Apocynaceae	Shrub	Dry wastelands, commonly found in dry choes	Non-native
Cannabis sativa L. (Bhang)	Cannabaceae	Shrub	Very common along roadsides, wastelands, Shrubberies	Non-native
Carissa spinarum L. (Karanda/ garna)	Apocynaceae	Shrub	Common in shrubberies Forests	Non-native
Casearia tomentosa Roxb. (Cheela)	Salicaceae	Tree	Only seen in forests	Native
Cassia fistula L. (Amaltaas/ kaniyaar)	Fabaceae	Tree	Common in forests, along roadsides and in villages	Native
Cayratia trifolia (L.) Domin (Jangliangoor)	Vitaceae	Climber	Along roadsides, wastelands and near fields	Native
Cenchrus ciliaris L. (Anjan)	Poaceae	Herb	Wastelands and near agriculture land	Native
Chenopodium album L. (Bathu)	Amaranthaceae	Herb	Very common in cultivated fields, wastelands	Naturalized
Chenopodium murale L. (Kodabathu)	Amaranthaceae	Herb	Common along roadsides, agriculture fields wastelands	Naturalized
Cirsium arvense (L.) Scop. (Leh)	Asteraceae	Herb	Common weed of agriculture area, along roadsides	Invasive
Cissampelos pareira L. (Patindu/Beldu)	Menispermaceae	Climber	Forests, shrubberies, along roadsides and near fields	Introduced

Citrullus colocynthis (L.) Schrad. (Kodhtuma)	Cucurbitaceae	Climber	Agriculture fields, wastelands	Native
Cleome viscosa L.	Cleomaceae	Herb	Wastelands, along roadsides and near fields	Naturalized
Coccinia grandis (L.) Voigt (Maie/ jangli karela)	Cucurbitaceae	Climber	Forests, shrubberies, along roadsides and near fields	Introduced
Coix lacryma-jobi L.	Poaceae	Herb	Wasteland near water body	Native
Colebrookea oppositifolia Sm. (Alah)	Lamiaceae	Shrub	Forests, shrubberies, along roadsides	Native
Commelina benghalensis L. (Shura)	Commelinaceae	Herb	Wastelands, along roadsides and near agriculture area	Non-native
Convolvulus arvensis L. (Hirankhuri)	Convolvulaceae	Climber	Wastelands, along roadsides and in cultivated area	Naturalized
Corchorus aestuans L.	Malvaceae (APG IV)	Herb	Wastelands, along roadsides and in cultivated area	Naturalized
Cordia dichotoma G.Forst. (Lasura)	Boraginaceae	Tree	Forests, along roadsides	Native
Crateva religiosa G.Forst. (Barna)	Capparaceae	Tree	Forests, along roadsides, in villages	Native
*Croton bonplandianus*Baill.	Euphorbiaceae	Herb	Wasteland, along roadsides, near fields	Naturalized
Cryptolepis dubia(Burm.f.) M.R. Almeida	Apocynaceae	Climber	Wasteland, along roadsides, forests	Native
Cucumis melo L. (Synonym *Cucumis melo var. agrestis*)(Chiber)	Cucurbitaceae	Climber	Wastelands and in agricultural area	Native
*Cuscuta reflexa*Roxb. (Kashvel/ amarvel/ hariol)	Convolvulaceae	Climber	Forests, along roadsides	Invasive
Cynodon dactylon (L.) Pers. (Khabalgha)	Poaceae	Creeping herb	Grasslands, along roadsides, forest floor, agriculture area	Naturalized
Cyperus rotundus L. (Deela)	Cyperaceae	Herb	Commonly grown in wet agricultural fields	Native
Cyperus spp. (Nirvesi)	Cyperaceae	Herb	Wet areas, planted in kitchen garden	Non-native
Dalbergia sissoo DC. (Tahli/ shesham)	Fabaceae	Tree	Forests, along roadsides, in farm land	Native
Datura innoxia Mill. (Datura)	Solanaceae	Shrub	Forests, shrubberies, along roadsides	Invasive
Datura metel L. (Datura)	Solanaceae	Shrub	Forests, shrubberies, along roadsides, wastelands	Invasive
Delonix regia (Hook.) Raf. (Gulmohar)	Fabaceae	Tree	Forests, in villages, along roadsides	Introduced
*Dendrocalamus hamiltonii*Nees&Arn. ex Munro (Baans)	Poaceae	Herb	Forests, along roadsides	Native
Dendrocalamus strictus (Roxb.) Nees(Bansugha)	Poaceae	Tree	Forests, along roadsides	Native
Desmodiumtriflorum(L.) DC.	Fabaceae	Herb	Grasslands, cultivated land, wasteland	Native
Desmostachya bipinnata (L.) Stapf(Dib)	Poaceae	Herb	Grasslands, near agriculture area and water bodies	Native
Dichanthium annulatum (Forssk.) Stapf(Parsiri)	Poaceae	Herb	Grasslands, near agriculture area	Native
Dicliptera paniculata (Forssk.) I. Darbysh.	Acanthaceae	Herb	Forest floor, along roadsides, near cultivated area	Native
Digera muricata (L.) Mart. (Tandla)	Amaranthaceae	Herb	Common in agriculture area	Naturalized
Dioscorea deltoidea Wall. ex Griseb. (Singlimingli)	Dioscoreaceae	Climber	Forests, shrubberies, along roadsides	Native
*Diospyros chloroxylon*Roxb. (Kinu)	Ebenaceae	Tree	Only seen in forests	Native
Diospyros montana Roxb. (Kanju/ kendu)	Ebenaceae	Tree	In forests, some plants grown by natives in their farmland	Native
Diplocyclos palmatus (L.) C. Jeffrey(Shivlingi/ dodnu)	Cucurbitaceae	Climber	Forests, shrubberies, along roadsides, agriculture field	Native

Dodonaea viscosa (L.) Jacq. (Mendru)	Sapindaceae	Shrub	Forest, in open slops	Native
Dryopteris spp.	Dryopteridaceae (Pteridophyte)	Herb	Few along roadsides and on moist walls	Native
Dysphania ambrosioides (L.) Mosyakin&Clemants (Jangliajwain)	Amaranthaceae	Shrub	Along roadsides, agricultural field, weed in villages	Non-native
Echinochloa colona(L.) Link. (Swank)	Poaceae	Herb	Common in grasslands and agriculture area	Naturalized
Echinochloa crus-galli (L.) P.Beauv. (Swanki)	Poaceae	Herb	Common in grasslands and agriculture area	Naturalized
Echinops echinatus Roxb.	Asteraceae	Herb	Open wastelands	Naturalized
Eclipta prostrata (L.) L. (Baringraj)	Asteraceae	Herb	Grown in wet area near fields, villages	Naturalized
Ehretia laevis Roxb. (Chamror)	Boraginaceae	Tree	Forests, along roadsides	Native
Erigeron bonariensis L.	Asteraceae	Herb	Wastelands, near agriculture area, along roadsides	Invasive
Erythrina varietaga L. (Pangra)	Fabaceae	Tree	Forests, along roadsides	Native
Eucalyptus tereticornis Sm. (Safeda)	Myrtaceae	Tree	Forests, along roadsides, agricultural area	Introduced
Eulaliopsisbinata(Retz.) C.E.Hubb. (Bhabhargha)	Poaceae	Herb	Common in grasslands and agriculture area	Native
Euphorbia hirta L. (Dhodak/ dudri)	Euphorbiaceae	Herb	Wastelands, in and around cultivated areas	Naturalized
Euphorbia prostrata Aiton (Hajardaana)	Euphorbiaceae	Herb	Wastelands, in and around cultivated areas	Naturalized
Euphorbia royleana Boiss. (Shoo/ Dandathor)	Euphorbiaceae	Shrub	Forests, along roadsides, also grown as hedge around agricultural area	Native
Evolvulus alsinoides (L.) L.	Convolvulaceae	Herb	Wastelands and in agriculture areas	Native
Evolvulus nummularius (L.) L.	Convolvulaceae	Herb	Wastelands and in agriculture areas	Naturalized
Ficus benghalensis L. (Bohar)	Moraceae	Tree	Forests, in villages, along roadsides	Native
Ficus palmata Forssk. (Fagura)	Moraceae	Tree	Forests, along roadsides	Native
Ficus racemosa L. (Rumbel/ Gular)	Moraceae	Tree	Forests, along roadsides	Native
Ficus religiosa L. (Peepla)	Moraceae	Tree	Forests, in villages, along roadsides	Native
Flacourtia indica (Burm.f.) Merr. (Kangu)	Salicaceae	Tree	Forests, along roadsides	Native
Fumaria indica (Hausskn.) Pugsley (Pith papra)	Papaveraceae	Herb	Common in agriculture area, wastelands	Native
Galium aparine L.	Rubiaceae	Herb	Forest floor, shrubberies, along roadsides, wastelands	Non-native
Geranium rotundifolium L.	Geraniaceae	Herb	Forest floor, shrubberies, along roadsides	Non-native
Gnaphalium polycaulon Pers.	Asteraceae	Herb	Wastelands, agricultural areas	Invasive
Grewia hirsute Vahl (Dhamni /chotibeol)	Malvaceae	Tree	Common in forests	Native
Grewia laevigata Vahl (Hidhak)	Malvaceae	Tree	Common in forests	Native
Grewia optiva J.R. Drumm. Ex Burret (Dhaman/ beol)	Malvaceae	Tree	Common in forests	Native
Grewia tiliifolia Vahl (Firnoo)	Malvaceae	Tree	Common in forests	Native
Helicteres isora L.	Malvaceae	Shrub	Common in forests	Native
Heteropogoncontortus(L.) P.Beauv. ex Roem. &Schult. (Sariala)	Poaceae	Herb	Common in grasslands, dry open slops, in dry choes	Native
*Holarrhenapubescens*Wall. Ex G. Don (Kayor)	Apocynaceae	Tree	Common in forests	Native

Holoptelea integrifolia (Roxb.) (Rajain)	Ulmaceae	Tree	Common in forests, along roadsides, water canals	Native
Hyptis suaveolens (L.) Poit.	Lamiaceae	Shrub	Hilly slops, forest shrubberies, along roadsides	Invasive
Ichnocarpus frutescens (L.) W.T.Aiton (Bakar vel)	Apocynaceae	Climber	Common in forests, planted in garden	Native
Ipomoea cairica (L.) Sweet (Railway creeper)	Convolvulaceae	Climber	Common in open forests, along roadsides, railway lines	Native
Ipomoea carnea Jacq. (Akdha)	Convolvulaceae	Shrub	Common in wastelands near water bodies, seasonal choes	Invasive
Ipomoea pes-tigridis L.	Convolvulaceae	Climber	Forests, along roadsides, agriculture fields	Non-native
Ipomoea triloba L.	Convolvulaceae	Climber	Forests, along roadsides and agriculture fields	Non-native
*Jatropha curcus*L. (Jablota)	Euphorbiaceae	Small tree	Forests, along roadsides, wasteland	Naturalized
Justicia adhatoda L. (Desi basuti)	Acanthaceae	Shrub	Very common along roadsides and shrubberies forests	Native
Justicia procumbens L.	Acanthaceae	Herb	Wastelands, along roadsides, forest floor	Native
Lactuca serriola L.	Asteraceae	Herb	Along roadsides, wastelands	Native
Lannea coromandelica (Houtt.) Merr. (Kambal)	Anacardiaceae	Tree	Common in forests	Native
Lantana camara L. (Panjphuli/ chudelbuti)	Verbenaceae	Shrub	Profusely grown in forests, along roadsides	Invasive
Lathyrus aphaca L. (Janglimatar)	Fabaceae	Herb	Weed of agriculture land	Non-native
Launaea nudicaulis (L.) Hook.f.	Asteraceae	Tree	Wastelands, agriculture lands	Native
Lemna minor L.	Araceae	Herb	Water bodies	Native
Lepidium didymum L.	Brassicaceae	Herb	Wastelands, agriculture lands	Invasive
Lepidium virginicum L.	Brassicaceae	Herb	Wastelands, agriculture lands	Non-native
Leucaena leucocephala (Lam.) de Wit (Rasindi or soolbool)	Fabaceae	Tree	Very common in forests, along roadsides	Invasive
Leucas cephalotes (Roth) Spreng.	Lamiaceae	Herb	Wastelands, agriculture land, floor of orchards	Native
Limonia acidissima Groff (Bilni)	Rutaceae	Tree	Found in dense forests	Native
Lindenbergia philippensis (Cham. &Schltdl.) Benth.	Plantaginaceae	Herb	Grown on walls and rocks	Native
Litsea glutinosa (Lour.) C.B.Rob. (Rahen/ Haryan)	Lauraceae	Tree	Found in dense forests, planted in cultivated land	Native
Mallotus philippensis (Lam.) Mull. Arg. (Kambal/ krambal)	Euphorbiaceae	Tree	Forests, along roadsides	Native
Malva pusilla Sm. (Button buti)	Malvaceae	Herb	Agriculture areas, wasteland	Non-native
Mangifera indica L. (Amb)	Anacardiaceae	Tree	Forests, along roadsides, planted in garden and farmland	Native
Marchantia spp.	Marchantiaceae (Bryophytes)	Herb	Grown on moist rocky surface	Native
*Marsilea minuta*L.	Marsileaceae (Pteridophytes)	Herb	Moist agriculture area, wastelands	Native
Martynia annua L. (Kaan)	Martyniaceae	Shrub	Very common in open forests, along roadside	Invasive
Mazus pumilus(Burm.f.) Steenis	Mazaceae (APG-IV, 2016)	Herb	Commonly grown in wet areas near water	Native
Medicago polymorpha L.	Fabaceae	Herb	Weed of cultivated land	Non-native
Melia azedarach L. (Dhek/ dhrek)	Meliaceae	Tree	Forests, along roadsides and planted in cultivated land	Native
Melilotus indicus (L.) All. (Maina)	Fabaceae	Herb	Weed of cultivated land	Native

Merremiaaegyptia(L.) Urb.	Convolvulaceae	Climber	Along roadsides, shrubbery forests, agriculture area	Invasive
*Mimosa himalayana*Gamble (Daghiari)	Fabaceae	Tree	Forests, very few along roadsides	Native
Momordica dioica Roxb. ex Willd. (Jangli karela)	Cucurbitaceae	Climber	Forests, along agricultural boundaries	Native
Moringa oleifera Lam. (Soanjna)	Moringaceae	Tree	Forests, planted in garden and farmland	Native
Morus alba L. (Toot/ shetoot)	Moraceae	Tree	Forests, along roadsides	Native
Morus indica L. (Toot/ shetoot)	Moraceae	Tree	Forests, along roadsides	Native
Mucuna pruriens (L.) DC. (Konch)	Fabaceae	Climber	Forests, along roadsides, agriculture area	Native
Mukia maderaspatana (L.) M. Roem.	Cucurbitaceae	Climber	Forests, along roadsides, agriculture area	Native
Murraya koenigii (L.) Spreng. (Gandla/ Kari patta)	Rutaceae	Shrub	Very common in shrubberies, along roadsides	Native
Murraya paniculata (L.) Jack (Kari patta)	Rutaceae	Shrub	Along roadsides, forests	Native
Naringi crenulata (Roxb.) Nicolson	Rutaceae	Tree	Found in dense forests	Native
Nicotiana plumbaginifolia Viv. (Janglitambakoo)	Solanaceae	Herb	Agricultural area, wastelands	Naturalized
Nyctanthesarbor-tristis L. (Kuri)	Oleaceae	Tree	Forests, planted in garden	Native
*Ocimum basilicum*L. (Janglitulsi/ ban tulsi)	Lamiaceae	Herb	Very common along roadsides, water canals, orchard floor, open wasteland	Non-native
Oplismenusburmannii(Retz.) P.Beauv. (Tokrighaa)	Poaceae	Herb	Common in agriculture area	Non-native
Opuntia dillenii (Ker Gawl.) Haw. (Chitar shoo/ chitarthor)	Cactaceae	Shrub	Very common along roadsides	Invasive
Oroxylum indicum (L.) Kurz	Bignoniaceae	Tree	Forests, along roadsides	Native
Oxalis corniculata L. (Kotri/ khatibuti)	Oxalidaceae	Herb	Agricultural areas, wasteland, forest floor especially in shady places	Naturalized
Oxalis debilis var. corymbosa (DC.) Lourteig	Oxalidaceae	Herb	Agricultural areas, wasteland, forest floor especially in shady places	Naturalized
Panicum virgatum L.	Poaceae	Herb	Agricultural areas, wasteland	Non-native
Parthenium hysterophorus L. (Gajarbuti)	Asteraceae	Herb	Agricultural areas, wasteland, along roadsides	Invasive
Peristrophe bicalyculata (Retz.) Nees	Acanthaceae	Herb	forests, wasteland, along roadsides	Native
Phalaris minor Retz. (Gulidanda)	Poaceae	Herb	Common weed of agriculture area	Native
Phoenix sylvestris (L.) Roxb. (Janglikhajoor)	Arecaceae	Tree	Forests, along roadsides	Native
Phragmites karka(Retz.) Trin. Ex Steud. (Nari)	Poaceae	Herb	Wastelands near water bodies	Native
Phyllanthus emblica L. (Amla)	Phyllanthaceae	Tree	Forests, along roadsides and planted in gardens	Native
Physalis minima L. (Rasbari)	Solanaceae	Herb	Along roadsides, wastelands, cultivated lan	Naturalized
Plumbago zeylanica L. (Chitrak)	Plumbaginaceae	Shrub	Forests, planted on field boundary	Native
Pogostemon benghalensis (Burm.f.) Kuntze	Lamiaceae	Shrub	Forests, along roadsides and water canals	Native
Polygonum plebeium R.Br.	Polygonaceae	Herb	Wasteland, agricultural land, forest floor, grassland	Native
Pongamia pinnata (L.) Pierre (Sukhchain)	Fabaceae	Tree	Forests, along roadsides, water canals	Native
Populus deltoides Marshall (Poplar)	Salicaceae	Tree	Planted along roadsides and in agricultural area	Introduced
Portulaca pilosa L. (Duper khidi)	Portulacaceae	Herb	Wastelands near water, wet field boundarie	Native

Prosopis cineraria (L.) Druce (Jand)	Fabaceae	Tree	Very few in forest area	Native
Pupalialappacea(L.) Juss. (Jhanjhir)	Amaranthaceae	Herb	Wasteland, shrubberies, along roadsides	Native
Ranunculus sceleratus L.	Ranunculaceae	Herb	Near water bodies, wet meadows	Non-native
Ricinus communis L. (Arind)	Euphorbiaceae	Small tree	Forests, along roadsides, wastelands	Non-native
Rumex dentatus L. (Jangli palak/ palak buti)	Polygonaceae	Herb	Wastelands, near water bodies, cultivated area	Introduced
*Rumex hastatus*D. Don	Polygonaceae	Herb	Open hill slops, along road sides	Non-native
Saccharum bengalense Retz. (Munj)	Poaceae	Herb	Wasteland especially in dry choes	Native
Saccharum spontaneum L. (Kai/ kana)	Poaceae	Herb	Wasteland especially in dry choes	Non-native
Senna occidentalis (L.) Link (Vadiealma)	Fabaceae	Shrub	Wastelands, along roadsides, agriculture area	Naturalized
Senna sulfurea (Collad.) H.S.Irwin&Barneby	Fabaceae	Small tree	Along roadsides, planted in gardens	Native
Senna tora (L.) Roxb. (Chotiealma)	Fabaceae	Herb	Wastelands, along roadsides and water canals	Naturalized
Sida acuta Burm.f.	Malvaceae	Shrub	Very common in wastelands, along roadsides and water canals	Naturalized
Sida cordifolia L.	Malvaceae	Shrub	Wastelands, along roadsides	Native
Sida rhombifolia L.	Malvaceae	Shrub	Rarely found in wastelands, along roadsides	Native
Silybum marianum (L.) Gaertn.	Asteraceae	Herb	Rarely found in wastelands, along roadsides	Non-native
Sisymbrium irio L.	Brassicaceae	Herb	Agriculture area, wastelands	Non-native
Solanum erianthum D. Don	Solanaceae	Shrub	Found in forests	Non-native
Solanum indicum L.	Solanaceae	Shrub	Found in forests	Non-native
Solanum nigrum L. (Pambola/ kyu kothi)	Solanaceae	Herb	Common in cultivated land, along roadsides, wastelands	Naturalized
Solanum virginianum L. (Kandiari)	Solanaceae	Shrub	Wastelands, dry area	Native
Sonchus asper (L.) Hill	Asteraceae	Herb	Cultivated land, wasteland	Non-native
Sonchus oleraceus (L.) L.	Asteraceae	Herb	Cultivated land, wasteland	Non-native
Spilanthes acmella (L.) L. (Karkra)	Asteraceae	Herb	Seen near water canal, along roadsides	Native
Stellaria media (L.) Vill.	Caryophyllaceae	Herb	Weed of cultivated land	Naturalized
Syzygium cumini (L.) Skeels (Jamun)	Myrtaceae	Tree	Forests, along roadsides, planted in garden and farmland	Native
Tamarindus indica L. (Imli)	Fabaceae	Tree	Forests, planted in garden and farmland	Native
Tamarix dioica Roxb. ex Roth. (Jhau)	Tamaricaceae	Shrub	Along roadsides, shrubbery forests and in dry choes	Native
Tectona grandis L.f. (Saagwan)	Lamiaceae	Tree	Forests, along roadsides and planted in farmland	Native
Tephrosia purpurea (L.) Pers.	Fabaceae	Herb	Wasteland, agriculture land	Native
Terminalia arjuna (Roxb. ex DC.) Wight &Arn. (Arjun)	Combretaceae	Tree	Forests, along roadsides and planted in farmland	Native
Terminalia bellirica (Gaertn.) Roxb. (Bahera)	Combretaceae	Tree	Forests, along roadsides and planted in farmland	Native
Terminalia chebula Retz. (Harar)	Combretaceae	Tree	Forests and planted in farmland	Native
Tinospora sinensis (Lour.) Merr. (Gloe)	Menispermaceae	Liana	Very common in forests, along roadsides	Native

Toona ciliata M. Roem. (Tun)	Meliaceae	Tree	Forests, along roadsides and planted in farmland	Native
Trianthema portulacastrum L. (Itsit)	Aizoaceae	Herb	Wasteland and agriculture land	Native
Tribulus terrestris L. (Bakhra)	Zygophyllaceae	Herb	Wasteland and agriculture land	Naturalized
Tridax procumbens (L.) L.	Asteraceae	Herb	Wasteland, along roadsides, agriculture lan	Non-native
Triumfetta tomentosa Bojer ex Bouton (Jhanjeer)	Malvaceae	Herb	Wasteland, along roadsides	Non-native
Typha angustifolia L. (Dib)	Typhaceae	Herb	Near water bodies	Invasive
Urena lobata L.	Malvaceae	Shrub	Wasteland, forests, along roadsides	Non-native
Vallaris solanacea (Roth) Kuntze (Poo paa)	Apocynaceae	Liana	Very common in forests and along roadside	Native
Verbascum chinense (L.) Santapau	Scrophulariaceae	Herb	Common in dry choes, open disturbed areas	Native
Verbascum thapsus L.	Scrophulariaceae	Herb	Common in dry choes, open disturbed areas	Native
Veronica agrestis L.	Plantaginaceae	Herb	Wet agriculture boundaries, near water bodies	Non-native
Vicia sativa L. (Rodhi)	Fabaceae	Herb	Weed of cultivated land	Native
Vitex negundo L. (Bna)	Lamiaceae	Tree	Forests, along roadsides, farmland	Native
Wendlandia heynei (Schult.) Santapau& Merchant(Pansar)	Rubiaceae	Tree	Forests, along roadsides	Native
Withania somnifera (L.) Dunal (Aksin)	Solanaceae	Shrub	Forests, along roadsides, wastelands	Native
Woodfordia fruticosa (L.) Kurz. (Dhawai)	Lythraceae	Shrub	Forests, along roadsides in hills	Native
Xanthium strumarium L. (Jhanjeer)	Asteraceae	Shrub	Forests, along roadsides, near cultivated area	Invasive
Youngia japonica (L.) DC.	Asteraceae	Herb	wastelands, along roadsides, near cultivated area	Naturalized
Ziziphus jujuba Mill. (Beri)	Rhamnaceae	Tree	Forests, along roadsides	Native
Ziziphus nummularia (Burm.f.) Wight &Arn. (Malha)	Rhamnaceae	Shrub	Forests, along roadsides, planted in cultivated area	Native

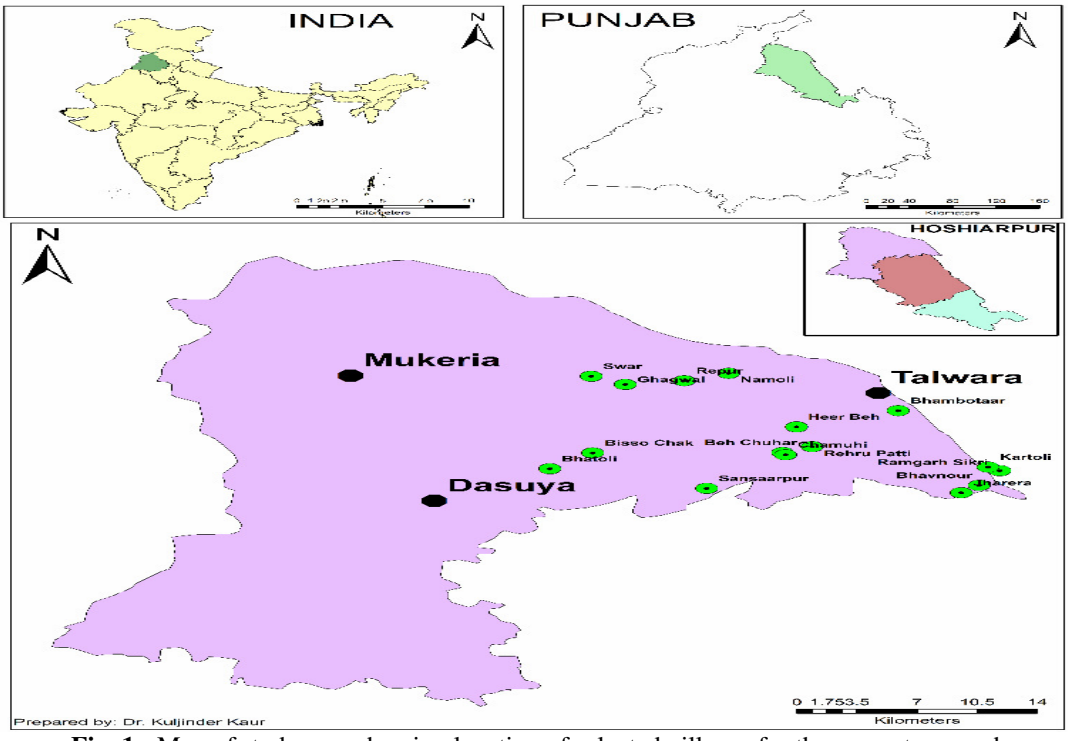

Fig. 1 : Map of study area showing location of selected villages for the present research

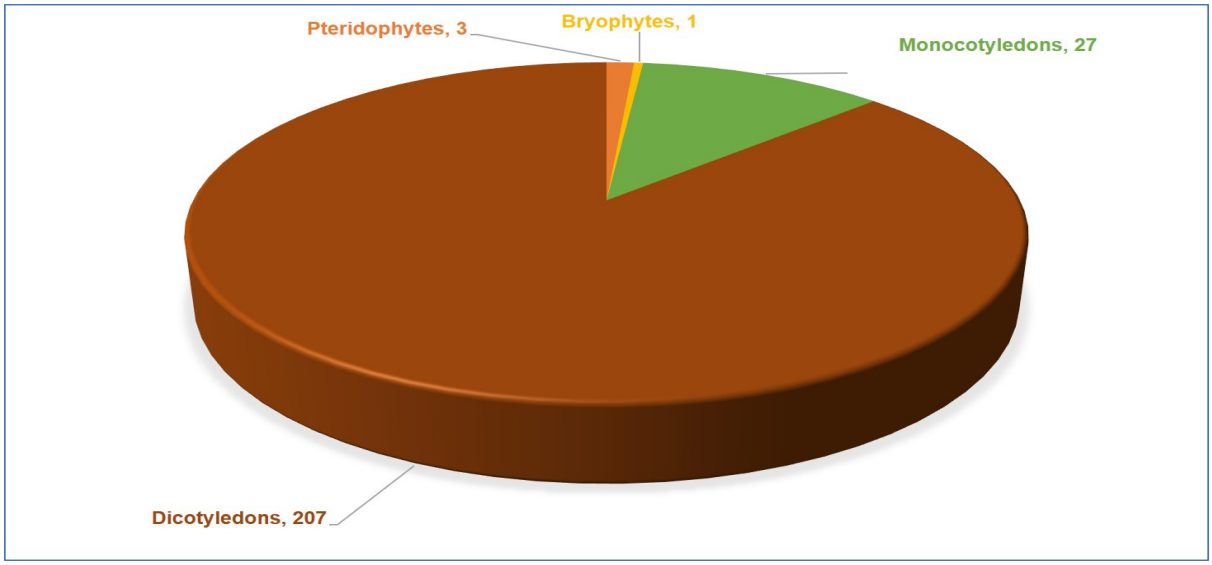

Fig. 2 : Distribution of plants of study area into various groups

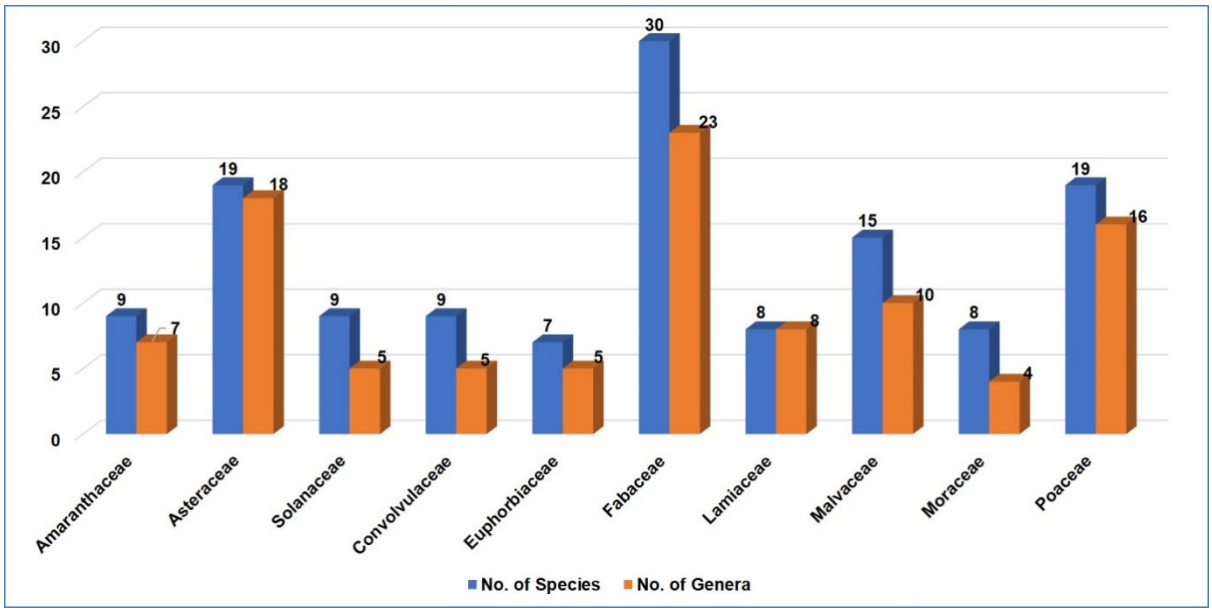

Fig. 3 : Top 10 families with their respective species and genera in Dasuya Forest Division

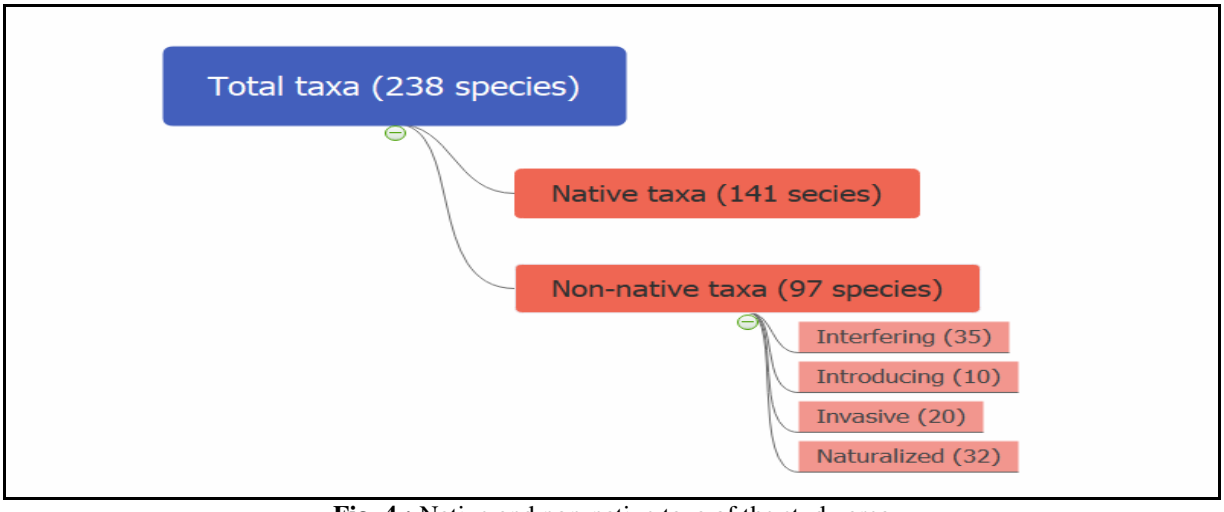

Fig. 4 : Native and non-native taxa of the study area

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