



An Ethno-botanical study of flora in Hisar district of Haryana, India

Jyotsana^{1*}, Ritu Rani², Harvinder Kaur Sidhu¹ and Pawan Kumar³

¹Department of Botany, Desh Bhagat University, Mandi Gobindgarh, 147301, Punjab, India

²Department of Botany, CBLU, Bhiwani, 127021, Haryana, India

³Department of Genetics and Plant Breeding, COA, CCS HAU, Hisar, 125004, Haryana, India

*Corresponding author: [jyot7206@gmail.com](mailto: jyot7206@gmail.com)

ABSTRACT

Floral diversity of any place is one of the most important blessings of nature. If we have a detailed knowledge about plants, we can use them in a number of ways for welfare of mankind as well as other organisms. An attempt was made to study the floral diversity available in Hisar city and its nearby villages during 2018-19. During this study a total of 79 plants belonging to 45 families including Herbs, Shrubs and Trees were studied for their morphological characters and uses, especially medicinal ones. All the plants in this study were recorded by visiting the whole city and villages of the area. A comparative study was also done between flora of city and villages. This study could play an important role for the conservation of valuable phyto-diversity, use of this phyto-diversity for the welfare of all other organisms, better ecological balance in future and sustainable development of the area.

Key words: *Flora; Hisar; Ethno-botanical; Medicinal properties*

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INTRODUCTION

Haryana is a state in India located in northern part of the country. It came into existence on 1 November, 1966, and covers 1.4% of India's land. Geographically, the Shiwaliks, the Aravalli hills and the Indo-Gangetic plains are the three zones in which the state is divided. Climate of the state varies from arid in southern part to moist sub-tropical in northern part. Annual rainfall varies from 213 mm in south west to 1400 mm in north east and the temperature ranges from between 1°C to 45°C. Hisar is one of 22 districts of Haryana located in northwestern part of the state. It is located 102 miles to the west of India's capital, New Delhi and it works as counter manager city for the "NCR (National Capital Region)" to develop as an alternative place of growth for Delhi. It belongs to Saraswati Valley Civilization but its name is cited in the history books too in the context of Indus civilization and is also studied for the location of one of five sheep farms; village Banawali.

As of 2011 it is the second most populous of the all districts of Haryana, after Faridabad. It is located at an elevation of 215 meters above the sea level. The district has fertile alluvial soil interspersed with highly permeable very sandy tracts in bangar tract. The climate of Hisar district reaches to tropical semi-desert type, which can be frequently dry between scorching summer times as well as freezing winter times. The climate is continual, with scorching summer (temperature varies between 40°C to 46°C) and chilly winters (1.5°C to 4°C). The average annual rainfall is 429 mm (16.9 in) most of which occur during July and August [15].

Flora refers to the plant life forms occurring within a certain area or time and Hisar is rich in floral diversity. The habitats of Hisar mainly include garden, parks, ponds, lawns & fields. It has grasslands, herbs, flowering or non-flowering plants, shrubs and trees which is indigenous-native plant life. They are classified on the basis of certain area, climate conditions and given period of time. Flora maintains our ecological balance. They are oxygen producing and carbon dioxide absorbing apparatus without which human cannot exist. They also contribute to aesthetic value and also expand local economies. A large number of floristic studies have been conducted for documentation of flora in different parts of Haryana

and North India. The study conducted by Yadav and Bhandoria [16], identified a total of 56 species of medicinal plants species used and manipulated by the community for routine maladies in Mahendergarh district of Haryana, India. Kumar and Singh [5] studied the diversity of 277 different plant species along with their common names, habit and habitat in another district (Karnal) of Haryana in India. Kumar *et al.* [6] conducted a field appraisal on plant diversity of K.M. Government College campus, Narwana, during 15 January, 2016 to 31 January, 2016 and prepared a herbarium. To gather the data about knowledge and traditional use of wild plants, Palria and Vashistha [9] did a study during different seasons of 2017 and studied floristic diversity and ethno-botany of Hansi region of Hisar district. They did interviews and questionnaires with local inhabitants, medicine practitioners, hakims and on the basis of all that collected a total of 78 species. Redhal [11] explored 17 medicinal plants of Hisar and Fatehabad districts of Haryana by surveys and inspections for curing rheumatism naturally.

Taxonomic knowledge is crucial to meet the challenges of biodiversity conservation in the 21st century [1] and helps us to understand the overall structure and function of our ecosystem [2]. In our study we mainly included Hisar city and three nearby villages and towns i.e. Sadalpur, Mandi Adampur and Agroha. This study provides the basic information and medicinal uses of the different plant species along with photographs, which are currently found in the Hisar district. It will play an important role for the local and regional authorities interested in to conserve this precious phyto-diversity for welfare of fore-coming generations and sustainable development of the area as well as for fields of biology in general and botany in particular.

MATERIAL AND METHODS

We live in a country rich in flora, having invaluable benefits. The present work is based on the bulk study of Flora in Hisar district, mainly Hisar City and three villages/towns of district; Sadalpur, Mandi Adampur, and Agroha (Fig. 1) were included.

Widespread land analyses were carried out in Hisar district through January 2018 to May 2018 to identify and classify several floral species. Plant observed in their vegetative, flowering and fruiting stages during the visit of farming lands, natural environment, pasture land, road sides, railway tracks, parks, gardens, ponds and other appropriate area to wrap nearly whole Hisar district in an organized way. In field observations habitats, type of soil, size of plant, flower color, time of flowering, fruiting and relative abundance of plants were noted in a field note book. Pictures of plants were captured in their natural habitat, describing all available details of leaf, stem, flower and fruit in field note book. Recognition of plant species was assisted with the help of following available literature, Supplement to the Duthies Flora of Upper Gangetic Plain [10], Flora of Delhi [7] and other flora books were used for identification of plants. The description is followed by classification, habit, size, abundance, flowering, medicinal importance and local use.

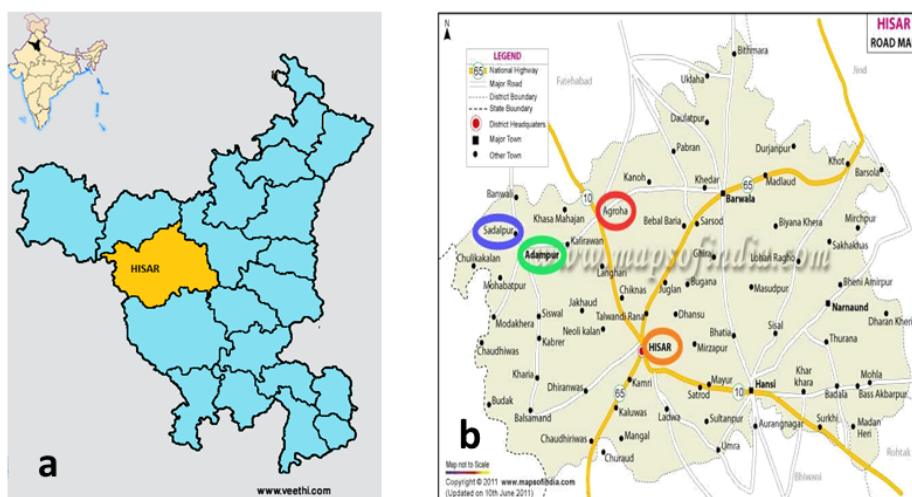


Fig. 1: Geographical representation of Hisar district (a) in Haryana, India and regions explored for the present study (b)

RESULT AND DISCUSSION

During the floristic studies of Hisar district and nearby selected villages, the total number of species recorded was 79; belonging to 70 genera and 45 families (Fig. 2). Out of 79 species, herbaceous flora

dominated with having 29 species which include 23 genus, followed by Shrubs having 27 species which includes 26 genus and Trees having 24 species which include 21 genus (Table 1).

Out of 18 families in Herbs, Asteraceae, Poaceae, Lamiaceae and Fabaceae have dominated the study area with excess of three different type plants each and followed by Asphodelus and Apocynaceae with excess of two different type plants from each family (Fig. 3).

Table 1: List of plants recorded in study in Hisar district of Haryana

Sr. No.	FAMILY	PLANTS	Sr. No.	FAMILY	PLANTS
HERBS					
1.	Asteraceae	<i>Conyzabon ariensis, Parthenium hysterophorus, Sonchus oleraceus</i>	10.	Zingiberaceae	<i>Amomum aromaticum</i>
2.	Poaceae	<i>Cynodon dactylon, Eragrostis lehmania, Triticum aestivum</i>	11.	Liliaceae	<i>Asparagus racemosus</i>
3.	Lamiaceae	<i>Mentha suaveolens, Ocimum tenuiflorum, Origamum majorana</i>	12.	Crassulaceae	<i>Bryophyllum pinnatum</i>
4.	Fabaceae	<i>Mimosa pudica, Trifolium alexandrinum, Glycyrrhiz aglabra</i>	13.	Cannabaceae	<i>Cannabis sativa</i>
5.	Asphodelus	<i>Aloe vera, Asphodelus tenuifolius</i>	14.	Araliaceae	<i>Scheffler adigitata</i>
6.	Apocynaceae	<i>Catharanthus roseus, Tylophora indica</i>	15.	Solanaceae	<i>Solanum lycopersicum</i>
7.	Portulacaceae	<i>Portulaca oleracea, Portula capillosa</i>	16.	Menispermaceae	<i>Tinospora cordifolia</i>
8.	Chenopodiaceae	<i>Chenopodium album</i>	17.	Caricaceae	<i>Carica papaya</i>
9.	Asparagaceae	<i>Chlorophytum comosum</i>	18.	Musaceae	<i>Musa acuminata</i>
SHRUBS					
1.	Apocynaceae	<i>Calotropis procera, Cryptostegia grandiflora, Nerium indicum, Tabernaemontana divaricata</i>	11.	Acanthaceae	<i>Justicia adhatoda</i>
2.	Solanaceae	<i>Datura inoxia, Datura stramonium, Solanum nigrum</i>	12.	Lythraceae	<i>Lawsonia inermis</i>
3.	Brassicaceae	<i>Brassica campestris, Raphanus sativus</i>	13.	Oleaceae	<i>Nyctanthes arbor-tristis</i>
4.	Agavaceae	<i>Dracaena hookeriana, Yucca gloriosa</i>	14.	Cactaceae	<i>Opuntia ficus-indica</i>
5.	Nyctaginacea	<i>Bougainvillea</i>	15.	Euphorbiaceae	<i>Ricinus communis</i>
6.	Lamiaceae	<i>Clerodendrum infortunatum</i>	16.	Rosaceae	<i>Rosa indica</i>
7.	Apiaceae	<i>Daucus carota</i>	17.	Poaceae	<i>Saccharum officinarum</i>
8.	Ephedraceae	<i>Ephedra viridis</i>	18.	Salvadoraceae	<i>Savadora oleoides</i>
9.	Asteraceae	<i>Helianthus annuus</i>	19.	Cupressaceae	<i>Thuja occidentalis</i>
10.	Rubiaceae	<i>Hamelia patens</i>	20.	Rhamnaceae	<i>Ziziphus jujube</i>
TREES					
1.	Fabaceae	<i>Acacia nilotica, Acacia karoo, Dalbergiasissoo, Cassia siamea, Prosopis cineraria, Saracaasoca</i>	6.	Anacardiaceae	<i>Mangifera indica</i>
2.	Myrtaceae	<i>Psidium guajava, Syzigium cumini, Callistemon viminalis, Eucalyptus globules</i>	7.	Combretaceae	<i>Terminalia arjuna</i>
3.	Moraceae	<i>Ficus religiosa, Ficus virens, Ficus benghalensis, Morus alba</i>	8.	Punicaceae	<i>Punica granatum</i>
4.	Meliaceae	<i>Azadirachta indica, Melia azaderach</i>	9.	Phyllanthaceae	<i>Phyllanthus emblica</i>
5.	Arecaceae	<i>Phoenix dactylifera, Hyophorbela genicaulis</i>	10.	Lauraceae	<i>Cinnamomum camphora</i>

Remaining 11 families had single type plant each. Among 20 families of Shrubs, Apocynaceae and Solanaceae have dominated the study area with excess of four and three different type plants each and followed by Brassicaceae and Agavaceae with excess of two different type plants from each family.

Remaining 16 families had single type of plant each. In case of Trees, Fabaceae, Myrtaceae and Moraceae have dominated the study area with excess of five, four and four different type plants, respectively and followed by Meliaceae and Arecaceae with excess of two different type plants from each family. Remaining 6 families had single type plant each. Similar results have been reported in previous reports [9], [11]. In the comparison of city and village flora, it was reported that villages areas have more diversity in plants as compare to city. It is because of the following reasons, 1) city has planned planting for landscape and avenue which needs the reaped use of limited type of plants 2) wild area in villages is more as compare city, 3) farming land and irrigation water makes the villages area more suitable diverse flora. The results showed that the environment of study area is suitable for dominated family of Herbs, Shrubs and Trees which were found grown wildy. Among all the plants, family Fabaceae had highest number of different plants in Hisar district (Table 2).

Table 2: Distribution of flora among city and village area in Hisar district

Sr. No.	Plant Families in Village (Number of plants in each family)	Plant Families in City (Number of plants in each family)	Sr. No.	Plant Families in Village (Number of plants in each family)	Plant Families in City (Number of plants in each family)
1.	Fabaceae (8)	Fabaceae (7)	22.	Caricaceae (1)	Caricaceae (1)
2.	Poaceae (5)	Poaceae (1)	23.	Musaceae (1)	Musaceae (1)
3.	Lamiaceae (5)	Lamiaceae (5)	24.	Nyctaginaceae (1)	Nyctaginaceae (1)
4.	Moraceae (4)	Moraceae (4)	25.	Apiaceae (1)	Apiaceae (1)
5.	Solanaceae (4)	Solanaceae (2)	26.	Ephedraceae (1)	Ephedraceae (1)
6.	Asteraceae (4)	Asteraceae (1)	27.	Rubiaceae (0)	Rubiaceae (1)
7.	Myrtaceae (4)	Myrtaceae (3)	28.	Acanthaceae (1)	Acanthaceae (1)
8.	Apocynaceae (3)	Apocynaceae (3)	29.	Lythraceae (1)	Lythraceae (1)
9.	Asphodelus (2)	Asphodelus (2)	30.	Oleaceae (1)	Oleaceae (1)
10.	Portulacaceae (2)	Portulacaceae (1)	31.	Cactaceae (1)	Cactaceae (0)
11.	Brassicaceae (2)	Brassicaceae (0)	32.	Euphorbiaceae (1)	Euphorbiaceae (0)
12.	Agavaceae (2)	Agavaceae (2)	33.	Rosaceae (0)	Rosaceae (0)
13.	Arecaceae (2)	Arecaceae (2)	34.	Salvadoraceae (1)	Salvadoraceae (1)
14.	Chenopodiaceae (1)	Chenopodiaceae (0)	35.	Cupressaceae (1)	Cupressaceae (1)
15.	Asparagaceae (0)	Asparagaceae (1)	36.	Rhamnaceae (1)	Rhamnaceae (1)
16.	Zingiberaceae (1)	Zingiberaceae (1)	37.	Anacardiaceae (1)	Anacardiaceae (1)
17.	Liliaceae (1)	Liliaceae (1)	38.	Combretaceae (1)	Combretaceae (1)
18.	Crassulaceae (1)	Crassulaceae (0)	39.	Punicaceae (1)	Punicaceae (1)
19.	Cannabaceae (1)	Cannabaceae (0)	40.	Phyllanthaceae (1)	Phyllanthaceae (1)
20.	Araliaceae (0)	Araliaceae (1)	41.	Lauraceae (0)	Lauraceae (1)
21.	Menispermaceae (1)	Menispermaceae (1)			

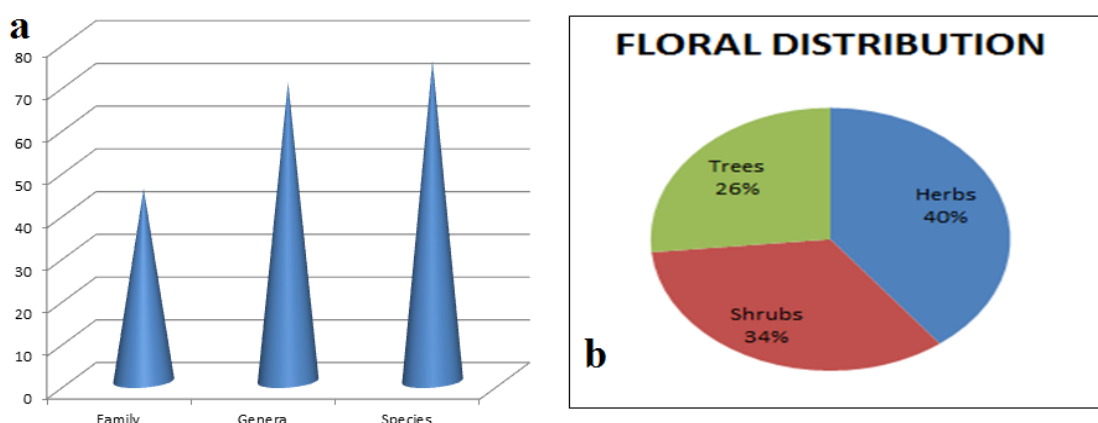


Fig.2: Distribution of available flora among family, genera, species and tree, herbs and shrubs

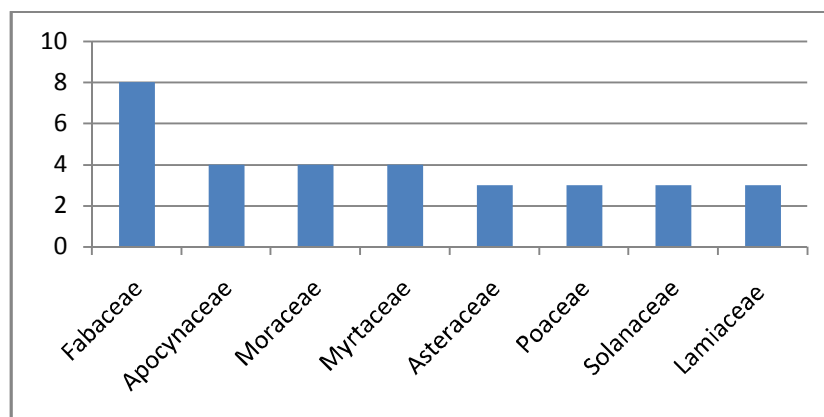


Fig.3: Dominance of plant families among the study area

CONCLUSION

This basic research is a great tool for identification of the different plant species. 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 Hisar district. Such a list could play an important role for the local and regional authorities interested in conserving this precious phyto-diversity for better environment in future and for welfare of coming generations and sustainable development of the area.

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