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OF ADVANCED RESEARCH****RESEARCH ARTICLE****Diversity of Medicinal Flora of Lower Shiwalik Hills of the Western Himalaya, India****Ujjwal Deep Sharma<sup>1</sup>, Sanjeev Kumar<sup>2</sup>, Kamal Sharma<sup>2</sup> and Som Datt<sup>2</sup>****1.** Botanist, Research Institute in Indian System of Medicines, Herbal garden & Herbarium, Joginder Nagar, Mandi, (H.P.)**2.** College of Horticulture and Forestry, Neri, Hamirpur (Dr. Y.S.Parmar University of Horticulture and Forestry, Nauni, Solan).**Manuscript Info****Manuscript History:**

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**\*Corresponding Author****Ujjwal Deep Sharma****Abstract**

The present paper deals with documenting the diversity of our rich and varied medicinal flora of Lower Shiwalik Hills of Western Himalaya. The work was carried out in this region of Western Himalayas because there exists ample scope for exploration of medicinal plants as the climatic and topographic location of this area is such that it supports wide range of floristic components whose latest status can only be assessed by fresh inventorization. A total of 323 plant species were reported with medicinal utility comprising of 197 plants of commercial importance and 126 plant species of lesser economic/ethnobotanical importance with potential for extensive utilization as low cost herbal home remedies by local inhabitants mostly village elders including women. The documented plants included 37 climbers, 106 herbs, 02 ferns, 80 shrubs and 96 trees. The 323 species of these plants belong to 97 families and 256 genera. Out of these, 289 species belong to Dicots, 23 species to Monocots, 1 species to Gymnosperms and 10 to Pteridophytes.

*Copy Right, IJAR, 2015,. All rights reserved***INTRODUCTION**

Since the dawn of civilization man on the earth has tried out plants that grew around him for the sake of his food, health and economic benefits. The ancient people accumulated a large number of plant drugs and the knowledge of these plants was handed down verbally or enchanted by tribal from generation to generation. Quest for knowledge about various Himalayan plants has apparently been present from time immemorial. Plants have been used as healers and health rejuvenators by rural folks and tribal in India. The use of plants as medicines by early man in the great ancient civilizations such as China, India, Middle East, North Africa and South America has led to development of traditional system of medicine. Systematic investigations of traditional medicinal plants provided many valuable drugs in Western medicines. The earliest use of medicinal plants has been mentioned in the Rig-Veda (4500-1660 B.C). Properties and uses of drugs are mentioned in Atharveda and Ayurveda (2500-600 B.C). The present paper deals with our rich and varied flora for pharmaceutical use and hence finding out the scope of the potential herbs to be brought under cultivation in near future. The study would help to protect more valuable plants from extinction in their natural habitats. The understanding of biodiversity of these plants will eventually give insight into the present status of medicinal plants for purpose of conservation, multiplication and further utilization. In one of the study Aswal and Mehrotra [1] reported 985 species belonging to 353 genera and 79 families from Lahaul spiti and part of Rohtang area while Dhaliwal and Sharma [2] studied the phyto-diversity of medicinal plants in Parvati Valley of Kullu and recorded 266 species belonging to 71 families and 180 genera. Inspired by the scope for fresh study the present work was undertaken in the lower Shiwalik hills of north western Himalayas as there exists ample scope for study of medicinal plants since it supports wide range of floristic components whose latest status can only be assessed by fresh inventorization.

The present work involves mainly identification, inventorization and study of potential medicinal plants. This study will be extremely useful in assessing the status, utilization potential and future strategies for the conservation of medicinal plant resources in these areas hence encourage similar approach in adjoining area and result in aiding the policy framing for conservation of endangered plants and the development of cultivation package vis-à-vis agro-technique thereof.

## 1. METHODOLOGY:

The present study was undertaken in the areas of forest ranges up to 700 msl in the lower Shiwalik Hills of Western Himalaya. The present investigations were carried out as follows:

- Systematic enumeration of floristic elements of major medicinal/commercial importance.
- Enumeration of medicinal plant species of lesser economic importance.
- Ethno-botanical studies of medicinal plants.

During the field work actual information about plants was collected in the field with the help of reliable local informants. The visits were undertaken in different parts of the study areas of 21 districts of 6 states falling in the lower Shivalik hill region of Western Himalayas. The photography of various aspects of plants was done during field visits at the flowering and fruiting stage from different habitat like forest, grassland, along road sides, orchards, riverbanks and wastelands. Photographs of plants were taken in natural conditions in fields and also after drying of seeds and fruits collected from the site. Characteristic features of plants were observed and noted in the field book for final comparison. As the Ethnobotanical information is ancient or unpublished, the literature information was used in ethno-botanical research and vast heritage of vedic literature in India was used as a valuable ethno-botanical resource. Hence both primary and secondary sources were used to collect ethno-botanical information. Plant identification was done according to field characteristics by consulting various flora as Collett [3], Kaur and Sharma [4] and Singh and Sharma [5].

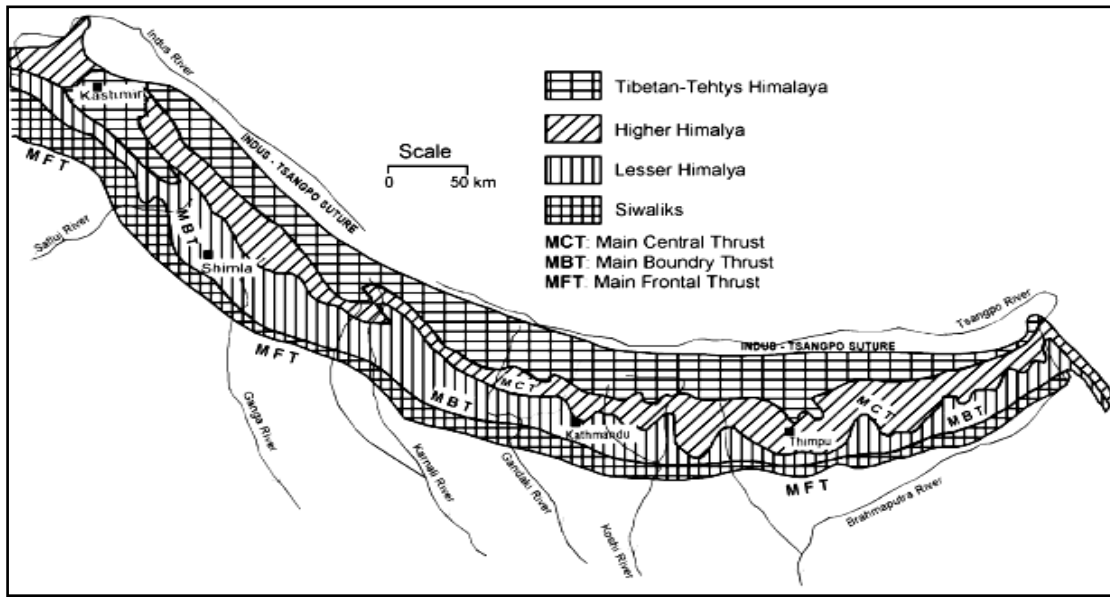
### Study Areas for plant enumerations in lower Shivalik Hills of Western Himalayas:

S.No.	State	Areas under study and Observations
1.	Jammu & Kashmir	Udhampur, Kathua, and Jammu, Reasi and Poonch district.
2.	Punjab	Gurdaspur, Nawan Shahar and Ropar district.
3.	Himachal Pradesh	Chamba, Kangra, Bilaspur, Una, Hamirpur, Solan, and Sirmur district.
4.	Haryana	Panchkula and Yamunanagar .
5.	Uttaranchal	Dehradun, Haridwar and Udham Singh Nagar.
6.	Uttar Pradesh	Saharanpur.

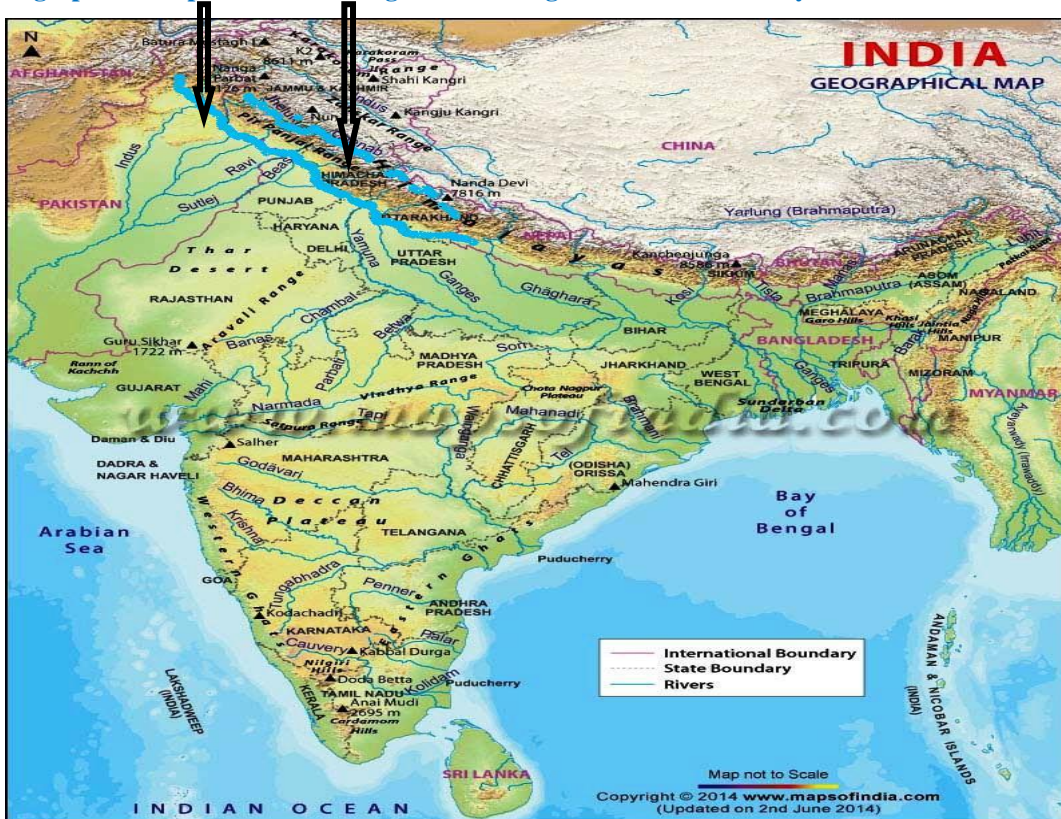
### General description of the study area

The Shivalik Hills or Range also spelled Shiwalik, Shivalik or Siwalik and sometimes called Churia or Chure Hills or Outer Himalaya. They are the southernmost and geologically youngest east-west mountain chain of the Himalayan System. They extend 1,600 km from the Teesta River in Sikkim, westward through Nepal and Uttarakhand, continuing into Kashmir and Northern Pakistan. They are cut through at wide intervals by large rivers flowing south from the Himalaya. This zone (< 1500 m) represents the sub-tropical climate, varied topography, rich alluvial soils and intermingling of taxa.

The map shows the four major Himalayan belts and the thrust lines separating each range from the other:



Geographical Map of India showing Shivalik ranges in western Himalayas.



In North these hills falls in the district of Udhampur, Kathua, and Jammu, ultimately merging into Reasi and Poonch district of Jammu & Kashmir. In Northeast Shiwalik hills arises in district of Chamba, Kangra, Bilaspur, Una, Hamirpur, Solan, and Sirmur in Himachal Pradesh; Panchkula and Yamunanagar in Haryana; Dehradun, haridwar

and Udham Singh Nagar in Uttaranchal and Saharanpur in Uttar Pradesh. In South these hills are bounded by districts of Gurdaspur, Nawan Shahar and Ropar of Punjab.

The major forest formations, according Champion & Seth [6] include Sub-tropical *Dry Evergreen Forests*, *Sub-tropical Pine Forests*, *Northern Dry Mixed Deciduous Forest*, *Dry Shivalik Sal Forest*, *Moist Mixed Deciduous Forest*, *Sub-tropical Broadleaf Wet Hill Forest*, *Northern Tropical Semi-evergreen Forest*, and *Northern Tropical Wet-evergreen Forest*.

Ecologically, entire Shivalik belt is considered as highly sensitive zone. This region suffers heavy fragmentation and degradation of habitat due to human encroachment and proliferation of exotic weeds such as *Lantana camara*, *Parthenium hysterophorus*, *Cassia tora*, and *Sida* spp.

## 2. RESULTS AND DISCUSSION

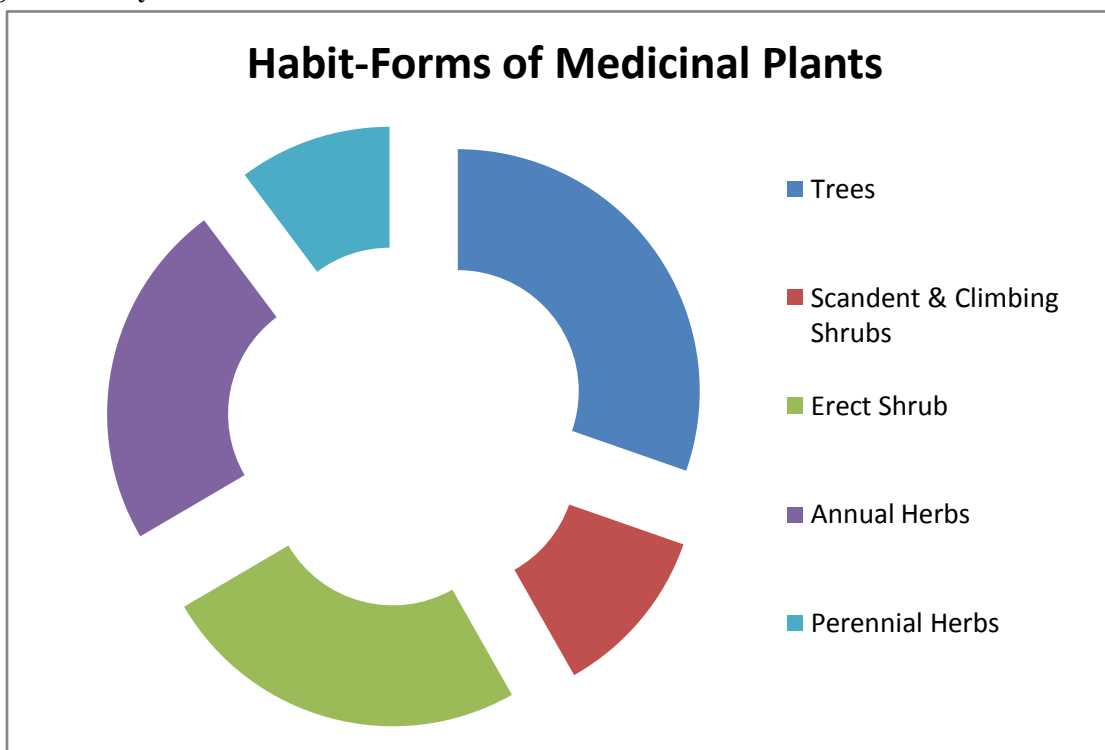
In the present study on medicinal flora in lower Shivalik hill region of western Himalayas an exploratory field visits were carried out during the period from June 2009 to July 2014. In all 323 species belonging to 256 genera spread over 97 families were reported from the study areas. The present work attempts to access the potentiality of Shivalik Hills with respect to the medicinal plants and the work of observation, identification, description, distribution, flowering, fruiting, useable parts and medicinal curative use for diseases was carried out for plant species of potential medicinal importance. During the course of study 197 plant species were recognized as major medicinal plants of commercial importance and 126 plant-species were found to be of lesser economic/ethno-botanical importance with potential for extensive utilization as low cost herbal home remedies by local inhabitants. Further, it was observed that out of 323 species of medicinal plants explored, Pteridophytes were represented by 10 species, Gymnosperms by only 01 species and Angiosperms by 312 species. Categorization of flora into herbs, shrubs, trees, etc. revealed that 106 species belongs to herbs, 80 species belong to shrubs, 96 species belong to trees and 37 species belong to climbers. Family wise analysis of data revealed that 10 dominating families were Fabaceae (46 species), Euphorbiaceae (17 species) Asteraceae (15 species) Moraceae (11 species) Apocynaceae, Solanaceae, Malvaceae (10 species each) Asclepiadaceae, Labiatae, Rosaceae (7 species each). The information collected is given in table 1 to 7.

**Table 1: Statistical Synopsis of the Medicinal Flora of the Study Area**

Taxa	Angiosperms				Gymnosperms		Fern & Fern allies		Grand Total
	Dicots		Monocots						
	Total	%age of the total	Total	%age of the total	Total	%age of the total	Total	%age of the total	
Families	85	87.63	07	7.22	01	1.03	04	4.12	97
Genera	227	88.67	18	7.03	01	0.39	10	3.91	256
Species	289	89.47	23	7.12	01	0.31	10	3.1	323

**Table 2: Analysis of Habit-Forms of Medicinal Plants of Study Area:**

S.No.	Habit-Forms		No. of species	Percentage
1.	Trees		98	30.34
2.	Shrubs	a) Scandent and climbing	37	11.46
		b) Erect	80	24.77
3.	Herbs	a) Annual	75	23.22
		b) Perennial	33	10.21
	<b>Total</b>		<b>323</b>	<b>100</b>

**Fig 1: Habit Forms.****Fig. 2: Diversity of Plants****Among dicots the dominating families are:**

Fabaceae 46 species, Euphorbiaceae 17 species, Asteraceae 15 species, , Moraceae 11 species, Malvaceae 10 species, Apocynaceae 10 species, Solanaceae 10 species, Labiatae 07 species, Rosaceae 07 species, Asclepiadaceae 07 species, Rutaceae 06 species, Oleaceae 06 species, Combretaceae 05 species, Verbanaceae 05 species, Menispermaceae 05 species, Acanthaceae 05 species, Rubiaceae 05 species, Cruciferae 04 species, Cucurbitaceae 04 species. Amaranthaceae, Anacardiaceae, Bignoniaceae, Meliaceae, Ulmaceae, Umbelliferae, Sterculiaceae, Ranunculaceae, Myrtaceae, Convolvulaceae and Rhamnaceae has 03 species each



**Least represented families among dicots are:**

Apiaceae, Aristolochiaceae, Boraginaceae, Cannabinaceae, Caricaceae, Caryophyllaceae, Dilleniaceae, Dipterocarpaceae, Elaeocarpaceae, Ericaceae, Nyctaginaceae, Pedaliaceae, Piperaceae, Pittosporaceae, Punicaceae, Polygonaceae, Samydaceae, Sapotaceae, Ternstroemiaceae, Juglandaceae, Plantaginaceae, Myrsinaceae and Nyctaginaceae, Flacourtiaceae, Moringaceae, Oxalidaceae, Palmae, Polygoniaceae, Lamiaceae, Vitaceae, Zygophyllaceae .

**Among monocots the dominating families are:**

Liliaceae (06 genera and 07 species), Gramineae (genera 05 and 07 species), Amaryllidaceae (02 genera and 02 species), Araceae (02 genera and 02 species), Cyperaceae (01 genera and 02 species), Orchidaceae (01 genera and 01 species)

**Among Gymnosperms:** Only one family Pinaceae (01 genera and 01 species).

**Among Pteridophytes dominant families are:**

Zingiberaceae (genera 07 and 07 species), Costaceae (01 genera and 01 species), Adiantaceae (01 genus and 01 species) and Dryopteridaceae (01 genus and 01 species).

3. **CONCLUSION:** A majority of medicinal plants are found growing along village wastelands, grasslands and open forest floor but under the constant threat of destruction by local inhabitants of the area due to lack of awareness about their identification and potentiality for human welfare. The area possesses rich representation of herbal wealth and this attempt is only initiation for further intensive and exploratory studies for better understanding and utilization of these resources on sustainable basis for generations to come. The documentation and inventorization of medicinal plant species are needed to highlight the newer resources of drugs required for the treatment of incurable and dreadful diseases in the world over.

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