

## QUANTITATIVE ANALYSIS OF ETHNOBOTANY AND COMMON REMEDIES ASSOCIATED WITH THE THREATENED FLORA OF GUJRANWALA REGION, PUNJAB, PAKISTAN

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**Abstract.** Current studies revealed the ethnobotanical importance of the threatened flora of Gujranwala region, Punjab, Pakistan including Gujranwala, Kamoki and Wazirabad Townships. This region is facing rapid expansion of industrialization and urbanization, therefore it is prime time to document and conserve it before it is lost. 100 different species belonging to 52 families were recorded through questionnaire and interviews. Steps for preservation, classification, quantitative indices and phytochemical composition were performed. Asteraceae was the dominant family with ten species. 55% of these represent herbs, 27% shrubs, 15% trees, 2% grasses and 1% weeds whereas 85% plant species were wild and 15% were cultivated. Leaves are the most frequently used parts 77%, followed by stem 12%, roots 12%, flowers 20%, rhizome 17%, seed oil 18%, and so on. As common remedies they are used as diuretics 26%, against fever 25%, laxatives 23%, emollients 22%, against constipation 20%, blood purifiers 20%, and against cough and cold 17% etc. RFC was recorded from 0.001 to 0.78. Informant consensus factor (FCI) ranged from 10–40, with the lowest value belonging to *Cucumis melo* which is used for treating eczema, dysuria, leucorrhoea and as laxative whereas the highest 37 for *Indigofera heterantha* and *Quercus incana* reported to be used for hemorrhagic septicemia and joint pain. Concrete efforts are required to conserve traditional flora and to provide awareness for possible benefits of threatened species.

**Keywords:** *ethnobotanical knowledge, documentation, urbanization, economic benefits, Gujranwala, Pakistan*

### Introduction

#### *Ethnobotany and drugs derived from plants*

The importance of plant based drugs is increasing day by day and their use spreads out of rural areas (Brandão et al., 2006; Shanley and Luz, 2003). These drugs are cheap, have minimum side effects and are usually more effective. Samie et al. (2005) reported that plant essential oils are used for treating sexually transmitted diseases, diarrhea, and dysentery like leaves of *Acacia senegalensis*. Both primary and secondary metabolites are major sources. Secondary metabolites are mostly used as phytomedicines that can be extracted from different plant parts including roots, stem, leaves, flowers, seeds and fruits etc. These plant based drugs include aspirin from willow bark, digoxin from foxglove, quinine from cinchona bark, and morphine from the opium poppy. Plants are natural source of remedies including cough, sneezing, head ache and even are successfully used against cancer. Plants are diverse in nature effective against more than one disease at a time (Khan et al., 2012). Pakistan has more than six to seven thousand species of plants that are wild in nature and about six hundred are known to have medicinally uses. Traditional knowledge is being transfer through Hakims who are Tabib (Traditional Medicine Practioner). Most of traditional knowledge is transferred through verbal

communication and no comprehensive documentation is available to plants of particular area or this region and moreover comparison of topology, genetic variation for specific efficacy (Amiri and Joharchi, 2016). Ethnobotanical studies although have been carried out in different parts of Pakistan yet they are scarce and not properly documented.

It is known that plants of any type and species are suitable for medicines due to diverse biochemical composition. For example, an important genus of the family Moringaceae is *Moringa* and the species i.e. *Moringa oleifera* is an important medicinal plant that is native to the tropical areas and grows in all type of soils (Fahey, 2005). *Moringa* tree is regarded as one of the world's most reliable tree for medicines, as the whole plant can be utilized for food purposes or has some other advantageous characteristics (Gupta et al., 2010). Ethnobotanical account of 40 species relating to 26 families from Township Dargai, District Malakand Pakistan has been documented by Zaman et al. (2013). Likewise Wazir et al. (2007) recorded 20 medicinal salt tolerant plants found in the neighboring areas of District Karak. Akhtar and Begum (2009) reported that 55 species of plants relating to 38 families of plants were utilized for about 42 diseases in Jalala area District Mardan. Ahmed et al. (2013) identified 100 ethno medicinal plant species from Madyan valley in District Swat, Pakistan. Most of them were used as tonic, stimulant, narcotics, laxative and diuretic. Important knowledge about medicinal plants and their utilization from Dera Ghazi Khan, Punjab, Pakistan were documented by Gulshan et al. (2012). Zereen and Sardar (2013) enlisted the ethno botanical data of natives on wild trees in 08 Districts of Central Punjab that were Narowal, Sialkot, Sahiwal, Nankana Sahib, Faisalabad, Lahore, Pakpattan and Vehari. There were about 48 species of plants belonging to 23 families were gathered, including their utilization by people of particular districts for various activities i.e. fruits, vegetables, timber, medicine, fuel, fodder, etc. About 161 plant species from 57 different families involving 22 trees, 104 herbs, 23 shrubs, 3 parasitic and 9 grasses species from Township Takht-e-Nasrati, District Karak, and Pakistan were examined by Khan and Hussain (2013). The people of this region utilized 118 species (73.3%) as traditional remedial plants, 114 species as animal food (70.8%), 47 species as fuel (26.7%), 16 as timber (9.94%), 23 as vegetables (14.3%), 50 as veterinary medicines (31.06%) and 90 species are recognized as honey bee attractive species (55.9%).

### ***Uses of plant parts and selection of the area***

Seventy-one species of medicinal plants belonging to 38 families have been reported that were collected through different people. Mostly the favored part of plants used as traditional medicine were leaves (38%) followed by the seed (13%), whole plant (11%), flower (9%), fruit (8%), root and bark (6%). These were obtained through wild herbs (54%) followed by the wild shrubs and wild trees (13%), cultivated herbs (10%), cultivated trees (5%), cultivated shrubs (3%) and wild grasses (2%). The medicines or the herbal products are usually recommended by oral means to the patients (Mahmood et al., 2013).

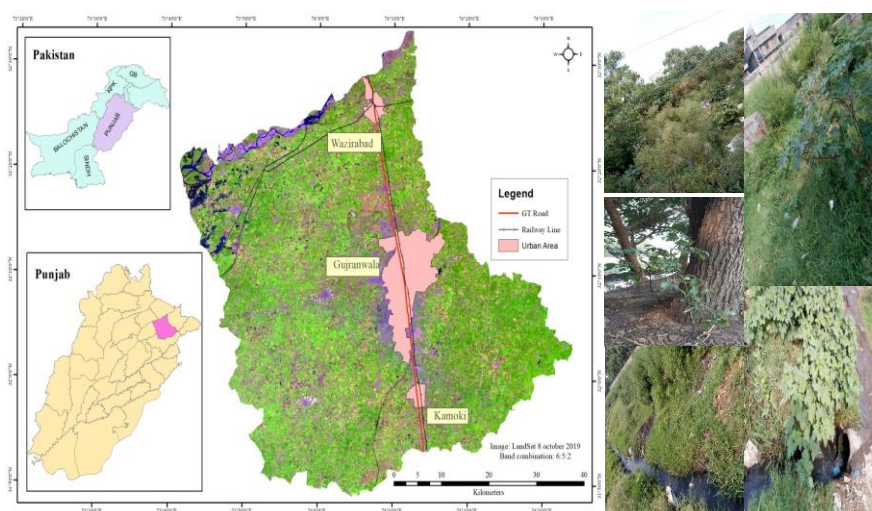
Current studies focused on Gujranwala region that constitutes three Townships viz., Gujranwala, Kamoki and Wazirabad. Gujranwala is known as one of the most important industrial cities of Pakistan. Due to various anthropogenic activities especially urbanization, industrial waste and different types of pollution plants are losing their habitats and are at the verge of endangerment. So it is the need of the hour to cut short our all sources that cause pollution or to collect and preserve the plants that are being destroyed. For that purpose, ethnobotanical studies are the best approach for obtaining data, sample collection and preservation. This will ensure availability of enlisted species

and documentation related to their significance, traditional uses, phytochemical composition and status of flora of different type of species/habitat within the District by both urban and rural people. This study aims to systematically document local flora of selected sites, traditional uses and their quantitative significance for illustrating importance of data collected for future application. This report would also be important to devise future strategy to plan survey, site selection, collection of sampling, interaction with local community and conservation efforts to ensure proper preservation for not only coming generations but also to earn revenue from herbal and pharmaceutical sector, along with comprehensive mode of action to resolve issues raised through anthropogenic activities.

## Materials and methods

### *Geological distribution and sites for survey*

Gujranwala region comprises of three Townships viz., Gujranwala, Kamonki and Wazirabad, which were selected for documenting traditional knowledge (Fig. 1). Gujranwala is an industrial city situated in the largest province of Punjab. Gujranwala is 226 m above sea level spreading over an area of 3198 km<sup>2</sup> with a population of 1,960,136. Gujranwala is Pakistan's 7<sup>th</sup> largest populous and metropolitan area and the fifth largest city. The months May, June and July are the hottest months with the temperature ranging from 36-42 °C (97-108 °F) while it may drop below zero sometimes in winter. Therefore, climate of the district is usually hot and semiarid. Soil is mainly fertile due to its plain and simple topology that supports plant biodiversity. Across Gujranwala, mostly people utilize plants as medicine for therapeutic purposes residing both in rural and urban areas. Plants are generally used for food, paper, clothing, dying, timber, fodder for livestock, medicines, cosmetics, and other domestic purposes. Many species are linked to cultural heritages. Due to little information Gujranwala region is selected to document local flora with ethnobotanical significance. Native people including male, female, farmers and herbalists were contacted for interview and questionnaire completion.



**Figure 1.** Map of Gujranwala region showing selected sites and habitats for survey (Gujranwala, Wazirabad, and Kamonki townships)

The following materials were used in the survey: pencil, notebook, gloves, polythene bags and knife. The study of the selected sites were carried out from winter (November) 2018 to summer (July) 2019. Information regarding ethnobotanical uses were collected and noted in the form of questionnaires by the informants of the areas of different ages. For ethnobotanical knowledge herbalists, native people of old ages and hakims were also consulted. The method of classification was based upon the botanical rules and regulations.

### *Collection, preservation and quantitative indices*

Collection was made during November 2018 to July 2019 through regular visits and field trips by selecting sites one by one. Plants were then dried under shade and converted to powder by grinding. Plants after their collection were washed by water, thoroughly cleaned and leaves were stripped by hands for better results. Questionnaire method was employed to note data for informants of the areas of all ages. For proper identification herbarium collections were consulted, many were matched with online databases and Flora of Pakistan. Herbarium specimen were prepared and deposited in Herbarium, Department of Botany, University of Gujrat, Gujrat, Pakistan. Herbarium specimen preparation was achieved by the following steps: (a) Voucher Number, (b) Common Names, (c) Botanical Names, (d) Habitats/Locality, (e) Family Names, and (f) The region etc. Quantitative indices were performed by employing various formulae as presented below.

### *Informant consensus factor (FCI/ICF)*

FCI values were calculated as the following formula (Heinrich et al., 2009).

$$FCI = N_{ur} - N_t / N_{ur} - 1$$

where,  $N_{ur}$  is the total number of use reports for each disease category.  $N_t$  is the number of species used in the said category.

### *Relative frequency of citation (RFC)*

The local importance of the species was calculated with the help of the relative frequency of citation. To find the RFC, number of responder's had provided useful information about species (FC) was divided by the total number of responder's in the field survey (N) as calculated previously (Tardío et al., 2008).

$$RFC = FC / N$$

### *Relative importance level (RIL)*

To find the RIL, number of responder's had provided useful information about species (FC) was divided by the total number of responders of all species ( $FC_t$ ) as described by (Friedman, 1986).

$$RIL = FC / FC_t$$

### *Use value (UV)*

Use value can be calculated by:

$$UV = \sum U_i / n_i$$

$\sum U_i$  is the use value of the species.  $n_i$  is the number of responders.

### *Fidelity level (FL)*

It is the ratio of the respondents showing the uses of a specific plant to treat a particular disease. FL is calculated by following Alexiades (1996).

$$FC (\%) = FC_p / FC \times 100$$

where  $FC_p$  is the frequency of citation of particular disease. FC is the total frequency of citation for a particular disease.

### *Corrected fidelity level (CFL)*

It is used for a correction factor to rank the plant with different RIL and FL values. It can be calculated by Ali-Shtayeh (2000).

$$CFL = FL \times RIL$$

### *Use reports (UR)*

It is the total number of uses reported by the user.

At room temperature, the plants were dried and grinded in to powder form. Then 200 g of each powdered plant material was soaked in 200 ml ethanol for 24 h. Then this was filtered using a filter paper i.e. Whatmann's filter paper No.42. This plant extract and the filtrate was then placed in vacuum at about 30 °C and stored at 4 °C. The following procedures were applied for preliminary screening of phytochemicals:

### *Tests for alkaloids*

0.2 g powdered sample of each plant was mixed with 10 ml of 1% HCl. Then this sample was transferred to water bath for a few minutes and 1 ml of this extract was treated with 2-4 drops of Dragendroff's reagent. The orange reddish precipitates confirmed the presence of alkaloids (Aiyegoro and Okoh, 2010).

### *Tests for flavonoids*

For flavonoids presence two solutions were made. Solution A was prepared by the help of 5 ml ethanol extract that was prepared earlier. Solution B contained 5 ml of ethanol solvent and 5 ml of KOH. Both these solutions were mixed together and the presence of yellow color indicated the flavonoids (Jaffer et al., 1983).

### *Tests for tannins*

10 ml of the solution in extract form was taken and about 2 drops of ferric chloride solution was put into the extract. The blue colored solution detected the presence of tannins (Aiyegoro and Okoh, 2010).

### *Tests for terpenoids*

1 ml of acid anhydride plus concentrated sulphuric acid was treated with 1 ml of the extract. Reddish Brown color appeared which confirmed the presence of terpenoids (Aiyegoro and Okoh, 2010).

### *Tests for saponins*

The extract was added in 2 ml distilled water shaken well. Foam was the indication that the sample contains saponins in it (Shihata, 1951).

### *Tests for phenols*

5 ml of the extracts of the plants were taken in a test tube and 1 ml of 1% solution of ferric chloride 1% solution of potassium ferrocyanide was added. Reddish blue color indicated the presence of phenols in it (Farhan et al., 2012).

### *Tests for resins*

20 ml of HCL was added in the 10 ml extract of each plant. Turbidity indicated the presence of resins in the sample (Alsaidy, 2013).

### *Tests for steroids*

2 ml of acetic anhydride plus 2 ml of sulphuric acid was added in the 0.5 g aqueous extracts of the plants. The change in the color from violet to blue or green indicated the presence of steroids (Sofowara, 1993).

## **Results**

### ***Ethnobotanical elaboration and therapeutic uses***

Questionnaire was filled by different age group of people with varying types of qualification, educational background, gender, informant category (*Table 1*). Data were collected from natives of the selected sites i.e. Gujranwala, Kamonki and Wazairabad Townships through surveys. Total natives that provide useful information in this survey were 300, out of which 185 were females (61.67%) and 115 were males (38.33%). Traditional health practitioners included 45 persons and 245 were indigenous people in which people below 20 years of age were 30, people between 21 and 30 years old were 27, people in the category of 31 to 40 years were 73, people of age between 41 and 50 were 70, people of age between 51 and 60 were 66 and above 61 were 34. Regarding their educational background 165 illiterate persons were included, people of matriculation level were 70, 30 people were of intermediate level, 20 people were of bachelors level and 15 people were of masters level. Therefore, educational background also reflects understanding towards importance and application of natural resources among different age groups.

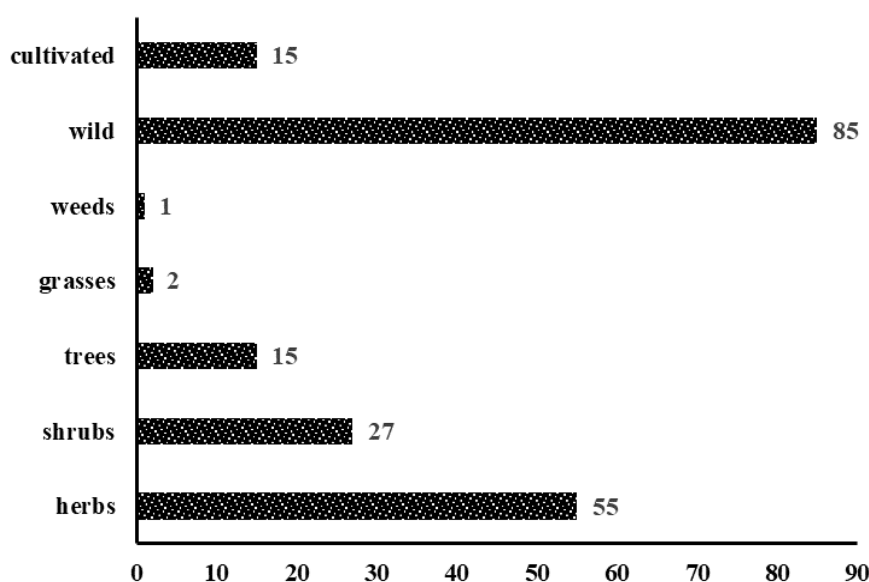
Collected plant species can be divided into different life forms/types viz., herbs (55%), shrubs (27%), trees (15%), grasses (2%) and weeds (1%). Wild and cultivated plants are also found in the study area which is 85% and 15% respectively (*Fig. 2*). Different plant parts such as roots, shoots, stem, leaves and flowers were used for various preparations. Leaves were the most frequently used parts (77%) followed by

stem (12%), roots (12%), flower (20%), rhizome (17%), seed oil (18%), shoots (27%), gel (8%) and whole plant (24%) (Fig. 3). These parts were found to be used in the form of different preparations such as extract (67%), juice (40%), powder (58%), poultices (30%), decoction (57%), ash (25%), mixture with sugar (3%), infusion (48%) (Fig. 4).

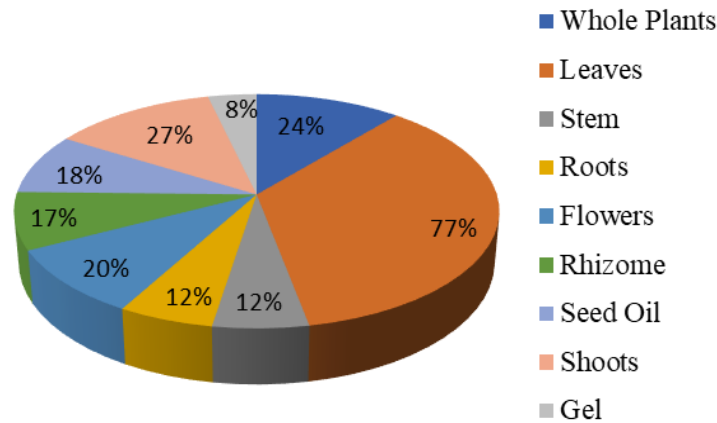
Family Asteraceae contributes the highest number of medicinal plant species that included 10 species, followed by Malvaceae with 6, Solanaceae 5, Mimosaceae, Cucurbitaceae with 4, Poaceae, Euphorbiaceae and Amaranthaceae with 3 each, Fabaceae, Rosaceae, Tiliaceae, and Portulacaceae with 2 each and Asparagaceae, Brassicaceae, Rutaceae have 1 species each and so on. The species found were whether monocot or dicot at particular location are shown in Table 2.

**Table 1.** Demographic data of the respondents from the study area

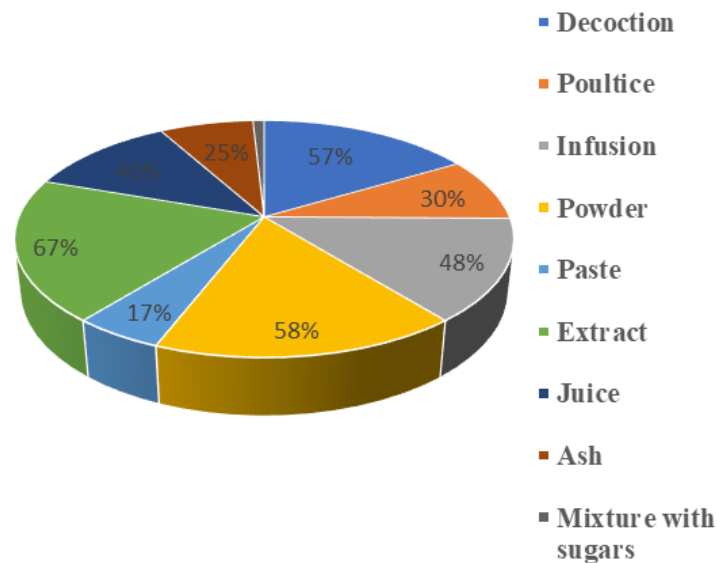
S. No.	Variable	Categories	Number of persons	% age
1.	Gender	Male	185	61.67
		Female	115	38.33
2.	Informant category	Traditional health practitioners	45	15
		Indigenous people	255	85
3.	Age	≤ 20 years	30	10
		21 - 30 years	27	9
		31 - 40 years	73	24.33
		41 - 50 years	70	23.33
		51 - 60 years	66	22
		≥ 61 years	34	11.33
4.	Educational background	Illiterate	165	55
		Matric	70	23.33
		Intermediate	30	10
		Bachelors	20	6.66
		Masters	15	5



**Figure 2.** Different plant types studied in 3 selected sites of Gujranwala region



**Figure 3.** Plant parts used for different therapeutic purposes studied in 3 selected sites of Gujranwala region



**Figure 4.** Graphical presentation of plant preparations used for different therapeutic purposes from 3 selected sites of Gujranwala region

**Table 2.** Families count present in the selected sites of Gujranwala

S.No.	Family	Genus	Species	Dicot/Monocot	Wazirabad	Gujranwala	Kamonki
1.	Astereace	<i>Xanthium</i>	<i>strumarium</i>	Eudicot	+	+	+
2.		<i>Parthenium</i>	<i>hysterophorus</i>	Eudicot	+	+	+
3.		<i>Artemisia</i>	<i>scoparia</i>	Eudicot	+	-	+
4.		<i>Eclipta</i>	<i>prostrate</i>	Dicot	+	-	+
5.		<i>Carthamus</i>	<i>oxyacantha</i>	Dicot	+	+	-
6.		<i>Taraxacum</i>	<i>officinale</i>	Dicot	+	+	-
7.		<i>Calendula</i>	<i>arvensis</i>	Dicot	-	+	+
8.		<i>Conyza</i>	<i>aegyptiaca</i>	Dicot	+	+	+
9.		<i>Bombax</i>	<i>ceiba</i>	Dicot	+	+	+
10.		<i>Cichorium</i>	<i>intybus</i>	Dicot	+	-	+



11.	Malvaceae	<i>Hibiscus</i>	<i>rosasinensis</i>	Dicot	+	+	+
12.		<i>Abutilon</i>	<i>indicum</i>	Dicot	+	+	-
13.		<i>Marva</i>	<i>parviflora</i>	Dicot	+	+	+
14.		<i>Melia</i>	<i>azedarach</i>	Dicot	+	+	+
15.		<i>Althea</i>	<i>rosea</i>	Dicot	+	+	+
16.		<i>Malvastrum</i>	<i>coromandelianum</i>	Dicot	-	+	+
17.	Solanaceae	<i>Withania</i>	<i>somnifera</i>	Dicot	+	-	+
18.		<i>Solanum</i>	<i>surattense</i>	Dicot	+	+	-
19.		<i>Solanum</i>	<i>nigrum</i>	Dicot	+	+	+
20.		<i>Capsicum</i>	<i>frutescens</i>	Dicot	+	+	+
21.		<i>Datura</i>	<i>innoxia</i>	Dicot	+	+	+
22.	Papilionaceae	<i>Indigofera</i>	<i>linifolia</i>	Dicot	-	-	+
23.		<i>Dalbergia</i>	<i>sissoo</i>	Dicot	+	+	+
24.		<i>Pongamia</i>	<i>pinnata</i>	Dicot	+	-	+
25.		<i>Crotolaria</i>	<i>burhia</i>	Dicot	+	-	+
26.		<i>Alhagi</i>	<i>maurorum</i>	Monocot	+	-	-
27.	Cucurbitaceae	<i>Citrullus</i>	<i>colocynthis</i>	Dicot	+	+	+
28.		<i>Cucurbita</i>	<i>Pepo</i>	Dicot	+	+	+
29.		<i>Cucumis</i>	<i>Melo</i>	Dicot	+	+	+
30.		<i>Benincasa</i>	<i>hispida</i>	Dicot	-	+	+
31.	Mimosaceae	<i>Albizia</i>	<i>Lebbek</i>	Dicot	+	+	+
32.		<i>Cassia</i>	<i>fistula</i>	Dicot	+	+	+
33.		<i>Acacia</i>	<i>modesta</i>	Dicot	+	+	+
34.		<i>Acacia</i>	<i>nilotica</i>	Dicot	+	+	+
35.	Poaceae	<i>Cynodon</i>	<i>dactylon</i>	Monocot	+	+	+
36.		<i>Avena</i>	<i>sativa</i>	Monocot	+	-	+
37.		<i>Bumfusa</i>	<i>arundinacea</i>	Monocot	-	+	+
38.	Euphorbiaceae	<i>Euphorbia</i>	<i>hirta</i>	Dicot	+	+	+
39.		<i>Euphorbia</i>	<i>heliscopia</i>	Dicot	+	+	+
40.		<i>Ricinus</i>	<i>communis</i>	Dicot	+	+	-
41.	Amaranthaceae	<i>Amaranthus</i>	<i>viridis</i>	Dicot	+	+	+
42.		<i>Achyranthes</i>	<i>aspera</i>	Dicot	+	+	+
43.		<i>Scandix</i>	<i>pectenvenneris</i>	Dicot	-	-	+
44.	Fabaceae	<i>Melilotus</i>	<i>indica</i>	Dicot	-	+	+
45.		<i>Indigofera</i>	<i>heterantha</i>	Dicot	+	-	+
46.	Rosaceae	<i>Duchesnea</i>	<i>indica</i>	Dicot	+	+	-
47.		<i>Rosa</i>	<i>indica</i>	Dicot	+	+	+
48.	Tiliaceae	<i>Grewia</i>	<i>asiatica</i>	Monocot	-	+	+
49.		<i>Corchorus</i>	<i>aestuans</i>	Dicot	+	+	+
50.	Lamiaceae	<i>Micromeria</i>	<i>biflora</i>	Dicot	-	+	-
51.		<i>Mentha</i>	<i>spicata</i>	Dicot	+	+	+
52.	Papaveraceae	<i>Fumaria</i>	<i>indica</i>	Dicot	+	+	+
53.		<i>Argemone</i>	<i>mexicana</i>	Dicot	+	-	+
54.	Apocynaceae	<i>Vinca</i>	<i>major</i>	Dicot	+	+	+
55.		<i>Nerium</i>	<i>oleander</i>	Dicot	+	+	+
56.		<i>Rhazya</i>	<i>stricta</i>	Monocot	+	-	+
57.	Amaryllidaceae	<i>Allium</i>	<i>cepa</i>	Monocot	+	+	+
58.		<i>Allium</i>	<i>sativum</i>	Monocot	+	+	+
59.	Asclepiadaceae	<i>Calotropis</i>	<i>procera</i>	Eudicot	+	-	+
60.		<i>Caralluma</i>	<i>edulis</i>	Eudicot	+	+	-
61.	Moraceae	<i>Ficus</i>	<i>benghalensis</i>	Dicot	+	+	+
62.		<i>Morus.</i>	<i>nigra</i>	Dicot	+	+	+

63.	Myrtaceae	<i>Syzygium</i>	<i>cumini</i>	Dicot	+	-	+
64.		<i>Eucalyptus</i>	<i>globulus</i>	Dicot		+	+
65.	Portulacaceae	<i>Portulaca</i>	<i>oleracea</i>	Dicot	+	+	-
66.		<i>Portulaca</i>	<i>quadrifida</i>	Dicot	+	+	-
67.	Boraginaceae	<i>Trichodesma</i>	<i>indicum</i>	Dicot	-	+	+
68.		<i>Heliotropium</i>	<i>strigosum</i>	Dicot	+	+	+
69.	Cuscutaceae	<i>Cuscuta</i>	<i>reflexa</i>	Dicot	+	+	+
70.	Cannabinaceae	<i>Cannabis</i>	<i>sativa</i>	Dicot	+	+	+
71.	Crassulaceae	<i>Bryophyllum</i>	<i>pinnatum</i>	Dicot	+	+	-
72.	Convolvulaceae	<i>Convolvulus</i>	<i>album</i>	Dicot	+	+	+
73.	Chenopodiaceae	<i>Chenopodium</i>	<i>album</i>	Dicot	+	+	+
74.	Cyperaceae	<i>Cyperus</i>	<i>rotundus</i>	Monocot	-	+	+
75.	Punicaceae	<i>Punica</i>	<i>granatum</i>	Dicot	+	+	+
76.	Nyctaginaceae	<i>Mirabilis</i>	<i>jalapa</i>	Dicot	+	-	-
77.	Rhamnaceae	<i>Zizyphus</i>	<i>nummularia</i>	Dicot	+	-	+
78.	Oxalidaceae	<i>Oxalis</i>	<i>corniculata</i>	Dicot	-	+	+
79.	Apiaceae	<i>Foeniculum</i>	<i>vulgare</i>	Dicot	+	+	+
80.	Aizoaceae	<i>Trianthema</i>	<i>portulacastrum</i>	Dicot	-	-	+
81.	Acanthaceae	<i>Justicia</i>	<i>adhatoda</i>	Dicot	+	+	-
82.	Salvadoraceae	<i>Salvadora</i>	<i>oleoides</i>	Dicot	+	+	+
83.	Tamaricaceae	<i>Tamarix</i>	<i>dioica</i>	Dicot	+	-	+
84.	Zygophyllaceae	<i>Tribulus</i>	<i>camaldulensis</i>	Dicot	+	+	-
85.	Arecaceae	<i>Phoenix</i>	<i>dactylifera</i>	Monocot	+	-	+
86.	Meliaceae	<i>Azadirachta</i>	<i>indica</i>	Monocot	+	+	+
87.	Asphodelaceae	<i>Aloe</i>	<i>vera</i>	Monocot	+	+	+
88.	Pontederiaceae	<i>Eichhornia</i>	<i>crassipes</i>	Monocot	-	+	+
89.	Asparagaceae	<i>Asparagus</i>	<i>racemosus</i>	Monocot	+	+	+
90.	Polygonaceae	<i>Polygonum</i>	<i>plebium</i>	Dicot	+	-	+
91.	Urticaceae	<i>Debregeasia</i>	<i>salicifolia</i>	Dicot	+	+	-
92.	Brassicaceae	<i>Lepidium</i>	<i>didymium</i>	Dicot	+	+	+
93.	Sapindaceae	<i>Dodonaea</i>	<i>viscosa</i>	Dicot	-	+	+
94.	Hypericaceae	<i>Hypericum</i>	<i>oblongifolium</i>	Dicot	+	-	+
95.	Oleaceae	<i>Jasminum</i>	<i>officinale</i>	Dicot	+	+	-
96.	Ranunculaceae	<i>Ranunculus</i>	<i>muricatus</i>	Dicot	-	-	+
97.	Caprifoliaceae	<i>Lonicera</i>	<i>quinqulocularis</i>	Dicot	+	+	-
98.	Fagaceae	<i>Quercus</i>	<i>incana</i>	Dicot	+	-	+
99.	Berberidaceae	<i>Berberis</i>	<i>lyceum</i>	Dicot	+	+	-
100.	Rutaceae	<i>Zanthoxylum</i>	<i>armatum</i>	Dicot	-	+	+

Medicinal values of 100 species of plants belonging to different families were recorded, that was used for different purposes such as stimulant, anthelmintic, cardiovascular diseases, febrifuge, diuretic, vermifuge, sedative and even antidote. Many diseases were treated such as hemorrhagic septicemia, jaundice, wound healing, severe burns and skin treatments of various types. Important medicinal uses of the plants include cold, flu, fever, dysentery, male diseases like gonorrhea, sores on genitals and female diseases such as amenorrhea, leucorrhea, and diarrhea, tooth aches, diabetes etc. Plants associated with different diseases for their treatment found in the study area were classified as diuretic (26%), febrifuge (25%), laxative (23%), emollient (22%), constipation (20%), blood purifier (20%), tonics (19%), diarrhea curing (19%),

carminatives (18%), cough and cold curing medicines (17%), dysentery treating (15%), jaundice pain relievers (15%), and anti-diabetics (14%) (Table 3; Fig. 5).

Twenty different plants were shortlisted for phytochemical analysis based on usefulness against common diseases through questionnaire method. Phytochemicals especially secondary metabolites are of supreme importance against number of ailments. The detection for presence/absence of these compounds is provided as a graphical presentation in Figure 6.

**Table 3.** Scientific names, parts used, preparation used as therapeutic uses and their habit/habitat studied in the selected sites of Gujranwala

S. No.	Scientific name	English names	Parts used	Preparation	Habit/habitat
1.	<i>Convolvulus albus</i>	Field bindweed	Whole Plant, Mostly Leaves	Powder or Juice	Shrub, Wild/Cultivated
2.	<i>Bryophyllum pinnatum</i>	Air plant/Cathedral bells	Leaves	Extract, Paste	Herb, Cultivated
3.	<i>Cannabis sativa</i>	Cannabis	Shoot, Leaves, Seeds	Powder, Juice, Decoction	Herb, Wild
4.	<i>Chenopodium album</i>	Wild spinach/manure weed	Whole Plant	Powder, Cooked, Extract	Herb, Wild
5.	<i>Heliotropium strigosum</i>	Bristly Heliotrope	Whole Plant, Leaves	Powder, Extract	Herb, Wild
6.	<i>Xanthium strumarium</i>	Rough cocklebur	Leaves, Seeds, Fruit	Paste, Extract	Herb, Wild
7.	<i>Trichodesma indicum</i>	Indian borage	Leaves	Paste, Extract, Decoction	Herb, Wild
8.	<i>Citrullus colocynthis</i>	Bitter cucumber/wild gourd	Seed, Fruit, Seed oil	Paste, Extract, Oil	Herb, Wild
9.	<i>Benincasa hispida</i>	Wax gourd/ash gourd	Fruit, Seed oil	Oil, Juice	Herb, Cultivated
10.	<i>Cucumis melo</i>	Muskmelon	Fruit, Leaves	Decoction, Paste	Herb, Wild
11.	<i>Cucurbita pepo</i>	Winter squash/pumpkin	Fruit, Leaves, Seeds	Paste	Herb, Wild/Cultivated
12.	<i>Cuscuta reflexa</i>	Giant dodder	Whole Plant	Powder, Extract	Herb, Wild/Cultivated
13.	<i>Euphorbia hirta</i>	Asthma plant	Leaves, Milky Latex	Extract	Herb, Wild
14.	<i>Euphorbia helioscopia</i>	Sun spurge	Seeds, Milky latex	Roasted, Extract	Herb, Wild
15.	<i>Ricinus communis</i>	Castor bean	Seeds, Stem, Leaves	Powder, Oil	Shrub, Wild
16.	<i>Cyperus rotundus</i>	Nut sedge	Whole Plant, Leaves, Rhizome	Decoction, Paste	Herb, Wild
17.	<i>Indigofera tinctoria</i>	Indigo	Whole Plant, Leaves	Decoction, Extract	Herb, Wild
18.	<i>Dalbergia sissoo</i>	North Indian rosewood	Bark, Leaves	Decoction, Juice, Infusion, Powder	Tree, Wild
19.	<i>Pongamia pinnata</i>	Indian beech/Pongam oiltree	Young Branches, Leaves, Seeds, Bark	Decoction, oil, Powder	Tree, Wild
20.	<i>Crotalaria burhia</i>	Ethiopian rattlebox	Flowers, Leaves, Whole Plant	Extract, Juice	Herb, Wild
21.	<i>Alhagi maurorum</i>	Camelthorn bush	Flowers, Leaves	Decoction, Powder	Herb, Wild
22.	<i>Argemone Mexicana</i>	Mexican poppy	Flowers, Milky Latex	Powder, Extract	Herb, Wild
23.	<i>Cynodon dactylon</i>	Bermuda grass/Dhoob	Roots, Flowers, Leaves	Powder, Juice	Grass, Wild
24.	<i>Avena sativa</i>	Common oat	Leaves, Whole Plant	Powder, Infusion	Grass, Wild
25.	<i>Bambusa arundinacea</i>	Bamboo	Leaves, Young Shoots, Roots	Powder, Infusion, Ash	Shrub, Wild
26.	<i>Rosa indica</i>	Rose	Leaves, Flower, Roots	Powder, Extract, Mixture with sugar	Shrub, Wild/Cultivated
27.	<i>Zizyphus nummularia</i>	Wild jujube	Leaves, Fruit	Decoction, Paste	Shrub, Wild
28.	<i>Punica granatum</i>	Pomegranate	Bark, Fruit	Powder, Ash	Tree, Cultivated

29.	<i>Portulaca oleracea</i>	Common purslane	Whole plant, Leaves	Powder, Infusion	Herb, Wild
30.	<i>Portulaca quadrifida</i>	Duckweed/little hogweed	Seeds, Leaves	Powder, Infusion, Paste	Herb, Wild
31.	<i>Eichhornia crassipes</i>	Common water hyacinth	Leaves	Infusion, Paste	Herb, Wild
32.	<i>Polygonum plebium</i>	Common knotweed	Leaves, Whole Plant	Extract, Oil, Decoction, Ash	Herb, Wild
33.	<i>Hibiscus rosasinensis</i>	Shoe flower/Chinese hibiscus	Fruit	Extract, Juice	Shrub, Wild/Cultivated
34.	<i>Abutilon indicum</i>	Mallow	Seeds, Leaves	Decoction	Herb, Wild
35.	<i>Marva parviflora</i>	Cheeseweed/marshmallow	Leaves	Decoction, Extract	Herb, Wild
36.	<i>Melia azedarach</i>	Chinaberry tree	Leaves	Paste, Infusion	Tree, Wild
37.	<i>Mentha spicata</i>	Bush mint/spearmint	Leaves, Shoot	Decoction, Paste	Herb, Wild/Cultivated
38.	<i>Mirabilis jalapa</i>	Marvel of peru/four o'clock flower	Leaves, Flower	Decoction, Paste, Juice	Herb, Wild/Cultivated
39.	<i>Syzygium cumini</i>	Black plum/Java plum	Seeds	Powder	Tree, Cultivated
40.	<i>Eucalyptus globulus</i>	Southern blue gum	Leaves	Decoction, Extract, Fumes	Tree, Cultivated
41.	<i>Acacia nilotica</i>	Gum Arabic tree	Flowers, Bark, Pod	Decoction, Powder, Juice	Tree, Wild
42.	<i>Albizia lebbek</i>	Lebbek tree/flea tree	Flowers, Seeds, Bark	Decoction	Tree, Wild
43.	<i>Cassia fistula</i>	Indian laburnum/golden shower	Flowers, Seeds, Fruits	Powder	Tree, Wild
44.	<i>Acacia modesta</i>	Phulai	Bark, Stem, Gum	Powder	Tree, Wild
45.	<i>Ficus benghalensis</i>	Banyan	Milky Latex, Young Branches	Powder, Gum	Tree, Wild
46.	<i>Morus nigra</i>	Black mulberry	Leaves, Roots, Fruit	Juice, Infusion, Powder	Tree, Wild
47.	<i>Oxalis corniculata</i>	Creeping woodsorrel	Leaves, Whole Plant	Extract, Powder	Herb, Wild
48.	<i>Foeniculum vulgare</i>	Sweat fennel	Leaves, Seeds	Extract, Decoction	Herb, Cultivated
49.	<i>Trianthema portulacastrum</i>	Desert horsepurslane	Whole Plant, Leaves, Roots	Powder, Decoction, Extract	Herb, Wild
50.	<i>Justicia adhatoda</i>	Malabar nut/adhatoda	Flower, Leaves, Roots	Juice, Decoction	Herb, Wild
51.	<i>Allium sativum</i>	Garlic	Bulbs	Juice	Herb, Wild
52.	<i>Nerium oleander</i>	Oleander	Roots, Stem, Leaves	Powder, Extract	Shrub, Wild
53.	<i>Amaranthus viridis</i>	Slender amaranth	Leaves	Powder, Paste	Herb, Wild
54.	<i>Achyranthes aspera</i>	Chaff flower	Leaves, Roots, Seeds	Powder, Extract, Decoction	Herb, Wild
55.	<i>Calotropis procera</i>	Apple of Sodom/roostertree	Stem, Milky Latex, Branches, Leaves, Flowers	Poultices, Ash, Powder	Herb, Wild
56.	<i>Caralluma edulis</i>	Caralluma	Whole plant, Leaves	Juice, Extract, Powder	Shrub, Wild
57.	<i>Parthenium hysterophorus</i>	Santa Maria feverfew/whitetop weed	Flowers, Leaves	Extract, Powder	Herb, Wild
58.	<i>Artemisia scoparia</i>	Virgate wormwood	Flowers, Leaves, Whole Plant, Shoot	Extract, Powder, Decoction	Herb, Wild
59.	<i>Eclipta prostrate</i>	False daisy	Roots, Whole Plant	Extract, Juice, Oil	Herb, Wild
60.	<i>Carthamus oxyacantha</i>	Wild safflower	Seeds	Oil	Herb, Wild
61.	<i>Taraxacum officinale</i>	Common dandelion	Leaves, Roots	Paste, Powder, Decoction	Herb, Wild
62.	<i>Salvadora oleoides</i>	Salvadora	Branches, Fruits	Decoction	Shrub, Wild
63.	<i>Datura innoxia</i>	Pricklyburr	Leaves, Seeds	Extract	Herb, Wild
64.	<i>Capsicum frutescens</i>	Chili pepper	Fruits	Powder, Paste	Herb, Cultivated

65.	<i>Solanum nigrum</i>	Black night shade	Fruit, Leaves, Whole Plant	Poultice, Infusion, Extract	Herb, Wild
66.	<i>Solanum surattense</i>	Surattense nightshade	Fruit, Leaves, Roots	Decoction	Herb, Wild
67.	<i>Withania somnifera</i>	Ashwagandha	Whole Plant, Roots	Decoction	Herb, Wild
68.	<i>Tamarix dioica</i>	Saltcedar	Branches, Leaves	Powder	Shurb, Wild
69.	<i>Grewia asiatica</i>	Phalsa	Branches, Fruit	Decoction, Juice	Tree, Wild/Cultivated
70.	<i>Corchorus aestuans</i>	Jute mallow	Seeds, Whole Plant	Powder	Herb, Wild
71.	<i>Tribulus camaldulensis</i>	River red gum	Seeds, Fruits, Leaves	Powder, Infusion	Herb, Wild
72.	<i>Scandix pectenvenenis</i>	Shepherd's needle	Stems, Leaves, Roots	Powder, Decoction	Herb, Wild
73.	<i>Rhazya stricta</i>	Rhazya	Stems, Leaves, Fruits	Extract	Shrub, Wild
74.	<i>Phoenix dactylifera</i>	Date palm	Leaves, Fruits	Extract, Decoction	Tree, Cultivated
75.	<i>Calendula arvensis</i>	Field marigold	Leaves, Flowers	Extract	Herb, Wild
76.	<i>Conyza aegyptiaca</i>	Canadian horseweed	Leaves, Flowers	Extract	Herb, Wild
77.	<i>Bombax ceiba</i>	Cotton tree/red silk cotton	Leaves, Stem, Seeds	Extract, Decoction	Herb, Wild
78.	<i>Aloe vera</i>	Indian aloe/Chinese aloe	Leaves, Gel	Extract, Decoction, Gel	Shrub, Wild/Cultivated
79.	<i>Allium cepa</i>	Onion	Leaves, Stem, Bulbs	Extract	Herb, Cultivated
80.	<i>Azadirachta indica</i>	Neem	Leaves	Extract, Decoction	Herb, Wild/Cultivated
81.	<i>Althea rosea</i>	Holyoke	Leaves, Flowers, Stems	Extract, Decoction	Herb, Wild/Cultivated
82.	<i>Asparagus racemosus</i>	Satawari	Leaves, Flowers, Stems	Extract, Decoction	Shrub, Wild
83.	<i>Vinca major</i>	Bigleaf periwinkle	Leaves, Seeds	Extract, Decoction	Shrub, Wild
84.	<i>Cichorium intybus</i>	Chicory	Leaves, Stem, Seeds	Extract, Decoction	Weed, Wild/Cultivated
85.	<i>Fumaria indica</i>	Fumitory	Leaves, Whole Plant	Extract	Weed, Wild
86.	<i>Lepidium didymium</i>	Swine cress	Leaves, Whole Plant	Extract	Herb, Wild
87.	<i>Malvastrum coromandelianum</i>	Red malvastrum	Leaves, Flowers	Decoction	Shrub, Wild
88.	<i>Melilotus indica</i>	Sweet clover	Leaves, Whole Plant	Decoction	Herb, Wild
89.	<i>Micromeria biflora</i>	Lemon scented thyme	Whole plant	Decoction	Herb, Wild/Cultivated
90.	<i>Ranunculus muricatus</i>	Scilly buttercup	Whole plant, Fruit, Leaves	Decoction	Herb, Wild
91.	<i>Quercus incana</i>	Bluejack oak	Leaves	Extract	Tree, Cultivated
92.	<i>Berberis lyceum</i>	Barberry	Leaves, Roots, Stem	Extract, Decoction	Shrub, Wild/Cultivated
93.	<i>Debregeasia salicifolia</i>	Debregeasia	Leaves	Powder	Shrub, Wild
94.	<i>Dodonaea viscosa purpurea</i>	Broad leaf hopbush/candle wood	Leaves, Flowers, Stem	Powder, Decoction, Oil, Extract	Shrub, Wild
95.	<i>Hypericum oblongifolium</i>	Pendant St. John's wort	Leaves, Fruits	Decoction, Extract	Shrub, Wild/Cultivated
96.	<i>Indigofera heterantha</i>	Himalayan indigo	Leaves, Fruits	Powder, Extract	Shrub, Wild
97.	<i>Jasminum officinale</i>	Common jasmine	Leaves, Flowers	Decoction, Extract	Shrub, Wild/Cultivated
98.	<i>Lonicera quinquelocularis</i>	Translucent honeysuckle	Leaves, Flowers	Extract	Shrub, Wild
99.	<i>Zanthoxylum armatum</i>	Winged prickly ash	Whole Plant, Leaves	Extract, Decoction, Powder	Shrub, Cultivated
100.	<i>Duchesnea indica</i>	Indian strawberry	Whole plant	Extract, Decoction,	Herb, Wild

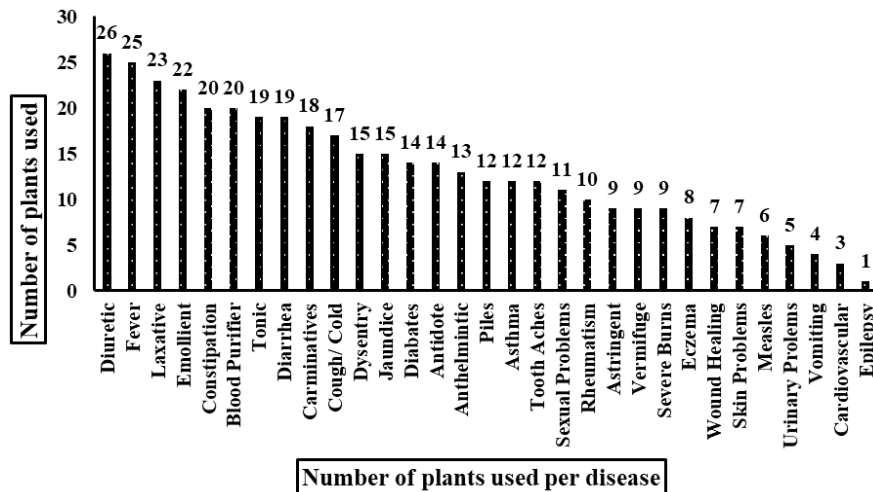


Figure 5. Number of plants used for treatment of diseases studied from 3 selected sites of Gujranwala region

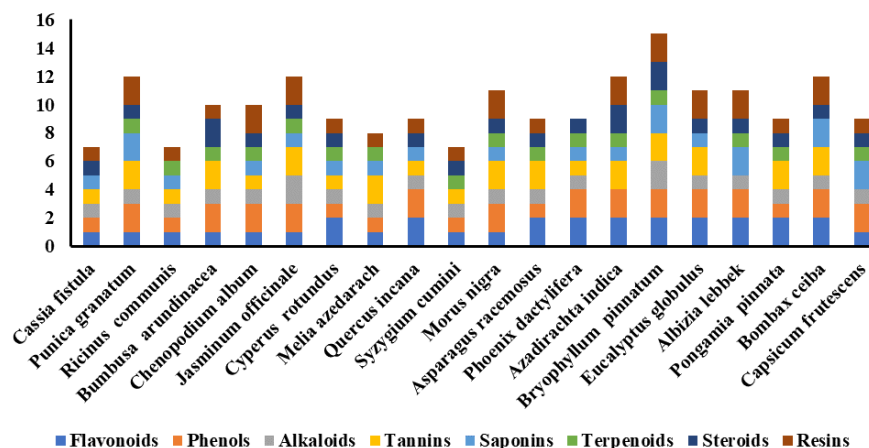


Figure 6. Comparison of phytochemicals present in selected species studied in 3 selected sites of Gujranwala region

### Quantitative indices

Medicinal values of different plants belonging to different families are present in Table 4, along with their common name, scientific name, families, quantitative indices viz., UV, FC, RFC, UR, RIL, FL, CFL and therapeutic uses. Plants of different types were found in the study area that has different therapeutic uses. They were quantitatively analyzed by using different formulas. Factor of informant consensus can be particularly useful to select the categories of diseases for which the species can traditionally are used. The relative importance level (RIL) presents the level of prominence of each species in a study site. Fidelity level (FL) of species uses, i.e. the ratio between the number of informants who independently cite the use of a species for the same major purposes use reports (URs) and the total number of informants who mentioned the plant for any use. Corrected fidelity level (CFL) of plant species were used as correction factor to accurately rank the plant species with different FL and RIL values. CFL was derived from FL, by multiplying FL with RIL values.

**Table 4.** Inventory of plant species, their quantitative analysis, therapeutic uses and reports of Gujranwala area

S.No	Common name	Scientific name and voucher specimen	Family	UV	FCI	RFC	UR	RIL	FL	CFL	Therapeutic uses
1.	Bahar Bail	<i>Convolvulus album</i> L. UOG-001005	Convolvulaceae	0.89	27	0.11	15	0.89	50	25	Emollient, anthelmintic, urinary tract infections, increasing bile production
2.	Zakhm-e-hayat	<i>Bryophyllum pinnatum</i> L. UOG-001006	Crassulaceae	0.71	11	0.02	15	0.78	70	35	Emollient, analgesic, carminative, vomiting, diarrhea
3.	Bhung	<i>Cannabis sativa</i> L. UOG-001007	Cannabinaceae	0.76	22	0.13	18	0.81	89.2	47	Tonic, relaxing purposes
4.	Bathu	<i>Chenopodium album</i> L. UOG-001008	Chenopodiaceae	0.67	14	0.03	19	0.56	77	38	Laxative, urinary problems, sexual diseases
5.	Gorakh Paan	<i>Heliotropium strigosum</i> L. UOG-001009	Boraginaceae	0.87	12	0.01	19	0.98	34	26	Diuretic, blood purifier, liver tonic
6.	Chota Dathoora	<i>Xanthium strumarium</i> L. UOG-001010	Asteraceae	0.65	16	0.15	17	0.89	64	34	Sedative, diuretic, eczema
7.	Kulfa	<i>Trichodesma indicum</i> L. R. Br. UOG-001011	Boraginaceae	0.98	15	0.16	11	0.67	78	44	Antidote, diuretic, dysentery, fever, diarrhea
8.	Tumma	<i>Citrullus colocynthis</i> L. UOG-001012	Cucurbitaceae	0.10	22	0.12	13	0.78	45	24	Purgative, amenorrhea, constipation, stomach aches, jaundice
9.	Bhtha	<i>Benincasa hispida</i> L. UOG-001013	Cucurbitaceae	0.45	25	0.16	15	0.65	46.35	20	Laxative, diuretic, tonic, anthelmintic, epilepsy
10.	Jangli Khaboz	<i>Cucumis melo</i> L. UOG-001014	Cucurbitaceae	0.76	10	0.14	12	0.78	78	40	Laxative, dysuria, leucorrhea, eczema
11.	Kaddu	<i>Cucurbita pepo</i> L. UOG-001015	Cucurbitaceae	0.56	20	0.16	12	0.56	25	10	Anthelmintic, emollient
12.	Neeli Taar	<i>Cuscuta reflexa</i> R. UOG-001016	Cuscutaceae	0.67	27	0.17	15	0.89	28	13	Rheumatism, anti-diabetic, toothache
13.	Spodhodol	<i>Euphorbia hirta</i> L. UOG-001017	Euphorbiaceae	0.45	17	0.19	18	0.87	30	18	Asthma, applied on injuries
14.	Dhodol	<i>Euphorbia heliscopia</i> L. UOG-001018	Euphorbiaceae	0.87	27	0.023	19	0.67	40	39	Purgative, skin eruptions
15.	Arnd	<i>Ricinus communis</i> L. UOG-001019	Euphorbiaceae	0.89		0.07	21	0.87	60	35	Regulate menses, scabies, obesity
16.	Deela	<i>Cyperus rotundus</i> L. UOG-001020	Cyperaceae	0.76	19	0.30	22	0.78	40	19	Diuretic, vermifuge, tonic for animals, diarrhea, pneumonia, children dysentery, antidote

S.No	Common name	Scientific name and voucher specimen	Family	UV	FCI	RFC	UR	RIL	FL	CFL	Therapeutic uses
17.	Turkhrai	<i>Indigofera linifolia</i> L. UOG-001021	Papilionaceae	0.89	10	0.078	10	0.89	56	30	Emollient, febrile skin problems
18.	Shishum	<i>Dalbergia sissoo</i> L. UOG-001022	Papilionaceae	0.13	29	0.54	20	0.99	64	34	Emollient, emetic, dysentery, fever, pyorrhea
19.	Sukhchain	<i>Pongamia pinnata</i> L. UOG-001023	Papilionaceae	0.24	10	0.67	22	0.78	84	67	Carminative, vermifuge, rheumatism, toothache
20.	Sann	<i>Crotolaria burhia</i> L. UOG-001024	Papilionaceae	0.65	15	0.12	52	0.87	37	20	Diuretic, blood purifier
21.	Phuwa	<i>Alhagi maurorum</i> L. UOG-001025	Papilionaceae	0.23	25	0.15	26	0.78	90	65	Piles, constipation
22.	Stianasi	<i>Argemone mexicana</i> L. UOG-001026	Papaveraceae	0.67	32	0.12	25	0.98	56	37	Laxative, effective against premature ejaculation, spermatorrhea
23.	Khbal Kha	<i>Cynodon dactylon</i> L. UOG-001027	Poaceae	0.87	27	0.16	15	0.56	73	49	Purgative, epistaxis, dysentery, blood purifier
24.	Javi	<i>Avena sativa</i> L. UOG-001028	Poaceae	0.89	29	0.16	13	0.89	72	50	Antispasmodic, liver tonic, diuretic
25.	Baans	<i>Bumusa arundinacea</i> L. UOG-001029	Poaceae	0.67	28	0.16	17	0.76	40	10	Carminative, cold, flu, fever, effective against, ringworms burns
26.	Gulab	<i>Rosa indica</i> L. UOG-001030	Rosaceae	0.77	21	0.19	16	0.56	37	14	Emollient, laxative, anthelmintic, diuretic, constipation
27.	Bair	<i>Zizyphus nummularia</i> L. UOG-001031	Rhamnaceae	0.60	27	0.20	29	0.78	48	27	Purgative, emollient, antiseptic, measles, constipation
28.	Anaar	<i>Punica granatum</i> L. UOG-001032	Punicaceae	0.83	26	0.23	17	0.87	47	19	Dysentery, pyorrhea, blood purifier
29.	Kulfa	<i>Portulaca oleracea</i> L. UOG-001033	Portulacaceae	0.34	25	0.34	19	0.450	45	13	Jaundice, liver and spleen disorders
30.	Desi Kulfa	<i>Portulaca quadrifida</i> L. UOG-001034	Portulacaceae	0.78	21	0.13	29	0.78	47	15	Vermifuge, piles, cold, flu, constipation
31.	Water Hyacinth	<i>Eichhornia crassipes</i> L. UOG-001035	Pontederiaceae	0.56	26	0.167	22	0.98	26	12	Emollient, blood purifier
32.	Droonk	<i>Polygonum plebium</i> L. UOG-001036	Polygonaceae	0.87	12	0.121	10	0.78	30	16	Eczema, heartburns
33.	Sura	<i>Hibiscus rosasinensis</i> L. UOG-001037	Malvaceae	0.56	23	0.321	15	0.98	38	26	Laxative, effective against burning sensation in the urine, constipation



S.No	Common name	Scientific name and voucher specimen	Family	UV	FCI	RFC	UR	RIL	FL	CFL	Therapeutic uses
34.	Pelae	<i>Abutilon indicum</i> L. UOG-001038	Malvaceae	0.78	20	0.176	170	0.89	67	56	Purgative, piles
35.	Sunchal	<i>Marva parviflora</i> L. UOG-001039	Malvaceae	0.64	27	0.321	190	0.99	98	78	Laxative, cold, flu, cough, fever
36.	Dhreek	<i>Melia azedarach</i> L. UOG-001040	Malvaceae	0.76	26	0.165	130	0.66	36	29	Emollient, laxative, antidote, blood purifier
37.	Podeena	<i>Mentha spicata</i> L. UOG-001041	Lamiaceae	0.54	25	0.178	190	0.78	48	20	Carminative, diarrhea
38.	Gul-e-Asar	<i>Mirabilis jalapa</i> L. UOG-001042	Nyctaginaceae	0.44	24	0.154	280	0.88	40	10	Purgative, Skin eruptions, constipation, hepatitis
39.	Jamun	<i>Syzygium cumini</i> L. R. UOG-001043	Myrtaceae	0.57	19	0.12	380	0.67	20	10	Diabetes
40.	Safaيدا	<i>Eucalyptus globulus</i> L. R. UOG-001044	Myrtaceae	0.89	17	0.16	170	0.98	89	56	Cold, flu, fever, sore throat
41.	Kikar	<i>Acacia nilotica</i> L. UOG-001045	Mimosaceae	0.98	14	0.156	270	0.78	54	22	Stops premature ejaculation, helps in digestion
42.	Shirin	<i>Albizia lebbek</i> L. UOG-001046	Mimosaceae	0.97	21	0.12	28	0.98	39	18	Diuretic, asthma, blood purifier
43.	Amaltas	<i>Cassia fistula</i> L. UOG-001047	Mimosaceae	0.79	24	0.21	26	0.67	56	27	Diarrhea
44.	Phulae	<i>Acacia modesta</i> L. UOG-001048	Mimosaceae	0.94	26	0.16	37	0.66	54	26	Carminative
45.	Bohrh	<i>Ficus benghalensis</i> L. UOG-001049	Moraceae	0.56	20	0.16	34	0.67	38	21	Stop premature ejaculation, syphilis, gonorrhea, provides sexual strength
46.	Kala Toot	<i>Morus nigra</i> L. UOG-001050	Moraceae	0.87	30	0.21	30	0.87	30	16	Carminative, blood purifier, sore throat, cold, cough
47.	Khkhtl	<i>Oxalis corniculata</i> L. UOG-001051	Oxalidaceae	0.37	20	0.71	29	0.67	40	20	Emollient, spermatorrhea
48.	Saunf	<i>Foeniculum vulgare</i> L. UOG-001052	Apiaceae	0.44	18	0.13	37	0.87	89	65	Carminative, purgative, diuretic, laxative, gas trouble, enhances eye sight
49.	Itst	<i>Trianthema portulacastrum</i> L. UOG-001053	Aizoaceae	0.76	19	0.34	37	0.56	65	47	Anthelmintic, diuretic, asthma, liver infection, jaundice
50.	Baykr	<i>Justicia adhatoda</i> L. UOG-001054	Acanthaceae	0.67	15	0.122	35	0.23	98	88	Abortifacient, cold, cough, flu, toothache, fever

S.No	Common name	Scientific name and voucher specimen	Family	UV	FCI	RFC	UR	RIL	FL	CFL	Therapeutic uses
51.	Thoom	<i>Allium sativum</i> L. UOG-001055	Amaryllidaceae	0.19	16	0.33	28	0.65	70	45	Lowering blood pressure, cardiac problems. Respiratory tract infection, hypertension
52.	Kanair	<i>Nerium oleander</i> L. UOG-001056	Apocynaceae	0.18	35	0.78	45	0.67	54	30	Abortions, toothache, earache
53.	Ghunar	<i>Amaranthus viridis</i> L. R. Br. UOG-001057	Amaranthaceae	0.67	34	0.67	26	0.78	89	67	Carminative, emollient, rheumatism
54.	Puthkanda	<i>Achyranthes aspera</i> L. R. Br. UOG-001058	Amaranthaceae	0.76	27	0.76	19	0.98	87	56	Pyorrhea, cold, flu, fever, pneumonia leprosy
55.	Desi Aak	<i>Calotropis procera</i> L. R. Br. UOG-001059	Asclepiadaceae	0.18	24	0.007	27	0.67	67	35	Expectorant, antidote, scabies, rheumatism, dysentery
56.	Chonga	<i>Caralluma edulis</i> L. R. Br. UOG-001060	Asclepiadaceae	0.18	18	0.0675	29	0.54	50	25	Anthelmintic, diuretic, diabetes
57.	Partha	<i>Parthenium hysterophorus</i> L. R. Br. UOG-001061	Asteraceae	1.05	17	0.67	26	0.67	78	44	Laxatives, diabetes, regulate bowl movements
58.	Chaou	<i>Artemisia scoparia</i> L. UOG-001062	Asteraceae	0.37	27	0.76	17	0.87	56	35	Purgatives, antidote, malaria
59.	Bhangra	<i>Eclipta prostrate</i> L. UOG-001063	Asteraceae	0.80	28	0.89	14	0.78	78	45	Emetic, jaundice
60.	Pholi	<i>Carthamus oxyacantha</i> L. UOG-001064	Asteraceae	0.90	35	0.003	2019	0.76	45	20	Ulcer, jaundice
61.	Hund	<i>Taraxacum officinale</i> L. R. UOG-001065	Asteraceae	0.79	12	0.330	22	0.89	47	26	Constipation, diabetes, antidote
62.	Pelo	<i>Salvadora oleoides</i> L. UOG-001066	Salvadoraceae	0.76	29	0.012	21	0.87	30.78	12	Toothache, tonic
63.	Siah Dahtora	<i>Datura innoxia</i> L. UOG-001067	Solanaceae	0.29	12	0.0456	25	0.90	67	33	Sedative, stops premature ejaculation
64.	Surkh Mirch	<i>Capsicum frutescens</i> L. UOG-001068	Solanaceae	1.08	22	0.054	40	0.87	56	31	Dyspepsia
65.	Kaanch Mainch	<i>Solanum nigrum</i> L. UOG-001069	Solanaceae	1.02	24	0.067	45	0.99	49	28	Laxative, jaundice, hepatitis, obesity
66.	Mookri	<i>Solanum surattense</i> L. UOG-001070	Solanaceae	0.67	25	0.05	15	0.34	36	29	Rheumatism, fever, asthma
67.	Aksn	<i>Withania somnifera</i> L. R. UOG-001071	Solanaceae	1.0	21	0.60	19	0.76	38	29	Dysentery, diarrhea

S.No	Common name	Scientific name and voucher specimen	Family	UV	FCI	RFC	UR	RIL	FL	CFL	Therapeutic uses
68.	Rukh	<i>Tamarix dioica</i> L. UOG-001072	Tamaricaceae	0.56	26	0.19	16	0.99	98	78	Piles, diarrhea
69.	Falsa	<i>Grewia asiatica</i> L. UOG-001073	Tiliaceae	0.98	27	0.19	15	0.47	36	25	Diuretic, constipation emetic, blood purifier
70.	Jute	<i>Corchorus aestuans</i> L. UOG-001074	Tiliaceae	0.76	19	0.19	13	0.36	40	20	Pneumonia
71.	Pakhra	<i>Tribulus camaldulensis</i> L. UOG-001075	Zygophyllaceae	0.67	19	0.167	18	0.98	93	67	Remove gall bladder and kidney stones
72.	Ziri	<i>Scandix pectenveners</i> L. UOG-001076	Amaranthaceae	0.54	24	0.7	14	0.67	27	12	Astringent, palpitations, blood coagulant
73.	Rangobul	<i>Rhazya stricta</i> L. UOG-001077	Apocynaceae	0.23	23	0.778	17	0.56	39	22	Antihypertensive
74.	Khajoor	<i>Phoenix dactylifer</i> L. UOG-001078	Arecaceae	0.46	18	0.56	15	0.87	20	06	Astringent, gonorrhea, abdominal pains
75.	Gul-e-Sharf	<i>Calendula arvensis</i> L. UOG-001079	Asteraceae	0.65	27	0.655	20	0.67	48	20	Severe pains
76.	Gul-e-Hozah	<i>Conyza aegyptiaca</i> L. UOG-001080	Asteraceae	0.66	15	0.006	22	0.87	49	29	Diarrhea, fever, toothache, earache
77.	Sumbal	<i>Bombax ceiba</i> L. UOG-001081	Asteraceae	0.78	27	0.45	25	0.78	46	28	Sericulture
78.	Kawar Gandal	<i>Aloe vera</i> L. UOG-001082	Asphodelaceae	0.53	26	0.65	27	0.89	45	20	Acne, pimples
79.	Ganda	<i>Allium cepa</i> L. UOG-001083	Amaryllidaceae	0.83	14	0.34	29	0.87	90	67	Disinfectant, earache, cardiovascular disorders
80.	Neem	<i>Azadirachta indica</i> L. UOG-001084	Meliaceae	0.67	20	0.56	27	0.78	87	50	Joints pain, malaria
81.	Gul-e-Khairu	<i>Althea rosea</i> L. R. UOG-001085	Malvaceae	0.91	18	0.87	24	0.76	45	27	Laxative, expectorant, demulcent, emollient, chest pain
82.	Moosli Safaid	<i>Asparagus racemosus</i> L. UOG-001086	Asparagaceae	0.35	27	0.16	37	0.89	47	28	Measles, liver tonic, heal wounds, asthma
83.	Periwinkle	<i>Vinca major</i> L. UOG-001087	Apocynaceae	0.87	22	0.02	20	0.65	49	20	Diarrhea, cancer, diabetes
84.	Kasni	<i>Cichorium intybus</i> L. UOG-001088	Asteraceae	0.17	25	0.34	34	0.78	29	13	Diuretic, stimulant

S.No	Common name	Scientific name and voucher specimen	Family	UV	FCI	RFC	UR	RIL	FL	CFL	Therapeutic uses
85.	Paprra	<i>Fumaria indica</i> L. UOG-001089	Papaveraceae	0.82	27	0.65	24	0.87	39	17	Fever, asthma
86.	Kurly Cress	<i>Lepidium didymium</i> L. UOG-001090	Brassicaceae	0.27	12	0.034	27	0.89	38	17	Antipyretic
87.	Bariar	<i>Malvastrum coromandelianum</i> L. UOG-001091	Malvaceae	0.2	34	0.560	27	0.98	30	19	Aphrodisiac, wound healing, fever
88.	Singi	<i>Melilotus indica</i> L. UOG-001092	Fabaceae	0.67	26	0.006	27	0.88	37	29	Abdominal pain, diabetes, dysentery, diarrhea
89.	Boine	<i>Micromeria biflora</i> L. UOG-001093	Lamiaceae	0.83	18	0.007	5	0.98	38	20	Diuretic, vomiting, constipation, headache
90.	Kor-Kandoli	<i>Ranunculus muricatus</i> L. UOG-001094	Ranunculaceae	0.18	27	0.070	18	0.78	37	27	Laxative, antidote, cough, remove tumors and bursts
91.	Erian	<i>Quercus incana</i> L. UOG-001095	Fagaceae	0.67	37	0.54	10	0.65	38	20	Hemorrhagic septicemia, joint pain
92.	Komal	<i>Berberis lyceum</i> L. UOG-001096	Berberidaceae	0.54	24	0.006	2938	0.78	49	29	bone fractures, jaundice, wound healing, dyspepsia, hypertension
93.	Sindari	<i>Debregeasia salicifolia</i> L. UOG-001097	Urticaceae	0.48	18	0.654	30	0.87	50	25	Febrifuge, jaundice
94.	Sanatha	<i>Dodonaea viscosa purpurea</i> L. UOG-001098	Sapindaceae	0.95	10	0.67	29	0.76	48	30	Anthelmintic, healing burns, wounds and bruises, astringent, blood purifier, paralysis
95.	Pinli	<i>Hypericum oblongifolium</i> L. UOG-001099	Hypericaceae	0.67	20	0.76	16	0.89	37	20	Blood pressure, ulcer
96.	Hiran Charri	<i>Indigofera heterantha</i> L. UOG-001100	Fabaceae	0.9	37	0.34	10	0.98	40	15	Vermifuge, hepatitis
97.	Chambeli	<i>Jasminum officinale</i> L. UOG-001101	Oleaceae	0.36	22	0.543	20	0.76	57	28	Anti-inflammatory, ringworms
98.	Phutt	<i>Lonicera quinquelocularis</i> L. UOG-001102	Caprifoliaceae	0.87	20	0.001	37	0.99	69	37	Improve vision, remove cataract, ophthalmic agent, wound healing
99.	Timbar	<i>Zanthoxylum armatum</i> L. UOG-001103	Rutaceae	0.10	12	0.004	19	0.99	46	21	Carminative, dyspepsia, stomach pains, piles
100.	Surkh Akhra	<i>Duchesnea indica</i> L. UOG-001104	Rosaceae	0.45	23	0.760	12	0.45	48	23	Diuretic, astringent, laxative, sore throat, nerve tonic

Informant consensus factor (FCI), Fidelity Level (FL), Corrected Fidelity Level (CFL), User Reported (UR), Relative frequency of citation (RFC), Relative Importance Level (RIL), Use Value (UV)

## Discussion

### *Ethnobotanical knowledge of threatened species and therapeutic uses*

Utilization of plants by humans as medicines was almost started in the Middle of Paleolithic era some 60,000 years back (Shipley and Kindscher, 2016). Plants can also be used as herbal medicines and the quantity of their usage in daily life varies because these plants are selected randomly and screened for different type of ailments (Gaoue et al., 2017). Traditional knowledge as per practice transferred from generation to generation through verbal and oral means of communication that is why evaluation on scientific basis got prime importance (Aziz et al., 2017; Polat et al., 2017). Data collected represent different life forms as herbs, shrubs and trees indicated presence at various localities of the selected sites (Mahmood et al., 2013).

Plants were generally used as stimulant, anthelmintic, cardiovascular diseases, febrifuge, diuretics, vermifuge, sedative and even antidote as this was previously reported by Mahmood et al. (2013) with few new species noticed in the current study. *Cichorium intybus* L. belongs to family Asteraceae used as a stimulant (Nandagopal and Kumari, 2007). Various plant species like *Convolvulus album* L., *Benincasa hispida* L., *Cucurbita pepo* L., *Rosa indica* L., *Trianthema portulacastrum* L., *Caralluma edulis* L. and *Dodonaea viscosa purpurea* L. were used as anthelmintic purposes and anti-parasitic properties (Amjad et al., 2017). Current studies reported plants such as *Trianthema portulacastrum* L., and *Allium cepa* L. are the best known for cardiovascular problems as it is good for the blood flow and pressure (Ugulu, 2011). *Debregeasia salicifolia* L. was considered the best against febrifuge.

Number of researchers reported the importance of different plants such as *Heliotropium strigosum* L., *Xanthium strumarium* L., *Trichodesma indicum* L., *Benincasa hispida* L., *Cyperus rotundus* L., *Crotolaria burhia* L., *Avena sativa* L., *Rosa indica* L., *Albizia lebbek* L., *Trianthema portulacastrum* L., *Caralluma edulis* L., *Grewia asiatica* L., *Micromeria biflora* L. and *Duchesnea indica* L. as diuretic (Mahmood et al., 2013; Bhakshu et al., 2008; Verma and Kumar, 2011; Zia-Ul-Haq et al., 2012; Amjad et al., 2017). The plants that were used for vermifuge purposes includes *Indigofera heterantha* L., *Portulaca quadrifida* L., *Pongamia pinnata* L. and *Cyperus rotundus* L. (Ghumare et al., 2014). *Xanthium strumarium* L. and *Datura innoxia* L., were used for sedative purpose. Current studies revealed few plants as antidote such as *Taraxacum officinale* L., *Artemisia scoparia* L., *Calotropis procera* L., *Ranunculus muricatus* L., *Melia azedarach* L. and *Trichodesma indicum* L.

One of the most noticed diseases from the study area were rheumatism and many plants were used for curing this disease like *Cuscuta reflexa* L., *Pongamia pinnata* L., *Amaranthus viridis* L., *Calotropis procera* L. and *Solanum surattense* L. Ghumare et al. (2014) noticed the first two species and rest of all are reported in this study. For blood purification species like *Dodonaea viscosa purpurea* L., *Scandix pectenvenaris* L., *Grewia asiatica* L., *Morus nigra* L., *Albizia lebbek* L., *Melia azedarach* L., *Eichhornia crassipes* L., *Punica granatum* L., *Cynodon dactylon* L., *Crotolaria burhia* L. and *Heliotropium strigosum* L. (Bhakshu et al., 2008).

Many diseases such as hemorrhagic septicemia, jaundice, wound healing, severe burns and skin treatments of various types were also found to be treated with different plant species like *Quercus incana* L. Jaundice was also treated by different plants such as *Debregeasia salicifolia* L., *Berberis lyceum* L., *Solanum nigrum* L., *Carthamus oxyacantha* L., *Eclipta prostrate* L., *Trianthema portulacastrum* L., *Portulaca oleracea*

*L. Citrullus colocynthis* L. *Indigofera linifolia* L. while *Mirabilis jalapa* L. for skin treatment. Similarly, this study also signifies that *Lonicera quinquelocularis* L., *Berberis lyceum* L. and *Malvastrum coromandelianum* L. were observed to be useful in wound healing (Amjad et al., 2017).

Some plants were also reported for treating various diseases like piles, dysentery, stomach problems, vomiting, measles, diarrhea, asthma, diabetes, liver tonic, tooth aches, urinary problems and sexual diseases like *Zanthoxylum armatum* L., *Tamarix dioica* L., *Abutilon indicum* L., *Portulaca quadrifida* L., *Alhagi maurorum* L., and *Convolvulus album* L., are used for the treatment of piles (Amjad et al., 2017; Mahmood et al., 2013). For dysentery, some plants were useful such as *Trichodesma indicum* L., *Cyperus rotundus* L., *Dalbergia sissoo* L., *Cynodon dactylon* L., *Punica granatum* L., *Calotropis procera* L., *Cynodon dactylon* L. In current studies, *Citrullus colocynthis* L. and *Zanthoxylum armatum* L. were shown to be used for releasing stomach pain while *Micromeria biflora* L. and *Bryophyllum pinnatum* L. are used against vomiting that were present in both Gujranwala and Wazirabad. For curing measles *Zizyphus nummularia* L. and *Asparagus racemosus* L. were found efficient. Amjad et al. (2017) reported many plants present in this region were used for treatment of diarrhea which were *Melilotus indica* L., *Vinca major* L., *Conyza aegyptiaca* L., *Tamarix dioica* L., *Withania somnifera* L., *Cassia fistula* L., *Mentha spicata* L., *Cyperus rotundus* L., *Trichodesma indicum* L. and *Bryophyllum pinnatum* L. and these all are present in the study area. For asthma *Euphorbia hirta*, *Albizia lebbek*, *Trianthema portulacastrum* L., *Solanum surattense* L., *Asparagus racemosus* L. and *Fumaria indica* L. were beneficial plants found in the study area. Plants which were found associated with the treatment of diabetes were *Melilotus indica* L., *Vinca major* L., *Taraxacum officinale* L., *Parthenium hysterophorus* L., *Caralluma edulis* L., *Syzygium cumini* L. and *Cuscuta reflexa* L. grown at various places in Kamonki and Wazirabad. *Heliotropium strigosum* L., *Avena sativa* L., *Portulaca oleracea* L., *Trianthema portulacastrum* L., *Asparagus racemosus* L. and *Duchesnea indica* L. acts as liver tonic. For tooth aches *Conyza aegyptiaca* L., *Salvadora oleoides* L., *Nerium oleander* L., *Justicia adhatoda* L., *Pongamia pinnata* L. and *Cuscuta reflexa* L. were important which are also present in Wazirabad, Kamonki and Gujranwala. For urinary infection some plants such as *Chenopodium album* L. and *Hibiscus rosasinensis* L. were found in the study area.

Plants used as anti-inflammatory purposes included *Trichodesma indicum* L., *Lepidium didymium* L. and *Jasminum officinale* L., (Tareen et al., 2016). Most of the plants were linked with treatment of common diseases like fever and constipation. For fever, *Convolvulus album* L., *Trichodesma indicum* L., *Dalbergia sissoo* L., *Bumusa arundinacea* L., *Marva parviflora* L., *Eucalyptus globulus* L., *Morus nigra* L., *Justicia adhatoda* L., *Achyranthes aspera* L., *Artemisia scoparia* L., *Solanum surattense* L., *Conyza aegyptiaca* L., *Fumaria indica* L., *Malvastrum coromandelianum* L. *Debregeasia salicifolia* L. were used found at various places of selected sites and for constipation the beneficial plants found are *Micromeria biflora* L., *Grewia asiatica* L., *Taraxacum officinale* L., *Mirabilis jalapa* L., *Hibiscus rosasinensis* L., *Zizyphus nummularia* L., *Rosa indica* L., *Alhagi maurorum* L., *Citrullus colocynthis* L. and *Convolvulus album* L. Interestingly a unique species and only one was also recorded for treating epilepsy from this region that was *Benincasa hispida* L. that belongs to the family Cucurbitaceae.

Plants were also reported to be used for various other aspects especially for aesthetic beauty, decorative purposes and as ornamentals etc., along as food, shelter, clothing, dyes, coloring etc. *Artemisia scoparia* L. a member of the family Asteraceae was used

in preventing hair loss. For this, the plant extract should be mixed with coconut oil and then boiled. It can be applied on the head to strengthen the hairs and to prevent them from becoming white. *Calendula arvensis* L., another member of the same family was used in weddings for decorative purposes. *Melia azedarach* L. and *Malvastrum coromandelianum* L. are the members of family Malvaceae used as ornamentals in various places of Gujranwala. Similarly, *Cassia fistula* L. and *Acacia modesta* L. members of family Mimosaceae are grown at various places in the selected sites of the Gujranwala region. Different plants have been used differently by the people such as *Chenopodium* is used as fodder crop for animals and it is used in the case of constipation. *Cucurbita pepo* L. the favorite vegetable of the summer was found in the study area. It is the member of family Cucurbitaceae, other members of the same family were *Cucumis melo* L. and *Benincasa hispida* L. that were used as vegetables. *Acacia modesta* L. and *Acacia nilotica* L. members of family Mimosaceae were widely found in the study area and are used in making and as additive for gums.

### ***Quantitative indices, phytochemical diversity and their role for conservation***

The relative frequency of citation (RFC) varies from 1 (means the number of useful plants responded by the respondents) to 0 (i.e. no one reported the plants uses). The lowest value for RFC calculated by the gathered data is 0.001 of plant *Lonicera quinquelocularis* which is used for the treatment of improving vision, removing cataract, as ophthalmic agent, wound healing purpose and the highest value is 0.78 of plant *Nerium oleander* used in the treatment for abortions, toothache and earache. Informants consensus factor (FCI) also describes the number of used reports for a said disease category and in this study it ranged from 10 to 40. The lowest value of FCI was 10 for *Cucumis melo* which was used in the treatment of eczema, dysuria, leucorrhoea and also acts as laxative. The highest value was 37 of plants *Indigofera heterantha* and *Quercus incana* used in treatment of hemorrhagic septicemia and joint pain.

Relative importance level (RIL) indicated the eminence of the species in the selected sites of study area. RIL varies from 0 (not much importance) to 1.0 (medicinal importance). The lowest value recorded by the data was 0.34 of plant *Solanum surattense* used for rheumatism, fever, asthma and the highest value was 0.99 of different plants like *Marva parviflora*, *Solanum nigrum*, *Tamarix dioica*, *Lonicera quinquelocularis* and *Zanthoxylum armatum* were being used of carminative, dyspepsia, stomach pains and piles (Umair et al., 2019). Fidelity level (FL) showed uses of specific plants to treat particular diseases. The fidelity count of plants in the study area ranges up to 90 that mark their importance in the field of medicines. *Benincasa hispida* have the lowest value calculated through gathered data i.e. 46.35 used for different problems laxative, diuretic, tonic, anthelmintic, epilepsy and the highest value is 98 for *Marva parviflora*, *Justicia adhatoda* and *Tamarix dioica* used in piles and diarrhea. Corrected fidelity level (CFL) is a correction factor that links RIL with FL and shows relative importance of different plants found in the study area. Different respondents give useful information which is an important aspect of the study. The lower value of CFL was 12 for *Eichhornia crassipes*, having different uses such as emollient, blood purifier and the highest value was 88 of *Justicia adhatoda* plant that was used as abortifacient, for cold, cough, flu and toothache.

User reports (UR) is the total number of users reported about a particular plant and this ranges between 1 and 20 mostly i.e. up to 20 users reported about a particular disease to be treated by the particular plant. The lowest numbers of users reported were

11, for plant *Trichodesma indicum*, which was used as antidote, diuretic, against dysentery and fever and the highest numbers of users reported were 380, for plant *Syzygium cumini* which was helpful in diabetes. The significance of each species was calculated by UV (use value) especially in the case of herbal drinks (Etongo et al., 2017). Use value (UV) of the plants was also beneficial for the studying of medicinal plants and in this study it ranges from 0 to 1 i.e. little to more importance in the field of medicines. The value of UV of plant *Citrullus colocynthis* was 0.1 which is the lowest value used in the treatment of amenorrhea, constipation, stomach aches, jaundice, also used as purgative, and the highest value of UV was 0.98 of plant *Trichodesma indicum* used for dysentery, fever and diarrhea.

Secondary metabolites are vital ingredients present in plants were quantified qualitatively using standard procedures. The severity of chemicals present in the selected sites of plants indicates their importance. About Twenty different plants were analyzed for phytochemical analysis. *Punica granatum*, *Chenopodium album*, *Jasminum officinale*, *Cyperus rotundus*, *Morus nigra*, *Bryophyllum pinnatum* and many others showed presence/indication of alkaloids, flavonoids, tannins, steroids, terpenoids, saponins, phenols and resins that are the major source of efficacy of various bioactive compounds effective against number of ailments. Further, these plants rich in biochemical constituents recommended for further characterization through GCMS or HPLC to gather more information about biochemical structure and their ingredients ultimate impact against ailments which are still considered as complex to treat completely. But in some plants such as *Quercus incana*, *Bambusa arundinacea* and *Syzygium cumini* compounds like terpenoids, saponins and steroids did not show any indication that might be due to variation in geographical area, topology, soil physical and chemical factors, climatic factors, and/or species or genetic variation. One of the major reasons might be industrialization that causes accumulation of toxic chemicals, industrial waste and heavy metals that needs thorough examination.

## Conclusion

In conclusion, the anthropocentric activities due to industry and urbanization may alter or degrade phytochemical diversity that ultimately change efficacy of particular extracts. Current studies revealed 100 different species of 52 families, where Asteraceae was dominant. Different life forms recorded i.e., 55% herbs, 27% shrubs, 15% trees, 2% grasses and 1% weeds, 85% wild and 15% cultivated. Leaves were predominantly used as 77%. Plants were found effective against fever, as laxatives, emollients, against constipation, as blood purifiers, and against cough and cold etc. Informant consensus factor for *Cucumis melo* showed the lowest value while *Indigofera heterantha* and *Quercus incana* represent the highest. Involvement of local community with public sector for implementing policies and guidelines according to Biodiversity action plan of Pakistan is required to be practiced to achieve environmental sustainability.

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