



Assessment of floristic diversity and documentation of traditional knowledge about the wild medicinal plants of Hercho valley, District Astore, Gilgit-Baltistan, Pakistan

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Research

Abstract

Background: Investigating wild medicinal plants and their traditional uses is essential for understanding local healthcare, especially in remote areas. This study examined the floristic distribution and traditional uses of wild medicinal plants by the inhabitants of Hercho valley in Gilgit-Baltistan (GB), Pakistan.

Methods: Ethnobotanical data were collected from 100 local informants through extensive fieldwork. This involved the use of the Global Positioning System, Geographic Information System, and various techniques such as medicinal and aromatic plants (MAPs), Frequency citation, Relative Frequency Citation, Use Value, Informant Consensus Factor, and Fidelity Level, all facilitated by an open-ended questionnaire.

Results: In total, 186 plant samples were identified, representing 62 families and 105 species with medicinal applications. Data analysis used statistical indices including Frequency Citation, Relative Frequency Citation, Use Value, Fidelity Level, and Informant Consensus Factor. Relative Frequency Citation measures citation frequency, with *Cicerbita decipiens* var. *multifida* having the highest RFC (0.9), followed by *Aconitum heterophyllum* (0.6) and *Lactuca decipiens* (0.5). The highest Use Value was recorded for *Cicerbita decipiens* var. *multifida* (0.8). The Informant Consensus Factor assessed knowledge sharing among the community, showing strong consensus for gastrointestinal (0.75) and respiratory (0.71) ailments, which received the most citations (gastrointestinal: 180; respiratory: 100). Higher Informant Consensus Factor values indicate prevalent ailments, likely due to poor socioeconomic conditions. Fidelity Level shows the percentage of informants preferring specific plants for ailments; 21 plants achieved high FL values (10-100%), with *Aconitum heterophyllum*, *Viola biflora*, and *Cicerbita decipiens* var. *multifida* at 100%.

Conclusions: These findings highlight the significance of wild medicinal plants in local healthcare practices, particularly during the COVID-19 pandemic. This study underscores the economic value of MAPs and their potential for pharmaceutical development.

Keywords: Ethnobotanical survey, Traditional medicine, Therapeutic properties, Geographic information system

Background

Human interaction with natural flora dates back to early civilization. Humans depend profoundly on flora, as all resources ultimately stem from nature. Across the globe, people have interacted with their local flora, with Himalayan communities in V shaped valleys being a prominent example. These communities use local flora in daily life, guided by a rich history rooted in religious beliefs, cultural norms, traditional events, and myths (Shinwari *et al.* 2003). Their deep understanding of wild medicinal flora—termed indigenous knowledge (IK)—comprises practices developed by local communities. However, IK, along with folk remedies, faces threats as modern societies do not widely accept or apply them. Still, in developing regions like rural GB, dependence on these resources remains high. The continued advancement of global healthcare trends is accelerating the loss of traditional medicinal plant knowledge, which is concerning. Scientific progress in recent decades has frequently built on this traditional knowledge. Thus, documenting IK is crucial for its conservation and for future reference. GB, located in northern Pakistan, spans 72,971 sq. kms. It is bordered by China to the north, Khyber Pakhtunkhwa to the south, Chitral to the west, and Indian occupied Jammu and Kashmir to the east and southeast (Noor *et al.* 2012). The Hindukush, Karakorum, and Himalaya (HKH) mountain ranges encircle the region. Of GB's total area, 1% is agricultural land, 4% is forest, 23% is rangeland, and 66% is glaciers and rivers (Noor *et al.* 2020).

Astore, a district in GB, is a hub for medicinal plants. Located between 34.35'80 N and 74.75'20 E, it is geographically distinct in GB. Astore lies in the southeast of GB, bordering Azad Jammu and Kashmir to the southwest, Diamar to the southwest, and Gilgit to the north. It covers 7221 sq km and has two tehsils: Astore and Shouner. Astore has a population of 95,416 (Khadim *et al.* 2024). It is a single-cropping zone and relies on agriculture, livestock, and tourism. The district lies in the dry temperate and subalpine Himalayan zones. Natural resources include forests, wildlife, medicinal plants, springs, minerals, fisheries, birch, salajeet, glaciers, mountains, livestock, and crops. Forests cover 307 sq km (Khadim *et al.* 2024a, 2024b). Hercho valley, a pristine area in Astore, features natural forests, shrubs, and wild medicinal herbs that have long been used for medicinal purposes. Potato and maize are cultivated, with potatoes being the main cash crop. Since the beginning of commercial potato farming, human pressure on natural resources has decreased. The valley also includes a variety of vegetables and fruits. In Hercho valley, people rely on native flora for medicine, construction, agriculture, fodder, and cultural uses. Recognizing this, the study was titled, "Assessment of floristic diversity and documentation of traditional knowledge about wild medicinal plants of Hercho valley, GB, District Astore (Pakistan)." The aims of this study were to document the distribution of flora by locality and altitude using a GPS, record indigenous knowledge, and assess the status of wild medicinal plants. Despite the importance of traditional knowledge for conservation and sustainable development, research in this region is limited. No in-depth quantitative ethnobotanical assessment has been conducted in Hercho valley, leaving gaps in understanding the area's medicinal plant knowledge, cultural diversity, and conservation status. This study addresses this knowledge gap by documenting the traditional knowledge of wild medicinal plants in the Hercho valley. Through quantitative analysis, this study highlights culturally important plants and recommends them for phytochemical studies.

Materials and Methods

Study area

The study area, Hercho valley, is one of the district's most beautiful valley. Administratively, it is part of union council Doyan, district Astore, GB, Pakistan. It is situated along the main road of district Astore. It is 28 km from the main KKH and 16 km from the Eidgah Astore headquarters. and covers a total area of 115.70 km, 22000 m (above sea level) to 5000m (Noor *et al.* 2013). Geographically, in the east, the whole Parishing valley and Louse area, while in the west, the Himalayan glacier along with Diamar district, in the south, Chongra and Rama meadows, and in the north, the whole Daskin area. The valley falls between latitudes 35-26 N and 74-47 E longitude. It remains snow-covered for 2-3 months in the lower areas and 4-5 months in the upper areas. In contrast, summers are cool and dry, with an average temperature of 20 to 25 °C. Areas lie outside the monsoon range with an average annual precipitation of 469 mm. Annually, the total rainfall was 469 mm, and the total snowfall was 43.5 cm. In contrast, the humidity ranges from 92 to 100. Temperatures in the valley bottoms can range from 35 °C in summer to less than -6.3 °C in winter (Shaheen *et al.* 2011). This indicates climatic change in the region's environment. Phytogeographically, the Hercho valley falls within the Himalayan mountain dry temperate zone, which comprises the following vegetative zones: Himalayan alpine zone (4500-5500 m), subalpine zone (3000-4500 m), and temperate mountain zone (1219-3000 m). Demographically, Harcho valley comprised 3300 persons and 300 inhabitants (Noor *et al.* 2014). Study area illustrated in (Fig. 1)

Historically, Harcho Valley has its own significance. The word Harcho itself is a combination of two Brushaski words, 'Har' and 'Cho'. Har in the Brushaski dialect means an Ox, and 'Cho' Stride or Step, signifying the farmstead or hamlet (Basti) is equal to one stride or step of an 'Ox'. Because of its short distance, ancient natives called it Harcho, and it is still known as

Hercho today. The ancient name of Hercho was Kazmnato Dass. Kazimoo was the first person to settle in the valley, but it was destroyed by flooding, along with the aborigines, and became notorious as “Kazmnato Dass” (Tehseen, 2002). Furthermore, Hercho valley is a treasure of natural heritage, including archaeological sites locally called ‘Kote’ (a fort in Tshina), as well as living cultural expressions reflected in the valley’s language, festivals, sports, arts, handicrafts, traditional music, and foods.

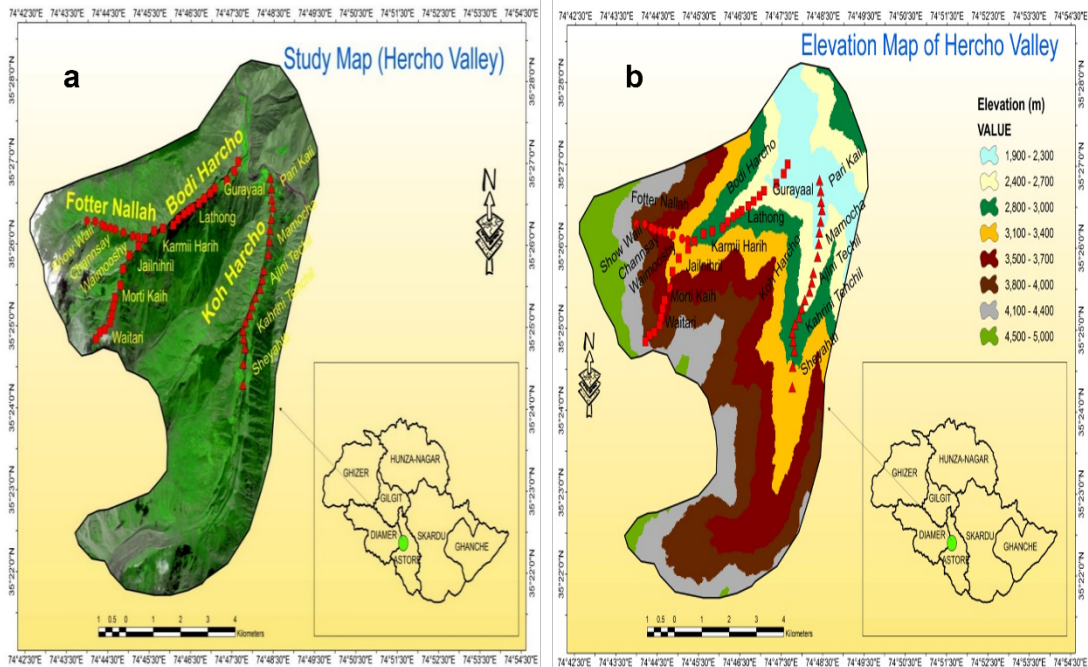


Figure 1. Map of Gilgit province, district Astor, Pakistan, showing the study area and elevation map of Hercho Valley.

Table 1. Socio-demographic data of participants in the study area.

Informant categories	Education				Age			Total
	Illiterate	Primary	Secondary	Higher Secondary	15-40	41-65	66 and above	
Herbalists Male	1	2	2	0	2	2	1	05
Married male	10	15	8	12	20	23	2	45
Married female	15	12	18	5	10	25	15	50

Ethnobotanical Survey and Data Collection

Field Surveys

Field surveys were conducted to collect ethnobotanical data, indigenous knowledge, and their status in the study area and its adjoining valleys from April 2023 to August 2024. Plant specimens were collected from different vegetative patches in two parts of Hercho valley, including Koh Hercho (lower part of hercho valley) and Badi Hercho (major part of valley), using GPS coordinates. The fieldwork was based on “field observation” which included collection number, photo number, GPS/altitude, locality, botanical name, voucher number, family, habit, habitat, soil nature, flower color, collector’s name, status, date, and general remarks.

Questionnaire

For this study, an open-ended questionnaire was designed for interviews to collect information from the hakims (expert specifically in traditional or Islamic medicine), Midwives, aged and older people, and shepherds. For each species, botanical name, local name, habit, habitat, locality, altitude, parts used for ailments, method of preparation, medicine, fuel, cultural beliefs, and other multifarious uses. Interviews were conducted to collect indigenous knowledge from local inhabitants of the study area.

Interviews

The informants were randomly interviewed. Emphasis was placed on gathering information from individuals with a sound understanding of the flora of the study area, including herbalists, hakims/herbal healers, local physicians, older people (both male and female), midwives, shepherds, farmers, and homemakers.

Identification

Plant specimens were collected, pressed, dried, and mounted on standard herbarium sheets. These specimens were then deposited in the Karakorum International University herbarium (KIUH). The specimens were identified using various floral references, including the Flora of West Pakistan (Stewart, 1972), Flora of Pakistan (Nasir & Ali, 1970-1989, 1989-1991, Ali & Nasir, 1993-2022), Flora of Nanga Parbat NW Himalaya, Pakistan (Dickore & Nusser, 2000) and Flora of Iranica (Rechinger, 1957-2001). Additional relevant literature was consulted, and the specimens were compared with authenticated samples already present in the KIUH herbarium to ensure accurate identification.

Preservation

The collected plant specimens were mounted adequately on standard herbarium sheets, along with biological information for each plant, and preserved at the KIUH for future reference.

Status of species

Plant species status was determined during 2023-2024 using field trip observations and IUCN keys (IUCN, 2001).

Ethnobotanical Data Analysis**Relative Frequency of Citations (RFC)**

The analysis of the gathered ethnobotanical information utilized the relative frequency citation (RFC) as defined in equation 1. In this equation, FC represents citation frequency, i.e., the number of respondents who reported using the species, and N denotes the total number of respondents in the study (Khadim *et al.* 2024a). It is determined using equation 1.

$$RFC = FC/N \quad \text{Equation 1}$$

Use Value (UV)

The relative importance of a particular plant species in indigenous medicinal practices among local communities was assessed using the UV method, as proposed by (Muthukrishnan *et al.* 2025, Phillips & Gentry, 1993). This was calculated using Equation 2, where U_i represents the total number of use reports provided by each informant for a specific plant species, and N_i denotes the total number of informants interviewed regarding that species. It is determined using equation 2.

$$UV_i = \sum U_i / N_i \quad \text{Equation 2}$$

Informant Consensus Factor (ICF)

It was employed to assess the general use of plants, emphasizing their cultural significance and the level of agreement among informants regarding their medicinal applications. Within a community and across cultural groups, ICF helps identify widely

used plant species, making it a valuable tool for selecting candidates for pharmacological and phytochemical research. To apply this method, illnesses are categorized as plants with a high ICF are considered more likely to have pharmacological efficacy than those with a low ICF. Higher ICF values indicated that many respondents consistently reported using the same plant species to treat a particular ailment. In contrast, lower values suggested a lack of consensus among informants regarding plant selection. ICF was calculated using equation 3 (Birjees *et al.* 2020, Turner, 1988). It is determined using equation 3.

$$ICF = \frac{nur - nt}{nur - 1} \quad \text{Equation 3}$$

Where ICF is the Informant Consensus Factor, nur is the number of use citations in each category, and nt is the number of species used.

Fidelity Level (FL)

FL helps identify key informants and the preferred species for treating specific ailments. Medicinal plants widely used by local inhabitants have higher FL values than those that are less prominent. FL indicates the percentage of informants who reported using a given plant species for the same primary purpose. This was designed to quantify a specie's importance for a given purpose. Before calculating the FL values, all reported ailments were grouped into major classes. The FL value was

estimated using equation 4, where l_p is the number of respondents who reported using medicinal plants for a specific primary ailment, and l_u is the total number of respondents who reported using the same plant for any ailment (Khadim *et al.* 2024b, Friedman, 1986). It was assumed that medicinal plants used repeatedly for the same disease category are more likely to be biologically active. It is determined using equation 4.

$$FL = l_p / l_u \times 100 \quad \text{Equation 4}$$

Quantitative data analysis

Frequency citation (FC) and Relative Frequency Citation (RFC)

Quantitative value indices were calculated to analyze ethnobotanical information. In order of RFC, the highest RFC value were ranked for *Cicerbita decipiens* var. *multifida* (0.9), followed by *Aconitum heterophyllum* (0.6) and *Lactuca rapunculoides* (0.5). The promising RFC values indicate the widespread use and retention of traditional knowledge among folks in the study area, owing to their availability and medicinal potential Use value (UV) (Ijaz *et al.* 2016, Faruque *et al.* 2018).

Use value (UV)

Use value determines the importance of a species, as reflected in the number of use reports from local people. In this study, the UV range is 0.1–0.8 (Table 2, Fig. 3a). To UV, the highest use value was recorded *Bergenia stracheyi* (0.83), followed by *Cicerbita decipiens* var. *multifida* and *Rheum tibetium* (0.8 each), *Ranunculus chaerophyllos* (0.76), *Capsella bursapastoris* and *Fraxinus hookii* (0.75 each), *Saussurea simpsoniana* (0.72), *Verbascum thapsus* and *Berberis orthobotrys* (0.71 each), *Abies pindrow* and *Astragalus strobiliforus* (0.66 each), *Podophyllum emodi* and *Urtica dioica* (0.57 each), *Rosa foetida* (0.5), *Oxyria digyna* (0.42), *Aconitum heterophyllum* (0.36), *Ferula narthex*, *Rhododendron hypenanthum*, *Ranunculus attenuates*, *Anthemis cotula* and *Pistacia khinjuk* (0.33 each), *Bunium persicum* (0.28), *Alcea rosea* and *Nepeta adenophyta* (0.25 each) (Table 2, Fig. 3b). The findings of result show that the plant species (*Bergenia stracheyi*) was more biologically active. The UV analysis of these plants revealed that was the most commonly used species, with the highest UV of it. 0.83 *Rheum tibetium* (0.8) has been frequently found in households and is widely used to treat heart problems, internal wounds, and to purify blood. The higher UV values highlighted familiarity among folks and the availability of plants (Caetano *et al.* 2020, Haq *et al.* 2023), as well as these plants' primary choice for cure and treatment ICF (Rahman *et al.* 2016).

Informant Consensus Factor (ICF)

In the study area, traditional herbalists used 105 medicinal plant species to treat a variety of ailments, which were categorized into 16 major disease groups. Among these, 45 plant species were used to treat gastrointestinal problems, followed by 29 for respiratory ailments. To ICF results, the gastrointestinal disorders were the highest value (0.75), followed by respiratory problems (0.71), ENT problems (0.66), skin issues (0.51), and urinary tract/kidney problems (0.47) (Fig. 3c). In this connection, the highest number of plant use citations were recorded for gastrointestinal ailments (180), followed by respiratory ailments (100). The widespread use of medicinal plants for gastrointestinal and respiratory conditions in the study area may indicate a high prevalence of these conditions. These results show strong agreement among respondents. A high ICF value further suggests that these diseases are more common in the study area due to challenging socioeconomic and sanitary conditions. On the other hand, according to (Heinrich *et al.* 1998), elevated ICF values can help identify specific plants for further investigation of their bioactive compounds (Fig. 3c). Higher ICF values indicate the efficacy of the plants used to treat or cure the disease or ailment (Teklehaymanot & Giday, 2007, Sharma & Manhas, 2015).

Fidelity Level (FL)

FL medicinal plants commonly used by local communities tend to have higher FL values than those used less frequently. The present study identified 21 medicinal plant species with high FL values, ranging from 10% to 100%. Among these, three species—*Aconitum heterophyllum*, *Viola biflora*, and *Cicerbita decipiens* var. *multifida* have a 100% FL. Additionally, 11 species, including *Thymus linearis*, *Artemisia santolinifolia*, *A. dracunculus*, *Ferula narthex*, *Bunium persicum*, *B. cylindricum*, *Saussurea simpsoniana*, *Angelica glauca*, *Arnebia benthamii*, *Swertia chirata*, and *Delphinium brunonianum*, exhibited 90% FL values but below 100%, suggesting their strong therapeutic potential (Fig. 3d). These highly valued (FL) plants are not only widely used within the study area, but also in other regions of Pakistan. Its medicinal properties are attributed to the presence of various bioactive phytochemicals. For example, *Artemisia santolinifolia* contains santonin, which is known for its remarkable medicinal benefits. *Angelica glauca* and *Podophyllum hexandrum* contain aricine, which is used as a purgative and laxative to relieve constipation-related pain. Similarly, *Ephedra intermedia* contains ephedrine, a key phytochemical that is commonly found in cough syrups. As frequently utilized plants tend to be more phytochemically active, those with high FL values may be prioritized for further chemical screening to isolate and identify the bioactive compounds responsible for their potent medicinal effects. Many folks often use the higher FL% and find many uses for it. On the other hand, a lower FL%

indicates that the informers disagreed on the same plant species. The species that have been given higher priority frequently have bioactive compounds and also exhibit therapeutic properties (Trotter & Logan, 1986) and are recommended for pharmacological investigation to authenticate their medicinal properties. On the other hand, lower FL% indicates neglect and risks the loss of traditional knowledge (Chaudhary *et al.* 2006), and it also has diverse therapeutic applications despite its low frequency.

Results and Discussion

Demographics of participants

A total of 100 informants were interviewed during this survey, including both male and female participants. Of these, 50 males included five herbalists and 50 females. Demographic data of the informants are mentioned in (Table 1). This study relates to a study from Ethiopia (Yiblet and Adamu, 2023).

Herbal remedies and diversity of plants

In total, 186 plant species out of 105 are medicinal plants used by humans, belonging to 150 genera and 62 families. Moreover, 50 unique floral species were reported from this valley compared to other valleys of district Astore, and their ethnobotanical uses were documented. These plant species were collected, and their ethnobotanical data were recorded from the different villages of the Hercho valley up to 5000 m. The nallahs (water sheds) and pastures of Koh Hercho and Badi Hercho were surveyed for the first time, and specimens and indigenous knowledge were collected from the local inhabitants. GPS was used to record the coordinates of 21 localities, and a distribution map was created in ArcGIS 10.5 software (Fig. 1a, b). Studies finds that , Compositae /Asteraceae was the most dominant family in the study area, recorded 26 species (13.9%), followed by Umbelliferae/Apiaceae and Leguminosae /Papilionaceae 11 (5.91% each), Polygonaceae 9 (4.8%), and Gentianaceae 7 (3.76%), Labiatae/Lamiaceae and Ranunculaceae 6 (3.22%), Salicaceae and Pinaceae 5 (2.68%), Cruciferae/Brassicaceae, Chenopodiaceae, Grossulariaceae, Poaceae and Scrophulariaceae 4 (2.15%), Moraceae, Caryophyllaceae, Crassulaceae and Boraginaceae 3 (1.61%), Asphodelaceae, Balsaminaceae, Celastraceae, Gymnospermae/Cupressaceae, Papaveraceae/Fumariaceae, Orchidaceae, Orobanchaceae, Onagraceae, Saxifragaceae, Solanaceae and Violaceae 2 (1.07%) and remaining families with one species (0.53%) each (a). Asteraceae was the most prominent family worldwide (Maroyi, 2023).

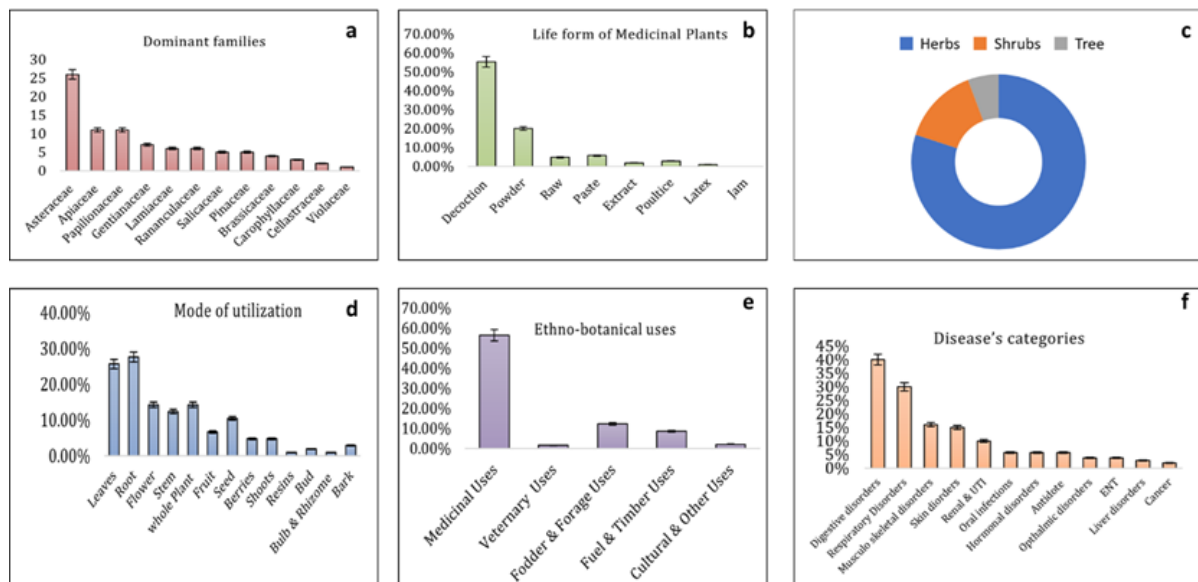


Figure 2. The dominant families in the study area (a). Life form of Medicinal Plants in Study area (b). Plant types used in treatment of various diseases in study area (c). Mode of utilization of medicinal plants (d). Ethno-botanical uses of plants in study area (e). Disease's categories in study area (f).

The indigenous knowledge of these medicinal plants was examined, and it was found that older people were better informed and more accustomed to using them to treat various ailments. The detailed list of unique flora and medicinally important plants used for different ailments recorded from Hercho valley represents an ethno-botanical inventory (Table 2, Fig. 2e).

Medicinal uses recorded from the study area

Fifty-five diseases were cured by one hundred and five medicinal plants by traditional herbalists and older adults (Fig. 3a). Regarding medicinal plant use, 84 species of herbs (80%) were heavily used, followed by trees (13, 14%) and shrubs (6, 5.71%) (Fig. 2c). Due to their wide distribution, high bioactive compound content, and easy availability, herbs were most commonly used in remote areas (Khoja *et al.* 2022). In most of the preparations, leaves used 27 species (25.71%), followed by stems (12.38%), fruits (6.66%), seeds (10.47%), roots (27.61%), bark (2.85%), flower (14.28%), whole plant (14.28%), berries (4.76%), shoots (4.76%), buds (1.90%), rhizomes, resin and bulbs (0.95% each) (Fig. 2d). For the potency and quality of herbal formulations, optimal collection of plant parts is essential (Sundaram & Suresh, 2019). Various modes of application have been observed in the study area. Most of the recipes are in the form of decoction (55.23%), followed by powder (20%), paste and poultice (5.71% and 2.85%), raw (4.76%), extract (1.90%), latex and jam (0.95% each) (Fig. 2b). Decoction is the most commonly used form of administration in the study area. Of 186 plant species, 52 were newly reported from the Hercho valley, especially in district Astore, while 30 species were documented to have additional uses (Table 2).

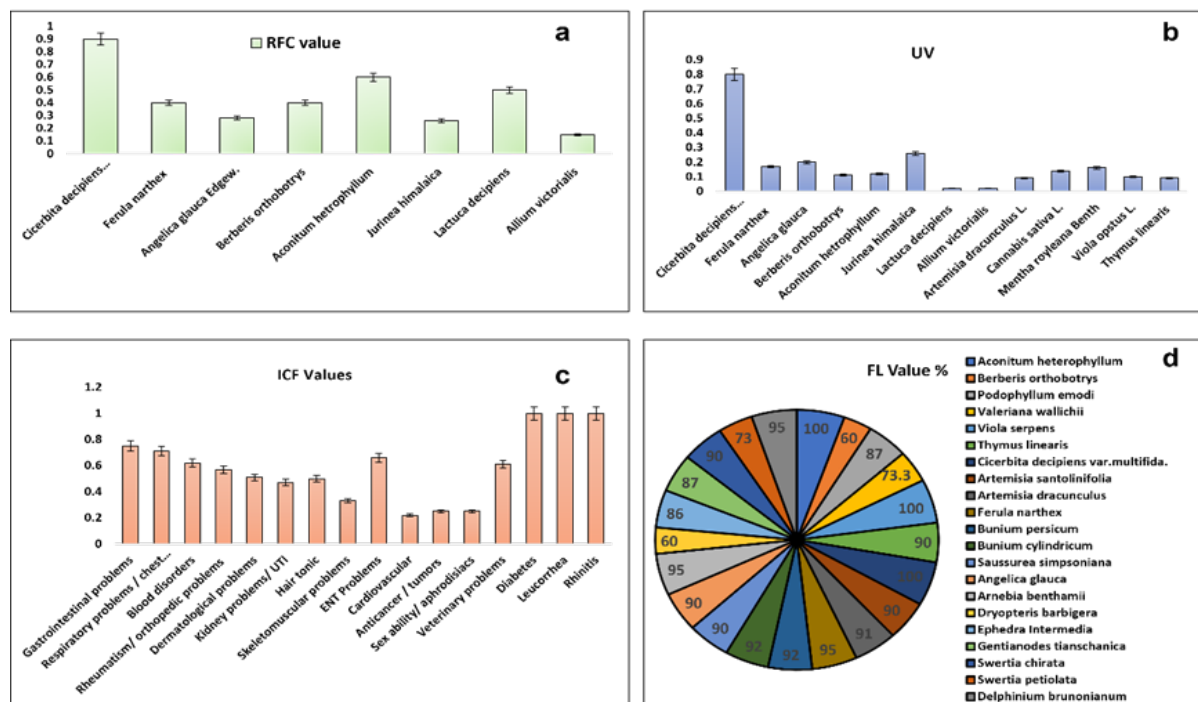


Figure 3. Relative frequency Citation (RFC) (a). Plant species with Highest Use Value (UV) (b). ICF values of traditional medical plants for treating human ailments (c). Fidelity level (FL) value of medicinal plants commonly reported against a given ailment (d).

Status of species

In this study, out of 186 plant species, 44 plant species were infrequent (Inf.), seven rare (R), five very rare (RR), three endangered (EN), two were critically endangered (CR), three were vulnerable (UV), 35 were ubiquitous (CC), and 87 were common (C) species. In addition, two plant species (*Aconitum violaceum* Jacq. ex Staf. and *Ribes himalensis* Royle.) were endemic to GB, including the study area (Table 3, Fig. 4a). This study concerns the endemic flora of GB (Alam and Ali, 2010). The highly valuable medicinal plants that have been used on a large scale for medicaments and other multi-purpose uses are facing population declines and the risk of extinction. The flora of the valley has unique significance and medicinal uses. Still, it is vulnerable to anthropogenic pressures, including unsustainable harvesting, grazing, cutting, collection, and extensive use for medicine and other purposes. As a result, various medicinally important plant species in the Hercho valley are becoming rare, and some are at high risk of extinction. Therefore, careful efforts should be made to ensure the sustainable conservation of these valuable plant species. These plant species should be conserved both in-situ and ex-situ to a large extent. It is necessary to preserve the natural habitats of these medicinal plants and cultivate them on a large scale through ex-situ conservation.

Table 2. Medicinal uses of herbs by indigenous communities living in the Hercho Valley, district Astore.

Family Name	Botanical Names	Vernacular Name	Common English Name	Common Urdu Name	Parts Used	Mode of Use	Ethnobotanical Uses	FC	RFC	UV
Alliaceae	<i>Allium carolinianum</i> DC.	Paloon	Not reported	Phut booti	Leaves	Raw	Leaves are used raw to treat abdominal pain and stomach problems.	15	0.15	0.02
Umbelliferae (Apiaceae)	<i>Carum carvi</i> L.	Hayo/ zirah	Caraway	Zirah	Seed	Raw	Seeds are used with lukewarm water to produce milk for breastfeeding mothers.	7	0.07	0.01
	<i>Bunium persicum</i> (Boiss.) B. Fedtsch	Kino hayo	Carum	Zira seyah	Seeds.	Raw	Seeds are used in lukewarm water to treat colic, abdominal pain, vomiting, and digestive problems.	8	0.08	0.03
	<i>Ferula narthex</i> Boiss.	Sap	Ferula	Hing/ Anjudan	Resin Root	Raw	Gum resin is used with water against abdominal pain, vomiting, toothache, constipation, and stomach problems. Root powder is used with milk as a cure for heart disease, swelling, blood purification, constipation, gastric problems, lung problems, Pneumonia, asthma, cough, and fever. Moreover, the plant is used as a germicide and insecticide.	40	0.4	0.17
	<i>Ligusticum thomsonii</i> C. B. Clarke	Korshidon	Not reported	Not reported	Root	Powder	Root is ground into powder and used as a remedy for bleeding from gums and toothaches. Roots are also used in powdered water as a cure for birth control in females.	15	0.1	0.03
	<i>Selinum papyraceum</i> C. B. Clarke	Botijat	Not reported	Not reported	Root	Decoction	Plant roots are boiled in water, and the decoction is used against asthma, gas troubles, abdominal pain,	17	0.1	0.04

							stomach disorders, and aphrodisiac			
	<i>Angelica glauca</i> Edgew.	Choro	Garden Angelica	Not reported	Root	Decoction Powder	Plant dry root is boiled in water, and the decoction is used as a remedy for asthma, fever, joint pain, flatulence, dyspepsia, cough, cordial diseases, urine problems, abdominal pain, and stomach disorders. Moreover, dried roots and powders are used as remedies for heart disease.	28	0.2	0.11
	<i>Angelica archangelica</i> L.	Fataw	Garden Angelica	Not reported	Whole plant	Decoction	The plant is boiled, and the decoction is used as a remedy for coughs, colds, and bronchitis.	4	0.04	0.03
Compositae (Asteraceae)	<i>Artemisia brevifolia</i> Wall. ex DC.	Zunne	Worm-wood	Rund	Whole plant	Decoction	Flowers and buds are boiled in water, and the decoction is used before breakfast to treat diabetes, high blood pressure, abdominal pain, ringworms, ulcers, fever, and jaundice. Moreover, plants are used as antiseptics. Further, plant flower decoction is used as a remedy to relieve the pain of snake and scorpion bites.	20	0.2	0.09
	<i>Artemisia santolinifolia</i> Turcz. Ex Krasch.	Kashray Zunne	Worm-wood	Asfateen	Bud Stem	Decoction	Buds and stems are boiled in lukewarm water, and the decoction is used for gastrointestinal ailments, abdominal pain in infants, malaria fever, cough, and as an anthelmintic.	20	0.2	0.04

<i>Artemisia siversiana</i> Ehrh. Ex Willd.	Sheeh Zunne/ Kakuz/ Kakets	Worm-wood	Atantin	Bud Flower	Decoction	Buds and flowers are boiled in water, ground into a powder, and the decoction or the powder is used as a remedy for infants with undigested milk, vomiting, intestinal worms, and thinness.	20	0.2	0.04
<i>Saussurea simpsoniana</i> Field.Garden.	Booshi Phunar	Phen Kamal	Not reported	Flower	Decoction	Plant flower is boiled in water, and the decoction is used against Pneumonia, cough, whooping cough, influenza, flu, sore throat, and internal wounds.	30	0.3	0.06
<i>Anthemis cotula</i> L.	Jandali	Stinking Chamomile	Not reported	Flower Root	Decoction	Flowers and leaves, boiled in water, are used to make a decoction for gas troubles, abdominal pain, toothaches, and back aches.	18	0.1	0.04
<i>Anaphalis virgata</i> Thomson ex C. B. Clarke	Shii chiki	Not reported	Not reported	Flower Leaves	Decoction	Boiled plant flowers and leaves are used as a remedy for abdominal pain in women, cough, asthma, and delivery problems.	16	0.1	0.04
<i>Cichorium intybus</i> L.	Shantoshah	Chicory	Kasni	Leaves Flower	Decoction Powder	Leaves and flower decoction or powder are used against asthma, joint pains, diarrhea, fever, jaundice, vomiting, and as a diuretic	17	0.1	0.07
<i>Dolomiaea macrocephala</i> Royle	Guguldup	Dhoop	Dhup	Root	Raw	Dried roots are burnt, and the smoke is inhaled for eye diseases. Roots are boiled in water, and the decoction is used as a remedy for internal wounds. Moreover, dried roots are ground into	26	0.2	0.2

							powder and used for external cuts and wounds.			
	<i>Taraxacum himalaicum</i> v. Soest	Lakanay	Not reported	Not reported	Leaves	Raw	Leaves of plants are used as vegetables and are considered remedies for skin diseases, blood purifiers, and digestive disorders.	8	0.08	0.03
	<i>Lactuca rapunculoides</i> (DC.) C B. Clarke	Azamor	Prickly Lettuce	Jangali adrak/ Kahu	Stem	Decoction	The plant is boiled in water, and the decoction is used as a remedy for acute abdominal pain and fever with shivering.	50	0.5	0.02
	<i>Cicerbita decipiens</i> var. multifida. (Hook.f)	Chitayaal	Not reported	Not reported	Leaves Stem	Decoction	The decoction of the stem and leaves of plants is used for typhoid. This plant is used during the COVID-19 pandemic in the study area.	90	0.9	0.8
	<i>Senecio krascheninnikovii</i> Schischk	Not Known	Not reported	Not reported	Flower Leaves	Decoction	A flower and leaf decoction are used as a remedy for abdominal pain and toothache.	3	0.03	0.02
Boraginaceae	<i>Onosma hispidum</i> Wall. ex G. Don	Shahrong	Not reported	Gule-laljari/Koame/ Laljari/Moharanga	Root Stem	Raw	Plant roots and stems are mixed with oil and used as a remedy for baldness and long hair.	5	0.05	0.02
	<i>Arnebia benthamii</i> (Wall. ex G. Don) I. M. Johnston	Gawzaban/ Zogipatsha	Arnebia	Gaozuban /Gul-e-Kashmiri	Flower	Powder	The aerial part is burnt, and the ash is used as a remedy for sore throat, Pneumonia, cough, whooping cough, and asthma.	8	0.08	0.03
Cruciferae (Brassicaceae)	<i>Descurainia sophia</i> (L.) Webb & Berth.	Not known	Flixweed		Whole Plant	Shoots	Plant shoots are boiled in water, and the decoction is used as a remedy for digestive problems.	5	0.05	0.02
	<i>Capsella bursa-pastoris</i> (L.) Medicus	Bordbordi	Shepherd's-purse	Chattri	Leaves Seed	Raw	Fresh plant leaves, when used raw, are used against stomach disorders and abdominal pain. Leaves are chopped, and paste is used	12	0.1	0.06

							as a remedy for acute migraine and headache. Plant seeds are used with water for acute locureria and as a general tonic.			
Betulaceae	<i>Betula utilis</i> subsp. <i>jacquemontii</i> (Spach) Kitam.	Johji	Himalayan Birch	Boj pattra	Bark	Raw Decoction	Bark burning smoke is given for eye redness, abscesses, and scabies. A decoction of the bark is used for ear pain.	4	0.04	0.03
Berberidaceae	<i>Berberis orthobotrys</i> Bienert ex Aitch	Tchirko/ Chirko, Churki	Barberry	Sumbal	Fruit Root Stem	Powder Decoction	Dry fruits are ground into a powder and used with water as a remedy for jaundice and to purify blood. Plant roots are boiled in water, and the decoction is used against joint pain, eye diseases, stomach problems, locuerria, diarrhea, kidney stones, wound healing, bone fractures, and urine problems.	40	0.4	0.11
Berberidaceae	<i>Podophyllum hexandrum</i> Royle	Ishmandy/ itchemane	Wild mandrake	Bankakri/ Banwangon	Root	Decoction	Root is boiled in water, and the decoction is used for diarrhea, heart disease, body shivering, and body pimples. Its powder is mixed with milk and used for birth control.	30	0.3	0.05
Cannabinaceae	<i>Cannabis sativa</i> L.	Bong	Indian Hemp	Bhang	Flower	Decoction	Plant flower is boiled in water, and the decoction is used as a cure for malaria, diarrhea, blood dysentery, fever, joint pain, asthma, cough, headache, nerve tonic, urinary problems, urine burning, and kidney stones and eye problems.	12	0.1	0.14

							Further, this plant has a nicoline effect.			
Chenopodiaceae	<i>Chenopodium botrys</i> L.	Kona/ Hamo Shah	Jerusalem Oak	Not reported	Stem Leaves	Decoction	Stem, along with leaves, is boiled in water and used as a remedy for fever, joint pain, asthma, and catarrh.	10	0.1	0.04
	<i>Chenopodium album</i> L.	Konoshah	Fat-hen	Em/Bathwa	Stem Leaves	Raw	Plant leaves are used as raw material for piles, hemorrhoids, abdominal pain, constipation, spleen, and heart diseases. Moreover, decoction of leaves and stems is used as a detergent.	10	0.1	0.07
	<i>Chenopodium foliosum</i> (Moench) Asch.	Shoie march	Not reported	Not reported	Berries	Powder	Dry berry plants are ground into powder and used as a remedy for tonsillitis, acne, pimples, and wounds.	10	0.1	0.04
Caryophyllaceae	<i>Silene vulgaris</i> (Moench) Garcke	Gigio/ Gigio Shah	Bladder Cam-pion	Not reported	Stem Leaves	Decoction	Plant stem and leaves are boiled in water, and the decoction is used as a laxative for acute constipation, Pneumonia, and malaria.	10	0.1	0.03
Convolvulaceae	<i>Convolvulus arvensis</i> L.	Hergoli /Harioli	Field Bindweed	Lehli	Whole Plant	Decoction	The boiled water and the decoction are used to cure constipation	7	0.07	0.02
Caprifoliaceae	<i>Lonicera quinquelocularis</i> Hardw.	Shozu/Pashki	Honeysuckle, Translucent	Not reported	Fruit	Raw	The ripened fruit of this plant is used to treat dry skin.	1	0.01	0.02
Capparidaceae	<i>Capparis spinosa</i> L.	Kabeer/kabilo-kay	Caper, Caper berry	Kabar/ Khawarg/ Panetero	Seed	Raw	Seeds are used with water to treat itching, swelling, and mental disorders.	2	0.02	0.03
Dryopteridaceae	<i>Dryopteris xanthomelas</i> (Christ) C. Chr.	Potolow Jabaati	Not reported	Not reported	Root	Decoction	The plant root is boiled in water, and the resulting decoction is used to treat toothaches and hepatitis.	19	0.3	0.02
Elaeagnaceae	<i>Hippophae rhamnoides</i> subsp. <i>turkestanica</i> Rousi	Boru/ Bourou	Sea-buckthorn	Sirma/ Tsarap	Berries	Raw Jam	Berries are eaten raw and are a remedy for jaundice, diabetes, diabetes, and	2	0.02	0.08

							high blood pressure. These are also used to make jams, which are considered power stimulants, appetizers, and general tonics. Medicinally, it is used again for cough and bronchitis.			
Ephedraceae (Gnetatae)	<i>Ephedra gerardiana</i> Wall. ex Stapf	Sung/ Suh	Somlata Joint-pine/ Jointfer/ Mormon- tea	Asmani buti	Leaves	Decoction	Fresh leaves are boiled in water, and the steam from the hot decoction is given to patients to treat respiratory problems, such as bronchitis, cough, whooping cough, hay fever, and asthma. Moreover, the decoction is also used for arthritis and rheumatism.	2	0.02	0.07
Ericaceae	<i>Rhododendron anthopogon</i> D. Don	Suhsuhr	Yellow dwarf Rhodo-dendron	Not reported	Flower Leaves	Decoction Paste	The dry leaves are boiled in water, and the decoction is used again as a blood purifier, for high blood pressure, and for irregular menses. Moreover, fresh leaves are finely crushed and made into a paste. It is applied externally on the forehead as a remedy for an acute headache.	1	0.01	0.04
Euphorbiaceae	<i>Euphorbia osyridea</i> Boiss.	Photoo	Not reported	Not reported	Leaves Seed	Powder	Dry leaves and stem powder are used with water as a purgative for acute constipation and abortion for females	19	0.1	0.01
Equisetaceae	<i>Equisetum arvense</i> L.	Chiw	Field Horsetail	Not reported	Whole Plant	Decoction	The plant is boiled, and the decoction is used for the cure of kidney and urinary bladder stones, T.B., and anticancer.	9	0.09	0.03

Fumariaceae (Papaveraceae)	<i>Fumaria indica</i> (Hauskn.) Pugsley	Papadah	Not reported	Not reported	Whole Plant	Decoction	The plant is boiled in water, and the decoction is used as a remedy for constipation, cough, fever, backaches, and headache.	17	0.1	0.05
Gentianaceae	<i>Swertia petiolata</i> Royle ex D. Don	Mumiran (Kapoosh)/ Bahu Shah/ Hajaton Jabbatti	Swertia	Momiran	Shoot	Powder	Shoots are ground into a powder, mixed with milk or water, and used for eye redness and pain, cough, and whooping cough. Moreover, plant roots are mixed with milk and poured into the eyes to relieve pain.	25	0.2	0.04
	<i>Swertia chirata</i> Wall.	Mumiran (Chirata)	Swertia	Not reported	Shoot	Decoction	The whole plant is boiled in water, and the decoction is used as a remedy for blood pressure, vomiting, heart disease, and headache.	25	0.2	0.03
	<i>Gentiana tianschanica</i> Rupr. Ex Kusn.	Palamas/ Khangar katsh	Not reported	Bangra	Stem Leaves Root	Poultice Paste Decoction	Stem and leaves are crushed into a paste used for external cuts and wounds. Root is boiled in water, and the decoction is used as a blood purifier, a remedy for stomach disorders, and a headache treatment.	20	0.2	0.04
	<i>Geranium himalayense</i> Klotzsch ex Hoffmeister & al.	Pour Ponour	Meadow Crane's-bill	Not reported	Whole Plant	Decoction	Plant decoction is used as a remedy for diarrhea and dysentery.	8	0.08	0.02
Grossulariaceae	<i>Ribes orientale</i> Desf.	Shotu/ Shatu	Not reported	Askutar	Berries Stem	Raw	Plant berries are eaten directly due to their delicious taste. Berries are considered energetic, tonic, and blood stimulants. It is also a useful laxative for acute constipation.	1	0.01	0.02

	<i>Ribes alpestre</i> Decne. Ex Jacquem.	Shumloo /Hergili	Hedge gooseberry	Not reported	Leaves	Raw	Plant berries are used for headaches, blood purification, fever, and stomach disorders.	1	0.01	0.02
Hypericaceae (Guttiferae)	<i>Hypericum perforatum</i> L.	Shna Chai	Perforate St John's-wort	Bassant	Whole Plant	Decoction	The whole plant is boiled in water, and the decoction is used as a remedy for dysentery, nervous depression, jaundice, piles, and urinary problems.	12	0.1	0.06
Iridaceae	<i>Iris hookeriana</i> Foster	Nili phul / Crisma	Not reported	Not reported	Flower	Decoction	The plant's flowers are boiled in water, and the decoction is used as a remedy for bronchitis, cough, asthma, chest infections, and pain.	15	0.1	0.05
Lamiaceae (Labiatae)	<i>Mentha royleana</i> Benth.	Jangali Phelil/ Philil	Horsemint	Jungali Podina/ Podina	Flower Leaves	Decoction	Dry and moist leaves are crushed, and the decoction is used to control blood pressure, vomiting, headache, acidity, gastric abdominal pain, gas trouble, cold, cough, nasal catarrh, control nasal bleeding, flu, fever, pyorrhea, toothaches, and diarrhea.	22	0.2	0.16
	<i>Nepeta adenophyta</i> Hedge	Charchumero	Not reported	Not reported	Leaves	Decoction	Leaves are boiled in water, and the filtered extract and decoction are used for diarrhea, abdominal and kidney pain, controlling bleeding in women, dysentery, general weakness, joint pain, and "Ree" problems.	20	0.2	0.07
	<i>Thymus linearis</i> Benth.	Tomorrow/ Tumuro	Wild thyme	Jangali Ajwine	Shoots	Decoction	Shoots are boiled in water, and the decoction (tea) is used for abdominal pain, asthma, toothaches, cough,	23	0.2	0.09

							fever, respiratory inflammations, and to lower blood pressure, cholesterol, and acidity.			
	<i>Ocimum basilicum</i> L.	Gasmalli/ Desi	Basil	Nyazbo/ Niazipu	Seed	Raw	Seed is directly used to clean the eyes of dust and eye redness.	5	0.05	0.02
Liliaceae	<i>Tulipa clusiana</i> DC.	Mion Push	Not reported	Not reported	Blub	Raw	The plant bulb is eaten raw after removing the outer bark and is considered a powerful stimulant, a general tonic, and energizing.	10	0.1	0.03
Malvaceae	<i>Alcea rosea</i> L.	Tchamna/ Chama	Hollyhock	Not reported	Flower	Decoction	Flowers are boiled in water, and the decoction is used for skin itching. Pneumonia, cough, and bronchitis.	16	0.1	0.04
Moraceae	<i>Ficus palmata</i> subsp. <i>virgata</i> (Roxb.) Browicz	Phak	Wild fig	Phagwara / Anjir/ Patguleri	Leaves Fruit	Raw Latex	Fruit is eaten directly and is generally considered a power stimulator, energizer, and tonic for abdominal pain, cardiac problems, and high blood pressure; a laxative for acute constipation; and a blood purifier.	2	0.02	0.04
Oleaceae	<i>Fraxinus xanthoxyloides</i> (Wall. ex G. Don) DC.	Kasanur	Afghan Ash	Hanuz	Bark	Decoction	Bark is boiled in water, and the decoction is used as a remedy for dysentery.	4	0.04	0.01
Orchidaceae	<i>Dactylorhiza hatagirea</i> (D. Don) Soo	Narmada/ Jadogar char	Marsh orchid	Salap/Salap misri	Root	Decoction	Plant roots are boiled in water, and the decoction is used as a remedy for aphrodisiac, fatigue, and backache.	8	0.08	0.03
Onagraceae	<i>Epilobium latifolium</i> L. subsp. <i>latifolium</i> Th. Fr. & Lange	Pondol/ Danui	Rose- bay Willowherb/Fireweed	Not reported	Leaf Flower	Paste Decoction	Plant flower is ground, and the paste is used externally for itching pimples. Moreover, plant leaves are boiled, and the decoction is	7	0.07	0.06

							used as a cure for skin problems and as an antidote.			
	<i>Astragalus rhizanthus</i> Royle ex Benth.	Knii haputch	Kon	Not reported	Root	Raw	Roots are used as a general tonic for cattle. Roots are boiled in water, and the decoction is used for jaundice and hepatitis, as well as a powerful stimulant.	8	0.08	0.06
	<i>Hedysarum falconeri</i> Baker.	Halaskur/ Khating	Not reported	Not reported	Stem	Raw	After removing the outer bark of the stem, it is eaten raw and considered energetic, a power stimulator, and a general tonic.	5	0.05	0.06
	<i>Cicer microphyllum</i> Benth.	Kukeni jungeli	Not reported	Not reported	Seed	Raw	The plant's seeds are eaten raw for their delicious taste and are considered energizing. Moreover, it is given to cows as a tonic to increase milk.	3	0.03	0.02
	<i>Colutea paulsenii</i> Freyn	Bizhee	Himalayan bladder Senna	Braa	Berries	Raw	Plant berries are used to relieve dryness of the hands and face during the hot summer.	1	0.01	0.01
Papaveraceae	<i>Papaver nudicaule</i> L.	Goshal	Not reported	Not reported	Flower	Decoction	Plant flower decoction is used for stomach problems.	5	0.05	0.02
Pinaceae	<i>Pinus gerardiana</i> Wall. ex Lamb.	Tulesh	Gerard's Pine	Chilgoza	Seed	Raw	Raw seed removal of the outer covering is used to treat arthritis, rheumatism, and gout.	4	0.04	0.03
Polygonaceae	<i>Oxyria digyna</i> (L.) Hill	Gurko /Churkki	Mountain Sorrel	Not reported	Stem	Raw	Raw stem is used as a remedy for blood purification, fever, and dizziness.	10	0.1	0.04
	<i>Rheum spiciforme</i> Royle.	Haluskir/ tari/chaontal/	Rhubarb	Lachu/ Rewanchini	Root	Powder	Root is ground and used with water as a remedy for bone fractures and	25	0.2	0.07

		bambala/Jaro Chontel					backaches, fever, asthma, cough, as a laxative for constipation, and as a blood purifier.			
<i>Aconogonon alpinum</i> (All.) Schur	Lamay/ Chirko	Alpine knot- weed	Not reported	Stem Root	Raw	Young stems are chewed raw for fever and heart problems. Roots are boiled, and the decoction is used as an antitumor.	10	0.1	0.03	
<i>Bistorta affinis</i> (D. Don) Greene	Chomi/ Garazap/ Titeri	Alpine bistort	Not reported	Root	Decoction	Roots of plants are boiled in water, and the decoction is used against wounds, acute bronchitis, chest infection, piles, rhinitis, and vomiting.	15	0.1	0.06	
<i>Rheum tibeticum</i> Maxim ex Hook.F	Markochal	Not reported	Not reported	Root	Decoction Powder	Roots are boiled in water, and the decoction (tea) is used against blood purification, heart diseases, internal wounds, and asthma. Moreover, root powder is used for external wounds.	26	0.2	0.05	
<i>Rumex patientia</i> subsp. <i>pamiricus</i> (Rech. f.) Rech. f.	Hubabel	Not reported	Not reported	Seed	Decoction	Seed bark is removed after ripening, boiled in water, and the decoction is used against abdominal pain, chronic constipation, and for the removal of the placenta, joint dislocation, and pain.	12	0.1	0.05	
<i>Polygonum polycnemoides</i> Jaub. & Spach	BrokoKuch	Not reported	Not reported	Whole Plant	Raw	The plant is crushed and mixed into a paste, then the warm paste is applied to the legs to coagulate dirt, eczema, and boils.	10	0.1	0.02	
<i>Polygonum aviculare</i> L.	Droup Kuch	Knotgrass	Not reported	Whole Plant	Decoction	The plant is boiled in water, and the decoction is used against wounds and inflammation of donkeys.	10	0.1	0.02	

Plantaginaceae	<i>Plantago depressa</i> Willd.	Khupa kato/ Khapaypato	Plantain	Isipaghule	Leaves Root Seed	Paste Decoction Powder	Fresh plant leaves are crushed, and the paste is used for boils. Seeds are used for constipation. Root is boiled in water, and the decoction is used for toothaches, kidney stone removal, snake bites, and wound healing.	18	0.1	0.06
Primulaceae	<i>Primula schlagintweitiana</i> Pax	Momiran	Primula	Not reported	Shoot	Powder	A cone-like structure formed among leaves and stem in which a powder is formed mixed with milk or water and poured drops in the eyes, causing redness and pain.	20	0.2	0.02
Poaceae (Gramineae)	<i>Saccharum ravennae</i> (L.) Murray	Furu	Not reported	Not reported	Root	Decoction	The plant roots are boiled, and the decoction is used as a diuretic.	3	0.03	0.01
	<i>Setaria viridis</i> (L.) P. Beauv.	Jachoo Kuch/ Ching	Green Bristle-grass	Not reported	Whole Plant	Powder	The whole plant is crushed into a powder, mixed with water, and applied externally for the treatment of bruises.	3	0.03	0.01
	<i>Piptatherum munroi</i> (Stapf) Mez	Kulagii	Not reported	Not reported	Whole Plant	Decoction	Women use plant decoctions after birth. Moreover, plant root powder is used with water to treat abdominal pain in small infants.	1	0.01	0.02
Rosaceae	<i>Fragaria nubicola</i> Lindl. ex Lacaita	Bourousse/ Buruse	Wild strawberry	Jangali Strawberry	Fruit Root	Decoction Raw	Root decoction is used to cure asthma and high blood pressure. Fruit is eaten with a general tonic, a blood stimulator, and a purifier.	12	0.1	0.04
	<i>Potentilla desertorum</i> Bunge	Not known	Not reported	Not reported	Whole Plant	Decoction	The plant is boiled, and its decoction is used as a remedy for antibacterial, antifungal, and antiviral	8	0.08	0.06

							diseases such as inflammation, infections, wounds, cancer, diabetes, diarrhea, and kidney stones.			
<i>Rosa webbiana</i> Wall. ex Royle	Chingay/ Shingey/Shingeyon Mayaro/ Kini shingey	Wild Rose	Jungli Gulab	Flower Stem	Decoction Poultice	Flowers' decoction is used to treat abdominal pain. Bark decoction is used as a blood purifier. Stem burns a little, and a black, sticky substance called "Methi" is used as a remedy for boils and eczema.	4	0.04	0.04	
<i>Rosa foetida</i> J. Herrmann	Ishkapur	Austrian yellow Rose	Not reported	Flower	Decoction	Decoction of flowers is used for abdominal pain.	2	0.02	0.01	
<i>Cotoneaster affinis</i> Lindl.	Khariz/ Luni	Purple- berry	Not reported	Berries	Raw Paste	Berries are used as a raw material for blood stimulants and a general tonic. Fresh berries are ground into a paste, which is used as an ointment for abscesses and boils.	1	0.01	0.04	
<i>Spiraea lasiocarpa</i> Kar. & Kir.	Darai/ Luni/ mujon Bish	Himalayan Spiraea	Not reported	Flower	Decoction	Flowers are boiled in water, and the decoction is used as a remedy for abortion and birth control.	2	0.02	0.02	
<i>Crataegus songarica</i> C. Koch	Shont	Asian Hawthorn	Not reported	Fruit	Raw	Fruit is eaten directly when it is ripe. It is a heart tonic and blood purifier.	3	0.03	0.02	
<i>Prunus amygdalus</i> Batsch	Kune	Wild Almond	Jungle badam	Fruit/ Seed	Raw	Plant seed oil is used as a remedy for constipation, as a nerve tonic, and for joint pain.	2	0.02	0.02	
<i>Rubus irritans</i> Focke	Uchjay/ Eiche	Climbing Blackberry	Not reported	Fruit	Raw	Fruit is edible and delicious, and used for blood stimulants and purifiers, digestive problems, and heart problems.	4	0.04	0.03	

Ranunculaceae	<i>Aconitum heterophyllum</i> Wall. ex Royle	Buma	Aconite /Atis Monkshood	Jadwar/ Atis	Root	Powder	Roots are ground into a powder and used in minute quantities with water for the treatment of abdominal shivering, pain, asthma, vomiting, cough, typhoid, Pneumonia, and as an antiparasitic agent. The plant is used during the COVID-19 pandemic in the study area.	60	0.6	0.12
	<i>Aconitum chasmanthum</i> Stapf ex Holmes	Bishmulo	Monkshood	Mori/ Ban-bal-nag	Root	Paste Powder	The plant is considered the "head of all medicines". Dry root powder is used with butter or warm milk in a minute quantity to cure snake bite, rheumatism, asthma, cough, whooping cough, fever, tumors, and breast cancer. The root powder is mixed with oil and used as an ointment for abscesses and boils.	32	0.3	0.08
	<i>Ranunculus attenuates</i> Royle	Koroloh	Not reported	Chambel booti	Shoots	Decoction	Shoots are boiled in water, and the decoction is used to treat gas troubles and restore the body's thinness.	12	0.1	0.02
	<i>Delphinium brunonianum</i> Royle	Mokhoty	Larkspur Delphinium	Gul-e-Mamoon	Flower Leaves	Decoction	Flowers and leaves are boiled in water, and the decoction is used as a remedy for cough, asthma, Pneumonia, flu, fever, piles, and poor blood circulation.	30	0.3	0.07
	<i>Pulsatilla wallichiana</i> (Royle) Ulbr.	Kamakoti	Not reported	Not reported	Root	Decoction	Plant root decoction is used as a remedy for menstrual disturbance and fever. It also used pregnant females in powder for easy delivery. Moreover, in powder form, it is used for cuts and	4	0.04	0.03

							wounds to remove germs and anti-lice.			
Salicaceae	<i>Salix sericocarpa</i> N. J. Andersson	Chiti bijau / vuir	Not reported	Bedh	Bark Leaves	Decoction	The plant's bark is boiled in water, and the decoction is used to treat skin diseases and fever. Small branches are used as a toothbrush for cleaning teeth, as a cure for gum bleeding, and for toothaches. A decoction of the leaves is used as a remedy for diabetes and high blood pressure.	2	0.02	0.05
Saxifragaceae	<i>Bergenia stracheyi</i> (Hook. f. & Thomson) Engl.	Lolo Tchapur/Shapur	Bergenia / Elephant's Ear	Zakham-i-Hayat	Leaves Root	Decoction	Leaves and roots are boiled in water, and the decoction (tea) is used as a remedy for heart diseases, cough, Pneumonia, analgesic, blood purifier, and abdominal pain, external and internal wounds.	25	0.2	0.08
Scrophulariaceae	<i>Veronica verna</i> L.	Jachkony/ Jajo-e-kach	Brooklime	Not reported	Whole Plant	Powder Poultice Paste	The plant is ground into a powder, and the paste is used for skin conditions such as eczema. Moreover, plant decoction is used as a remedy for uric acid, as an anti-scour, and as a diuretic.	10	0.1	0.05
	<i>Verbascum thapsus</i> L.	Romkot/ Ramkato	Great Mullein	Gidhar tambaku/ Bentamaku	Leaves Root	Poultice Decoction Powder	Leaves are warmed, applied with oil, and tied to the joints to relieve pain. A flower and leaf decoction are used for chest pain, cough, and diarrhea.	20	0.2	0.04
	<i>Pedicularis pycnantha</i> Boiss.	Knii Chhiki	Not reported	Not reported	Whole plant	Powder	The whole plant is used as a powder for controlling bleeding, like Methergine.	1	0.01	0.01
Solanaceae	<i>Hyoscyamus niger</i> L.	Bazarbang	Henbane	Ajwain-e- Khurasani	Leaves Seeds	Raw	Plant fresh leaves externally applied on	10	0.1	0.02

							abscesses and boils for maturation and expulsion of pus. Plant seeds are narcotic and a remedy for sleeplessness.			
	<i>Datura stramonium</i> L.	Daturo	Thorn apple	Datura	Leaves Seed	Raw	Raw leaves are used externally as painkillers. The plant's seeds are used to make sleeping drugs and to smoke for pain relief from toothaches. Further, the plant is used to treat hair loss.	10	0.1	0.03
Thymeleaceae	<i>Daphne mucronata</i> Royle	Nirko/ Nik	Not reported	Kuttibel/ Kuttikal	Leaves	Decoction	Dry leaves of plants are boiled in water, and the decoction is used externally against dermal diseases due to the poisonous nature of the leaves.	5	0.05	0.01
Urticaceae	<i>Urtica dioica</i> L.	Gomee/ Jomi	Stinging nettle/Common Nettle	Bichu-Booti	Stem Leaves Root	Raw Decoction Powder	Young leaves are used as vegetables, and are used against jaundice, paralysis, and disorders of the urine and kidneys. Moreover, stems and leaves are boiled in water, and the decoction is used for diabetics, dermal disorders, and anti-dandruff. Root powder is used as a remedy to lower sugar levels and to treat infertility.	18	0.1	0.08
Valerianaceae	<i>Valeriana himalayana</i> Grubov	Gonespaw-Jabatti	Indian valerian	Mukshbala/ Pishwala	Root Rhizome	Powder	The rhizome and root are ground into a powder, which is used with water for bleeding gums, toothaches, as a mouth freshener, and for pyorrhea. Moreover, plant root decoction is used as a	20	0.2	0.09

							remedy for black hepatitis, white hepatitis, blue hepatitis, and red hepatitis.			
Violaceae	<i>Viola biflora</i> L.	Lilio	Yellow Violet/Sweet violet	Banafsha	Leaves Flower	Decoction Paste	Plants' leaves, along with flowers, are dried and boiled in water, and the decoction is abundantly used in the treatment of mental fatigue, bronchitis, cough, sore throat, flu, constipation, abdominal pain, fever, liver and kidney diseases, and Pneumonia.	27	0.2	0.1
Zygophyllaceae	<i>Tribulus terrestris</i> L.	Morkutti	Puncture vine	Bakhra/ Gokhru, Tirkundi	Leaves Stem, Root	Powder Decoction	Plant leaves are ground, and the powder is used for dysentery, digestive, and urinary stones. Moreover, seed decoction is used as a remedy for sexual, kidney, and urinary problems.	10	0.1	0.05

Table 3. Cumulative list of plant species in the Himalayan Dry Temperate Zone in the study area

Family	Name of species voucher No.	Vernacular Name (Sh)	Habitat	Habit	Locality	Altitude	Coordinates (GPS)	Status
Alliaceae	<i>Allium carolinianum</i> DC. (H 55)	Palon	Alpine open grassy slopes	P.H	Paleenat Kai	3376m	N 35°25.433' / E 074°47.299	C
Amaranthaceae	<i>Amaranthus retroflexus</i> L. (H 003)	Ganhar	Grassy slopes, dry Temperate zone	A.H	Hercho	2086m	N 35°26.999' / E074°47'.794	C
Anacardiaceae	<i>Pistacia khinjuk</i> Stocks. (H 06)	Kakaou	Grassy slopes, dry Temperate zone	Tree	Hercho	2086m	N35°26.999' / E074°47'.794	RR
Umbelliferae (Apiaceae)	<i>Heracleum pinnatum</i> C.B Clarke. (H 105)	Not Reported	Grassy slopes, dry Temperate zone	P.H	Ajin Techil	2390m	N 35°26.747' / E074°47'.082	C
	<i>Heracleum candicans</i> . Wall ex DC. (H 007)	Ichfalah	Dry Temperate Mountain zone	P.H	Hercho	2086m	N 35°26.999' / E074°47'.794	C
	<i>Carum carvi</i> L. (H 03)	Hayo/ zirah	Grassy slopes subalpine zone	P.H	Faqeer-i- Tali	3000m	N 35°26.487' / E074°47'.215	C
	<i>Bunium persicum</i> (Boiss.) B. Fedtsch (H 58)	Kini Hayo	Grassy slopes subalpine zone	P.H	Ramzan-i- Kanii	3161m	N 35°26.487' / E074°47'.215	CC
	<i>Ferula narthex</i> Boiss. (H 17)	Sap	Dry places of the Temperate Mountain zone	P.H	Batmal	2315m	N 35°27.126' / E074°48'.712	UV
	<i>Ligusticum thomsonii</i> C. B. Clarke (H 21)	Korshidone	Dry places of the Temperate Mountain zone	P.H	Hercho	2086m	N 35°26.999' / E074°47'.794	CC
	<i>Selinum vaginatum</i> (Edgew.) C.B. Clarke (H 29)	Botijat	Subalpine zone	P.H	Jail Naril	3031m	N 35°24.708' / E074°47'.857	C
	<i>Selinum papyraceum</i> C. B. Clarke (H 102)	Botijat	Subalpine zone	P.H	Pari Kaii	2982m	N 35°26.922' / E074°47'.826	C
	<i>Angelica glauca</i> Edgew. (H 34)	Choro	Moist places of the Temperate Mountain zone	P.H	Jail Naril	3031m	N 35°24.708' / E074°47'.857	VU
	<i>Angelica archangelica</i> L. (H 97)	Fataw	Moist places of the Temperate Mountain zone	P.H	Ajin Techil	2390m	N 35°26.747' / E074°47'.082	Inf.
Compositae (Asteraceae)	<i>Senecio krascheninnikovii</i> Schischk (H 04)	Dundely	Dry places of the Temperate Mountain zone	P.H	Chilobashim	2352m	N 35°26.058' / E074°48'.415	C
	<i>Artemisia brevifolia</i> Wall. ex DC. (H 26)	Zoon	Dry places of the Temperate Mountain zone	P.H	Hercho	2086m	N 35°26.999' / E074°47'.794	CC

<i>Artemisia santolinifolia</i> Turcz. Ex Krasch. (H 36)	Kashray Zoon	Dry places of the Temperate Mountain zone	P.H	Karmi Hari Eel	2792m	N 35°25.044'/ E074°48'.046	CC
<i>Artemisia siversiana</i> Ehrh. Ex Willd. (H 19)	Sheeh Zoon/ Kakuz/ Kakets	Dry places of the Temperate Mountain zone	P.H	Hercho	2086m	N 35°26.999'/ E074°47'.794	CC
<i>Artemisia scoparia</i> Waldst. & Kit (H 39)	Jay/ kakuz	Dry places of the Temperate Mountain zone	P.H	Hercho	2086m	N 35°26.999'/ E074°47'.794	CC
<i>Artemisia desertorum</i> Spreng. (H 49)	Zunne	Dry places of the Temperate Mountain zone	P.H	Badi Naril	3163m	N 35°24.447'/ E074°47'.737	C
<i>Picris hieracioides</i> auct., non L. (H 110)	Kantas	Alpine grassy slopes	P.H	Karini Techil	2322m	N 35°26.778'/ E074°47'.239	C
<i>Saussurea simpsoniana</i> Field.Garden. (H 44)	Booshi Phunar	Extreme alpine Stoney places	P.H	Kalay Uchyi	3444m	N 35°26.922'/ E074°47'.826	CC
<i>Anthemis cotula</i> L. (H 46)	Jabdali	Temperate mountain zone	P.H	Hercho	2086m	N 35°26.999'/ E074°47'.794	C
<i>Anaphalis virgata</i> Thomson ex C. B. Clarke (H 14)	Shii chiki	Dry places of the Temperate Mountain zone	P.H	Chilo-bashim	2352m	N 35°26.058'/ E074°48'.415	C
<i>Anaphalis nepelensis</i> (Spreng.) Hand-Mazz. (H 050)	Chiki	Dry places of the Temperate Mountain zone	P.H	Chilo-bashim	2352m	N 35°26.058'/ E074°48'.415	C
<i>Cichorium intybus</i> L. (H 37)	Shantoshah	Moist places of the Temperate Mountain zone	P.H	Hercho	2050m	N 35°26.999'/ E074°47'.794	C
<i>Dolomiaea macrocephala</i> Royle (H 52)	Guguldup	Dry places of the Temperate Mountain zone	P.H	Skarblo Talo	3000m	N 35°26.922'/ E074°47'.826	C
<i>Taraxacum himalaicum</i> v. Soest (H 54)	Lakanay	Most of the Temperate Mountain zone	P.H	Hercho	2086m	N 35°26.999'/ E074°47'.794	Inf.
<i>Echinops cornigerus</i> DC. (H 30)	Shawkono	Dry places of the Temperate Mountain zone	P.H	Hercho	2086m	N 35°26.999'/ E074°47'.794	C
<i>Sonchus asper</i> (L.) Hill. (H 56)	Koishaa	Dry places of the Temperate Mountain zone	P.H	Hercho	2086m	N 35°26.999'/ E074°47'.794	Inf.
<i>Lactuca rapunculoides</i> (DC.) C B. Clarke (H 59)	Azomor	Alpine grassy slopes	P.H	Badi Naril	3161m	N 35°24.447'/ E074°47'.737	Inf.
<i>Lactuca lessertiana</i> (DC.) C B. Clarke (H 80)	Not Reported	Alpine grassy slopes	P.H	Badi Naril	3150m	N 35°24.447'/ E074°47'.737	C
<i>Lactuca orientalis</i> (Boiss.) Boiss. (H 79)	Doodah Kacho	Dry Temperate Mountain zone	P.H	Batmal	2315m	N 35°27.126'/ E074°48'.712	C

	<i>Cicerbita decipiens</i> var. <i>multifida</i> . (Hook.f) (H 43)	Chitayaal	Alpine grassy slopes	P.H	Badi Naril	3150M	N 35°24.447'/ E074°47'.737	C
	<i>Scorzonera virgata</i> DC. (H 073)	Dundely/Maicher	Dry places of the Temperate Mountain zone	P.H	Badi Naril	3161m	N 35°24.447'/ E074°47'.737	C
	<i>Achillea millefolium</i> L. (H 74)	Kakatch/ Katsh Akirkarra (Akra)	Moist alpine slopes	P.H	Dagocore	3100m	N 35°26.999'/ E 074°47'832	Inf.
	<i>Tragopogon gracilis</i> D. Don (H 76)	Garganay	Subalpine zone	P.H	Jail Naril	3161m	N 35°24.708'/ E074°47'.857	C
	<i>Senecio tibeticus</i> Hook. f. (H 75)	Not Reported	Alpine grassy slopes	P.H	Hercho	2086m	N 35°26.999'/ E074°47'.794	Inf.
	<i>Cirsium argyranthum</i> DC. (H 78)	Not Reported	Dry places of the Temperate Mountain zone	P.H	Hercho	2086m	N 35°26.999'/ E074°47'.794	C
	<i>Aster alpinus</i> L (H 81)	Not known	Dry places of the Subalpine zone	P.H	Jail Naril	3161m	N 35°24.708'/ E074°47'.857	C
Asphodelaceae	<i>Eremurus himalaicus</i> Baker (H 82)	Shilo Shah	Grassy slopes, Temperate Mountain zone	P.H	Bilistoon	2250m	N 35°25.153'/ E074°49'.449	Inf.
Berberidaceae	<i>Berberis orthobotrys</i> Bienert ex Aitch (H 85)	Tchirko/ Chirko, Churki	Grassy slopes, Subalpine zone	Shrub	Waitari	3444m	N 35°22.637'/ E074°47'.037	Inf.
	<i>Podophyllum hexandrum</i> Royle (H 50)	Ishmandy/ itchemane	Moist places in the Subalpine zone	P.H	Waitari	3785m	N 35°22.637'/ E074°47'.037	UV
Betulaceae	<i>Betula utilis</i> subsp. <i>jacquemontii</i> (Spach) Kitam.(H 45)	Johji	Moist alpine slopes	Tree	Waitari	3376m	N 35°22.637'/ E074°47'.037	C
Cruciferae (Brassicaceae)	<i>Descurainia sophia</i> (L.) Webb & Berth. (H 119)	Not known	Subalpine zone	P.H	Badi Naril	3161m	N 35°24.447'/ E074°47'.737	C
	<i>Capsella bursa-pastoris</i> (L.) Medicus (H 86)	Bordbordi	Subalpine zone	P.H	Jail Naril	3161m	N 35°24.708'/ E074°47'.857	CC
	<i>Sisymbrium altissimum</i> L. (H 89)	Jungali Sarsoo	Grassy slopes, Subalpine zone	P.H	Ajin Waimosy	3021m	N 35°24.739'/ E074°47'.684	Inf.
	<i>Matthiola flavida</i> Boiss. (H 90)	Not Reported	Dry places of the Temperate Mountain zone	P.H	Batmal	2315m	N 35°27.126'/ E074°48'.712	C
Balsaminaceae	<i>Impatiens edgwarthii</i> Hook. F. (H 31)	Chati char	Temperate mountain zone	P.H	Karmi Harii	2786m	N 35°25.044'/ E074°48'.046	CC
	<i>Impatiens brachycentra</i> Kar. & Kir. (H 091)	Futongi	Grassy slopes of the Subalpine zone	P.H	Jail Naril	3031m	N 35°24.708'/ E074°47'.857	C

Boraginaceae	<i>Myosotis asiatica</i> Schischk. & Serg. (H 112)	Not Reported	Subalpine zone	P.H	Pari Kaili	3219m	N 35°26.922' / E074°47'.826	C
	<i>Onosma hispidum</i> Wall. ex G. Don (H 084)	Shahrong	Grassy slopes, Subalpine zone	P.H	Chhans	3324m	N 35°22.665' / E074°47'.501	C
	<i>Arnebia benthamii</i> (Wall. ex G. Don) I. M. Johnston (H 094)	Kazban	Alpine zone	P.H	Kalay Auchy	4600m	N 35°26.922' / E074°47'.826	C
Celastraceae	<i>Euonymus hamiltonianus</i> Wall. Maxim. (H 23)	Meou	Dry places of the Temperate Mountain zone	Tree	Hercho	2086m	N 35°26.999' / E 74°47'.794	R
	<i>Euonymus fimbriatus</i> Wall. (H 099)	Vatil Kallow/Kumatsh	Dry places of the Temperate Mountain zone	Tree	Hercho	2086m	N 35°26.999' / E074°47'.794	RR
Crassulaceae	<i>Rhodiola heterodonta</i> (Hook. f. & Thomson) Fu (H 104)	Not Reported	Dry rocky Alpine slopes	P.H	Pari Kaili	3156m	N 35°26.922' / E074°47'.826	C
	<i>Rhodiola tibetica</i> (Hook.f & Thomson) S.H.Fu. (H 108)	Chickee	Dry Alpine rocky slopes	P.H	Waitari	3700m	N 35°22.637' / E074°47'.037	Inf.
	<i>Hylotelephium ewersii</i> (Ledeb.) H. Ohba (H 68)	Chao char	Moist Alpine slopes	P.H	Waitari	3444m	N 35°22.637' / E074°47'.037	C
Cannabinaceae	<i>Cannabis sativa</i> L. (H 107)	Bong	Grassy slopes, Temperate Mountain zone	P.H	Hercho	2086m	N 35°26.999' / E074°47'.794	C
Chenopodiaceae	<i>Chenopodium botrys</i> L. (H 109).	Kona/ Hamo Shah	Grassy slopes, Temperate Mountain zone	P.H	Hercho	2086m	N 35°26.999' / E074°47'.794	C
	<i>Chenopodium album</i> L. (H 111)	Konoshah	Grassy Temperate Mountain zone	P.H	Hercho	2086m	N 35°26.999' / E074°47'.794	C
	<i>Chenopodium foliosum</i> (Moench) Asch. (H 51)	Shoie Juch	Dry slopes Subalpine zone	P.H	Usli Hari	3376m	N 35°26.747' / E 074°47'785	Inf.
	<i>Krascheninnikovia ceratoides</i> (L.) Guelden. (H 08)	Buldr	Temperate mountain zone	P.H	Hercho	2086m	N 35°26.999' / E074°47'.794	C
Caryophyllaceae	<i>Silene vulgaris</i> (Moench) Garcke (H 42)	Gigio/ Gigio Shah	Moist places of the Temperate Mountain zone	P.H	Chilo-bashim	2368m	N 35°26.058' / E074°48'.415	CC
	<i>Lepyrodiclis holosteoides</i> (C. A. Mey.) Fenzl ex Fisch. & Mey. (H 113)	Burgal	Grassy slopes, Temperate Mountain zone	P.H	Hercho	2086m	N 35°26.999' / E074°47'.794	Inf.
	<i>Cerastium cerastioides</i> (L.) Britton (H 92)	Not Reported	Subalpine zone	P.H	Waitari	3400m	N 35°22.637' / E074°47'.037	C

Convolvulaceae	<i>Convolvulus arvensis</i> L. (H 57)	Hergoli /Harioli	Dry places, Temperate Mountain zone	P.H	Hercho	2086m	N 35°26.999' / E074°47'.794	Inf.
Cupressaceae	<i>Juniperus communis</i> subsp. <i>Alpina</i> (Neilr.) Celak. (H 35)	Metahri/ Metharo	Dry places of the subalpine zone	Shrub	Pari Kaii	3156m	N 35°26.922' / E074°47'.826	C
	<i>Juniperus excelsa</i> subsp. <i>Polycarpus</i> (K. Koch) Takht. (H 47)	Chilli	Dry places of the temperate mountain zone	Tree	Hercho	2086m	N 35°26.999' / E074°47'.794	CC
Caprifoliaceae	<i>Lonicera quinquelocularis</i> Hardw. (H 40)	Shozu/Pashki	Dry places of the temperate mountain zone	Shrub	Hercho	2086m	N 35°26.999' / E074°47'.794	C
	<i>Sambucus wightiana</i> Wall. ex Wight & Arn. (H 168)	Ganduli	Subalpine zone	P.H	Naril	3800m	N 35°24.708' / E074°47'.857	CC
Capparidaceae	<i>Capparis spinosa</i> L. (H 114)	Kabilo-kay	Dry Temperate Mountain zone	Shrub	Laskum	2072m	N 35°27.162' / E074°47'.762	C
Dryopteridaceae	<i>Dryopteris xanthomelas</i> (Christ) C. Chr. (H 116)	Potolow Jabaati	Moist places, Temperate Mountain zone	P.H	Hercho	2086m	N 35°26.999' / E074°47'.794	C
Elaeagnaceae	<i>Hippophae rhamnoides</i> subsp. <i>Turkestanica</i> Rousi (H 118)	Bourou/ Buru	Moist places, Temperate Mountain zone	Shrub	Gulam Raslo Das	2086m	N 35°27.551' / E074°47'.748	C
	<i>Elaeagnus angustifolia</i> L. (H 100)	Guneer	Temperate mountain zone	Tree	Gulam Raslo Das	2086m	N 35°27.551' / E074°47'.748	C
Ephedraceae	<i>Ephedra intermedia</i> Schrenk & Mey. (H 02)	Sou	Dry places, Dry Temperate Mountain zone	Shrub	Mamat kano das	2086m	N 35°27.197' / E074°47'.915	C
Ericaceae	<i>Rhododendron anthopogon</i> D. Don (H 10)	Suhsuhr	Alpine grassy slopes	Shrub	Show Waii	3419m	N 35°24.413' / E074°46'.278	Inf.
Euphorbiaceae	<i>Euphorbia osyridea</i> Boiss. (H 120)	Photoo	Dry places, Temperate Mountain zone	P.H	Faqro-eel	2300m	N 35°26.487' / E074°47'.215	C
Equisetaceae	<i>Equisetum arvense</i> L. (H 59)	Cheiw	Moist Temperate Mountain zone	A.H	Techil	2282m	N 35°26.747' / E074°47'.082	CC
Fumariaceae	<i>Corydalis govaniana</i> Wall. (H 115)	Show-lashker	Dry places, Subalpine zone	P.H	Show- waii	3164m	N 35°24.413' / E074°46'.278	Inf.
	<i>Fumaria indica</i> (Hauskn.) Pugsley (H 121)	Papadah	Dry places, Temperate Mountain zone	P.H	Loli Kaii	2400m	N 35°26.747' / E 074°47'285	Inf.
Gentianaceae	<i>Gentianopsis paludosa</i> (Munro ex.Hook.F.) (H 87)	Not Reported	Temperate mountain zone	P.H	Badi Naril	2400m	N 35°24.447' / E074°47'.737	C

	<i>Jaeschkea oligosperma</i> (Griseb.) Knobl. (H 117)	Not Reported	Subalpine zone	P.H	Badi Naril	3140m	N 35°24.447'/ E074°47'.737	C
	<i>Gentianopsis viviskiodis</i> L. (H 122)	Not Reported	Subalpine zone	P.H	Waitari	3140m	N 35°22.637'/ E074°47'.037	Inf.
	<i>Swertia petiolata</i> Royle ex D. Don . (H 52)	Bahu Shah/ Hajaton Jabbatti	Alpine grassy slopes	P.H	Waitari	3444m	N 35°22.637'/ E074°47'.037	Inf.
	<i>Swertia chirata</i> Wall. (H 70)	Mumiran	Alpine grassy slopes	P.H	Waitari	3444m	N 35°22.637'/ E074°47'.037	Inf.
	<i>Gentiana tianschanica</i> Rupr. Ex Kusn. (H 123)	Palamas/Khangar katsh	Alpine grassy slopes	P.H	Kuti Moos	3000m	N 35°22.637'/ E074°47'.037	Inf.
	<i>Gentiana karoo</i> Royle. (H 124)	Palamas	Subalpine zone	P.H	Kuti Moos	3000m	N 35°22.637'/ E074°47'.037	Inf.
Geraniaceae	<i>Geranium himalayense</i> Klotzsch ex Hoffmeister & al. (H 117)	Pour Ponour	Alpine grassy slopes	P.H	Karini Techil	2322m	N 35°26.778'/ E074°47'.239	CC
Grossulariaceae	<i>Ribes orientale</i> Desf. (H 41)	Shotu/ Shatu	Dry places of the temperate mountain zone	Shrub	Hercho	2218 m	N 35°26.999'/ E074°47'.794	C
	<i>Ribes alpestre</i> Decne. ex Jacquem. (H 125)	Shumloo	Grassy slopes, Subalpine zone	Shrub	Waitari	3477m	N 35°22.575'/ E074°46'.759	Inf.
	<i>Ribes nigrum</i> L. (H 126)	Furpotti/ Hargil	Subalpine zone	Shrub	Waitari	3477m	N 35°22.637'/ E074°47'.037	R
	<i>Ribes himalense</i> Decne. (H 127)	Hargili	Moist places of the Temperate Mountain zone	Shrub	Waimosy	2930m	N 35°24.863'/ E074°47'.784	R(end)
Hypericaceae (Guttiferae)	<i>Hypericum perforatum</i> L. (H 128)	Shna Chai	Subalpine zone	P.H	Jail Naril	3031m	N 35°24.708'/ E074°47'.857	Inf.
Iridaceae	<i>Iris hookeriana</i> Foster (H 129)	Nili phul / Crisma	Subalpine zone	P.H	Naril	3031m	N 35°24.708'/ E074°47'.857	Inf.
Lamiaceae (Labiatae)	<i>Mentha royleana</i> Benth. (H 01)	Jangali Phelil/ Philil	Moist places of the Temperate Mountain zone	P.H	Hercho	2086m	N 35°26.999'/ E074°47'.794	CC
	<i>Nepeta adenophyta</i> Hedge (H 44)	Charchumero	Alpine open grassy slopes	P.H	Gal-wani-jutt	3284m	N 35°23.985'/ E074°47'.476	CC
	<i>Nepeta discolor</i> Royle ex Benth. (H 130)	Koroloo/Shaye	Subalpine zone	P.H	Gal-wani-jutt	3284m	N 35°23.985'/ E074°47'.476	C
	<i>Thymus linearis</i> Benth. (H 131)	Tomorrow/ Tumuro	Alpine grassy slopes	P.H	Pari Kahi	3303m	N 35°26.922'/ E074°47'.826	CC
	<i>Ocimum basilicum</i> L. (H 132)	Gasmalli/ Desi	Temperate mountain zone	P.H	Hercho	2086m	N 35°26.999'/ E074°47'.794	Inf.

	<i>Phlomis bracteosa</i> Royle ex Benth. (H 133)	Not Reported	Alpine moist places	P.H	Waitari	3444m	N 35°22.637' / E074°47'.037	Inf.
Liliaceae	<i>Tulipa clusiana</i> DC. (H 134)	Mion Push	Temperate mountain zone	P.H	Ramzan-i-Kanii	3000m	N 35°26.747' / E074°47'.082	C
Malvaceae	<i>Alcea rosea</i> L. (H 18)	Tchamna/ Chama	Grassy slopes, Temperate Mountain zone	P.H	Hercho	2086m	N 35°26.999' / E074°47'.794	C
Moraceae	<i>Ficus palmata</i> subsp. <i>Virgata</i> (Roxb.) Browicz (H 135)	Phak	Grassy slopes, Temperate Mountain zone	Tree	Hercho	2086m	N 35°26.999' / E074°47'.794	R
	<i>Morus alba</i> L. (H 136)	Bidana shai maroch/maranu /Shai maroch	Temperate mountain zone	Tree	Hercho	2086m	N 35°26.999' / E074°47'.794	C
	<i>Morus nigra</i> L. (H 137)	Kinii maroch	Temperate mountain zone	Tree	Hercho	2086m	N 35°26.999' / E074°47'.794	C
Oleaceae	<i>Fraxinus xanthoxyloides</i> (Wall. ex G. Don) DC. (H 38)	Kasanur	Dry places, Temperate Mountain zone	Tree	Hercho	2086m	N 35°26.999' / E074°47'.794	Inf.
Orchidaceae	<i>Epipactis helleborine</i> (L.) Crantz. (H 67)	Plamath	Moist areas of the Temperate Mountain zone	P.H	Ajin Techil	2390m	N 35°26.747' / E074°47'.082	Inf.
	<i>Dactylorhiza hatagirea</i> (D. Don) Soo (H 69)	Narmada	Moist areas of the Temperate Mountain zone	P.H	Sheyatti	2136m	N 35°26.909' / E074°47'.609	Inf.
Orobanchaceae	<i>Orobanche cernua</i> Loefl. (H 106)	Taarey	Subalpine zone	P.H	Pari Kaii	3376m	N 35°26.922' / E074°47'.826	C
	<i>Euphorasia thimalayana</i> L. (H 138)	Not Reported	Subalpine zone	P.H	Waitari	3785m	N 35°22.637' / E074°47'.037	Inf.
Onagraceae	<i>Epilobium hirsutum</i> L. (H 88)	Not Reported	Alpine moist places	P.H	Badi Naril	2370m	N 35°24.447' / E074°47'.737	C
	<i>Epilobium latifolium</i> L. subsp. <i>latifolium</i> Th. Fr. & Lange (H 77)	Danui	Alpine moist sandy places	P.H	Badi Naril	3185m	N 35°24.447' / E074°47'.737	Inf.
Papilionaceae (Leguminosae)	<i>Trifolium pratense</i> L. (H 09)	Tchepati/ Chipati	Grassy slopes, Temperate Mountain zone	P.H	Hercho	2086m	N 35°26.999' / E074°47'.794	CC
	<i>Trifolium repens</i> L. (H 139)	Ishpit	Grassy slopes, Temperate Mountain zone	P.H	Hercho	2086m	N 35°26.999' / E074°47'.794	C
	<i>Caragana conferta</i> Benth. ex Baker (H 140)	Shii Haputch	Dry places, Temperate Mountain zone	P.H	Batmal	2315m	N 35°27.126' / E074°48'.712	C
	<i>Hedysarum falconeri</i> Baker. (H 141)	Halaskur/ Khating	Dry places, Subalpine zone	P.H	Chhans	3398m	N 35°25.665' / E074°47'.501	C

	<i>Astragalus strobiliferus</i> Royle ex Benth. (H 62)	Haputch	Dry areas of the Temperate Mountain zone	P.H	Hercho	2086m	N 35°26.999' / E074°47'.794	Inf.
	<i>Astragalus rhizanthus</i> Royle ex Benth. (H 142)	Knii Haputch	Dry areas of the Temperate Mountain zone	P.H	Batmal	2315m	N 35°27.126' / E074°48'.712	C
	<i>Medicago sativa</i> subsp. <i>falcata</i> (L.) Arcang. (H 143)	Rishka/Ishpit	Grassy slopes, Temperate Mountain zone	P.H	Batmal	2315m	N 35°27.126' / E074°48'.712	CC
	<i>Oxytropis tatarica</i> Cambess. (H 144)	Not Reported	Alpine grassy slopes	P.H	Waitari	4000m	N 35°22.637' / E074°47'.037	C
	<i>Cicer microphyllum</i> Benth. (H 71)	Kukeni jungeli	Grassy slopes, Temperate Mountain zone	P.H	Waimosy	2930m	N 35°24.863' / E074°47'.785	C
	<i>Melilotus alba</i> Desr. (H 145)	Nilatsot	Grassy slopes, Temperate Mountain zone	P.H	Hercho	2086m	N 35°26.999' / E074°47'.794	CC
	<i>Colutea paulsenii</i> Freyn (H 146)	Bizhee	Dry places, Temperate Mountain zone	Shrub	Hercho	2282m	N 35°26.999' / E074°47'.794	R
Papaveraceae	<i>Papaver nudicaule</i> L. (H 66)	Goshal	Grassy slopes Alpine grassy slopes	P.H	Pari Kai	3303m	N 35°26.922' / E074°47'.826	Inf.
Pinaceae	<i>Pinus gerardiana</i> Wall. Ex Lamb. (H 24)	Tulesh	Dry places, Temperate Mountain zone	Tree	Faqro eel	2395m	N 35°26.487' / E074°47'.215	CR
	<i>Pinus wallichiana</i> A. B. Jackson (H 147)	Chui	Dry places, Temperate Mountain zone	Tree	Mamochal	2844m	N 35°26.365' / E074°47'.113	EN
	<i>Abies pindrow</i> Royle (H 148)	Ray	Dry places, Temperate Mountain zone	Tree	Mamochal	2844m	N 35°26.365' / E074°47'.113	EN
	<i>Picea smithiana</i> (Wall.) Boiss. (H 149)	Kachel	Dry places, Temperate Mountain zone	Tree	Mamochal	2844m	N 35°26.365' / E074°47'.113	EN
	<i>Cedrus deodara</i> (Roxb. ex D. Don) G. Don (H 27)	Not Reported	Dry places, Subalpine zone	Tree	Jail Naril	3161m	N 35°24.708' / E074°47'.857	R
Polygonaceae	<i>Oxyria digyna</i> (L.) Hill (H 32)	Gurko /Churkki	Alpine sandy and moist places	P.H	Waitari	3376m	N 35°22.637' / E074°47'.037	C
	<i>Rheum webbianum</i> Royle (H 20)	Haluskir/Tari/chaontal/Bambala	Moist & dry Temperate Mountain zone	P.H	Karini Techil	2282m	N 35°26.778' / E074°47'.239	R
	<i>Rheum spiciforme</i> Royle. (H 150)	Haluskir/ tari/chaontal/bambala/Jaro Chontel	Alpine moist slopes	P.H	Fakro-e-eel	2282m	N 35°26.487' / E074°47'.215	Inf.
	<i>Rheum tibeticum</i> Maxim ex Hook. F (H 151)	Markochal	Alpine moist sandy places	P.H	Badi Naril	3163m	N 35°24.447' / E074°47'.737	C

	<i>Aconogonon alpinum</i> (All.) Schur (H 05)	Lamay/ Chirko	Alpine grassy slopes	P.H	Jail Naril	3161m	N 35°24.708'/ E074°47'.857	CC
	<i>Bistorta affinis</i> (D. Don) Greene (H 74)	Chomi/ Garazap/ Titeri	Alpine grassy slopes	P.H	Waitari	3445m	N 35°22.637'/ E074°47'.037	CC
	<i>Rumex patientia</i> subsp. <i>pamiricus</i> (Rech. f.) Rech. f. (H 152)	Fantul / Hubabel	Alpine moist places	P.H	Hercho	2050m	N 35°26.999'/ E074°47'.794	CC
	<i>Polygonum polycnemoides</i> Jaub. & Spach (H 29)	BrokoKuch	Dry places, Subalpine zone	P.H	Jail Naril	3161m	N 35°24.708'/ E074°47'.857	CC
	<i>Polygonum aviculare</i> L. (H 153)	Droup Kuch	Alpine moist slopes	P.H	Hercho	2086m	N 35°26.999'/ E074°47'.794	CC
Plantaginaceae	<i>Plantago depressa</i> Willd. (H 28)	Khupa kato/ Khapaypato	Grassy slopes, Temperate Mountain zone	P.H	Hercho	2086m	N 35°26.999'/ E074°47'.794	C
Platanaceae	<i>Platanus orientalis</i> L. (H 154)	Buch	Moist places, Temperate Mountain zone	Tree	Hercho	2086m	N 35°26.999'/ E074°47'.794	RR
Primulaceae	<i>Primula schlagintweitiana</i> Pax (H 155)	Momiran	Alpine moist slopes	P.H	Waitari	3445m	N 35°22.637'/ E074°47'.037	Inf.
Poaceae	<i>Agrostis vinealis</i> Schreb. (H 96)	Not known	Alpine dry sandy places	P.H	Hercho	2030m	N 35°26.999'/ E074°47'.794	CC
	<i>Saccharum ravennae</i> (L.) Murray (H 22)	Furu	Sandy areas of the Temperate Mountain zone	P.H	Ajin Techil	2282m	N 35°26.747'/ E074°47'.082	CC
	<i>Setaria viridis</i> (L.) P. Beauv. (H 25)	Jachoo Kuch/ ching	Grassy slopes, Temperate Mountain zone	P.H	Hercho	2054m	N 35°26.999'/ E074°47'.794	Inf.
	<i>Piptatherum munroi</i> (Stapf) Mez (H 70)	Kulagii	Grassy slopes of the Sub-alpine zone	P.H	Kulagii Core	3718m	N 35°22.637'/ E074°47'.037	C
Pyrolaceae	<i>Pyrola rotundifolia</i> subsp. <i>Karakoramica</i> Krisa (H 93)	Not Reported	Alpine grassy slopes	P.H	Badi Naril	3377m	N 35°24.447'/ E074°47'.737	C
Rosaceae	<i>Fragaria nubicola</i> Lindl. ex Lacaita (H 53)	Bourousse/ Buruse	Grassy slopes, Subalpine zone	P.H	Pari Kai	3156m	N 35°26.922'/ E074°47'.826	C
	<i>Potentilla desertorum</i> Bunge (H 156)	Not Reported	Alpine grassy slopes	P.H	Pari Kai	3156m	N 35°26.922'/ E074°47'.826	Inf.
	<i>Rosa webbiana</i> Wall. ex Royle (H 16)	Chingay/ Shingey/Shingeyon Mayaro/ Kini Shingey	Dry places, Temperate Mountain zone	Shrub	Hercho	2086m	N 35°26.999'/ E074°47'.794	C
	<i>Rosa foetida</i> J. Herrmann (H 157)	Ishkapur	Dry places, Temperate Mountain zone	Shrub	Hercho	2086m	N 35°26.999'/ E074°47'.794	RR

	<i>Cotoneaster affinis</i> Lindl. (H 158)	Luni	Dry places, Temperate Mountain zone	Shrub	Shelshing	2086m	N 35°26.778' / E074°47'.239	C
	<i>Cotoneaster gilgitensis</i> G. Kloltz. (H 159)	Chiti- Luny	Dry places, Temperate Mountain zone	Shrub	Shelshing	2600m	N 35°26.778' / E074°47'.239	C
	<i>Prunus jacquemontii</i> Hook. f. (H 160)	Tundul/ Tonel	Dry places, Temperate Mountain zone	Shrub	Poranacoat	2124m	N 35°26.766' / E074°47'.032	Inf.
	<i>Spiraea lasiocarpa</i> Kar. & Kir. (H 161)	Darai/ Luni/ mujon Bish	Dry places, Temperate Mountain zone	Shrub	Daryat	2600m	N 35°26.487' / E074°47'.215	C
	<i>Crataegus songarica</i> C. Koch (H 33)	Shont	Grassy slopes, Temperate Mountain zone	Tree	Ajin Techil	2390m	N 35°26.747' / E074°47'.082	R
	<i>Prunus amygdalus</i> Batsch (H 63)	Kune	Dry and sandy Temperate Mountain zone	Tree	Hercho	2086m	N 35°26.999' / E074°47'.794	C
	<i>Rubus irritans</i> Focke (H 101)	Uchjay/ Eiche	Grassy slopes of the Sub-alpine zone	Shrub	Jail Naril	3031m	N 35°24.708' / E074°47'.857	Inf.
Ranunculaceae	<i>Aconitum heterophyllum</i> Wall. ex Royle (H48)	Buma	Grassy slopes of the Sub-alpine zone	P.H	Badi Naril	3163m	N 35°24.447' / E074°47'.737	CR
	<i>Aconitum chasmanthum</i> Stapf ex Holmes (H 11)	Bishmulo	Moist Alpine grassy slopes	P.H	Chhans uch	3398m	N 35°25.433' / E074°47'.295	C(end)
	<i>Ranunculus attenuates</i> Royle. (H 15)	Koroloh	Moist Temperate Mountain zone	P.H	Hercho	2086m	N 35°26.999' / E074°47'.794	CC
	<i>Ranunculus diffusus</i> DC. (H 162)	Jibedaji	Moist Temperate Mountain zone	P.H	Jail Naril	2086m	N 35°24.708' / E074°47'.857	C
	<i>Pulsatilla wallichiana</i> (Royle) Ulbr. (H 60)	Karmkoti	Grassy slopes of the Sub-alpine zone	P.H	Gal-wani-jutt	3284m	N 35°23.985' / E074°47'.476	Inf.
	<i>Delphinium brunonianum</i> Royle (H 163)	Mokhoty	Moist places of the Subalpine zone	P.H	Jalii	4000m	N 35°24.578' / E074°46'.699	C
Salicaceae	<i>Salix sericocarpa</i> N. J. Andersson (H 98)	Chiti Bayo/ Bijau	Moist places, Temperate Mountain zone	Tree	Hercho	2086m	N 35°26.999' / E074°47'.794	C
	<i>Salix karelinii</i> Turcz. ex Stschegl. (H 95)	Suhsuhrbay	Moist Alpine moist slopes	Tree	Waitari	3400m	N 35°22.637' / E074°47'.037	Inf.
	<i>Salix babylonica</i> L. (H 166)	Mori Bayo	Moist places, Temperate Mountain zone	Tree	Hercho	2086m	N 35°26.999' / E074°47'.794	C
	<i>Populus caspica</i> Bornm. (H 164)	Fratz	Grassy Temperate Mountain zone	Tree	Hercho	2086m	N 35°26.999' / E074°47'.794	C

	<i>Populus nigra</i> L. (H 165)	Fratz	Grassy slopes, Temperate Mountain zone	Tree	Hercho	2086m	N 35°26.999' / E074°47'.794	C
Saxifragaceae	<i>Bergenia stracheyi</i> (Hook. f. & Thomson) Engl. (H65)	Lolo Tchapur/Shapur	Moist and dry places, Alpine moist slopes	P.H	Waitari	3800m	N 35°22.637' / E074°47'.037	C
	<i>Bergenia ciliata</i> L. (H167)	Show Shapur	Moist and dry Alpine moist slopes	P.H	Waitari	3800m	N 35°22.637' / E074°47'.037	CC
Scrophulariaceae	<i>Veronica verna</i> L. (H 169)	Jajo-e-kach	Subalpine zone	P.H	Naril	3163m	N 35°24.708' / E074°47'.857	C
	<i>Euphrasia incisa</i> Pennell (H 83)	Not Reported	Subalpine zone	P.H	Waitari	3785m	N 35°22.637' / E074°47'.037	C
	<i>Pedicularis pycnantha</i> Boiss. (H 64)	Knii Chhiki	Alpine moist slopes	P.H	Badi Naril	3161m	N 35°24.447' / E074°47'.737	CC
	<i>Verbascum thapsus</i> L. (H12)	Romkot/ Ramkato	Dry areas of the Temperate Mountain zone	P.H	Karmi Hari	2792m	N 35°25.044' / E074°48'.046	C
Solanaceae	<i>Hyoscyamus niger</i> L. (H72)	Bazarbang	Dry slopes Subalpine zone	P.H	Badi Naril	3080m	N 35°24.447' / E074°47'.737	RR
	<i>Datura stramonium</i> L. (H170)	Datura	Dry slopes, Temperate Mountain zone	A.H	Hercho	2086m	N 35°26.999' / E074°47'.794	Inf.
Thymeleaceae	<i>Daphne mucronata</i> Royle (H17)	Nirko/ Nik	Dry places, Temperate Mountain zone	Shrub	Pottay	2234m	N 35°26.843' / E074°47'.444	Inf.
Urticaceae	<i>Urtica dioica</i> L. (H 171)	Gomee/ Jomi	Moist places, Temperate Mountain zone	P.H	Hercho	2086m	N 35°26.999' / E074°47'.794	CC
Valerianaceae	<i>Valeriana himalayana</i> Grubov (H 61)	Gonespaw-Jabatti	Dry places of the temperate mountain zone	P.H	Batmal	2315m	N 35°27.126' / E074°48'.712	Inf.
Violaceae	<i>Viola biflora</i> L. (H175)	Lilio	Alpine grassy slopes	P.H	Waitari	3490m	N 35°22.637' / E074°47'.037	CC
	<i>Viola rupestris</i> F. W. Schmidt (H92)	Lilio	Dry places, Alpine grassy slopes	P.H	Waitari	3490m	N 35°22.637' / E074°47'.037	CC
Vitaceae	<i>Vitis vinifera</i> L. (H 172)	Jach	Dry places, Temperate Mountain zone	Shrub	Hercho	2086m	N 35°26.999' / E074°47'.794	C
Zygophyllaceae	<i>Tribulus terrestris</i> L. (H173)	Morkutti	Dry places, Temperate Mountain zone	P.H	Chachar-o-Kaii	2000m	N 35°26.999' / E074°47'.794	Inf.
	<i>Fagonia bruguieri</i> DC. (H 174)	Daasowkonu	Dry places Temperate Mountain zone	P.H	Hercho	2000m	N 35°26.999' / E074°47'.794	C

Phytogeographic zones

However, in the recent phytogeographic survey and floristic inventory (2023-24), the study area, Hercho valley, falls in the Himalayan dry temperate zone and was identified as having the following three zones: alpine zone (4500-5500); subalpine zone (3000-4500); and temperate mountain zone (1219-3000). In the phytogeographic survey, the temperate mountain zone at the top recorded 99 plant species, followed by the alpine zone (44) and the subalpine zone (42). The study's findings highlighted that the dry temperate mountain zone is the most promising study area because it supports diverse species (Table 3, Fig. 4b). The findings of the study also relate to those of Khan et al. (2004) studies on the Haramosh and Bugrote valleys (Gilgit).

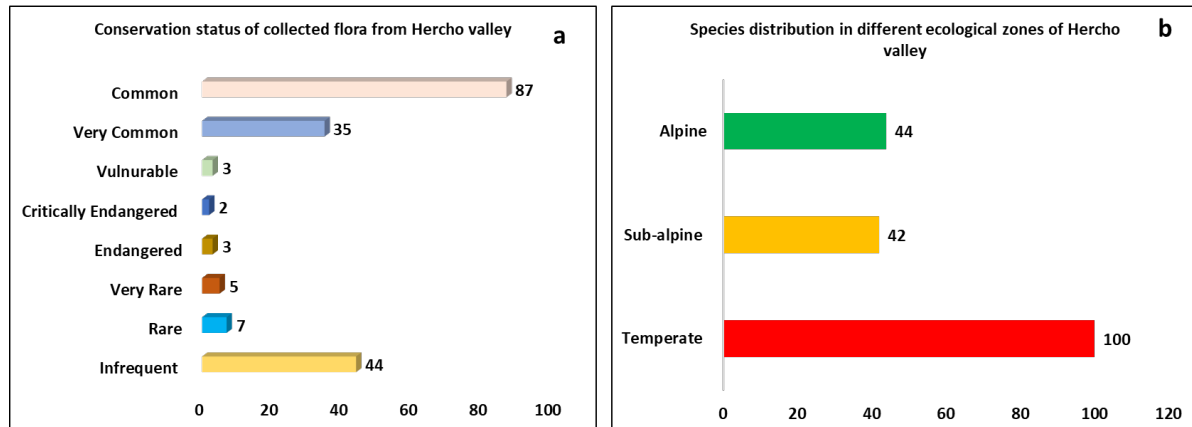


Figure 4. Conservation status of collected flora from Hercho valley (a). Species distribution in different ecological zones of Hercho valley (b).

Conclusion

The study provides a comprehensive overview of the indigenous knowledge related to 186 plant species located in the Hercho valley. These plants form the basis of local traditional medicine, used to address a variety of ailments and highlighting significant cultural continuity. Among these, 44 species are newly documented in the Hercho valley, while 29 species have been noted for additional uses. The newly reported species with distinct and unique floral species, the medicinal flora of Hercho Valley is facing potential threats and anthropogenic pressures, including unsustainable harvesting, collection, and bulk-level use of medicinal plant species for different purposes. As a result, these plant species, *Juniperus excelsa* subsp. *Polycarpus*, *Pinus gerardiana*, *Cedrus deodara*, *Abies pindrow*, *Picea smithiana*, *Berberis orthobotrys*, *Hippophae rhamnoides* subsp. *Turkestanica*, *Fraxinus xanthoxyloides*, *Betula utilis* subsp. *Jacquemontii*, *Bunium persicum*, *Carum carvi*, *Swertia petiolata*, *S. chirata*, *Podophyllum hexandrum*, *Aconitum heterophyllum*, *Oxyria digyna*, *Viola biflora*, *V. rupestris*, *Bergenia stracheyi*, *Allium carolinianum*, *Dryopteris xanthomelas*, *Ferula narthex*, *Dolomiaea macrocephala*, *Arnebia benthamii*, *Thymus linearis*, *Rheum tibeticum*, *Pulsatilla wallichiana*, *Valeriana himalayana*, *Dactylorhiza hatagirea*, *Sonchus asper*, are highly endangered in the study area and need conservation. These valuable medicinal plants have been used on a large scale for medicines and other purposes. Due to anthropogenic pressure, diverse medicinal plants in the Hercho valley are becoming rare, and some are at high risk of extinction in the near future. So, careful efforts should be made to sustainably conserve these valuable plant assets. Further, plant species should be conserved both on-site and off-site. In addition, it is need of an hour to create awareness among the native communities regarding the conservation of flora and to take tangible measures like; to make more employments for the people of area to reduce the pressures on natural resources, to provide facilities for cultivation and preservation of plants, to arrange joint campaigns among different departments to create awareness for plantation on barren lands at large extent, to promote sustainable utilization, engaging local communities through awareness programs and policy initiatives, to establish separate department for conservation, management and monitoring of natural resources.

Declarations

List of Abbreviations: A.H - Annual Herb; P.H - Perennial Herb; Inf - Infrequent; C - Common; CC – Very Common; R - Rare; RR - Very Rare; CR - Critically Endangered; EN - Endangered; VU - Vulnerable; FL - Fidelity Level; FC - Frequency Citation; RFC - Relative Frequency Citation; UV - Use Value; ICF - Informant Consensus Factor; FIC - Frequency of Informant Consensus; GIS - Geographic Information System; GB - Gilgit-Baltistan; KPK – Khyber Pakhtunkhwa; N - Total number of respondents; Ni - Number of informants for a specific plant species; Ui - Number of use reports cited by each informer for a specific plant

species; CHF - Conservation of Herbaceous Flora; Ph - Phytochemical; HPT - Health Promoting Traits; TG - Traditional Gatherers; TK - Traditional Knowledge; IGW - Indigenous Medicinal Gathering; EPA - Ethnobotanical Plant Assessment; GSE - Global South Economies

Ethics approval and consent to participate: The study was conducted in accordance with ethical guidelines for research involving traditional knowledge and human participants. Prior to data collection, informed consent was obtained from all participants after clearly explaining the objectives and purpose of the study. Participation of the respondents was entirely voluntary, and the information provided was used only for academic and research purposes. The study followed ethical standards for ethnobotanical research and respected the cultural values, knowledge systems, and intellectual contributions of the local communities and traditional healers who participated in this research.

Consent for publication: Not applicable

Availability of data and materials: The datasets generated and analyzed during the current study are available from the corresponding author upon reasonable request.

Competing interests: The authors declare that they have no competing interests.

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Author contributions: M.H. designed and conceived the ethnobotanical study, supervised the research, and prepared the original draft of the manuscript. I.H. performed data curation, conducted the data analysis, and revised the manuscript. S.W.K. and Q.A. assisted in revising and improving the manuscript and contributed by providing ethnobotanical tools and equipment to identify plants used in this study. All authors contributed to the article and approved the final version of the manuscript.

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