International Journal of Science and Research Archive
eISSN: 2582-8185
Cross Ref DOI: 10.30574/ijsra
Journal homepage: https://ijsra.net/

(RESEARCH ARTICLE)

Ethnobotanical perspective on medicinal plant utilization and assessment of floristic diversity in Duskhel valley DIR lower, Khyber Pakhtunkhwa, Pakistan

Muhammad Haroon [1], Muhammad Zubair [2,*], Sumaira Naz [1], Nadia Faqir [1], Shakila Rahman [3], Kainat Mahmood [4], Sahar Nasim [5], Seemab Ali Khan [2] and Ajmal Khan [7]

[1] *Department of Botany, Islamia College, University of Peshawar, Khyber Pakhtunkhwa, Pakistan.*
[2] *Department of Botany, University of Science and Technology Bannu, Khyber Pakhtunkhwa, 28100 Pakistan.*
[3] *Department of Botany, Hazara University, Mansehra, Pakistan.*
[4] *Department of Plant Sciences, Quaid-i-Azam University Islamabad, Pakistan.*
[5] *Department of Botany, University of Malakand Pakistan.*
[6] *Department of Botany, University of Science and Technology Bannu, Khyber Pakhtunkhwa, 28100 Pakistan.*
[7] *Department of Botany, Hazara University, Mansehra, Pakistan.*

International Journal of Science and Research Archive, 2025, 16(03), 880-888

Publication history: Received on 09 August 2025; revised on 18 September 2025; accepted on 20 September 2025

Article DOI: https://doi.org/10.30574/ijsra.2025.16.3.2652

Abstract

This study explores the floristic and ethnobotanical diversity of Bagh Valley, highlighting the significance of local plant species in traditional medicine. Over two years (2019-2020), we documented 88 plant species from 44 families, with 29 trees, 48 herbs, and 11 shrubs. Notably, most of these plants are wild and freely available, yet play a vital role in treating various ailments, including cough, malaria, kidney disease, and diabetes, among others.Our research reveals that local communities rely heavily on these plants, utilizing different parts, such as leaves (14.77%), fruits (21.59%), seeds (5.68%), and whole plants (20.45%), to harness their medicinal properties. Key medicinal plants include *_Myrtus communis_*, *_Carolluma tuberculata_*, *_Justicia adhatoda L_*, *_Olea ferrugina Royle_, and _Ocimum bascillicum_*. This study underscores the importance of preserving traditional knowledge and promoting sustainable use of these valuable plant resources.

Keywords: Medicinal plants; Ethnobotany; Bagh Valley; Traditional medicine; Plant diversity

1. Introduction

Flora means all plant species in a locality. It differs from vegetation in terms of population, size, relative importance, population, and plant species. The floristic diversity helps in understanding attributes of soil, climate features and of vegetation (Ali et al., 2016). Floristic list is ecologically very important of an area which gives information of natural resources and plants relation with each other and with abiotic and biotic factors (Ullah and Badshah, 2017). Floristic composition of Pakistan and of different areas of the world have been explored by many researchers (Segawa and Nkuutu, 2006; Alsherif et al., 2013; Durrani et al., 2010; Ihsan et., 2016; Mehmood et al., 2015; Perveen et al., 2008; Eminağaoğlu & Anşin. 2003)

Ethnobotany which is a multidisciplinary science deals with study of interrelation of plants and peoples. This relation of human cultures and plants is not only limited with to use as a food, shelter and clothing but also used as ornamentation, religious ceremonies, and health care (Choudhary et al., 2008). It helps in understanding a dynamic relationship between social and cultural and biological diversity (Amjad, 2015). Ethnobotanical survey main purpose is

* Corresponding author: Muhammad Zubair; Email: zubirhasraat@gmail.com

to know about the local native usage of plant resources. World population mainly depends upon the drugs, in which around 75% is dependent over the plant derived drugs for their health care (Shuaib et al., 2019).

Plants help to provide materials for medicinal purposes, forage Values and for survival. Along with these services it also preserves cultural heritage, indigenous knowledge, and biological information (Ahmad et al., 2012). Despite of developmental increase in pharmaceutical industry the world is still dependent over ethno medicine for basic ailments. In many countries ethnomedicine gained popularity and many indigenous peoples especially living in rural areas depends over the use of ethnobotany. Health care seeking process, healing practices and health issue of indigenous communities is being fulfilled by ethnobotanical use of plants (Khan et.,2018).

The geographical position of Pakistan has too much importance as it has rich floral diversity and, in this region, also about 6000 vascular plants have been reported till now.in endemic flowering plants about 80% is reposted in northern and western ranges of the country (Mehmood et al., 2015).

Ethnobotany science is more than a documentation science which progress to practical science from the last 100 years with sustainable usage and conservational strategies. Because of multiple ecological regions, diverse climatic zones and different soil conditions Pakistan gained diverse habitat which is associated with different flora. There are wild species of 6000 in Pakistan of which 400__600 is of medicinal important. Himalaya, Hindukush, and Karakorum which are northern areas of Pakistan has unique biodiversity. The peoples of these areas collect plants and use for their purposes according to their lifestyle (Shuaib et al., 2014).

Human have been using plants as medicine since ancient time. According to some predictions 90% tibbi medicine preparation is from herbs or plant based. A study being conducted in kumrat valley district Dir Upper which is northern area of Khyber-Pakhtunkhwa, of wild food plants regarding their collection, cultivation, ethnomedicinal uses and market values among the local communities of the area. 50 species in total of wild food plants belongs to 30 families and 40 genera were investigated in which rosacea was a dominant. One followed by Moraceae and Leguminosae (Ahmad et al., 2021).

With respect to folk medicine Pakistan has a rich history. Some plant has been reported from different localities as from Khyber agency, local medicinal and other traditional plants from mansehra, from Rawalpindi, margalla, Kurram, Abbottabad, kotli, Chitral, attock and from Dir Kohistan. All these Reports shows that the areas are rich in plant diversity and ethnobotanical use (Jan et al., 2011).

2. Materials and Methods

2.1. Study area

The study area is historical dushkhel valley Dir lower KP. The research was conducted from 2019 and completed in 2020. It is located 40km away on southern side from District head quarter Timargara Dir lower. The research study areas i.e. Tawda China, Inzaro, Pingall, Otala,Masho, shanai, sawokani, qala, bagh, katan, delway,lasho, bakhbilanda, chenaronu, spen Sali, salem abad. The Dir Lower district shares an international boundary with Afghanistan (Kunar province) in the west, by Swat district in the east, Malakand district in the South, while the Upper Dir lies in the North (Ahmad 2015). The population of the Lower Dir district increased by more than double during the last 19 years (1998–2017) from 717,649 people in 1998 to 1,435,917 people in 2017. The average annual growth rate of population in Lower Dir was 3.71 during 1998–2017. The highest rain fall in Dir lower is 243.22 mm in March and lowest in July, October, and November. A vast diversity of plants is found throughout the district. (Latif Ahmad 2018).

2.2. Questionnaire

A semi structured questionnaire was used in this study to collect information from the mentioned areas. The local inhabitants of the area with different ages, sex and traditional knowledge were freely allowed to talk about the locally usage of the plants of the area includes, which type of habitat these plants prefer, plant status, local name, part of the plant used and their medicinal importance like for which type of disease it will cure.

2.3. Plant Collection

Field trips were made regularly for plant collection during 2019 to 2020 in 16 villages of Bagh dushkhel valley district Dir lower. Plants were collected from different villages of research area. Photographs were taken on the spot of plant collection while they were in their natural condition.

2.4. Identification and deposition in herbarium

Plants samples were collected in the field brought to Islamia College Peshawar where Dr. Sher wali identified. The completely dried plant specimens were mounted according to the procedure of Forman and Bridson (1989). After complete identification plants were assigned voucher specimens numbers and deposited as ready reference for future studies.

3. Results and discussion

Total 88 plants were collected from research area for identified the flora and their medicinal uses. These plant species belong to 44 family. Habitat wise 29 plants are trees, 48 are herbs and 11 plants are shrubs. Mostly plants are wild in research area. All these plants are available free in free, and these plants are using by local peoples for different disease such as cough, malaria, kidney disease, stomach problem, diabetes, hepatitis, skin problem, digestive problem, heart disease, diarrhea, and epilepsy. Mostly used leaf, fruit, and seeds for the treatment of disease. Seed 5.68%, leaf 14.77%, fruit 21.59%, whole plant 20.45%, seed + leaf 9.09%, leaf + fruit 10.22%, flower 4.54%, bark 6.8% and stem 6.8% use as medicine of research area.

Table 1 The list showing floristic diversity and there medicinal uses

S. No	Family	Botanical name	Local name	Plant status	Habit	Medicinal use
1	Myrtaceae	*Myrtus communis*	manan	W	H	Use for bronchitis, urinary infection, digestive problem, cough, and anti-cancer.
2	Apocynaceae	*Nerium oleander* L	Gangerae	C	S	Use for ringworm and malaria
3		*Carsissa macrocarpa*	Spengulai	C	S	Antimalarial and ante digestion
4	Arecaceae	*phoenix dactylifera*	Kajora	C	T	Fruit are used for cough and anemia and seed use for kidney problem
5	Amaranthaceae	*amaranthus viridus* L	Ghanharr	W	H	Effective in inflammation and snake bite
6		*Acyranthus aspera* L	Spaebotay	W	H	Use for headache and stomach problem
	Rutaceae	*Citrus indica*	Naranj	C	T	Use for cough, fever and tooth polishing.
8		*Alternthera sessile*	Unknown	W	H	Use for hepatitis, bronchitis and asthma
9	Asteraceae	*parthenium hysteroporus* L	Skhabotay	W	H	Use for skin inflammation
10		*Xanthium stramarium* L	Gheeshe	W	H	Mostly used for fungal infection and arthritis
11		*sonchusasper* L	Shodapay	W	H	Used for diuretic problem
12		*Taraxicum officinale wabber*	zyar gulii	W	H	Used for liver disease
13	Apocynaceae	*Catharanthus roseus*	Spenay	C	H	Use for cancer treatment and skin disease
14	Amaryllidaceae	*Amaryllis belladonna* L	Gantoll	C	H	Use for cold and cough treatment
15		*Narcissus tazzetta*	Gullenguss	W	H	Mostly used for epilepsy

16		*Allium grifathianum*	Ogakay	W	H	Antimalarial and inti digestion
17	Alliaceae	*Allium cepa*	Pyaz	C	H	Antimalarial and intidigestion
18	Apiaceae	*Coriandrum sativum*	Danya	C	H	Anti-adiabatic and digestive
19		*Capsicum fruitescens* L	Marchaki	C	H	Used for digestion and intestinal gas
20	sapotaceae	*monotheca buxifolia*	Gwargwara	W	T	Use for digestive, anthelmintic and antipyretic
21	Acanthaceae	*Justicia adhatoda* L	Baykar	W	S	Use for cough and asthma
22	Asclepiadaceous	*Calotropis procera*	Spalmay	W	S	Used for the treatment of stomach ulcer and constipation
23		*Carolluma tuberculata*	Pamankay	W	H	Used for diabetes, paralysis and malaria
24	Brassicaseae	*Brassica compests*	Sharsham	C	H	For the increase production of milk in cattle and hair strength
25		*lepidium olidymium*	Unknown	W	H	Used for treatment of allergies and wound
26	Bignoniaceae	*Tecoma stan*	zyar gulii	C	T	Used for digestive problem and snake bite
27	Cucrbitaceae	*luffa cylindrica* L	Toray	C	H	Use for cardiac disease and cold, chest pain
28		*cucurbita maxima duchesne*	Kado	C	H	For blood pressure and constipation
29	Convolvulaceae	*convolvulus arvensis* L	Prewatay	W	H	Used for skin problem
30	Cactaceae	*opuntia dillenii*	Kamala	W	H	Use for treatment of diabetes and wound
31	Chenopodacae	*chenopdium album*	Sagg	C	H	Used for cardiac disorder
32		*spinacae oleraceae* L	Falak	C	H	Use for heart disease, anti-oxidant
33	Cannabaceae	*cannabis sativa* L	Bang	W	H	Anticancer and vomiting
34	Chenopodacae	*chenopodium album*	Sarmy	W	H	Anthelmintic, diuretic and laxative
35	Cupressaceae	*thuja occidentalis*	Sarwa	C	T	Use for respiratory tract infection, bacterial skin infection.
36		*Cupressus arizonica*	Sarwa	C	S	Antibacterial, antifungal and anti-viral
37	Euphorbiaceae	*Euphorbia heliescpia* L	Mandanu	W	H	For skin disease such as irritation and swelling
38		*euporbia milli*	Unknown	C	H	For the treatment of hepatitis
39		*mallotus philipenensis* L	Kambela	W	S	Use for irritation, and also used for healing of wound

40	Fabaceae	*Acacia senegal*	palosa	W	T	For stomach inflammation and gum used for skin
41		*Acacia modesta*	spena palosa	W	T	Use of wound healing, cough and bacterial infection
42		*Trifolium repen* L	Shawotal	C	H	Use for treatment of abdominal pain and eye wash
43		*Arachis hypogea* L	Mumpale	C	H	Mostly used as a nutritive
44		*phaseolus valgaris*	Mahee	C	H	Used for diabetes, high cholesterol and kidney stone
45	Juglandaceae	*Juglan regia* L	Ghoz	C	T	Used for brain tonic and bark using for cleaning teeth
46	Lamiaceae	*Mentha arvensis* L	Podena	C	H	Mostly used for vomiting, digestion, asthma
47		*mentha logifolia* L	Venally	W	H	Use for diarrhea, dysentery and constipation
48		*Ocimum bascillicum* L	Kashmaly	C	H	Use for oral disease and seed is used for stomach problem
49	Punicaceae	*Punica granitum*	Anar	C	T	Use for dysentery, diarrhea and cough
50		*legarstromia indica*	Sorgwalle	C	T	Used for antinflammatary
51	Myrtaceae	*pasidium gugava* L	Amrood	C	T	Used for stomach and constipation
52		*Euclyptas lanceolatus*	Lachi	C	T	Use for vomiting
53		*Callistimen lenceolatus*	bottal brush	C	T	Use for treatment diarrhea and anti-cough
54	Moraceae	*Moras nigra* L	tor tot	W	T	Used for cough and chest relief
55		*moras alba* L	spen tot	W	T	Used for chest and cough
56		*Ficus carica* L	gat inzar	C	T	Control blood pressure, sugar and digestion
57		*Ficus palmate*	kach inzar	W	T	Control blood pressure, sugar.
58		*Broussonetia papyrifera* L	Gultot	W	T	Dysentery and tonic
59	Vitaceae	*Vitis vinifera* L	Angor	C	T	Used cholera and small pox
60	Malvaceae	*Abelmoschus esculentus* L	Bendi	C	H	Use for the treatment of ulcer treatment, bone and essential for blood clothing.
61		*Malva neglecta*	Panirak	W	H	Mostly used for digestive problem
62	Myrtaceae	*Anagallis arvensis*	Shadani	W	H	Anti-microbial, anti-oxidant and anti-viral
63	Musaceae	*Musa peradisiaca*	Kela	C	H	Used for constipation and diarrhea
64	Oleacae	*Olea ferrugina royle*	Khona	W	T	Used for blood pressure, sugar and leaves used for throat problem
65	Oxalidaceae	*Oxilis carnicolata* L	Tarokay	W	H	Used for fever, wound, snake and dog bite

66	Plantenaceae	*plantanus orientalis*	Chenar	C	T	Used for pain
67	Pinaceae	*pinus roxburghii serg*	Nakhtar	W	T	For liver tonic and gum used for skin problem
68		*cedrus deodara*	Deyar	C	T	Epilepsy, useful in fever
69	Poaceae	*Cynodan dictylon* L	Kabal	W	H	Used for asthma
70		*Zea mays* L	Jowar	C	H	Use for blood pressure, kidney stone and digestion
71		*Teriticum estivum* L	Ghanaum	C	H	Used as a food and constipation
72		*Avena sativa* L	Jawdar	W	H	Used for epilepsy, headaches
73		*Cymbopogan citratus*	Barwaza	W	H	Treatment for nervous and gastrointestinal disorder
74	Papillonaceae	*Medicago sativa* L	Speshtare	W	H	Used for digestive disorder
75	Polygonaceae	*Rumex dentatus* L	Shalkhe	W	H	Used for nausea, pain and liver disorder
76	Rosaceae	*Prunus armeniaca* L	Khubani	C	T	Used for constipation, dysentery
77		*Eriobotrya japonica*	Loct	C	T	Use for anti-cancer, blood pressure
78		*Rubus anatoticus* L	Larwara	W	S	Used for sexual desire
79		*Rosawebbiana well ex*	jangali gulab	W	S	For stomach pain asthma
80	Rhamnaceae	*Ziziphus jijuba mill*	Bera	W	T	Use for asthma, cough and liver disease
81		*Ziziphus numularia*	Karkana	W	T	Use for digestion disorder
82	Simaroubaceae	*Ailianthus sltissimia*	khara shanday	W	T	Use for anti-anthelmintic, dysentery and diarrhea
83	Solanaceae	*Lycopersicon escolentum*	Tamatar	C	H	Used skin soft
84		*Daturametel* L	Batora	W	S	Use as an anti-asthmatic
85		*Solonum nigram* L	Kachmacho	W	H	Painkiller and anti-diabetic
86		*cestrum nocturnum* L	Ratkrani	C	S	Antioxidant, antibacterial and anti-fungal
87	Sapindaceae	*Dodonia viscosa* L	Gwaraski	W	S	Leaf is used for sore throat and root for treat cold and seed use for malaria
88	Melaceae	*Mellia azedarach L*	tora shanday	W	T	Use for diabetes and various gastrointestinal disorders

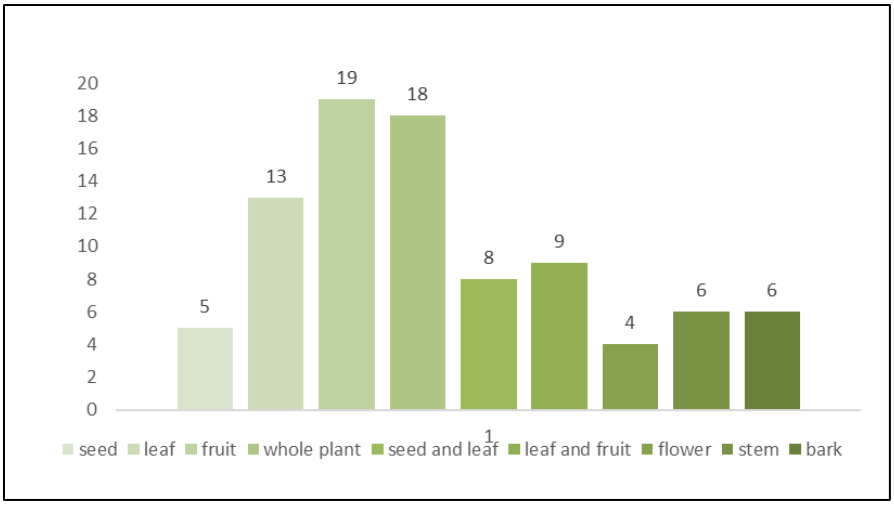

Figure 1 Parts used as a medicine

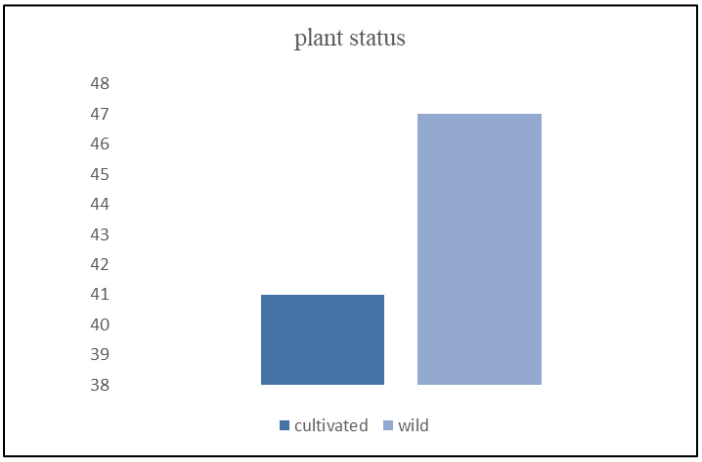

Figure 2 Plant status

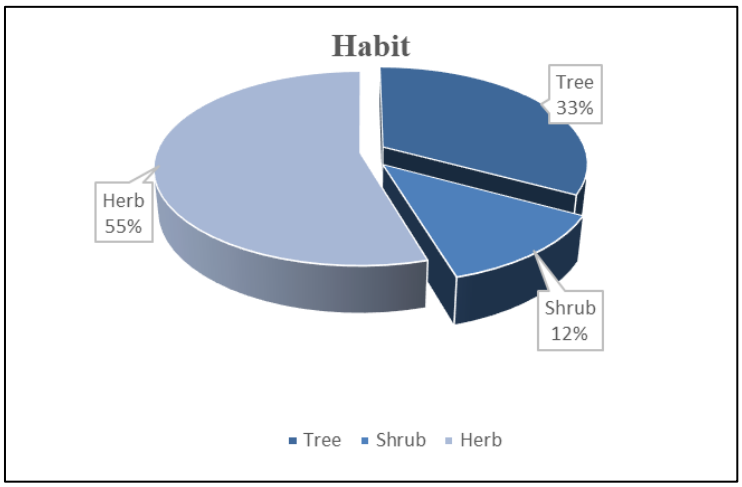

Figure 3 Habit of collected plants

Figure 4 Number of species in each family

4. Conclusion

This study highlights the rich floristic diversity and traditional medicinal knowledge of the Dushkhel Valley, Dir Lower, KP, Pakistan. A total of 88 plant species from 44 families were documented, with 29 trees, 48 herbs, and 11 shrubs. The local community relies heavily on these wild plant resources to treat various ailments, including cough, malaria, kidney disease, and diabetes. The study reveals the importance of preserving traditional knowledge and promoting sustainable use of these valuable plant resources. The findings of this study can contribute to the development of new medicines and conservation strategies for these medicinal plants.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

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