Available online freely at www.isisn.org

Bioscience Research

Print ISSN: 1811-9506 Online ISSN: 2218-3973

Journal by Innovative Scientific Information & Services Network

RESEARCH ARTICLE BIOSCIENCE RESEARCH, 2020 17(2): 919-925. **OPEN ACCESS**

Survey of taxo-ethnomedicinal plants belonging to family *Apiaceae* in the outer hills of Dir Kohistan, Pakistan

Ali Hazrat[1], Khan Sher[2], Gul Rahim[1], Zakia Ahmad[4], Jehan Zada[1], Muhammad Mukhtiar[3], Zahid Fazal[5], Shabana Bibi[12], Amir Hassan[2], Abid Ullah[1] and Mohammad Nisar[1]

[1]Department of Botany University of Malakand, Chakdara, Dir Lower, **Pakistan**
[2]Department of Botany Shaheed Benazir Bhutto University Sheringal Dir Upper, **Pakistan**
[3]Department of Pharmacy, University of Poonch Rawalakot, Azad Kashmir, **Pakistan**
[4]Department of Botany University of Swat, KPK, **Pakistan**
[5]Department of Botany University of Peshawar, **Pakistan**

***Correspondence:** aliuom@gmail.com **Received 05-04-2020, Revised: 23-04-2020, Accepted: 26-04-2020 e-Published: 08-06-2020**

Seventeen plant species and 13 genera of the selected family were collected from Dir Kohistan, with elevation ranges from 1200-4000 meters during 2016-2018. They were taxonomically determined, recorded the information about these native plants and have been described for the first time in the history of this area. In view of the fact that wild plant species are scarcely distributed therefore efforts should be made to conserve them. The key objective of the present research was to file the taxonomic knowledge of plant species of the selected family. Furthermore a key of the genera and plant species, flowering and fruiting periods of all species are given. The GPS (Global position system) elevation data and distribution of the species in the selected area are also discussed in this research work. Furthermore use of plant species for therapeutic purpose is as old as human history. In the research a major part of population is dependent on the traditional medicine derived from plants for primary health care system. The interest in the use of traditional system of medicine has gained popularity globally. The developed countries are shifting their focus to further research based on the indigenous knowledge collected from aboriginal people. The present study reviews the ethno-medicinal uses of family Apiaceae reported from Dir Kohistan. Out of 17 species reported from Dir Kohistan, all the species are found to be used medicinally. Most commonly used for the treatment of gastrointestinal tract and liver disorder, followed by cough, cold and respiratory tract problems The plant parts frequently used are roots followed by whole plant material, leaf material, fruit, seed, stem, flower and aerial parts. It is suggested to carry out similar studies for other families to explore the indigenous knowledge for the development of commercial products and to jointly file the dispersed current data.

Keywords: Taxonomic Diversity, Apiaceae, Ethnomedicinal, Elevation, Dir Kohistan.

INTRODUCTION

The research area in which the study is conducted are situated in the North-East of Dir which is surrounded by the Hindukush Raj on North and West. Torwal and Gabral areas are located in the East. Dodbah Sir Ghair and Batraei Ghair located in the South and South west respectively (Hazrat et al., 2011). District Dir (U) is one of among the 26 districts of Khyber

Pakhtunkhwa and covers an area of 3699 km^2. Kohistan valley starts from gateway of babe Kohistan called Khwgo Oba and extended to up to the valley of Kumrat. (Hazrat et al., 2007). According to forest division the area of Dir (U) Kohistan 645 square miles. Out of this an area of 140351 acres were covered by coniferous or pine forests (DCR, 2017).

Taxonomic diversity means the varieties of plants of the selected family distributed in the study area. Plants belonging to the selected family of any category of taxonomic rank of hierarchy are collected. Flora of the selected family includes all the wild and cultivated plants of the selected area like the study conducted by (Ali, 2008). Similarly Chitral is an area of rich floristic diversity (Stewart 1972, 1982). Though processes of evolutionary success of angiosperm and its different innovations remained difficult (Crepet & Niklas, 2009). The Hindukush mountain range on the planet covering an area of 3500 km2 in the South Asia which is globally one of the five floristically most important regions (Myers, 2001; Shinwari, 2010). The selected family is one of the important family of plants. Most of the species of this family are aromatic species which shows that these species are very important for medicinal purposes due to the wealth of high valued chemical constituents. The selected family have great economic export value for Pakistan (Hazrat et al., 2013). Sixteen species of the selected family were checked and identified through with help of morphological. And also generate easy taxonomic keys which enable the young researcher's scholar and many other who's interested on the identification of these species (Nasir, 1972).This study is a based on the herbarium preserved specimens kept in the herbaria of both Shaheed BB University Sheringal and University of Malakand.

The traditional methods of healing have been adopted by mankind since ancient times. Despite all the developments and advancements which have been achieved by today's modern science, these traditional treatments are still in use. Traditional healing treatments refers to collective knowledge, skills and practices that are based on the theories, values, and personal experiences developed and used by indigenous people of different cultures to improve health, avoid and reduce disease and its spread, or
for complete cure of both physical and mental health (Fabricant and Farnsworth, 2001). The most common practices of traditional health care include traditional Chinese medicine, Ifa, Muti, Acupuncture, traditional African medicine, ancient Iranian medicine, Unani, Siddha medicine, Islamic medicine, Ayurveda, traditional Korean medicine and herbal medicine (http://ic.steadyhealth.com/). According to an estimate 80% of the developing countries while half of the industrialized world population is dependent on traditional medicine (Bodeker and Fredi, 2002). Herbalism also termed as herbal medicine is the therapeutic or medicinal use of herbaceous plants or the products obtained from these herbs. Any part of the plant can be used as herbal medicine but the most common parts used are leaves, bark, seeds, roots, fruits and flowers. They are swallowed, eaten, inhaled, drunk or used as a topical application to skin (Acharya and Shrivastava, 2008; Fabricant and Farnsworth, 2001). The herbal medicine is a worldwide growing industry. Out of the 32,0000 species of higher plants (Prance, 2001) more than 10 percent are used in different medicinal preparations. According to some estimates global marketing of medicinal plants may reach $5 trillion by 2050 (Shinwari, 2010). Therefore, herbal remedies are being opted by a huge proportion of globe's population and the original knowledge and worth of information about these plants is cherished by the aboriginal and tribal population (Sarwat & Ahmad, 2012; Nadeem *et al.,* 2013; Shinwari et al., 2013). The study of use of local flora of a particular region or culture by native people is termed as ethnobotany.

The native population of different regions of Pakistan use the plants in their locality for different purposes since ancient times. From generation to generation this wealth of knowledge has been transferred. This medicinal flora is used for the treatment of a wide range of diseases, from headache to stomach ache, cuts and wounds (Bhardwaj and Gakhar, 2005).Although there are different systems of Unani, Ayurvedic (Eastern medicines) which are prevailing even today for primary health care by exploring medicinal properties of plants, yet there are serious threats of loss to this precious wealth of indigenous knowledge. Not only the proper documentation of this knowledge is required but also the conservation strategies (ex-situ and in-situ measures) should be carried out to deal with the ongoing loss of medicinal plants (Shinwari and Gilani, 2003; Shinwari and Qaiser, 2011).

It is very easy for expert and non expert in the taxonomy to use it. The present study recommended to starting of a national wide program for the conservation of these species and also include other families, species and genera.

MATERIALS AND METHODS

The present survey were carried out in the study area from 2016-2018 and the area was visited frequently. This paper is based on the collection and then identified of the species in the flowering seasons with the help of flora of Pakistan and Taxonomic experts. (Stewart., 1972 and Ali & Qasir., 2009). Some species are easy and identify in the field from the fresh whole plant material. The flowers were boiled for about 2 to 3 minutes to study them under the stereoscope from the dried specimens. Keys of all the species and genera were drawn and the data regarding botanical name, local name, part used, elevation and research area are presented in the table 01.

The information about the Ethnomedicinal uses of the plants was obtained from the stakeholder of the area through questionnaire. The outcome of the results were rechecked and compared with literature like that of Ali and Fefevre (1996) and Khalid (1995). The data was analyzed and indigenous knowledge was documented.

RESULTS AND DISCUSSION

The research area showed great taxonomic diversity. All the plants of the selected family are well represented in the research area. The current research was designed to find out the Taxonomic diversity of plants of Dir Kohistan Valley because it is a remote and hilly area which has not been studies previously for such type of studies. A total of 17 species has been collected and preserved from the hilly area of Dir Kohistan. Species keys are generated for all the species. And the data of plants are tabulated in table 01 in the form Voucher Number, Botanical name, Local name, Villages in research area, Elevation in meter, part used, medicinal uses table-1 and figure-1. Among the 17 species found in Dir Kohistan some were found to have been used medicinally by different cultures across the world. Root was found to be the most used part of these plants followed by whole plant material. Other parts used are leaf material, fruit, seed, stem, flower and aerial parts figure. 2. Different syndromes that are cured by Apiaceae species are summarized in Table 1. As shown in these plants are mostly used for treating gastro intestinal tract disorders and liver disorders followed by cough, cold and respiratory tract problems (Nasir 1972).

The present research work is the first of its kind from this selected area of Kohistan. On the basis morphology observation and Taxo-ethnomedicinal survey of these species are differentiated from one another.

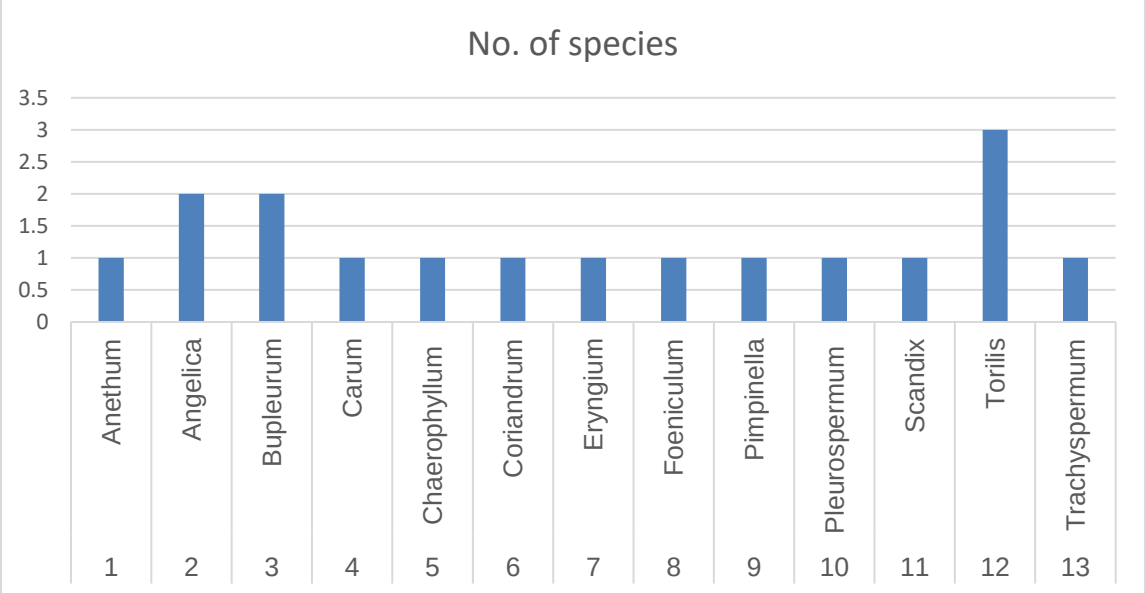

Figure 1: Genus wise distribution of Apiaceae

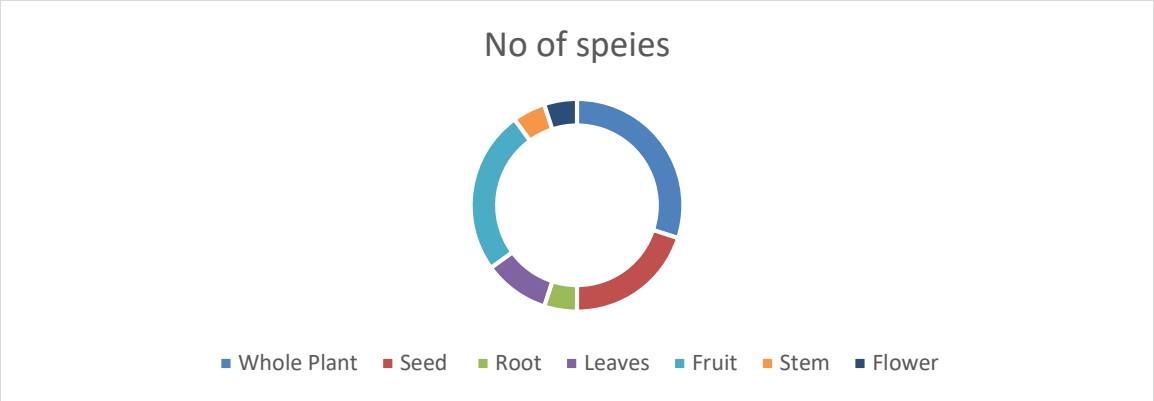

Figure 2: Part used data

Key to the genera

1. Flowers and fruits sessile, bracts spinose---------- *Eryngium*
+ Flowers characters other wise----------2
2. Leaves, simple ----------*Bupleurum*
+ Leaves, compound ----------3
3. Furrows 1-vittate----------6
+ Furrows more than 1-vittate ----------4
4 Fruit glabrous not winged---------- *Pimpinella*
+ Fruit winged----------5
5 Furrows 2-3-vittate---------- *Pleurospermum*
+ Furrow many vittate ---------- *Angelica*
6 Flowers color yellow---------- ---------- *Anethum*
+ Flowers other wise----------7
7 Fruit prickly---------- *Torilis*
+ Fruit not prickly----------8
8 Leaves 2-3 pinnate----------9
+ Leaves much divided----------*Trachyspermum*
9 Plants perennial. Tall up to one meter---------- *Chaerophyllum*
+ Plants annual. Tall up to 25cm----------*Scandix*

Note: The following genera of this family are in cultivation in the research area which was not included in the key given. These genera are *Coriandrum, Foeniculum* and *Carum.*

Genus: *Bupleurum* L., Spe. Pl. 236. 1753.

Key to the genera

I Middle and upper leaves with 13 or more parallel veins----------*Bupleurum longicaule*
+ Middle and upper leaves with 9 or less parallel veins---------- *Bupleurum falcatum*

Genus: *Angelica* L., Spe. Pla. 250.1753.

Key to the species

I Fruit 8-12 mm long; furrows 1-vittate; dorsal ----------*Angelica glauca*
+ Fruit 6-8 mm long; furrows multi-vittate; dorsal----------*Angelica archangelica var. himalaica*

Genus: *Torilis* Adans., Fam. 2:99. 1763.

Key to the species

1 Bract present, Rays 3-10, Spines on fruit incurved, Styles twice as long as the stylopodium --------
----------*Torilis japonica*
+ Bract lacking, Rays 2-6, Spines on fruit subglochidiate, Style as longer than the stylopodium ----2
2 Rays 01-2 cm long----------*Torilis nodosa*
+ Rays 02-4 cm long----------*Torilis leptophylla*

Checklist of the plants of Kohistan valley

Table 1: Checklist of wild/cultivated plant species of Apiaceae in Dir upper

S.No	V.No	Botanical Name	Local Name	Research Area	Elevation in meter	Part Used	Medicinal Uses
1	564	*Anethum graveolens* L.	Sowah	Dogdara, Sunderae, Lamutai	1300	Whole Plant	Antihypertensive, stomachache digestive and carminative,
2	897	*Angelica archangelica* L. Var. himalaica (Clarke)	Derae pana	Kumrat, Dogdara, Sunderae,	1200	Whole plant	Gastrointestinal disorder, Respiratory and nervous system
3	907	*Angelica glauca* Edgew.	Kathmana	Kumrat, dojanga, Dogdara	1300	Whole plant seed	Cardio active, constipation and stomachache
4	996	*Bupleurum falcatum* L.	Nil	Dogdara, Sheringal, Sunderae, Lamutai, Janus can	1400	Whole plant seed	Anti-inflammatory, antitumor and antielergic activities
5	887	*Bupleurum longicaule* Wall. Ex DC.	Nil	Sheringal, Dogdara, Sheringal, Lamutai, Janus candio	1500	Root l eaves	Abdominal inflammation and fever
6	986	*Carum carvi* L.	Sperkai	Kumrat, Smang	Cultivated	Fruit	Gastro intestinal and dyspepsia
7	566	*Chaerophyllum reflexum* Lindl.	Nil	Guldae, Dogdara, Sunderae, Lamutai, Janus candio	2000	Stem	Kidney and urinary disorder
8	567	*Coriandrum sativum* L.	Dania	Cultivated	Cultivated	Fruit	Dysentery, diarrhea, cough and vomiting
9	946	*Eryngium coeruleum* M-Bieb.	Tha Manzari Mangwal	Common	1200	Seed	Constipation
10	568	*Foeniculum vulgare* Mill.	Kagah	Cultivated	Cutivated	Seed	Stomachache vomiting, body cooling
11	926	*Pimpinella acuminata* (Edgew.)	Nil	Thall, Dogdara, Sheringal	2200	Whole plant	Diarrhéa, dysenterie
	1007	*Pleurospermum candollei* (DC.)	Nil	Jaz banda	4000	Flower	Diarrhia, dyspepsie and stomachac
12	906	*Scandix pectin-veneris* L.	Shana butaey	Common	1200	Whole plant	Blood coagulation and body pain
13	896	*Torilis japonica* (Houtt.) DC.	Shankaey	Shahoor, Dogdara, Sheringal, Sunderae, Lamutai, Janus candio	3500	Fruit	Infertility in women, diarrhea and Rheumatism
14	570	*Torilis leptophylla* (L.) Reichb. f.	Shankaey	Janus, Dogdara, Sheringal, Sunderae, Lamutai	3600	Fruit	Gastro intestinal disorder
15	886	*Torilis nodosa* (L.) Gaertn.	Shankaey	Kumrat, Dogdara, Sheringal, Sunderae, Lamutai, Janus candio	3600	Fruit	For liver disorder
16	876	*Trachyspermum ammi* (L.) Sprague	Sperkai	Kumrat, Dogdara, Sheringal, Sunderae	3700	Leaves	Diarrhea, dysentery, cholera and cough

CONCLUSION

There is an outstanding connotation between the indigenous people and their living environments which has been established over decades. The centuries old indigenous knowledge of medicinal plants is in danger of being lost. Therefore it is required to conserve it. The presence of large number of medicinal plants in a single family shows that Pakistan is provided with lot of useful biodiversity. Research is required to provide scientific basis for their specific medicinal uses. The medicinal properties of these plants can be exploited for the development of large number of different products.

CONFLICT OF INTEREST

The authors declared that present study was performed in absence of any conflict of interest.

ACKNOWLEGEMENT

This work was carried out under the Scholarship sponsored by the Higher Education Commission, Islamabad.

AUTHOR CONTRIBUTIONS

AH and KS designed and performed the experiments and also wrote the manuscript. GR, ZA, and JZ collection and identification, MM, ZF and SB help in the medicinal value survey, AH, AU and MN data analysis and reviewed the manuscript. All authors read and approved the final version.

REFERENCES

Ali SI (2008) Significance of the flora with special reference to Pakistan. Pak. J. Bot. 40(3), 967- 971.

Ali H, Qaiser M (2009) The ethnobotany of Chitral Valley, Pakistan with particular reference to Medicinal plants. Pak. J. Bot. 41(4): 2009-2041.

Ali SI, Qaiser M (Eds.) (1993-2009) *Flora of Pakistan.* No. 194-216. Karachi.

Ali A, Fefevre JL (1996) "Indigenous knowledge of plants-A case study in Chitral", *Proceedings of Ethnobotany workshop*, September16-24, NARC Islamabad, pp. 136-151.

Acharya D, Shrivastava A (2008) Indigenous Herbal Medicines: *In: Tribal Formulations and Traditional Herbal Practices*. Aavishkar Publishers, Delhi.

Bhardwaj S, Gakhar SK (2005) Ethno medicinal plants used by the tribals of Mizoram to cure cuts and wounds. *Ind. J. Trad. Know.,* 4(1): 75-80.

Bodeker G, Kronenberg F(2002) A public health agenda for traditional,complementary and alternative medicine. *Am. J. Public Health,* 92(10): 1582-1591.

Crepet WL, Niklas KJ (2009) Darwin's second abominable mystery': why are there so many angiosperm species? Am. J. Bot 96, 366-381.

District CR (2017) Shows a complete detail of Dir Kohistan, KP. 19-26.

Fabricant DS, Farnsworth NR (2001) The value of plants used in traditional medicine for drug discovery. *Environ. Health Perspect.,* 10(9): 69.

Hazrat A, Nisar M, Zaman S (2013) Antibacterial activities of sixteen species of medicinal plants reported from Dir Kohistan valley KP, Pakistan. Pak J. Bot; 45 (4): 1369-1374.

Hazrat A, Shah J, Nisar M (2007) Worked on medicinal plants of timergara Valley Dir, Pakistan. Int. J. Biol., 4(2-3): 249-251.

Hazrat A, Shah J, Ali M, Iqbal I (2007) Worked on medicinal value of Ranunculaceae of Dir valley. Pak. J. Bot., 39(4):1037-1044.

Hazrat A, Nisar M, Shah J, Zaman S and Sher K(2014) Taxonomic Studies on the Asteraceae of Dir Kohistan Khyber Pakhtunkhwa Pakistan, Vol. 3 | Issue. 6 | March, Review Of Research, ISSN:- 2249- 894X.

Khalid S (1995) "Plant in danger", *Fifth National Conference of Plant Scientists*, March 28-30, NARC Islamabad.

Myers N (2001) Hotspots. In: Encyclopedia of Biodiversity 3, 371-381. .

Nasir E (1972) Umbelliferae. In: Flora of Pakistan. (Eds.): E. Nasir and S.I. Ali. No. 20 pp. 1-168. Gordon College Rawalpindi.

Nadeem M, Shinwari ZK, Qaiser M (2013) Screening of folk remedies by genus *Artemisia* based on Ethno medicinal

surveys and traditional knowledge of native communities of Pakistan. *Pak. J. Bot.*, 45(S1): 111-117.

Prance GT (2001) Discovering the Plant world. *Taxon*, 50:345-359

Shinwari ZK (2010). Medicinal Plants Research in Pakistan. J. Med. Pl. Res 4(3), 161-176.

Stewart RR (1972) *An annotated catalogue of the vascular plants of West Pakistan and Kashmir*. Fakhri Press, Karachi, pp. 102.

Sarwat ZKS, Ahmad N (2012). Screening of potential medicinal plants from district Sawat specific for controlling women diseases. *Pak. J. Bot.*, 44(4): 1193-1198.

Shinwari ZK, Gilani SS (2003) Sustainable harvest of medicinal plants at Bulashbar Nullah, Astore (Northern Pakistan). *J. Ethnopharmacol.*, 84: 289-298.

Shinwari ZK (2010) Medicinal plants research in Pakistan. *J. Med. Plants Res.,* 4(3): 161-176.

Shinwari, Z.K. and M. Qaiser. 2011. Efforts on Conservation and Sustainable Use of Medicinal Plants of Pakistan. *Pak. J. Bot.,* 43(SI): 5-10.

Shinwari, Z.K., M. Salima, R. Faisal, S. Huda and M. Asrar. 2013. Biological screening of indigenous knowledge based plants used in diarrheal treatment. *Pak. J. Bot.,* 45(4): 13751382.