ETHNOBOTANICAL ASSESSMENT OF SELECTED PLANTS OF TEHSIL KARAK, KP, PAKISTAN

Siddiq Ullah and Fazle Malik Sarim

Department of Chemical and Life Sciences, Qurtuba University, Peshawar, Pakistanandan

Abstract- The aim of the current study was to evaluate the ethnobotanical and conservation status of selected plants of Tehsil Karak, KP, Pakistan. A total of 120 plant species used by the locals belongs to 45 plant families. The ethnobotanical important plant included 11 trees, 16 shrubs and 93 herbs. Family wise Asteraceae and Poaceae were the most dominant families in the area (Table; Fig). The ethnobotanical aspect of the research area suggested that inhabitants used 94 plant species as a folk medicinal plants (83.33%) followed by 94 fodder species (78%), 74 honey bee plant species (62%), 44 veterinary plants (36.6%), 33 fuel species (28%), 23 species of fruits yielding (23%), 20 vegetable species (17%), 17 fencing plants (14.16%), 13 furniture plants (11%) and 11 (9%) timber species. Some common ethnobotanical utilization of these trees includes either timber, sheltering, fuel or agricultural uses. Lack of awareness about the potential uses of these species, and particularly ignorance of the concerned authorities, have led to a decline in the population of the flora. The area was investigated for the first time, and information about the traditional remedies with special reference to their medicinal uses were collected and documented before they were lost. From the economic and botanical point of view, the study area has great potentiality.

I. INTRODUCTION

The use of the plants for the welfare of the living organisms and their relationship with each other's in the environment is termed as ethnobotany (McClatchy, 2009). In 1896, Harshberger coined the word "ethnobotany" to describe the plants that Aboriginal people used. It is regarded as an area within ethnobiology. It examines the impact of the plant environment on human society as well as the investigation and assessment of plant-human relations throughout all stages. People of all cultures have always been depended on plants for their primary needs (food, shelter, warmth, medicines, etc.), and have naturally learned diverse applications of plants. (Ali *et al.*, 2018). The people of the rural area have outstanding knowledge about the utilization of plants. The rural people prefer medicinal plants because of easy availability and cheap source of therapy as compared to costly pharmaceuticals (Shuaib *et al.*, 2023). Ethnobotanical and ecological study of plants is very important in understanding the culture of a society and it provides a base for further study on scientific lines. Pakistan has a great diversity of medicinal plants in different ecological zones. The country has over 600 wild plant species that are medicinally valuable. In Pakistan, most of the population is dependent on herbal drugs, apart from some big cities. The research area (Tehsil Karak) has rich biodiversity consisting of a large number of plants, some of which are used for their medicinal values. Due to their remote locations and lack of access to medical services, the majority of the people in the area still relies on traditional medicines. The region has a rural culture steeped in old traditions, and the locals follow their own set of values and preferences when it comes to their village site housing, family, weddings, childbirth, funeral rites, cultural events, festivals, and socio religious beliefs. So, they get indigenous knowledge about the local plants. Many researchers have also been carried out work on ethnobotany (Umair *et al.*, 2017; Ali *et al.*, 2018; Gulzar *et al.*, 2019; Amjad *et al.*, 2020; Alemneh 2021; Dogara *et al.*, 2022; Shah *et al.*, 2022; Essandoh *et al.*, 2023; Hameed *et al.*, 2023; Liaqat *et al.*, 2023). Lack of proper infrastructure and the poor economic conditions of rural communities make them dependent on herbal medicines. Thus, there is a need to obtain and conserve the historic and traditional knowledge about the medicinal importance of different plants found in different areas of the world. The goal of the current study was to gather, record, and disseminate a variety of traditional local knowledge about the medicinal plants of Tehsil Karak, KP, Pakistan. Such a study will demonstrate their validity in a certain ailment, which will make it an extremely interesting and fruitful prepharmacological foundation for conducting its examination on a scientific basis. To our knowledge, no study has been conducted to elucidate the ethnomedicinal potential of local plants in the present study area. Therefore, this study was conducted to compile the traditional ethnobotanical knowledge and conservation status of some woody plants in differesnt villages of the Tehsil Karak, KP, Pakistan.

The literature review showed that there is no work has been done on ethnobotanical assessment of plants of Tehsil Karak, Khyber Pakhtunkhwa, Pakistan. Therefore, the present study endeavored to highlight the ethnobotanical properties of the plants of the selected area.

Research Area

The research area is located in 70°.30′ to 71°.30′ East and 32°.47′ to 33° 28′ north. It is bounded by Tehsil Takht Nasrati in North, on the south by Tehsil Banda Daud Shah, west by District Bannu and east by Punjab respectively (Fig.1). The Climatic conditions of the study area are very harsh as hot in summer and very cold in winter. June and July are the hottest months whereas December and January are the coldest months. In the month of June the maximum rang of Temperature is recorded 38°Cto 44°C, while in January the minimum range of temperature is 5°C to 10°C (Javid *et al.*, 2019). The rainfall is scanty and uncertain. The winter rains durations are of weeks whilst the summer rains are characterized by thunderstorms creating flashfloods in the streams. The soil is generally clay, sandy or stony with rare fertile loamy soil (Khan *et al.* 2013). Some ecological problems of the area are deforestation, over grazing, soil erosion, wind erosion, soil salinity and shortage of water.
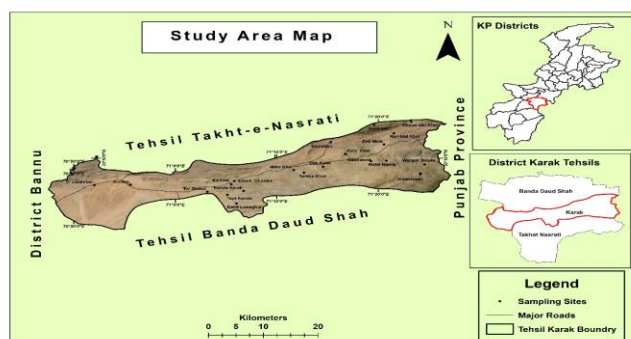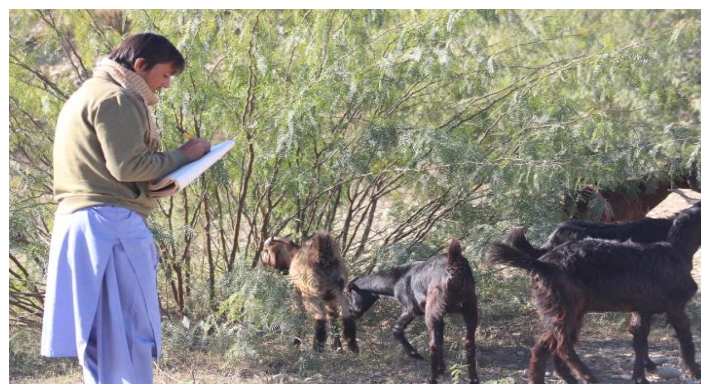
Figure 1. Map of Tehsil Karak showing research spots.

II. MATERIAL AND METHODS

Field activities were conducted during 2021-23 to record the ethnobotanical data of the important species. Data about the plants used by the locals as medicinal, fuel wood, timber and fodder etc. were obtained through random sampling by interviews from different walks of life because different age group and gender use these plant for different purposes. Individual questionnaire was filled from plant collectors, housewives, shopkeepers, elders, plant traders and local healers (Hakims), who were the actual users and have a lot of indigenous knowledge about the plants and their traditional uses. The data was classified, tabulated, analyzed and concluded for final report. Plants specimens were collected, dried and identified with the help of local available literature and deposited to the Department of Life and Chemical Sciences (Botany) Qurtuba University Peshawar, Pakistan. Every plant species was categorized into trees, shrubs, and herbs along with information about the parts used, floral time, family, botanical name, and application and preparation methods. The information about the survey area was collected before starting the research work.

III. RESULTS AND DISCUSSION

The following ethnobotanical information was collected on 120 plant species in the investigated area (Table 1). The reported vegetation comprised 93 species of herbs, 16 shrubs and 11 tress. The people of the area depend on agriculture, fuel & timber wood selling, livestock and other natural resources of the area for earning their daily commodities.

1. Plants used as a medicinal

There were 100 plant species that are being used as medicine. Some of these plants are used individually, while others in mixtures. Many plant species have single or multiple uses. Among such plants *Acacia modesta*, *Acacia nilotica*, *Albizia lebbeck*, *Allium cepa*, *Allium sativum*, *Aloe barbadensis*, *Amaranthus viridis*, *Capparis decidua*, *Chenopodium album*, *Citrullus colocynthis*, *Convolvulus arvensis*, *Coriandrum sativum*, *Cucurbita pepo*, *Cymbopogon jwarancusa*, *Dalbergia sissoo*, *Eucalyptus lanceolatus*, *Fagonia cretica*, *Gymnosporia royleana*, *Helianthus annus*, *Heliotropium europaeum*, *Hordeum vulgare*, *Lactuca sativa*, *Launaea procumbens*, *Mentha arvensis*, *Ocimum basilicum*, *Peganum harmala*, *Phoenix dactylifera*, *Plantago lanceolata*, *Plantago ovate*, *Rhazya stricta*, *Rumex dentatus*, *Salvadora oleoides*, *Tamarix*, *Trianthema portulacastrum*, *Tribulus terrestris*, *Vitex trifolia*, *Withania coagulans*, *Withania somnifera* and *Zizyphus maurtiana* are commonly used against various diseases. Our present research study are in accord with with Khan *et al*. (2013) who reported 161 medicinal plants of Tehsil Takht-e-Nasrati, Pakistan. Tariq *et al*. (2016), Rahman *et al*. (2017), Ali *et al*. (2018), Amjad *et al*. (2020) and Islam *et al*. (2021) also documented valuable medicinal plants from different parts of the country which concerning our results were similar with them. It was noted that old people including male and females were having more knowledge regarding these medicinal plants in the area. People of the investigated area collect plants and sell them in market.

2. Fodder plants

One of the most significant aspects of village life is livestock. Some 94 plant species are used as fodder. The most commonly used plants are *Acacia modesta, Acacia nilotica, Achyranthus aspera, Arachis hypogaea, Astragalus psilocentros, Avena sativa, Cenchrus biflorus, Cenchrus ciliaris, Cicer arietinum, Convolvulus arvensis, Cymbopogon jwarancusa, Cynodon dactylon, Dalbergia sissoo, Eragrostis poaoides, Eruca sativa, Euphorbia prostrata, Fagonia cretica, Gymnosporia royleana, Heliotropium europaeum, Hordeum vulgare, Launaea procumbens, Morus alba, Pennisetum typhoideum, Prosopis farcta, Punica granatum, Salvadora oleoides, Tamarix aphylla, Tribulus terrestris, Trifolium alexandrianum, Triticum aestivum, Vicia sativa, Zea mays, Zizyphus maurtiana* and *Zizyphus nummularia* shown in (Table). Early winter is rich in grasses and herbaceous flora. The locals harvest grasses for storing and then uses later on in winter season. Many fodder species are valued that are preferred by grazing animals because of high nutritive values. Many researchers in the country and abroad have been reported the similar findings. i.e. Barakatullah *et al*. (2009), Sher *et al*. (2011), Umair *et al*. (2017), Ahmad *et al*.(2018), Gonfa *et al*. (2020) and Alemneh (2021).

3. Honey bee plant species

The research area is well known famous for honey production. It is the source of income for the people of the study area. The honey bee flora includes *Acacia modesta, Achyranthus aspera, Albizia lebbeck, Amaranthus viridis, Avena sativa, Brassica rapa, Calendula arvenis, Chenopodium murale, Cicer arietinum, Citrullus colocynthis, Convolvulus arvensis, Coriandrum sativum, Eruca sativa, Euphorbia helioscopa, Fagonia cretica, Fumaria indica, Gymnosporia royleana, Helianthus annus, Heliotropium europaeum, Hordeum vulgare, Kickxia ramosissima, Lactuca sativa, Lactuca serriola, Launaea procumbens, Malva neglecta, Melia azedarach, Mentha arvensis, Morus* spp*, Ocimum basilicum, Pennisetum, Phoenix dactylifera, Plantago* spp *Prosopis* spp, *Punica granatum, Rhazya stricta, Rosa indica, Rumex dentatus, Sesamum indicum, Sissymbrium irrio, Solanum surattense, Tamarix* spp, *Taraxacum officinale, Tribulus terrestris, Triticum aestivum, Zea mays* and *Zizyphus* spp shown in (Table). Sher *et al*. (2011) and Badshah *et al*. (2013) results gives strengthen to our present work.

4. Plants used as Veterinary medicines

In research area people used plants for different animals associated diseases. Over all 44 plants were using the locals for curing different diseases of animals. Among these plant species herbs were 27, trees 10 and shrubs were 07 used by the residents of the area for animals diseases. Most of the species used for digestive related problems in animals. These plants were *Allium cepa, Allium sativa, Aloe barbadensis, Capparis decidua, Chenopodium album, Chenopodium murale, Cicer arietinum, Convolvulus arvensis, Convolvulus prostratus, Coriandrum sativum, Cucurbita pepo, Cucurbita melo, Luffa spp, Dalbergia sisso, Eleusine indica, Eragrostis poaoides, Eragrostis monor, Eruca sativa, Gymnosporia royleana, Heliotropium europaeum, Launaea procumbens, Momordica charantia, Monotheca buxifolia, Rumex, Sesamum indicum, Solanum incanum,*

Tamarix, Taraxicum officinale, Vitex, Xanthium strumarium and *Ziziphus*. Tabuti *et al*. (2023) reported many plants from Uganda used by the people for various livestock diseases. In research area the fluid of *Rhazya stricta* used for goat, sheep mouth diseases and for donkey and camel used *Tamarix* leaves. The milky fluid of *Calotropis procera* is used for the wounds treatment in animals by the locals. Similarly *Eleusine indica* is used for the curing of constipation in grazing animals. Many scientists reported the similar results i.e. Qureshi *et al*. (2011), Ajaib *et al*. (2016) and Ali *et al*. (2018) This is the first effort to clarify and search the ethnoveterinary medicinal plants in the area.

5. Fuel wood species

Nearly 33 wood species were used as fuel in the study area. In current research 33 plants were using by the locals for fuel purposes. These plants are harshly used by the people due to lack of gas facility and some other alternate resources in study area. The rssult showed that the residents of the rsearch area cuts and collect these 33 plants including 17 trees, shrubs 13 and 03 herbs for fuel purposes. The most common wood species are *Acacia modesta, Acacia nilotica, Albizia lebbeck, Capparis decidua, Capparis spinosa , Dodonaea viscosa, Eucalyptus globules, Eucalyptus lanceolatus, Gymnosporia royleana, Monotheca buxifolia, Morus alba, Cymbopogon jwarancusa, Dalbergia sissoo, , Morus nigra, Saccharum bengalense, Saccharum spontaneum, Salvadora oleoides, Tamarix aphylla, Vitex trifolia* and *Zizyphus maurtiana,* Due to high fuel values these plants are preferred in research area. These plants are cuts and stored in winter for life activities. Sher *at al*. (2013) reported 43 fuel species from District Buner. Deka *et al*. (2021) reported 12 fuel woody species. According to Scurlock & Hall (2022) fuel wood species is the major source for three quarters of the world population who live in developing countries.

6. Plants yielding fruits

There are 23 plants which are fruit yielding using by the people. Some of the fruits yielding plants are *Arachis hypogaea, Capparis* spp, *Capsicum annum, Cicer arietinum, Citrullus colocynthis, Cucurbita pepo, Cucumis melo, Monotheca buxifolia, Morus alba, Morus nigra, Phoenix dactylifera, Peganum harmala, Zea mays* and *Zizyphus maurtiana,* . In the study area still people have no proper and scientific methods of plants collection, processing and packing of these valuable fruits. Sher and Hussain (2009) reported 14 wild fruit species from higher altitude coniferous forest of Malam Jaba, Swat. Similarly Khan *et al*. (2013), Amjad *et al*. (2020) and Islam *et al*. (2021) investigated the similar research work which gives strengthen to our present work.

7. Plants used as Vegetables

Most important plants that are cultivated for vegetable purposes in the research area are *Allium cepa, Allium sativum, Brassica rapa, Cicer arietinum, Coriandrum sativum, Cucurbita maxima, Cucurbita pepo, Lactuca* spp, *Luffa acutangula, Luffa aegyptiaca, Mentha arvensis,* and *Raphanus sativus* shown in (Table). The leaves of the plants such as *Amaranthus viridis, Chenopodium album, Chenopodium murale, Lactuca sativa, Cicer arietinum* and *Brassica rapa* are used as a Saag and are

very delicious. Vegetables play very vital role in the economy of the country. Nowadays generation is not an aware of these plants values and wealth, therefore it is the need of today to save these wild plants in research area. These vegetables are generally called saag and are very delicious. Ali *et al*. (2018) reported 36 plants used as a vegetables in which Cicer arietinum and Brassica rapa leaves are boiled and eaten. Many researchers reported both wild and cultivated vegetables whuch are in use of the local people i.e. Razaq *et al*. 2010; Badshah & Hussain 2011; Hazart *et al*. 2011; and Sher *et al*. (2011).

8. Fencing plants

Livestock grazing is an important practice in the area therefore the people protects their crop fields by planting thorny, bushy or spiny plants around their crop fields. These plants were *Acacia modesta*, *Acacia nilotica*, *Capparis* spp, *Eucalyptus globules*, *Eucalyptus lanceolatus*, *Morus alba*, *Morus nigra*, *Ficus indica*, *Sacchharum* spp, *Phoenix dactylifera*, *Phragmites karka*, *Prosopis juliflora*, *Salvadora oleoides*, and *Zizyphus* spp (Table). People of the study are mostly chosen spiny and bushy plants for fencing purposes. Fencing of fields and crops is one of the common practice in research area to avoid the grazing and browsing.

9. Plants used for furniture purposes

Some of the important plant species used for furniture by the people were *Acacia modesta*, *Acacia nilotica*, *Albizia lebbeck*, *Dalbergia sissoo*, *Eucalyptus lanceolatus*, *Melia azedarach*, *Monotheca buxifolia*, *Morus alba*, *Morus nigra*, Salvadora *oleoides*, *Tamarix aphylla*, *Tamarix decidva* and *Zizyphus mauritiana*. Still people of the area are using plants to make furniture for different daily life requirements.

10. Timber wood species

Common timber wood species included *Acacia modesta*, *Acacia nilotica*, *Albizia lebbeck*, *Dalbergia sissoo*, *Eucalyptus globules*, *Eucalyptus lanceolatus*, *Morus alba*, *Phoenix dactylifera*, *Prosopis Salvadora oleoides*, *Tamarix aphylla*, *Tamarix decidva* and *Zizyphus mauritiana* are used as timber wood.People of the area used these woody species for construction. Our results are highly supported by Umair *et al*. (2017), Khan *et al*. (2018) and Amjad *et al*. (2020). In research area most of the medicinal plants were sold at higher rates in local markets. There was no strategy of plants conservation with the locals. Our current study suggested that due to modernization of the people the traditional knowledge of these medicinal plants are going towards losing which is not good sign for our future generations.
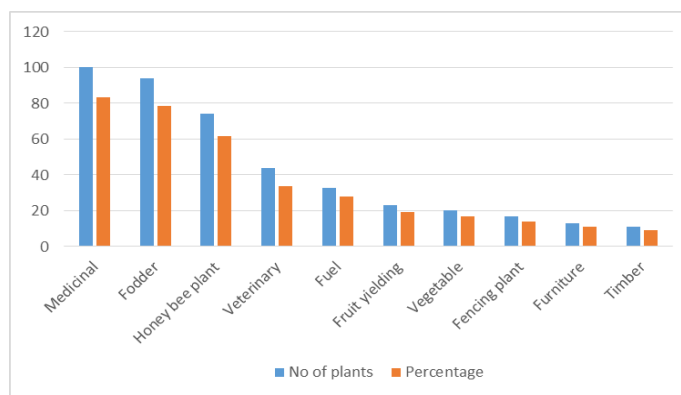
IV. CONCLUSION

The current study demonstrated that the locals have a solid understanding of herbal medications, but as they get more modernized, their knowledge of the customary applications of plants may eventually be lost. The investigated area has a rich diversity of medicinal plants and provides a conducive habitat and ideal conditions for their growth. It is important to support active healers in appropriately imparting their wisdom to others. These investigations may also furnish biochemists and pharmacologists with valuable insights for the identification of specific species, prompt evaluation of phytochemical constituents, and bio analysis for genuine treatment of many ailments.

REFERENCES

[1] Alemneh. (2021). Ethnobotanical Study of Plants Used for Human Ailments in Yilmana Densa and Quarit Districts of West Gojjam Zone, Amhara Region, Ethiopia. *Hindawi Bio-Med Research International.,* 2(1): 66-83.

[2] Ali, A., L. Badshah and F. Hussain. 2018. Ethnobotanical Appraisal and Conservation Status of Medicinal Plants in Hindukush Range, District Swat, Pakistan. *Journal of Herbs, Spices & Medicinal Plants*., 5(5): 295-299.

[3] Amjad, M. S., U. Zahoor, R. W. Bussman and M. Altaf. 2020. Ethnobotanical survey of the medicinal flora of Harighal, Azad Jammu & Kashmir, Pakistan. *Journal of Ethnobiology and Ethnomedicine.,* 16-65.

[4] Essandoh, P. K., G. Dali and I. M. Bryant. 2023. Medicinal plant use and integration of traditional healers in to health care system:A case study at Ankasa Forest Reserve and catchment communities in Ghana. *Ethnobotany Research and Applications*., 25(15): 1-24.

[5] Gulzar, H., A. Hazrat, K. Gulzar, F. Ali, N. Khan, M. Nisar, I. Khan and A. Ullah. 2019. Medicinal plants and their traditional uses in Thana Village, District Malakand, Khyber Pakhtunkhwa, Pakistan. *Int. J. endorsing health sci. res*., 7 (1): 2310-3841.

[6] Hameed, T., I. Ahmad, S. Ullah and W. Hussain. 2023. Ethnobotanical study and conservation status of medicinal

plants used by traditional healers in Toormang Valley, Northern Pakistan. *Journal of Xi'an Shiyou University, Natural Science Edition*., 19(1): 1566-1594.

[7] Liaqat, I., S. Hussain, H. Bibi, I. Ahmad, S. Arif, M. Haq, F. Parveen, H. Rehman and B. Mahmood. 2023. Ethnobotanical Survey of Medicinal Plants Used for Primary Health Care from Patan Sher Khan and Surrounding Areas of District Sudhnoti, Azad Jammu and Kashmir, Pakistan. Journal of Applied Research in Plant Sciences., 4(1): 518-528.

[8] McClatchey, W. C., G. B. Mahady, B. C. Bennett, L. Shiels and V. Savo. 2009. Ethnobotany as a pharmacological research tool and recent developments in CNS-active natural products from ethnobotanical sources. *Pharmacol. Ther*., 123(2): 239-254.

[9] Shuaib, M., N. Jang, S. Ayub, S. U. Rahman, M. T. Khan, M. Fazil and Z. Ali. 2016. Export of important medicinal plants to local and international market from district Dir, Khyber Pakhtunkhwa, Pakistan. Amer-Eur. *J. Agric. Environ. Sci*., 16(1): 99-103.

[10] Shah, A., S. K. Marwat, F. Gohar, A. Khan, K. H. Bhatti, M. Amin, N. Din, M. Ahmad and M. Zafar. 2013. Ethnobotanical Study of Medicinal Plants of Semi-Tribal Area of Makerwal & Gulla Khel (Lying between Khyber Pakhtunkhwa and Punjab Provinces), Pakistan. *American Journal of Plant Sciences*., 4(1): 98-116.

[11] Umair, M., M. Altaf and A. M. Abbasi. 2017. An ethnobotanical survey of indigenous medicinal plants in Hafizabad district, Punjab-Pakistan. *PLoS ONE* .,12(6): 177-191.

[12] Dogara, M., S. W. Bradosty, W. Hamad, M. Ibrahim, A. Lema, N. Sunsi, M. Usman, I. Ashirn, N. B. Ahmad, N. Wada and R. W. Bussman. 2022. Traditional Methods for Treatment and Management of Measles in Northern Nigeria: Medicinal plants and their molecular docking. *Ethnobotany Research and Applications., 23-33.*

[13] Bano, A., M. Ayub, S. Rashid, S. Sultana and H. Sadia. 2013. Ethnobotany and conservation status of Floral Diversity of Himalyan Range of Azad Jammu and Kashmir Pakistan. *Pak. J. Bot*., 45(SI): 243-251.

[14] Alam, J., G. Mujtaba, A. H. Shah, S. Ahmad, H. Ali and A. Mahmood. 2018. Conservation status assessment of native vascular flora of Kalam Valley, Swat District, Northern Pakistan. *International Journal of Biodiversity and Conservation*., 10(11): 453-470.

[15] Khan, M and F. Hussain. 2013. Conservation status of plant species in Tehsil Takht-eNasrati, District Karak, Khyber Pakhtun Khawa, Pakistan. *International Journal of Biodiversity and Conservation*., 5(1): 20-26.

[16] Khan, K., I. U. Rahman, E. S. Calixto, N. Ali and F. Ijaz. 2019. Ethnoveterinary therapeutic practices and conservation status of the medicinal flora of Chamla valley, Khyber Pakhtunkhwa, Pakistan. *Front. Vet. Sci*., 6, 122.

[17] Khan, S and M. Khan. 2015. Ethnomedicinal and Conservation Status of plant species in Tehsil Takht Bhai, District Mardan, Pakistan. *International Letters of Natural Sciences*., 37: 18-29.

[18] Javid, T., Sarwar, T., Ullah, I., Ahmad, S & Rashid, S. (2019). Evaluation of ground water in district Karak Khyber Pakhtunkhwa, Pakistan. University of Engineering Technology Taxila. *Technical Journal*., 19(1): 333-347.

[19] IUCN (World Conservation Union). 2010. IUCN Red List categories and criteria: version 8.1. Species Survival Commission, IUCN, Gland, Switzerland, and Cambridge, United Kingdom.

[20] Doka, D., P. Saikia and D. Konwer. 2007. Ranking of fuel wood species by Fuel Value Index. Energy Sources, part A. Recovery, Utilization, and Environmental Effects, 29 (16), 1499–1506.

[21] Badshah, L and F. Hussain. 2011. Farmers preferences and use of local fodder flora in Tank District, Pakistan. *Afric. J. Biotechnol*., 10(32): 6062-6071.

[22] Hazrat, A., M. Nisar, J. Shah and S. Ahmad. 2011. Ethnobotanical study of some elite plants belonging to Dir, Kohistan Valley, Khyber Pukhtunkhwa, Pakistan. Pak. J. Bot., 43(2): 787-795.

[23] Sher, Z., Z. D. Khan and F. Hussain. 2011. Ethnobotanical studies of some plants of Chagharzai valley, District Buner, Pakistan. Pak. J. Bot., 43(3): 1445-1452.

[24] Badshah, L., F. Hussain and Z. Sher. 2012. An over view of people plant interaction in the rangeland of district Tank, Pakistan. *J. Med. Plant Res*., 6 (14): 2820-2826.

[25] Barkatullah, M. Ibrar and F. Hussain. 2009. Ethnobotanical studies of Charkotli Hills, Batkhela District, Malakand, Pakistan. Front. Biol. China, 4(4): 539-548.

[26] Gonfa, N., D. Tulu, K. Hundera and D. Raga. 2020. Ethnobotanical study of medicinal plants, its utilization, and conservation by indigenous people of Gera district, Ethiopia. *Cogent food & Agriculture* ., 6(1): 222-234.

[27] Islam, T., A. Pierni, S. Bokhter and M. Faruque. 2021. Medical ethnobotany of the Marma community of Rangamati district of Bangladesh. *An International Journel for Botany and Mycology*., 39(2):66-84.

[28] Tariq, A., M. Adnan and S. Begum. 2016. Medicinal plants density along an altitudinal gradient in And around Ayubia National Park. *Pak. J. Bot*., 48(4): 1537-1546, 2016.

[29] Rehman, A and M. Adnan. 2018. Nutritional potential of Pakistani medicinal plants and their contribution to human health in times of climate change and food insecurity.. *Pak. J. Bot*., 50(1): 287-300.

[30] Sher, H. and F. Hussain. 2009. Ethnobotanical evaluation of some plant resources in Northern part of Pakistan. African Journal of Biotechnology, 8 (17): 4066-4076.

[1]   Authors

First Author – Siddiq Ullah, Ph.D, Directorate, Non Tember Forest Products Khber Pakhtukhwa, Pakistan and Qurtaba University, Peshawar Pakistan
Second Author – Fazle Malik Sarim, Ph.D\. Qurtaba University, Peshawar Pakistan

Correspondence Author – Siddiq Ullah, Ph.D, Qurtaba   University, Peshawar Pakistan