Traditional knowledge of Ethnoveterinary Medicinal Plants used by Livestock owners for Livelihood Security of Swat Kohistan Valley, Hindu Kush Range, Swat Pakistan

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Abstract

A detailed investigation was carried out during 2023-2024 to document information on ethno veterinary plant used by the local community of Swat Kohistan Valley for the treatment of various livestock ailments. A total of 14 plant taxa were recorded during the present study to treat various livestock ailments. These species were classified among 14 genera and 13 families. Polygonaceae was the dominant family which contributed 2 species while rest of families namely Hippocastinaceae, Asparagaceae, Berberidaceae, Saxifragaceae, Geraniaceae, Araliaceae, Fabaceae, Oleaceae, Paeoniaceae, Urticaceae, Valerianaceae and Fagaceae are represented by a single species each. The most common ethnoveterinary diseases viz., abdominal pain, antiworm, anthelmintic, cough, fever & chest infections, wounds healing, digestion, diarrhea, discharge of pus, lactation in cattle, paralysis, constipation, appetizer, colic, tonic and urinary tract infections were documented for the treatment of animal health care. Herbaceous flora was dominant with 8 species followed by shrubs 3 species, trees 2 species and climber with 01 species in descending order. The study also indicated 07 plant species are also used in enhancing milk production. Leaf was widely used part 6, followed by roots 4, fruits 3, shoots and rhizome 2 species each, bark and seed with 1 species each. IUCN Red List Criteria, 2001, version 3.1, and 2003 Version 3.0 were used to establish conservation status of ethnoveterinary plants. It was concluded that that valley is hot centre of medicinal plant biodiversity and local community utilized these plant sources for livelihood security of the area but some globally important and rare medicinal plant are severely threated due to habitat degradation, unsustainable utilization and overexploitation.

Key words: Ethno-veterinary Plants, Medicinal uses, Conservation Status, Swat Kohistan Valley, Hindu Kush Range, Northern Pakistan

Introduction

Plants are a vital source of traditional medicine that is used for treatment of various diseases. Approximately 422000 flowering plants are reported from the world with more than 50,000 have been used for medicinal purposes & traditional medicine across the globe. In developed countries people especially rural communities still depend on traditional and indigenous system of healthcare due to its low price and least side effects, as compared to the modern allopathic medicine. It is one of the main reasons that are why people used extensively throughout the world especially in the third world countries. (Walter & Hamilton,1993).

Medicinal plants are most important source of drugs in traditional system of medicine and continue to be extensively used as a major source of drugs for treatment of many health disorders throughout the world. Mountainous community used medicinal plant resources for the treatment of human and livestock health care since time immemorial. The cultural practice and indigenous uses of herbal remedies has descended down from generation to generation and includes the treatment from simple ailments to the most complicated ones. Medicinal plants and herbal medicine form an important component of treatment in the indigenous systems that have been used for millennia in all cultures over centuries and serve both as a source of income and a source of affordable healthcare (World Bank, 1997).

Pakistan is blessed with approximately 6000 species of higher plants, of which 600–700 are used medicinally (Shinwari, 2015), out of these 6000 species, half (3000 species) are reported from Northern areas out of which 124 species have medicinal importance. In rural areas of Pakistan, approximately 75% of the inhabitants are still reliant on traditional knowledge for their basic healthcare system (Ullah, 2013) because there is no modern healthcare facility provided to them.

Despite the fact that ethno medicinal and veterinary plant species is very crucial in indigenous system of medicine for the human and animal health care of most region of our country, it has not yet been well explored, analyzed, documented and also their documentation is very much neglected in remote areas of our country. Much effort and works are needed for research and integration activities in the field of ethno veterinary plant biodiversity to enhance the sustainable livelihood security of the area.

The inhabitants of the Swat Kohistan valley have indigenous and cultural knowledge about the usage of the plants. They use the folk medicines through different ways, depending on plant species, use of recipes, folk uses, method of preparation, doses and pattern of application. Some studies viz., McCorkle (1996), Catley and Mohammad (1996), Heffernan *et al.* (1997), Waihenya et al. (2002), Jabbar *et al*., 2006, Lans et al. (2007), Farooq *et al*., 2008, Abbasi *et al.*, Khan (2009), Khan, 2009, Muhammad, Iqbal, & Hussain, 2009, Rashid *et al.,* (2010), Tabuti *et al.,* (2012),and Yirga *et al.,* (2012), Abbasi *et al.,* 2013, Luseba1 and Tshisikhawe (2013), Hassan *et al.,* (2014), Tariq. *et al.,* 2014, Midrarullah *et al.,* 2014, Ahmad *et al.,* 2015, Teklay (2015), Jima (2018), Majid *et al.,* 2019, have been carried out on indigenous knowledge of medicinal plants in the Hindukush Himalaya region Northern Pakistan to treat livestock and human ailments however few workers have recorded the ethnoveterinary plants used in indigenous system of animal medicine in different parts of Pakistan.

Despite the fact that ethnomedicinal and veterinary plant species is very crucial in indigenous system of medicine for the human and animal health care of most region of our country, it has not yet been well explored, analyzed, documented and also their documentation is very much neglected in remote areas of our country. Much effort and works are needed for research and integration activities in the field of ethnoveterinary plant biodiversity to enhance the sustainable livelihood security of the area therefore present study was scheduled to record ethno veterinary plants and their medicinal values for livelihood security of the local community. This was the first attempt to be enlist ethno-veterinary plants from study area. The main objectives of the study to record indigenous knowledge of ethno-veterinary plants

The objectives of this field study are

1. Inventory of ethnoveterinary medicinal plants used in indigenous and traditional system of medicine from Swat Kohistan Valley, HKH, Northern Pakistan.
2. To record the traditional knowledge, indigenous and cultural practices of medicinal plants used for treating animal diseases in the Swat Kohistan, HKH, Northern Pakistan
3. To record the folk recipes and plant-based remedies of the local people to treat various animals' diseases.
4. To document and enlist ethnoveterinary diseases treated by the local communities using medicinal plant species as primary animal health care.

5. To examine local perceptions of factors that threaten wild medicinal plant resource

MATERIALS AND METHODS

Study area

The valley of Swat, popularly known as the Switzerland of the east with its pristine scenic grandeur is highly popular among the tourists for its lavish display of natural majesty and scenery. The area is consists of 5337 Km² of land and can be traced within 34° 30´- 35° 55´ N latitude and 71° 45´- 72° 50´ E longitude. The District is composed of rocky mountainous series of Hindukush-Himalayan having great altitudinal variation, ranging from gentle slope in the south to very steep slopes at high altitude of northern parts (Ahmad, 1995). (Anonymus, 1998). Major portion of the area comes under the influence of Sino-Japanese floristic region. (Ali and Qaiser, 1986).

The Swat Kohistan is a mountainous area with lush green valleys, snow covered peaks, glaciers, forests, meadows and water fall. It is located between the Himalayan and the Hindu Kush foothills of Khyber Pakhtunkhwa (KP. The valley has altitudinal variation ranging approximately from 60m in the South at Maglaur (Valley entrance) to more than 6000 m in the North (Anonymous, 1998).

The area is covered with thick forest of blue pine. The Chir pine and *Quercus incana* occupying the low altitude. *Abies pendrow* and *Picea smithiana*, *Cedrus deodara* and *pinus geradiana*, taxus wallichina dominates the higher altitude of the area. *Abies pendrow* and *Picea smithiana* dominates the shady places while *Cedrus deodara* and *pinus geradiana* found on exposed and dry rocks of the area. (Anonymous, 1998). The vegetation of the area especially medicinal plants is severely threatened due to habitat loss, degradation, deforestation, anthropogenic activities, over harvesting and over exploitation.

Field Survey and Ethnomedicinal Data collection

Field visits were carried out in the Swat Kohistan, HKR, Pakistan, from October 2023 to December 2023 for the collection, documentation and exploration of living ethno-Medicinal Plants and Ethno-Veterinary Medicinal Plants. The primary data on medicinal plants were collected using personal interviews and group discussions after obtaining prior informed consent

from the participants. Secondary data was obtained published, books, journal articles, monographs, pamphlets and other authentic available literature of medicinal plants. Information was mostly obtained from herbalists, traditional healers/hakims, farmers, nomads, herdsmen, and elder peoples. Information on ethno medicinal plants regarding their Botanical name, family name, vernacular name, part used, habit, part used, traditional and folk recipes, mode of administration, collection methods, collection time, flowering seasons, distribution, availability, abundance and conservation status were recorded during interview and group discussions Plant specimens were collected and personal observations were also recorded in the fields with comprehensive field's notes including locality, sub locality, habit, abundance, altitude, etc.

Plant Preservation and Identification

Taxonomic identification of ethnoveterinary medicinal plants were identified with help of flora of Pakistan and other available literature. ((Nasir and Ali, 1970-89; Ali and Nasir, 1989-1991; Ali and Qaiser, 1993-2016). Ethnoveterinary remedies and traditional uses were also verified and compared with help of available medicinal plants literature (Published books, chapters and article of medicinal plants of the Hindukush Himalaya Range and Nothren Pakistan). Botanical names, family's names, synonyms and authorities was further confirmed using the updated legitimate data base for plant taxonomy and Nomenclature; Kew Plant of the World online(https://powo.science.kew.org), BGIF (The Global Biodiversity Information Facility-http://www.gbif.org/dataset/0064f3b0-e3f0-4ff6-bb7d-f0bb93cff2ee), Tropicose (http:/tropicose.org), WFO Plant List (https://wfoplantlist.org/). APG IV,2020(Angiosperm Phylogeny Group) was used for Families nomenclature and classification. All the recorded species were properly pressed, dried, processed and submitted to Qarshi Herbarium, Qarshi Herb Research Centre.

RESULTS AND DISCUSSIONS

Present study documented and explored a total of 60 medicinal plant biodiversity including some 14 ethno-veterinary important plants for sustainable livelihood security and safety of the area.

A total of 14 plant taxa were recorded during the present study to treat various livestock ailments (Table-II). These species belong to 14 genera and 13 families. Out of which, 13 families

belong to Dicots and 1 Monocot. Family Polygonaceae was the most widely used family with 2 species whereas the remaining 12 families viz., Hippocastinaceae, Asparagaceae, Berberidaceae, Saxifragaceae, Geraniaceae, Araliaceae, Fabaceae, Oleaceae, Paeoniaceae, Polygonaceae, Urticaceae, Valerianaceae and Fagaceae are monospecific and monogeneric, contributed one species each. (Table- I & II). Herbaceous flora was dominant with 8 species followed by shrubs 3 species, trees 2 species and climber with 01 species in descending order. The present study was the first of its nature in the Swat Kohistan area and 14 ethnoveterinary plant species viz., Aesculus indica (Wall.ex. Cambl.) Hook.f., Asparagus officinalis L., Berberis lyceum Royle, Bergenia ciliata Sternb., Bistorta amplexicaulis (D. Don) Green, Geranium wallichianum D.Don ex Sweet, Hedera nepalensis K. Koch., Indigofera heterantha Wall. ex Brandis, Jasminum officinale L., Paeonia emodi Wall ex Royle, Rumex hastatus D. Don., Urtica dioica L., Valeriana jatamansi Jones and Quercus incana Roxb. were documented for the first time in the study area for their ethnoveterinary practices.

A total of 19 disease/disease groups were recorded in the study area. The most common disease of livestock documented in the study area were abdominal pain, cough, fever, chest infections, wounds healing, digestion, body warmth, diarrhea, discharge of pus, paralysis, constipation, tonic, appetizer, colic and urinary tract infections. (Table-II).

Leaf was widely used part 6, followed by roots 4, fruits 3, shoots and rhizome 2 species each, bark and seed with 1 species each. (Table-I).

Leaves (32%) were the most frequently used plant parts in the preparation of ethnoveterinary recipes followed by root (21%), fruit (16%), rhizome (11%), shoots (10%) and bark and seeds (05% each). (Table-III).

The results showed that most of the medicinal plant biodiversity are under threaten category by various ecological factors/ anthropogenic activities which radiate signals for attention needed to protect these medicinal plants. The study also confirms that most threaten factors for medicinal plant biodiversity and associated indigenous knowledge are natural and anthropogenic factors such as agriculture expansion, deforestation, overharvesting of plant resources for medicinal purposes, overconsumption for charcoal, firewood, timber wood, overgrazing. Informants ranked quality of

habitat loss, overharvesting of medicinal plants, deforestation and agriculture expansion are the most the serious threats for medicinal plants.

CONSERVATION ISSUES

IUCN Red List Criteria 2001 version 3.1 was used to establish conservation status of plant biodiversity of the area. Of these 14 taxa, 01 species (%) were recorded Critically Endangered, 08 species Endangered, 01 species Vulnerable, 02 Near Threatened, 01 Least Concern and as 01 data deficient while 04 species were recognized as Alien/Cultivated (Table-III). Dominant factors which are used for the evaluation of conservation status are population reduction, b. restricted distribution, c. Population size, d. No. of Mature individuals in the wild and e. Probability of extinction. The taxa depend on each or any of these five criteria determine conservation values of plant biodiversity.

CONCLUSIONS:

The present investigation is the first attempt to record ethnoveterinary plants that are used by tribal communities of the Swat Kohistan, Northern Pakistan, for treatment of animal diseases. 19 disease/health groups were recorded during the course of study being cured with ethno veterinary medicinal plants of which 07 plant species are used in enhancing milk production. The most common disease of livestock documented in the study area were anthelmintic, abdominal pain, cough, fever, chest infections, enhance milk production, wounds healing, digestion, body warmth, diarrhea, discharge of pus, paralysis removal of leeches, constipation, tonic, appetizer, colic and urinary tract infections. The ethnoveterinary knowledge was mostly confined to elders' peoples, shepherds, herders and farmers. It was concluded that further phytochemical and pharmaceutical analysis of these important medicinal plants is needed for validation of veterinary diseases. The study indicated that habitat degradation, overexploitation, deforestation and agriculture expansion are some serious threats for medicinal plants which create huge biotic pressure and threatened the ethno veterinary plant biodiversity & livelihood security of the local community.

Novelty of the study:

The current study is the first attempt in the study area. A total of 14 ethno-veterinary Plants viz., Aesculus indica (Wall.ex. Cambl.) Hook.f., Asparagus officinalis L., Berberis lycium Royle,

Bergenia ciliata (Haw.) Sternb., Bistorta amplexicaulis (D. Don) Green., Geranium wallichianum D.Don ex Sweet, Hedera nepalensis K. Koch., Indigofera heterantha Wall. ex Brandis, Jasminum officinale L., Paeonia emodi Wall ex Royle, Valeriana jatamansi Jones, Urtica dioica L., Rumex hastatus D. Don. and Quercus incana Roxb. were documented for the first time in Swat Kohistan valley for their ethnoveterinary practices.

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CONFLICT OF INTREST

All the authors have no conflict of interest.

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Chart-I. Shows Number of Ethno-veterinary Plants used by Livestock owners for Livelihood Security of Swat Kohistan Valley, Hindu Kush Range, Swat Pakistan

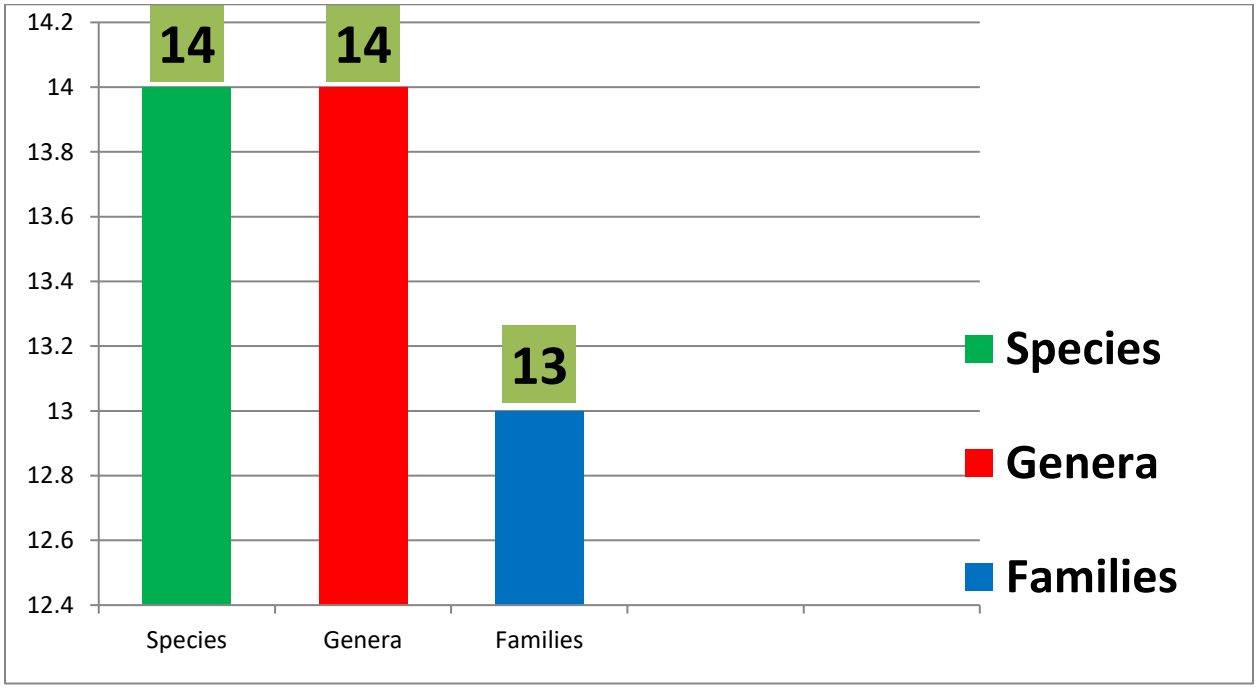

Chart-II. Shows Number of Species families in different taxonomic groups of Ethnoveterinary Plants

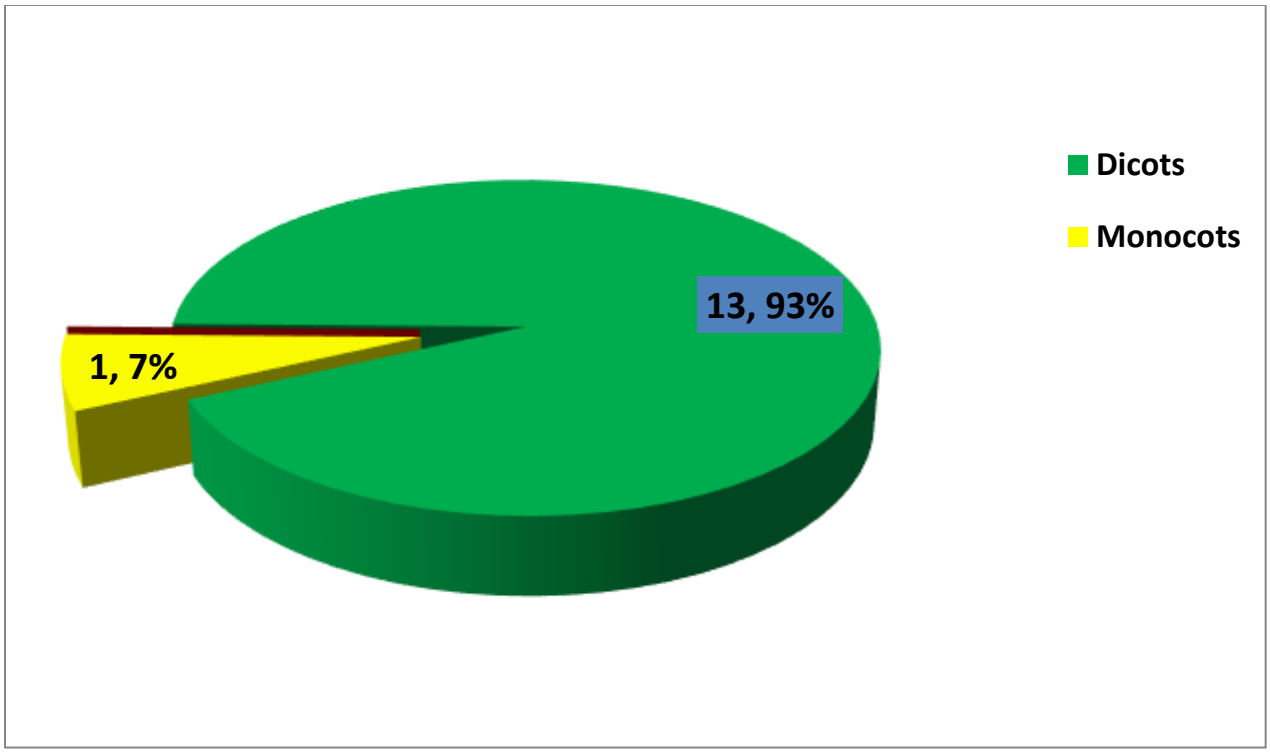

Chart-III. Shows number and percentage of species in each IUCN Red List Category

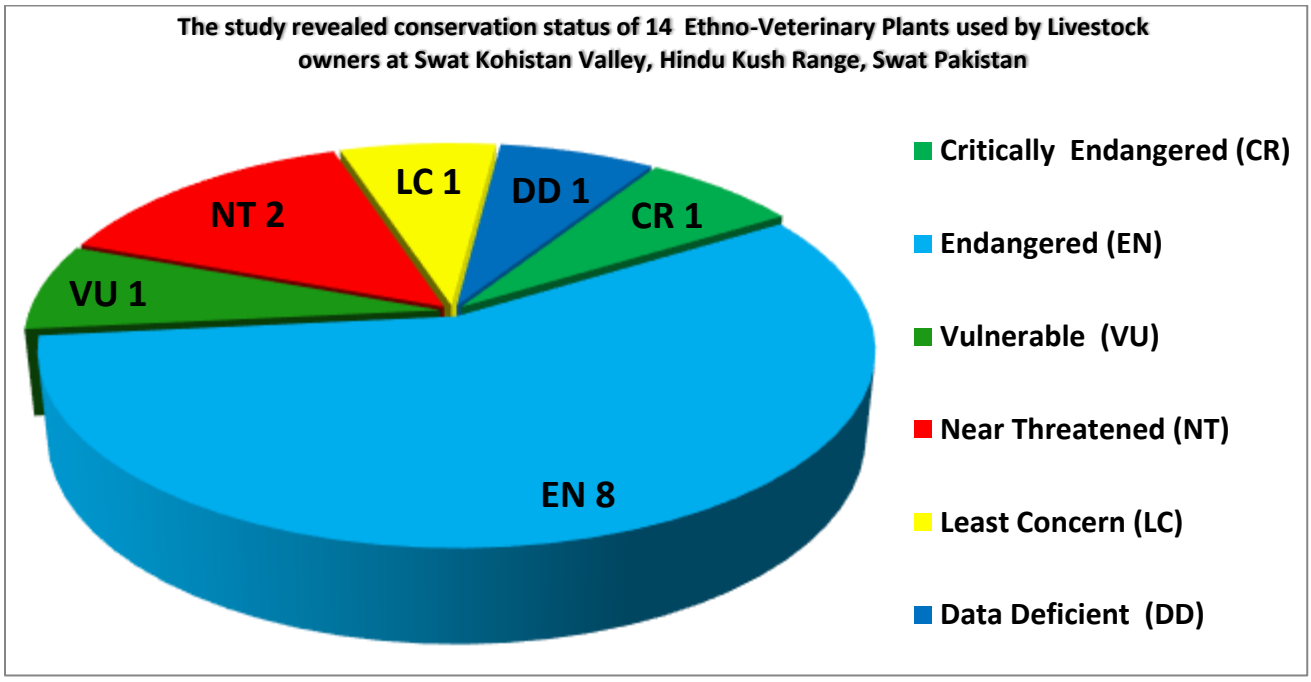

Chart-IV. Ethno-veterinary Plant Parts in the Preparation of Animal Folk Recipes

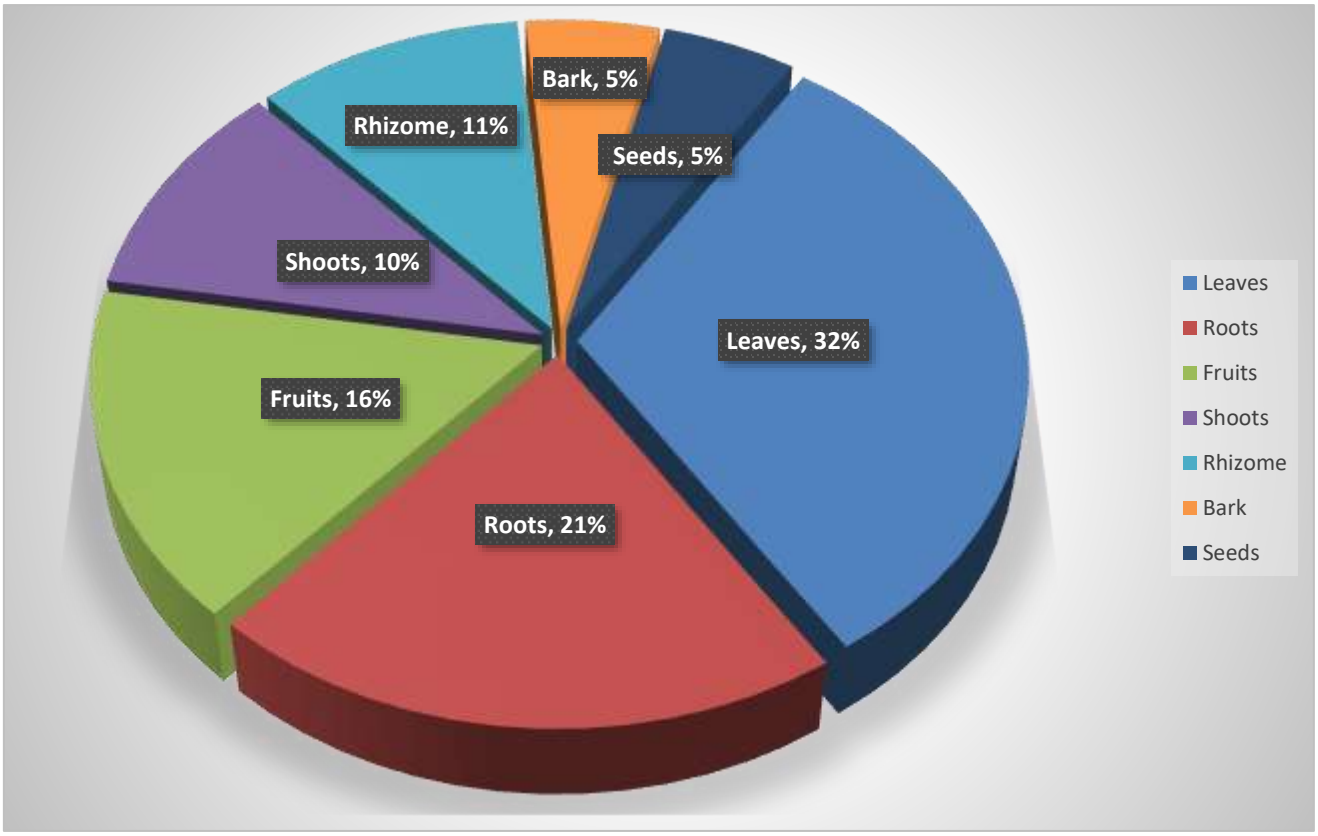

Table-I. Inventory and Medicinal utility of Ethno veterinary Plants in Swat Kohistan Valley, Hindu Kush Range, Northern Pakistan

S.#	Taxon	Family	Local Name	Habit	Part Used	Animals	Medicinal/Folk Uses
1.	*Aesculus indica* (Wall.ex. Cambl.) Hook.f.	Hippocastinaceae	Jawaz	Tree	Seeds/Fruits	Cows and Buffalos	Seeds & nuts are grinded into powdered, given to the horses & other animals in abdominal pain, cough, fever & chest infections. Plant is also used for enhancing milk production in cattle Seeds are grinded powdered and taken orally with a glass of water for intestinal worms in both human and cattle. Plant is also used for milk production in cattle.
2.	*Asparagus officinalis* L.	Asparagaceae	Tindorai/Muslisufaid	Herb	Young shoots	Cows and Buffalos	Enhance lactation in cattle
3.	*Berberis lycium* Royle	Berberidaceae	Kwaray/Ziarlarge	Shrub	Roo/Bark	Buffaloes, cows, goats and sheep	Bark of the root is dried, grinded and mixed with wheat flour and is given to cows, buffaloes, goats and sheep for improving digestion. Bird also used this plant as paste for their wound healing.

							The bark of rhizome is uses for internal and external healing in livestock. Dried rhizome is boiled in water and filtered through fine cloths and the extract is used for internal wound and body warmth in livestock.
4.	*Bergenia ciliata* (Haw.) Sternb.	Saxifragaceae	Makanpath, ghat panra/Kmar panra	Herb	Leaves	Cows, buffaloes, sheep and Goats	Locally the dried leaves are crushed and mixed with wheat flour and fed to cattle for treatment of diarrhea. Plant is also used in discharge of pus in case of livestock.
5.	*Bistorta amplexicaulis* (D. Don) Green.	Polygonaceae	Tarva pana/Anjabar/ Bekh-e-anjabar	Herb	Rhizome/root	Cows, buffaloes and goat	Powdered of rhizome is administered with milk to soften mammary gland of livestock and also used for diarrhea. Fresh ground root is given to cattle (in bolus form) for curing of paralysis in cattle
6.	*Geranium wallichianum* D.Don ex Sweet	Geraniaceae	Wallich Geranium/ Sra Zela	Herb	Roots	Cows and buffaloes	The powdered rhizome is mixed with milk and fed to livestock especially in winter to promote lactation.
7.	*Hedera nepalensis* K.	Araliaceae	Zelai	Climber	Leaves & fruits	Cattles	Juice of plant is used for removal of leeches from nose of cattle.

	Koch.						
8.	*Indigofera heterantha* Wall. ex Brandis	Fabaceae	Ghwareja	Shrub	Roots/young shoots	Cattles	Dried roots are mixed with wheat flour and taken orally to cattle for various infections. The young twigs and leaves are given to cattle for treatment of abdominal pain.
9.	*Jasminum officinale* L.	Oleaceae	Chambel	Shrub	Leaves	Cows, buffaloes,	The Plant is also fed to livestock for cough and fever and to increase milk production.
10.	*Paeonia emodi* Wall ex Royle	Paeoniaceae	Mamekh	Herb	Roots	Cows, buffaloes and goats	Powdered rhizome is considered as general body tonic and is given to cattle (in bolus form) to enhance lactation, and also as general body tonic. Rhizome is given to cattle for fever.
11.	*Valeriana jatamansi* Jones	Valerianaceae	Mushke Bala	Herb	Rhizome	Cows and buffaloes	The plant is used to increase lactation in livestock.
12.	*Urtica dioica* L.	Urticaceae	Seezonakay	Herb	Leaves	Cows and buffaloes	The whole plant is mixed with other fodder crops in considerable amount for increase milk or lactation
13.	*Rumex hastatus*	Polygonaceae	Tarokay	Herb	Leaves	Cows and buffaloes	Fresh crushed leaves are mixed with wheat flour for

	D. Don.						the treatment of constipation in cattle. Root of plant is used in colic & abdominal pain. Leaves of plant are considered as appetizer for livestock. Roots are boiled in water along with gur, mixture is then filtered & given to the livestock in case of colic.
14.	*Quercus incana* Roxb.	Fagaceae	Spin banj	Tree	Fruits	Cows and buffaloes	Fruit is dried, powdered, mixed with wheat or corn flour and is given to animals for the treatment of urinary tract diseases.

Table-II. Ethnomedicinal Usage of Ethnoveterinary Plants from Swat Kohistan HKH Range, Northern, Pakistan

S.#	Bot. Name	Family Name	Disease treated	Method of Usage/Ethnomedicinal use
1.	*Aesculus indica* (Wall.ex. Cambl.) Hook.f.	Hippocastinaceae	anthelmintic, abdominal pain, cough, fever & chest infections. enhance milk production	Seeds & nuts are grinded into powdered, given to the horses & other animals in abdominal pain, cough, fever & chest infections. Plant is also used for enhancing milk production in cattle Seeds are grinded powdered and taken orally with a glass of water for intestinal worms in both human and cattle. Plant is also used for milk production in cattle.
2.	*Asparagus officinalis* L.	Asparagaceae	Enhance lactation in cattle	Young shoots are fed to cattle for increase milk production.
3.	*Berberis lyceum* Royle	Berberidaceae	Wounds healing, digestion, body warmth	Bark of the root is dried, grinded and mixed with wheat flour and is given to cows, buffaloes, goats and sheep for improving digestion. Bird also used this plant as paste for their wound healing. The bark of rhizome is used for internal and external healing in livestock. Dried rhizome is boiled in water and filtered through fine cloths and the extract is used for internal wound and body warmth in livestock.

4.	*Bergenia ciliata* Sternb.	Saxifragaceae	Diarrhea, discharge of pus	Locally the dried leaves are crushed and mixed with wheat flour and fed to cattle for treatment of diarrhea. Plant is also used in discharge of pus in case of livestock
5.	*Bistorta amplexicaulis* (D. Don) Green.	Polygonaceae	Lactation in cattle, paralysis, diarrhea.	Powdered of rhizome is administered with milk to soften mammary gland of livestock and diarrhea. Fresh ground root is given to cattle in bolus for curing of paralysis in cattle
6.	*Geranium wallichianum* D.Don ex Sweet	Geraniaceae	Promote lactation	The powdered rhizome is mixed with milk and is given animals to promote lactation.
7.	*Hedera nepalensis* K. Koch.	Araliaceae	Removal of leeches	Juice of plant is used for removal of leeches from nose of cattle.
8.	*Indigofera heterantha* Wall. ex Brandis	Fabaceae	Abdominal pain, livestock ailments	Dried roots are mixed with wheat flour and taken orally to cattle for various infections. The young twigs and leaves are given to cattle for treatment of abdominal pain.
9.	*Jasminum officinale* L.	Oleaceae	increase milk production	The Plant is also fed to livestock for cough and fever and to increase milk production.
10.	*Paeonia emodi* Wall ex Royle	Paeoniaceae	increased lactation in cattle, Fever	Powdered rhizome is given to cattle in bolus form, to increase lactation, and also as general body tonic. Rhizome is given to cattle for fever and milk production.
11.	*Rumex hastatus* D. Don.	Polygonaceae	Constipation, appetizer, colic	Fresh crushed leaves are mixed with wheat flour for

				the treatment of constipation in cattle. Root of plant is used in colic & abdominal pain. Leaves of plant are considered as appetizer for livestock. Roots are boiled in water along with gur, mixture is then filtered & given to the livestock in case of colic.
12.	*Urtica dioica* L.	Urticaceae	increase milk production in livestock	Leaves are mixed with fodder and fed to livestock increase milk production
13.	*Valeriana jatamansi* Jones.	Valerianaceae	Tonic, enhance lactation	The plant is used to increase lactation in livestock.
14.	*Quercus incana* Roxb.	Fagaceae	Urinary tract infections	Fruit is dried, powdered, mixed with wheat or corn flour and is given to animals for the treatment of urinary tract diseases.

Table III. Ethnomedicinal Usage and conservation status of Ethnoveterinary Plants of Swat Kohistan Valley, HKH Range, Northern Pakistan

S.No.	Family	Species	English/ Local Name	Part used	Folk Use	Conservation status
1.	Hippocastinaceae	*Aesculus indica* (Wall.ex. Cambl.) Hook.f.	Jawaz	Seeds/Fruits	Seeds & nuts are grinded into powdered, given to the horses & other animals in abdominal pain, cough, fever & chest infections. Plant is also used for enhancing milk production in cattle Seeds are grinded powdered and taken orally with a glass of water for intestinal worms in both human and cattle. Plant is also used for milk production in cattle.	Critically Endangered
2.	Oleaceae	*Jasminum officinale* L.	Chambel	Leaves	The Plant is also fed to livestock for cough and fever and to increase milk production.	Data Deficient
3.	Asparagaceae	Asparagus officinalis L.	Tindorai/Muslisufaid	Young shoots	Enhance lactation in cattle	Endangered
4.	Berberidaceae	*Berberis lycium* Royle	Kwaray/Ziarlarge	4.	Bark of the root is dried, grinded and mixed with wheat flour and is given to cows, buffaloes, goats and sheep for improving digestion. Bird also used this plant as paste for their wound healing. The bark of rhizome is uses for internal and external healing in livestock. Dried rhizome is boiled	

					in water and filtered through fine cloths and the extract is used for internal wound and body warmth in livestock.	
5.	Fagaceae	*Quercus incana* Roxb.	Spin banj	Fruits	Fruit is dried, powdered, mixed with wheat or corn flour and is given to animals for the treatment of urinary tract diseases.	Endangered
6.	Geraniaceae	*Geranium wallichianum* D.Don ex Sweet	Wallich Geranium/ Sra Zela	Roots	The powdered rhizome is mixed with milk and fed to livestock especially in winter to promote lactation.	Endangered
7.	Paeoniaceae	*Paeonia emodi* Wall ex Royle	Mamekh	Roots	Powdered rhizome is considered as general body tonic and is given to cattle (in bolus form) to enhance lactation, and also as general body tonic. Rhizome is given to cattle for fever.	Endangered
8.	Polygonaceae	*Bistorta amplexicaulis* (D. Don) Green.	Tarva pana/Anjabar/ Bekh-e-anjabar	Rhizome/root	Powdered of rhizome is administered with milk to soften mammary gland of livestock and also used for diarrhea. Fresh ground root is given to cattle (in bolus form) for curing of paralysis in cattle	Endangered
9.	Saxifragaceae	*Bergenia ciliata* (Haw.) Sternb.	Makanpath, ghat panra/ Kmar panra	Leaves	Locally the dried leaves are crushed and mixed with wheat flour and fed to cattle for treatment of diarrhea. Plant is also used in discharge of pus in case of livestock.	Endangered
10.	Valerianaceae	*Valeriana jatamansi* Jones	Mushke Bala	Rhizome	The plant is used to increase lactation in livestock.	Endangered
11.	Polygonaceae	*Rumex hastatus* D. Don.	Tarokay	Leaves	Fresh crushed leaves are mixed with wheat flour for the treatment of constipation in cattle. Root of plant is used in colic & abdominal pain. Leaves of plant are considered as appetizer for livestock. Roots are boiled in water along with gur, mixture is then filtered & given to the livestock in case of colic.	Least Concern
12.	Urticaceae	*Urtica dioica* L.	Seezonakay	Leaves	The whole plant is mixed with other fodder crops in considerable amount for increase milk or lactation	Near Threatened
13.	Araliaceae	*Hedera nepalenis* K. Koch.	Zelae	Leaves & fruits	Juice of plant is used for removal of leeches from nose of cattle.	Vulnerable
14.	Fabaceae	*Indigofera heterantha* Wall. ex Brandis	Ghwareja	Roots/young shoots	Dried roots are mixed with wheat flour and taken orally to cattle for various infections. The young twigs and leaves are given to cattle for treatment of abdominal pain.	Vulnerable