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Documentation of Commonly Used Ethnoveterinary Medicines from Wild Plants of the High Mountains in Shimla District, Himachal Pradesh, India

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Abstract: The aim of current study is to provide a significant traditional knowledge on wild medicines used for ethnoveterinary purposes in the rural area of Maraog region in district Shimla. The medicinal plants have played a significant role in the treatment of human as well as animal's dis-

eases. The rural people of the Maraog region were interviewed through a questionnaire and extensive field surveys were conducted from June 2020 to July 2021. The discussion, observations and interviews were conducted in study site and included 96 informants. The information gathered from the residents is presented in a table format and includes scientific and local names, different parts used, diseases treated and mode administration. The most commonly used taxa are calculated with used value. The study revealed 100 plants in which trees (7), shrubs (26), herbs (56), ferns (5), grasses (3) and climbers (3) were identified. The most commonly documented livestock diseases were found to be hoof infections, eyes infections, poisoning and skin infections. In the current study, the Rosaceae family was reported as being the highest number (11), followed by Asteraceae (10) and then Lamiaceae (6). It was found that leaves, roots, flowers and fruits are the commonly used parts for ethnoveterinary medications. The phytochemicals present in the plant, such as alkaloids, sterols, glycosides, flavonoids, lignin, coumarins and terpenoids, etc., may be responsible for their medicinal properties. In this documentation, it was observed that the younger generation does not have good knowledge of medicinal plants as compared to the older ones. Therefore, it is necessary to preserve the traditional knowledge of these medicinal plants before their permanent loss. The documentation and conservation of medicinal plants can be a good start for novel phytopharmacological research in the veterinary field.

Keywords: therapeutic uses; ethnoveterinary plants; rural people; livestock

1. Introduction

Ethnoveterinary medicine is a branch of science that explores the values, methods, skills, procedures and practices used for animal health care [1–4]. In rural areas of the northwestern Himalaya, plants are important for ethnic communities' survival. As the World Health Organization (WHO) reports, approximately 80% of the world's population is directly dependent on plant resources for their health, especially those living in rural regions [5,6]. India is considered a rich source of biodiversity, with two mega biodiversity hotspots, the Western Ghats and Eastern Himalayas [7]. The state of Himachal Pradesh has about 3256 plant species [8]. There are 3120 species of angiosperms, 124 species of pteridophytes and 12 species of gymnosperms in Himachal Pradesh. The high and low hills are covered with coniferous forests, with oak trees growing in the hollows. Firs and spruce dominate the higher elevations, while pines cover the lower elevations. The Himachal Pradesh is rich source of herbal medicinal plants and people of some areas are completely dependent on these plants for their well-being. In different reports, it was documented that aromatic and medicinal plants are used for various therapeutic purposes [9–11]. It was reported that different plants species have been used in India for medicinal purposes and human nourishment since Vedic times [12]. Medicinal plants possess different types of phytochemicals, such as alkaloids, flavonoid and saponin. [13–15]. The different natural resources from forests such as wild plants are used to fulfil the daily human beings' requirements, such as fuel, fodder and medicines [16,17]. Some wild plants yielding fruits are major source of nutrients and economy for many communities throughout the world [18,19]. Since ancient times, plants have been used by the majority of tribal communities. Some causes, such as rising drug prices and veterinary practices, have suddenly increased interest in the field of ethnoveterinary research [20]. People acquire ethnoveterinary information through several years of experience and only orally pass it on from generation to generation (oral tradition). With rapid cultural changes and modernization, this traditional information is being loss [21]. Therefore, there is an urgent need to for scientific documentation of traditional information from rural areas of India [22]. Different types of ethnoveterinary research on the use of plants in therapeutic studies have been conducted around the world [23]. Ethnoveterinary traditional knowledge is applied for the health care system of domestic animals [24,25]. In India, since the Vedic era, plants have been

used in veterinary treatment [26–28]. The current study documented a large number of wild plants with medicinal properties and therapeutic applications which are still unknown from Maraog region in Shimla district. In this context, it is important to conduct the extensive field surveys in unexplored regions that document the ethnoveterinary knowledge, because rapid urbanization and the greater use of synthetic drugs or medicines and culture variations may contribute to the loss of traditional knowledge from society. In addition, it can also provide important information for the selection of natural alternatives for treating livestock diseases and finding new drugs. Therefore, an attempt has been performed to document some useful indigenous knowledge of ethnoveterinary uses of plants from the rural region of Maraog in district Shimla of Himachal Pradesh, India. It was observed that due to modernization in the society, new generation of the study area is not interested in traditional knowledge; hence, the compilation of these ethnoveterinary plants is need of time. The usefulness of ethnopharmacology for drug development will be severely limited due to a lack of regional knowledge base concerning medicinal plants that can be exploited in veterinary ethnopharmacology. This study was conducted in the Shimla district of Maraog region in order to preserve the traditional knowledge of medicinal plants. The primary aim of this research was to collect and document the local traditional knowledge of ethnoveterinary plants used by native people of study site.

2. Materials and Methods

2.1. Description of the Study Area

The survey was carried out in Maraog region in tehsil Chopal of Shimla district. Maraog region is a rural area in Shimla district of Himachal Pradesh with a diverse ecological, archaeological, religious, mythological and spiritual community Figure 1. Chopal forest division is divided into 7 forest ranges and has 73 forest beats and 22 forest blocks [29]. Agriculture and farming are the primary occupations of the residents of the district. Apple, maize, green vegetables and potato are the chief cultivation crops grown in the study region. The animals such as sheep, goats, cows and buffalos are popular at the study site and provide meat, milk and milk products for rural people in Shimla district.

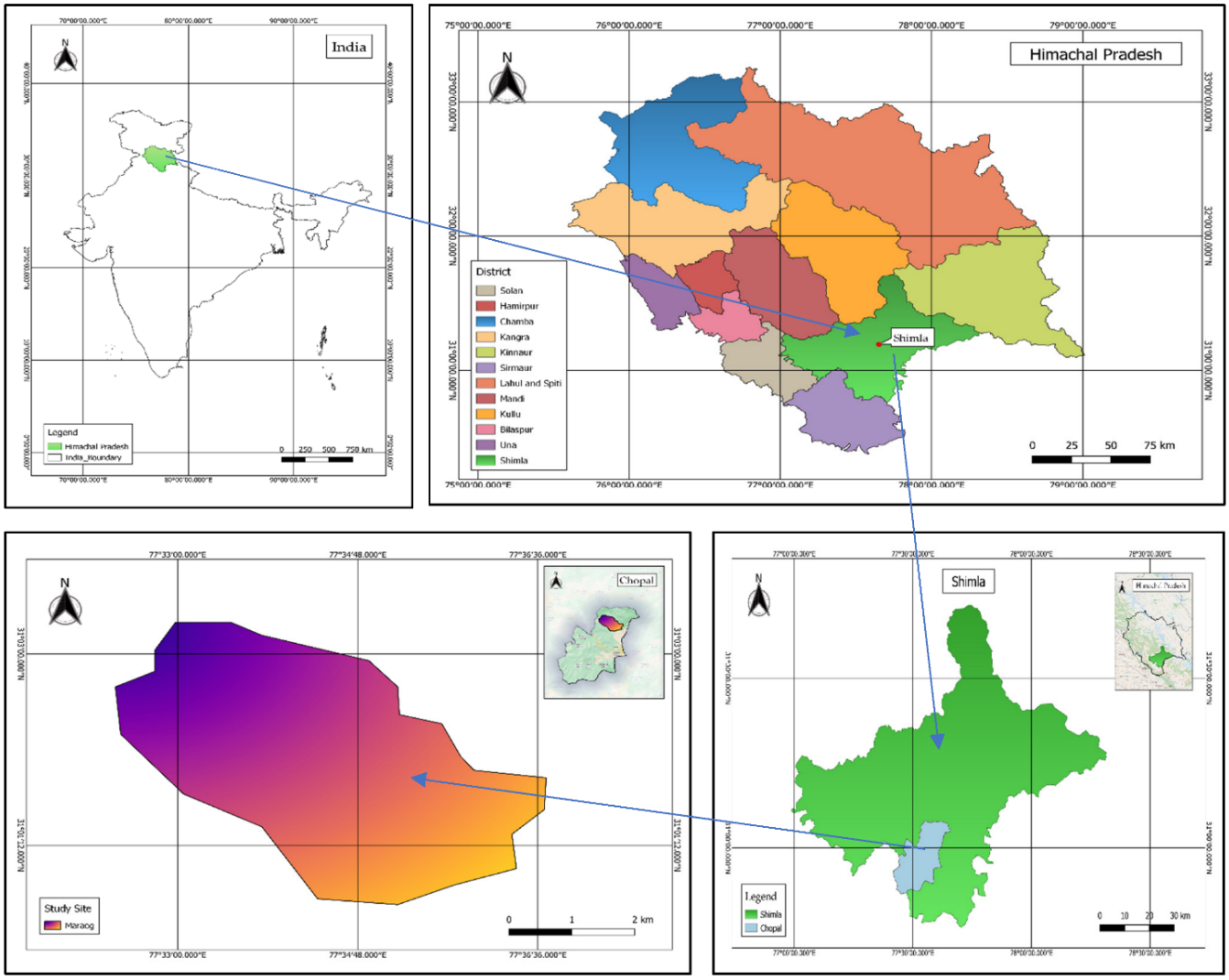


Figure 1. Scale map of study site.

2.2. Sampling Informants

During a survey, a total of 96 informants (57 male and 39 female) were selected for interview. The age and educational background of informants were documented during interview. The informants were divided into 5 groups on the basis of their age (Table 1). In this study, it is discovered that aged people have immense traditional knowledge of ethnoveterinary plants as compared to younger generation.

Table 1. Demography and literacy among informants.

Sr. No.	**Age Groups**	**No. of Informants**				
1.	25–36	18 (10, Male and 8 Female)				
2.	37–46	25 (15 Male and 10 Female)				
3.	47–56	37 (21 Male and 16 Female)				
4.	57–66	10 (7 Male and 3 Male)				
5.	67–80	6 (4 Male and 2 Female)				
Literacy Among		**Age Groups**				
Informants:		**25–36**	**37–46**	**47–56**	**57–66**	**67–80**
1.	Never attended school	0	0	3 (2 Male, 1 Female)	5 (3 Male, 2 Female)	5 (4 Male, 1 Female)

2.	Attended school up to primary level (1–5 class)	0	5 (2 Male, 3 Female)	2 (1 Male, 1 Female)	1 (1 Male)	1 (1 Male)
3.	Attended school up to middle level (6–8)	0	5 (3 Male, 2 Female)	6 (4 Male, 2 Female)	3 (2 Male, 1 Female)	0
4.	Attended school up to metric level (9–10 class)	18 (10 Male, 9 Female)	15 (9 Male, 6 Female)	26 (15 Male, 11 Female)	1 (1 Male)	0

2.3. Ethnoveterinary Data Collection and Ethical Considerations

The ethnoveterinary data were collected from Maraog region in district Shimla, Himachal Pradesh India. A total of 96 male and female informants were selected by snowball methods for interviews. The ethnoveterinary data were collected through pretested questionnaire, observation, interviews and participatory observations [30,31]. The extensive field visits were used to collect ethnoveterinary data from unexplored rural area of Maraog in tehsil Chopal of Shimla district, Himachal Pradesh, India. For ethnoveterinary survey questionnaire was divided into 3 sections: demographic data, ethnoveterinary plant uses and informant's declaration. The ethnoveterinary plants species collected from Maraog region in between 2020 to 2021 and they were identified from Botanical Survey of India, Dehradun Uttarakhand, India. The identified plant specimens with voucher numbers were submitted to the herbarium of Shoolini University, Solan, Himachal Pradesh, India.

Questionnaire for Conducting the Ethnoveterinary Study

The authors followed a specific questionnaire for conducting this study, as given in Supplementary Information S1.

2.4. Data Analysis

Ethnoveterinary data were collected by snowball method and selected 96 informants (male and female) from Maraog region in tehsil Chopal. The ethnoveterinary data were analyzed through used value.

Use Value

The use value is an ethnobotanical key that has been used to calculate the relative value of useful plant species [32,33].

$$UV = \Sigma Ui / n$$

where Ui is the number of usage reports cited by each informer for a given plants and n is total number of informants. The use value is important to find which plants are most useful to specific inhabitants, estimating possible medicinal plant uses and determining community awareness [34,35]. It has been mentioned that use value places more significance to plants which have various uses, even if these species are not well identified [36]. A high use value indicates that the plant is important, while a low or zero use value indicates that the plant is rarely used or recorded. There is no indication in the use value whether the plant is used for one or more purposes [37].

3. Results

3.1. Ethnoveterinary Plants Reported by the Informants

In study site a total of 96 informants reported 100 plant species used for ethnoveterinary purposes. In this study, it was found that Rosaceae, Asteraceae and Lamiaceae were the highest reported families by rural people of Maraog. The Rosaceae family had 11 plant species, followed by Asteraceae family with 10 plants and the Lamiaceae family with 6

plants; the Apiaceae, Brassicaceae and Solanaceae families each contributed 3 plant species, while the Fabaceae and Polygonaceae families each contributed 4 plant species; the Amaranthaceae, Berberidaceae, Oxalidaceae, Pinaceae, Poaceae, Primulaceae, Pteridaceae, Ranunculaceae, Scrophulariaceae and Utricaceae contributed 2 plant species (Figure 2).

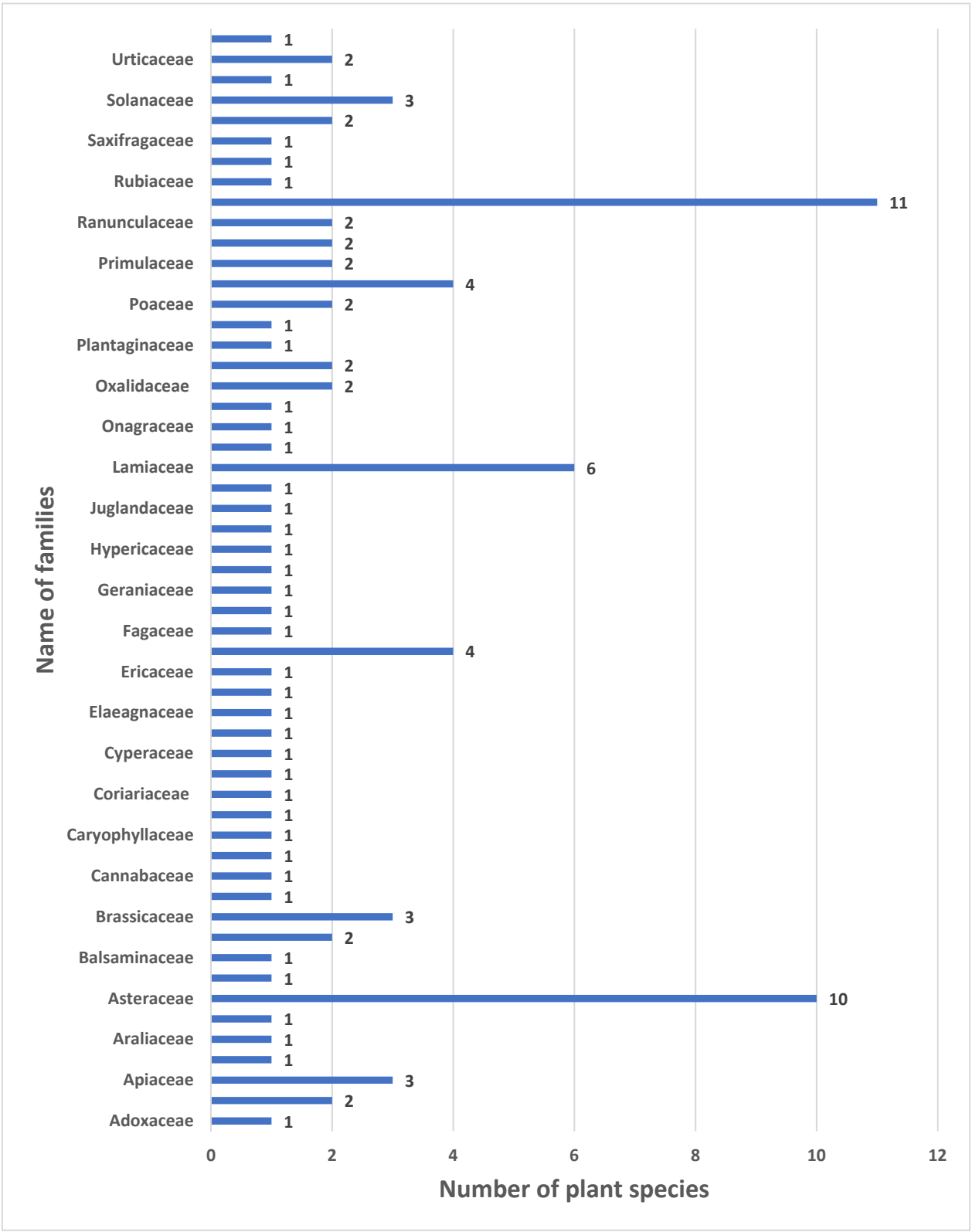


Figure 2. Representation of the families and number of plants studied at study site.

Some ethnomedicinal plants in the study area are well known for ethnoveterinary purpose was found as *Chenopodium album*, *Cannabis sativa*, *Cynodon dactylon*, *Bromus hordeaceus*, *Cedrus deodara*, *Ajuga parviflora*, *Foeniculum vulgare*, *Sonchus oleraceus* and *Urtica dioica*. The documented plants include 56 herbs, 26 shrubs, 7 trees, 5 ferns, 3 climbers and 3 grasses (Figure 3).

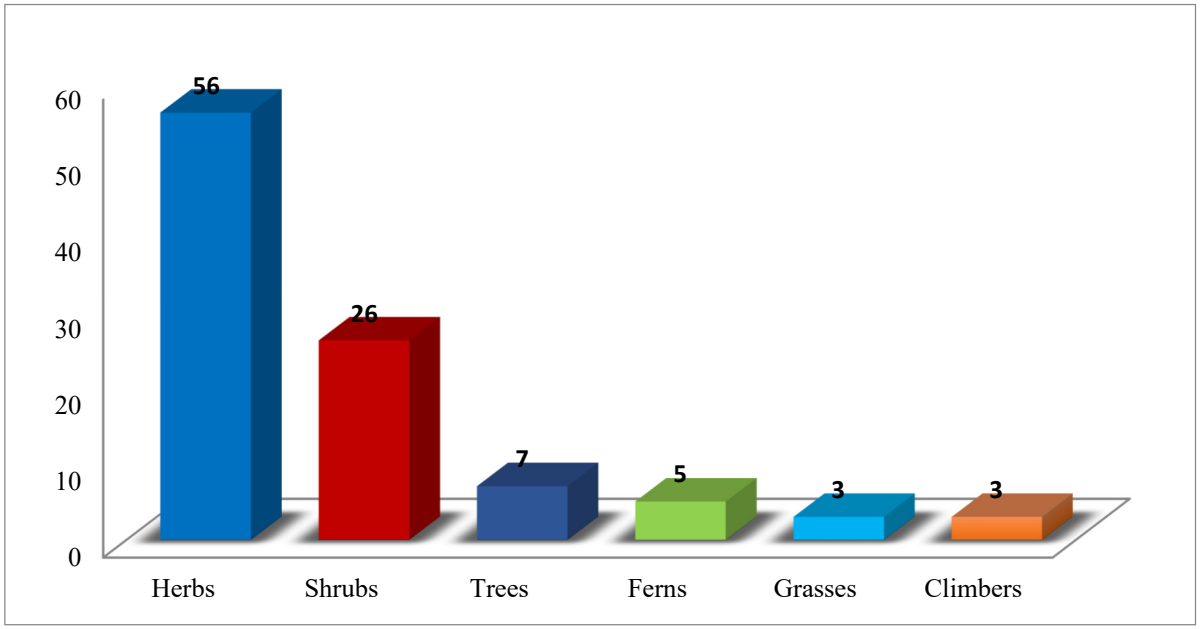


Figure 3. Growth forms of plant species at study site.

As shown in Figure 4, the rhizome, tubers and buds were the least frequently documented plant parts used in ethnoveterinary purpose.

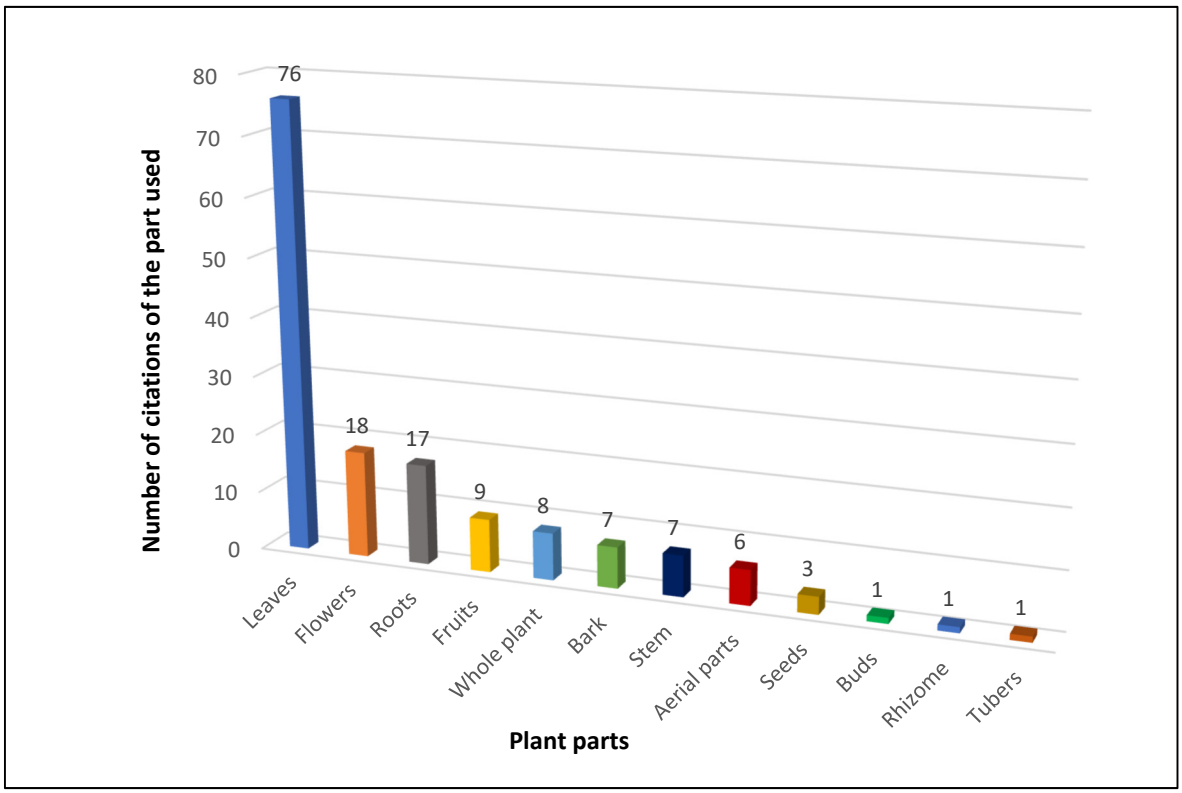


Figure 4. Representation of the number of citations of plant parts used.

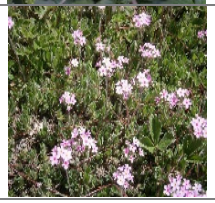
3.2. Use Value of Medicinal Plants

It was found that few plant species have greater used value *Cannabis sativa* (0.79), *Cynodon dactylon* (0.75), *Datura stramonium* (0.71), *Rhododendron arboreum* (0.71), *Chenopodium album* (0.69), *Hedera nepalensis* (0.68), *Mentha viridis* (0.65) and *Viola canescens* (0.63).

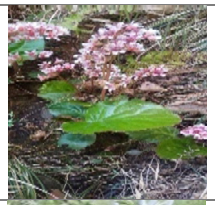
Different plant parts roots, leaves, stem, rhizoids and tubers, etc., are used to treat a variety of livestock diseases. A total of 100 plants were documented for ethnoveterinary preparations in rural region of Maraog. In discussion with aged people, they reported skin infections, mouth blisters, diarrhea, gastrointestinal disorders, cuts, udder infections and eye disorders were the most commonly found symptoms in livestock. The most popular methods of preparation include the use of leaf paste, infusion and decoction, with other methods such as wood ash being recorded less frequently. According to the data collected from the informants, it was found that the mode of administration can be oral or topical and certain plants can be used both orally and topically to treat livestock diseases. The majority of preparations use a single plant, with just a few combining multiple plant species.

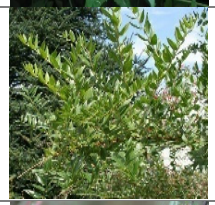
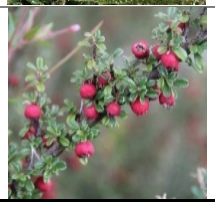
Table 2 describes all plants reported with their botanical name, family, habit, parts used and ailment treated.

Table 2. Ethnomedicinal plants used in study area.

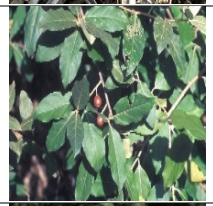
Botanical Name	Actual Morphology of Ethnomedicinal Plant	Family	Common Name	Voucher No.	Habit	Parts Used	Disease Treated	Mode	Ailment Treated and Citations	Use-Value
Abies pindrow (Royle ex D. Don) Royle		Pinaceae	Tonss	SUBMS/BOT-4184	Tree	Leaves	Udder infection	Topical	Leaf paste is applied on udder of cow to treat clotting of milk (66).	0.68
Adiantum venustum D. Don		Pteridaceae	Jamna	SUBMS/BOT-4185	Fern	Leaves	Skin disease	Topical	Paste of plant part is applied on chronic tumors for rapid healing (57).	0.59
Ajuga parviflora Benth.		Lamiaceae	Neel kanthi	SUBMS/BOT-4186	Herb	Aerial part	Sores, Wounds	Topical	Fine powder of aerial parts with few drops of edible oil is applied on skin of cattle to treat sores, wounds (69).	0.71
Amaranthus, blitum L.		Amaranthaceae	Sukhichalayi	SUBMS/BOT-4187	Herb	Leaves	Diarrhea, Dysentery, Skin infection	Oral, Topical	Fresh leaves are used to cure diarrhea and dysentery. Paste of leaves is useful in curing skin infection (48).	0.50
Androsace sarmentosa Wall.		Primulaceae	Phoolru	SUBMS/BOT-4188	Herb	Leaves	Skin infections	Topical	Paste of fresh leaves is applied on skin infections (45).	0.46

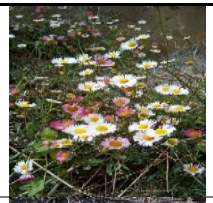
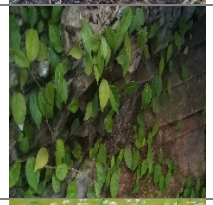
Artemisia vestita Wall. Ex Besser		Asteraceae	Chamber	SUBMS/BOT-4189	Herb	Leaves, Flowers	Wounds	Topical	Paste of leaves or flowers is used to treat wounds (54).	0.56
Aruncus dioicus (Walter)Fernald		Rosaceae	Pothee	SUBMS/BOT-4190	Herb	Roots	Internal bleeding, Stomach pains, Diarrhea	Oral	Roots along with warm water is used to stop bleeding after birth Paste of fresh roots cures stomachache and diarrhea (56).	0.58
Asplenium dalhousiae Hook.		Aspleniaceae	Nanwein	SUBMS/BOT-4191	Fern	Whole plant	Skin infection	Topical	Whole plant is used to treat bacterial skin infections (48).	0.50
Berberis lycium Royle		Berberidaceae	Kashmal	SUBMS/BOT-4192	Shrub	Leaves, Roots, Stem Bark,	Tonic, Bone fractures, Wounds, Stomach infection, Skin infections	Topical, Oral	The paste of root bark is externally applied on wounds and on bone fracture. Decoction of root and stem barks are used against stomach infection (61).	0.63
Berberis aristata DC.		Berberidaceae	Chatra	SUBMS/BOT-4193	Shrub	Leaves	Mouth infections, Itching, Eye infections	Topical	Paste of fresh leaves cure mouth and skin infections. Juice extract from fresh leaves is affective against eye infection (59).	0.61

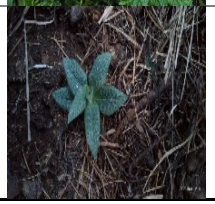
Bergenia ciliata (Haw.) Sternb.		Saxifragaceae	Daclambu	SUBMS/BOT-4194	Herb	Leaves, Roots	Wound healing	Topical	Paste of leaves/ root is applied on wound. Wood ash is also used for wound healing (55).	0.57
Bromus hordeaceus L.		Poaceae	Jawi	SUBMS/BOT-4195	Grass	Whole plant	Fodder	Oral	Plant is used as fodder for livestock as rich in nutritional content (50).	0.52
Buddleja crispa Benth.		Scrophulariaceae	Taakla	SUBMS/BOT-4196	Shrub	Leaves	Cold, Dysentery, Bleeding	Oral, Topical	Fresh leaves are given to animals to cure cold and dysentery. Paste of fresh leaves is used to stop bleeding (47).	0.48
Cannabis sativa L.		Cannabaceae	Bhang	SUBMS/BOT-4197	Herb	Leaves	Intestinal worms, Stomach pain	Oral	Powdered leaf balls are given to cattle to treat intestinal worms and body pain (76).	0.79
Capsella bursa-pastoris (L.) Medik.		Brassicaceae	Khandwa	SUBMS/BOT-4198	Herb	Leaves	Wound	Topical	Leaf paste is used to cure wounds (54).	0.56
Cedrus deodara (Roxb. ex D.Don) G. Don		Pinaceae	Devdar	SUBMS/BOT-4199	Tree	Leaves	Skin infections	Topical	Paste of fresh leaves is applied on skin to cure infections (53).	0.55

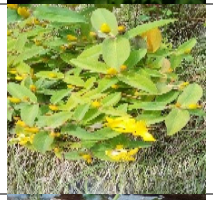
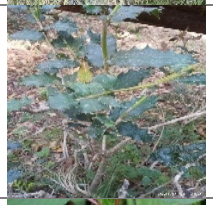
Chenopodium album L.		Amaranthaceae	Bathuwa	SUBMS/BOT-4200	Herb	Whole plant	Skin disorders	Oral	Decoction of whole plant with *Solanum surrattense* is given orally to cure skin diseases (67).	0.69
Cirsium arvense (L.) Scop.		Asteraceae	Bhenda	SUBMS/BOT-4201	Herb	Whole plant	Digestion	Oral	Used as feed for ruminants due to high nutritional value (45).	0.46
Clematis buchananiana DC.		Ranunculaceae	Silra	SUBMS/BOT-4202	Climber	Whole plant	Wound healing	Topical	Plant paste is applied on wounds (56).	0.58
Clematis vitalba L.		Ranunculaceae	Garol	SUBMS/BOT-4203	Shrub	Leaves	Skin eruptions	Topical	Paste of leaves is applied on skin eruptions in livestock (47).	0.48
Coriaria nepalensis Wall.		Coriariaceae	Gandhla	SUBMS/BOT-4204	Shrub	Leaves, Fruits	Dysentery	Oral	Fresh leaves and ripened fruits are used to cure dysentery (49).	0.51
Cotoneaster microphyllus Wall. ex Lindl.		Rosaceae	Jampradua	SUBMS/BOT-4205	Shrub	Leaves	Acute dermatitis	Topical	Leaf paste is used to treat acute dermatitis (51).	0.53

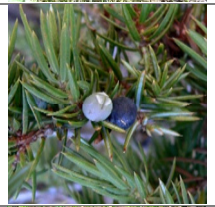
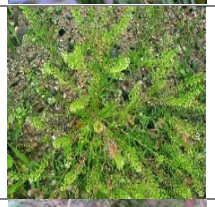
Curculigo orchioides Gaertn.		Hypoxidaceae	Lehsun-phool	SUBMS/BOT-4206	Herb	Leaves, Flowers	Diarrhea	Oral	Paste of dried leaves and flowers is used to cure diarrhea (46).	0.47
Cynodon dactylon (L.) Pers.		Poaceae	Droob	SUBMS/BOT-4207	Grass	Leaves	Eye diseases, Stomach, Skin infections infection, Cold	Topical, Oral	Juice extract of leaves is used to treat eye diseases. Fresh leaves given to cure stomach infection and cold (72).	0.75
Cyperus cyperoides (L.) Kuntze		Cyperaceae	Kadreen	SUBMS/BOT-4208	Grass	Leaves	Fodder	Oral	It is used as fodder (52).	0.54
Daphne papyracea Wall. ex G. Don		Thymelaeaceae	Baruvaa	SUBMS/BOT-4209	Shrub	Aerial part	Mange, Stomach pain	Oral, Topical	Paste of aerial part is applied on skin for the treatment of mange. Decoction from aerial part is used to treat stomach pain (44).	0.45
Datura stramonium L.		Solanaceae	Datura	SUBMS/BOT-4210	Shrub	Leaves	Skin infection	Topical	Paste of fresh leaves is used to get rid of skin parasites (69).	0.71

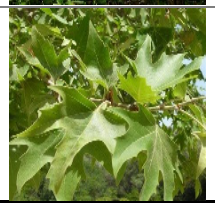
Desmodium elegans DC.		Fabaceae	Murta	SUBMS/BOT-4237	Shrub	Leaves	Fodder	Oral	Fresh leaves are used as fodder (43).	0.44
Deutzia scabra Thunb.		Hydrangeaceae	Suniya	SUBMS/BOT-4211	Shrub	Leaves	Skin infections	Topical	Paste of fresh leaves is useful against skin infections (51).	0.53
Diplazium esculentum (Retz.) Sw		Athyriaceae	Lingar	SUBMS/BOT-4239	Fern	Leaves	Diarrhea	Oral	Young leaves boiled in water is useful against diarrhea (39).	0.40
Elaeagnus umbellata Thunb.		Elaeagnaceae	Genhi	SUBMS/BOT-4212	Shrub	Flowers	Reduce inflammation	Topical	Flowers are used to reduce inflammation on affected areas (44).	0.45
Epilobium hirsutum L.		Onagraceae	Dandri	SUBMS/BOT-4213	Herb	Leaves	Mouth ulcers, Wasp sting	Oral, Topical	Paste of leaves is used to treat mouth ulcers and wasp stings (42).	0.43
Equisetum arvense L.		Equisetaceae	Ramban	SUBMS/BOT-4214	Herb	Aerial part	Urinary tract infections	Oral, Topical	Plant extract is used to treat urinary tract infections and other health infection (49).	0.51

Erigeron alpinus L.		Asteraceae	Chipru	SUBMS/BOT-4215	Herb	Leaves	Bleeding	Topical	Paste of fresh leaves is applied on bleeding wound (40).	0.41
Erigeron bonariensis L.		Asteraceae	Kupru	SUBMS/BOT-4216	Herb	Leaves	Stomach pain, Urinary infection	Oral	Plant is used to treat stomach pain and urinary infection (47).	0.48
Evolvulus nummularius (L.) L.		Convolvulaceae	Ghareu	SUBMS/BOT-4217	Herb	Leaves	Skin infection	Topical	Paste of fresh as well as dry leaves is applied to cure skin infections caused by parasites (53).	0.55
Fagopyrum acutatum (Lehm.) Mansf. ex K. Hammer		Polygonaceae	Fafri	SUBMS/BOT-4218	Herb	Leaves	Skin infections	Topical	Paste of leaves is applied on skin infections (45).	0.46
Foeniculum vulgare Mill.		Apiaceae	Sounph	SUBMS/BOT-4219	Herb	Leaves, Seeds	Poisoning, Cough, Tonic, Skin infection	Oral, Topical	Dried seeds are given to cure poisoning and cough. Seeds with hot water is given to animals after parturition, used as tonic. (59).	0.61
Fragaria virginiana Mill.		Rosaceae	Bhumbal	SUBMS/BOT-4220	Herb	Roots, Leaves, Fruits	Skin infection, Indigestion	Oral, Topical	Juice of ripened fruit is applied on skin infection. Paste of powdered root and leaves is applied on cuts and wounds (48).	0.50

Galinsoga quadriradiata Ruiz & Pav.		Asteraceae	Sheliya	SUBMS/BOT-4221	Herb	Leaves	Cuts, Wounds	Topical	Paste of dry as well as fresh leaves is applied on cuts and wounds (47).	0.48
Gentiana argentea (Royle ex D.Don) Royle ex D.Don		Gentianaceae	Bhuin neem	SUBMS/BOT-4222	Herb	Leaves, Flowers, Roots	Skin infections, Wound, Poisoning	Topical, Oral	Paste of fresh leaves are used to treat skin infections and wounds. Decoction of whole plant is used in the treatment of poisoning (51).	0.53
Geranium nepalense Sweet		*Geraniaceae*	Bhrago-ro-naush	SUBMS/BOT-4223	Herb	Leaves	Skin infections	Topical	Paste of fresh leaves is used to cure skin infections (49).	0.51
Girardinia diversifolia (Link) Friis		Urticaceae	Lindu bhaber	SUBMS/BOT-4224	Shrub	Leaves	Gastric infection	Oral	Fresh leaves boiled with hot water is used for treating gastric infection (47).	0.48
Goodyera repens (L.) R.Br.		Orchidaceae	Kaligatti	SUBMS/BOT-4225	Herb	Leaves, Roots	Stomach pain	Oral	Powdered leaves and roots are used to treat stomach pain (55).	0.57

Hedera nepalensis K.Koch		Araliaceae	Kanewari	SUBMS/BOT-4226	Climber	Leaves	Leeches	Topical	Leaf extract is used to remove leeches in sheep (66).	0.68
Helichrysum arenarium (L.) Moench		Asteraceae	Dhareri	SUBMS/BOT-4227	Herb	Aerial part	Cough	Oral	Extract obtained from the plant is used to treat cough (48).	0.5
Heracleum maximum W. Bartram		Apiaceae	Patla	SUBMS/BOT-4228	Herb	Roost	Swellings, Blisters	Topical	Paste prepared from the root is applied on swellings and blisters (43).	0.44
Hypericum perforatum L.		Hypericaceae	Choli phulya	SUBMS/BOT-4229	Shrub	Aerial part	Relive pain	Oral	Used to relive nerve pain due to puncture wounds (57).	0.59
Ilex dipyrena Wall.		Aquifoliaceae	Khareu	SUBMS/BOT-4230	Tree	Leaves	Enhance milk production	Oral	Fresh leaves are fed to cattle to enhance the milk secretion and to increase strength (61).	0.63
Impatiens glandulifera Royle		Balsaminaceae	Rdheu	SUBMS/BOT-4231	Herb	Leaves, Flowers	Poisoning	Oral	Infusion of fresh leaves and flowers is used to cure poisoning occurred from toxic plants (59).	0.61

Indigofera gerardiana Baker		Fabaceae	Kathi	SUBMS/BOT-4232	Shrub	Bark	Broken bones	Topical	Bark is boiled in milk and a bandage is formed and is used externally to treat broken bones (47).	0.48
Juglans regia L.		Juglandaceae	Akhrot, khodh	SUBMS/BOT-4233	Tree	Bark	Oral diseases	Topical	Paste of bark is used to cure oral diseases (54).	0.56
Juncus effusus L.		Juncaceae	Kirala	SUBMS/BOT-4234	Herb	Leaves	Urine infection	Oral	Fresh leaves are given to cure urine infection (48).	0.5
Juniperus communis L.		Cupressaceae	Gala	SUBMS/BOT-4235	Shrub	Leaves	Intestinal parasites, Snake bite	Oral, Topical	Paste of dried leaves is used treat the worms inside the digestive tract. Paste of dried leaves is used to cure snake bite (42).	0.43
Lepidium campestre (L.) R.Br.		Brassicaceae	Khoru	SUBMS/BOT-4236	Herb	Leaves, Stem	Skin infection	Topical	Infusion of leaves and stem prepare in hot water is used to treat skin infections (45).	0.46
Malva verticillata L.		Malvaceae	Mikanchi	SUBMS/BOT-4238	Herb	Leaves	Flatulence	Oral	Infusion of leaves is used for the treatment of flatulence (47).	0.48

Mentha viridis (L.) L.		Lamiaceae	Pahari pudina	SUBMS/BOT-4241	Herb	Leaves	Stomach infection, Skin infections, Hoof diseases	Oral, Topical	Fresh leaves are given to cure stomach infection. Paste of fresh leaves is beneficial against skin infection and hoof diseases (63).	0.65
Nicotiana tabacum L.		Solanaceae	Tambakhoo	SUBMS/BOT-4240	Herb	Leaves, Stem	Pain relief	Oral	Decoction of leaves is used to reduce pain (50).	0.52
Oxalis articulata Savigny		Oxalidaceae	Shash	SUBMS/BOT-4242	Herb	Leaves, Flowers	Poisoning, Cold	Topical	Paste of fresh leaves is used to treat poisoning in animal. Whole plant is given to cure cold (47).	0.48
Oxalis corniculata L.		Oxalidaceae	Shash	SUBMS/BOT-4243	Shrub	Leaves, Flowers	Snakebites, Cold	Topical, Oral	Paste of fresh leaves is used to treat snakebites. Whole plant is given to cure cold (52).	0.54
Petridium aquilinum (L.) Kuhn		Dennstaedtiaceae	Barna	SUBMS/BOT-4244	Fern	Leaves, Roots	Bone fractures, Pain	Topical, Oral	Paste of leaves is used in binding bone fracture. Decoction of roots is used as pain reliving agent (48).	0.5
Platanus orientalis L.		Platanaceae	Kimti	SUBMS/BOT-4245	Shrub	Leaves, Bark	Diarrhea, Dysentery, Wounds	Oral, Topical	A decoction of bark is used to cure diarrhea, dysentery. Leaves are used to heal wounds (46).	0.47

Potentilla indica var. *wallichii* (Franch. & Sav.) Th.Wolf		Rosaceae	Bhumbhal	SUBMS/BOT-4246	Herb	Leaves, Fruits	Insect bite	Topical	Paste of fresh fruits and leaves is applied on insect bites (40).	0.41
Potentilla tabernaemontani Asch.		Rosaceae	Diyuda	SUBMS/BOT-4247	Herb	Flowers,Leaves, Roots	Stomach infection, Hoof infection	Oral, Topical	Juice from fresh leaves and flowers is used to cure stomach infection. Paste of powdered root is applied on hoof infections (61).	0.63
Primula denticulata Sm.		Primulaceae	Lattar-phul	SUBMS/BOT-4248	Herb	Flower	Snake bite	Topical	Flower paste is used to treat snakebites in cattle (54).	0.56
Prinsepia utilis Royle		Rosaceae	Bhekhal	SUBMS/BOT-4249	Shrub	Fruits	Joint pain	Topical	Oil of fruits is used to relieve from joint pain (45).	0.46
Pteris cretica var. *laeta* (Wall. ex Ettingsh.) C. Chr. & Tardieu		Pteridaceae	Barne	SUBMS/BOT-4250	Fern	Leaves	Skin infection, Bleeding	Topical	Paste of green leaves is used to treat skin infection and bleeding (49).	0.51

Pyrus pashia Buch-Ham. ex D.Don		Rosaceae	Kainth	SUBMS/BOT-4251	Tree	Fruits	Eye infection	Topical	Juice of ripe fruit is used to cure eye infection (49).	0.51
Quercus floribunda Lindl. ex A.Camus		Fagaceae	Moru	SUBMS/BOT-4252	Tree	Leaves	Skin infection	Topical	Paste of fresh leaves are applied to cure skin infection (46).	0.47
Rhododendron arboreum Sm.		Ericaceae	Buransh	SUBMS/BOT-4253	Tree	Flowers, Leaves	Snake bite, Diarrhea	Oral	Paste of dried flowers is used against snake bite. Paste of powered leaves is used to cure diarrhea (69).	0.71
Rosa brunonii Lindl.		Rosaceae	Kujja	SUBMS/BOT-4254	Shrub	Fruits, Leaves	Diarrhea, Lactation	Oral	Ripe fruits are used to cure diarrhea. Fresh leaves are given to increase milk quantity of goats and sheep (43).	0.44
Rosa sericea Wall. ex Lindl.		Rosaceae	Junglee kuja	SUBMS/BOT-4255	Shrub	Fruits, Leaves	Gastric infection	Oral	Ripe fruits are used to cure gastric infection (39).	0.40
Rubia cordifolia L.		Rubiaceae	Majith	SUBMS/BOT-4256	Shrub	Stem, Leaves	Hoof diseases, Blisters	Topical	Paste of dried root is used to treat hoof diseases. Paste of fresh leaves is applied on blisters (44).	0.45

Rubus ellipticus Sm.		Rosaceae	Hinser	SUBMS/BOT-4257	Shrub	Bark, Roots	Urine infection, Gastric troubles	Oral	Juice of the root is used in the diarrhea. The bark from this plant is used to cure urinary infection (41).	0.42
Rubus niveus Thunb.		Rosaceae	Kamrai	SUBMS/BOT-4258	Shrub	Fruits	Snake bite, Tonic	Oral	Extracts and juices from the fruits is used as an antidote for snake bites and as a tonic during pregnancy (37).	0.38
Rumex obtusifolius L.		Polygonaceae	Kransh	SUBMS/BOT-4259	Herb	Leaves, Roots	Skin infection, Sores	Topical	Paste of fresh leaves is applied on skin infections. Paste of dried roots is applied on sores (40).	0.41
Rumex tuberosus L.		Polygonaceae	Khatti patti	SUBMS/BOT-4260	Herb	Leaves	Skin infection	Topical	Paste of fresh leaves is applied on skin infections (37).	0.38
Rumex hastatus D. Don		Polygonaceae	Bhanora	SUBMS/BOT-4261	Herb	Leaves, Tuber	Wound, Dysentery	Topical, Oral	The extract of leaves of plant is applied on wounds and cuts to check bleeding. The juice of the plant is used in the treatment of dysentery (33).	0.34
Salix triandra L.		Salicaceae	Bhaill	SUBMS/BOT-4262	Shrub	Bark, Leaves	Fever, Joint pains	Oral, Topical	Powder of leaves is given to cure fever. Paste of bark and leaves is affective against joint pains (36).	0.37

Salvia lanata Roxb		Lamiaceae	Kuku-ro-bath	SUBMS/BOT-4263	Herb	Leaves	Healing wounds	Topical	Paste of fresh leaves are applied on external wounds (43).	0.44
Sarcococca saligna Mull.Arg.		Buxaceae	Shangal	SUBMS/BOT-4264	Shrub	Leaves	Fever	Oral	Aqueous extract of leaves is used as antipyretic (41).	0.42
Scutellaria ovata Hill		Lamiaceae	Kathiya	SUBMS/BOT-4265	Herb	Leaves, Flowers	Respiratory infection, Diarrhea, Nose bleeding	Oral, Topical	Plant extract with hot water is affective against respiratory infection and diarrhea. Paste of leaves is useful for preventing nose bleeding (38).	0.39
Scutellaria scandens D.Don		Lamiaceae	Kadwi	SUBMS/BOT-4266	Herb	Leaves, Flowers	Skin infection	Topical	Powdered leaves and flowers are applied on skin infections for its cure (48).	0.50
Selinum wallichianum (DC.) Raizada & H.O. Saxena		Apiaceae	Chamber ghass	SUBMS/BOT-4267	Herb	Roots	Stomachache	Oral	Dried and powdered leaves are used for abdominal diseases (49).	0.51
Silene vulgaris (Moench) Garcke		Caryophyllaceae	Monch	SUBMS/BOT-4268	Herb	Leaves, Roots	Vomiting, Poisoning, Constipation, Skin infections	Topical, Oral	Decoction of roots is used to treat vomiting, poisoning and constipation. Liquid extract of leaves is used to cure skin infections (42).	0.43

Solanum nigrum L.		Solanaceae	Genhi	SUBMS/BOT-4269	Herb	Leaves, Flowers, Roots, Fruits	Itching, Oral ulcer, Cough, Urine infection	Topical, Oral	Paste of powdered leaves, fruit, flower is used against itching, oral ulcers. Extracts of roots and flowers are used for curing cough. Decoction obtained from leaves cure urinary troubles (44).	0.45
Sonchus asper (L.) Hill		Asteraceae	Dudhiya	SUBMS/BOT-4270	Herb	Whole plant, Leaves, Stem	Skin infection	Topical	Freshly prepared plant extract is applied on skin infections (57).	0.59
Sonchus brachyotus DC.		Asteraceae	Sadhi	SUBMS/BOT-4271	Herb	Bud, Flowers, Leaves, Stem, Roots	Puss in ear, Dermatitis, Ulcers	Topical, Oral	Extract of bud is used against puss formed in the ear. A decoction of the whole plant is used to treat stomach infection, itching, ulcers (36).	0.37
Sonchus oleraceus (L.) L.		Asteraceae	Dudhi	SUBMS/BOT-4272	Herb	Leaves, Whole plant	Diarrhea, Inflammation Warts	Oral, Topical	Whole plant is given to animals suffering from diarrhea. Latex is applied on the inflammation and warts (48).	0.5
Stemmacantha rhapontica (L.) Dittrich		Asteraceae	Kusumphool	SUBMS/BOT-4273	Herb	Bark, Leaves	Indigestion	Oral	Extract of bark and roots is used for indigestion (36).	0.37

Thlaspi arvense L.		Brassicaceae	Mahula	SUBMS/BOT-4274	Herb	Seeds, Whole plant	Inflammation, Fever, Tonic	Topical, Oral	Powdered form of seeds is used to calm down swelling of limbs. Plant juice is used as tonic (47).	0.48
Thymus linearis Benth.		Lamiaceae	Marcha	SUBMS/BOT-4275	Herb	Flowers, Leaves	Stomach infection, Fever	Oral	Paste of flowers and leaves are used to cure stomach infection. Semi-solid paste of dried plant is given in the form of small balls to cure fever during the winter (50).	0.52
Trifolium repens L.		Fabaceae	Khatti shash	SUBMS/BOT-4276	Herb	Leaves, Flowers	Skin infection, Cough	Topical, Oral	Paste of fresh leaves used to treat skin infection. Powdered flowers along with leaves are used to cure cough (41).	0.42
Urtica dioica L.		Urticaceae	Kunkshi	SUBMS/BOT-4277	Herb	Leaves	Diarrhea, Skin infection	Oral	Semifluid paste of leaves with hot water is beneficial against diarrhea. Leaves with other food is given to cattle to get relief in skin diseases during lactation (39).	0.40
Valeriana jatamansi Jones		Caprifoliaceae	Mushki	SUBMS/BOT-4278	Herb	Leaves, Rhizome	Skin infection, Wound healing, Redness of eyes	Topical	Powdered leaves are used to cure skin infections. Paste of root is applied on wounds for better healing. Rhizomes are used to treat dryness and redness of eyes in the cattle (52).	0.54

Verbascum thapsus L.		Scrophulariaceae	Kukurdara	SUBMS/BOT-4279	Herb	Leaves, Flowers, Roots	Pain, Warts, Flatulence	Topical, Oral	Decoction leaves is used to treat warts on the skin. Decoction of inflorescence is used to cure flatulence in cattle (42).	0.43
Veronica persica Poir.		Plantaginaceae	Raat ki kali	SUBMS/BOT-4280	Herb	Leaves	Skin infection, Wound healing	Topical	Paste of fresh leaves used to cure skin disorders and serve as an excellent wound healing remedy (47).	0.48
Viburnum grandiflorum Wall. ex DC.		Adoxaceae	Pothi	SUBMS/BOT-4281	Shrub	Leaves	Constipation	Oral	A paste of leaves with hot water is affective against constipation (44).	0.45
Vicia sativa L.		Fabaceae	Matari	SUBMS/BOT-4282	Climber	Seeds, Leaves	Skin infection	Topical	Paste of dry seeds and leaves are used against skin parasites (49).	0.51
Viola canescens Wall.		Violaceae	Banaksha	SUBMS/BOT-4283	Herb	Leaves, Flowers, Stem, Roots	Dysentery, Cold, Cough, Skin infection	Oral, Topical	Powder of whole plant with hot water is used for dysentery. Decoction of flowers along with fennel is used to cure cold and cough. Paste of fresh leaves and stem is used to treat skin infections (61).	0.63

4. Discussion

4.1. Ethnoveterinary Prospective of Wild Plants

Ethnopharmacological studies are an important step in the development of natural-source drugs. Today, around 65% of Indian people are dependent on the medicinal plants [38]. Traditional knowledge of medicinal plant use, wild crafting and preservation promotes research for novel drugs, as well as the time effectiveness [39–42]. Medicinal plants have the capability to treat both infectious and noninfectious diseases and not only used to treat human diseases, but are also frequently utilized to treat animal ailments [43–46]. The primary goal of the ethnoveterinary study is to compile a list of plant species that have ethnoveterinary applications in the unexplored region of tehsil Chopal in district Shimla, Himachal Pradesh, India. In earlier studies, all over the world, it was documented that those medicinal plants show significant role in the human being healthcare system, as well as that of animals. They are easily available from nature, without any cost [47–49]. The documentation of ethnobotanical studies from rural and unexplored areas of all over the world is highly significant for future researchers [49–51]. In ethnoveterinary practices, plants are used for the treatment of diseases due to reduced number of side effects [52,53]. Ethnoveterinary medicines are easily available from surroundings without much effort [2,22]. In this study, it was found that Rosaceae family is the most frequently mentioned species from Maraog region in Shimla district. The Rosaceae plants have traditionally used to treat skin diseases, intestinal disorders, hoof infections and eye infections. In relation to shrubs and trees, herbaceous plants were used most frequently in the Maraog region. In various studies, all over the world, it was reported that different medicinal plants possess different types of phytochemicals. Phytochemical components present in different plant species are the most significant method for identifying the active medicinal potential of plants [54–57]. The concentration of phytochemicals in plant species varies according to geographical variations [58–60]. In ethnobotanical studies, it was reported that aged people have great traditional knowledge as compared to younger generation due to western culture followed by new generation [21,61]. The study, conducted in different regions of India, proved that new generation is not interested in traditional knowledge due to socioeconomic and cultural changes in the society [62]. The use value is a quantitative method that determines the relative importance of plant species for societies [63]. The most commonly used species had a high use value, showing that they are significant. The species with high use values found in this study had previously been scientifically well-known for their phytochemical composition and medicinal value. Saponins, tannins, flavonoids and phenolic compounds are among the chemical compounds contained in *Chenopodium album*, which are responsible for its antimicrobial activity [64]. The Cannabinoids, which have anti-inflammatory properties, are contained in the chemical components of *Cannabis sativa* [65]. The phytochemical study of *Cynodon dactylon* revealed details of flavonoids, alkaloids, glycosides, tannins, saponins, volatile oils and flavonoids, which are responsible for its dermatological and anti-inflammatory action [66]. Similarly phenolic acids, flavonoids (quercetin, rutin) and alkaloids like berberine, berbamine, palmatine, columbamine, jatrorrhizine, oxyacanthine in *Berberis aristata,* Alkaloids like berberine, berbamine, chenabine, karakoramine, palmatine, baluchistanamine, gilgitine, jhelumine, punjabine, sindamine in *Berberis lycium* [67], pentadecanoic acid, hexadecanoic acid, heptadecanoic acid, octadecanoic acid, eicosanoic acid, steroids, amino acids (glycine, histidine) and flavonoids (tricin, kaempferol, quercetin) in *Capsella bursa-pastoris* [68], alkaloids (atropine, hyoscyamine, scopolamine), glycosides, saponins and tannins in *Datura stramonium* [69], flavonoids, terpenoids, alkaloids, carbohydrates, proteins, amino acids, steroids (phytosterols), saponins and tannins in *Equisetum arvense* [70], glyxylic acid, oxalic acid, vitexin, isovitexin, netural lipids, glycolipids, vitamin c, phaspholipids, fatty acids and tocopherols in *Oxalis corniculate* [67]. Nepalin, nepodin and rumicin in *Rumex hastatus*, flavonoids (catechin, epicatechin, rutin), phenolic acids (caffeic acid, gallic acid,

protocatechuic acid), fatty acids (linoleic acid 67.9%), carbohydrates (polysaccharides) in *Solanum nigrum* [70], taraxacin, taraxacerine, cerylalcohol, lactuce-roltaraxacin, choline, inulin, tannin, etereal oil, vitamin C, xanthophylls, potassium and vitamin A in *Taraxacum officinale* [67], alkaloids (betaine, choline), amino acids, carbohydrates, protein polymer (neutral and acidic), carotenoids (carotenes) and saponins in *Urtica dioica* [71]. Curculigenin in *Curculigo orchioides* [72], caryophyllene oxide, β-Caryophyllene, germacrene, β-Pinene in *Juglans regia* [55]. All of these compounds show antibacterial, antidiabetic, wound healing, hepatoprotective and anti-inflammatory activities. The majority of medicinal preparations use only one plant species, but certain medications are made with two or more plants, which improve their therapeutic effectiveness [73,74]. In the current findings, it was observed that the most frequently used plant parts were leaves followed by flowers, roots and fruits, etc. Due to harsh environmental conditions and non-availability of veterinary facilities at higher altitudes, the rural people of high altitude in Himachal Pradesh used traditional remedies to treat their livestock's illnesses [21,50].

4.2. Prospects of Using Wild Plant Species in Horticulture

The inhabitants were using the different plant species not only to feed and treat the diseases of their livestock, but also to nurture themselves. Plant species like *Rubus niveus, Rubus ellipticus*, *Pyrus pashia, Prinsepia utilis, Berberis lycium, Elaeagnus umbellata and Juglans regia* are well known for their fruit yields [18,75–79]. *J. regia* and *P. pashia* are important fruiting plants as they are employed by inhabitants for their fruit production, which is a good source of their income [19,80]. The oil extracts of *P. utilis* are consumed by locals and the remaining part of the fruit is used for feeding the cattle along with other dietary products [81–83]. It was also observed that some plant species and their products were used by locals for different agricultural and horticultural activities. The organic manure was prepared by using plants like *Amaranthus blitum, Artemisia vestita, Bromus hordeaceus, Cannabis sativa*, *Capsella bursa-pastoris*, *Erigeron bonariensis, Fagopyrum acutatum, Sonchus asper* and *Urtica dioica* along with cattle dung. The use of cannabis manure has been reported to be effective in removing harmful soil elements [84]. The plant residues were also used in the preparation of vermiwash, which is used in various agricultural and horticultural activities [85]. The paste of roots of *Cirsium arvense* and *Rubus ellipticus* was practiced to remove the root borer from the apple plant in the study region. Many researchers have reported on *Rubus ellipticus* for its antimicrobial activities and the extraction of silver nanoparticles which act as pathogen destroyers and root enhancers [86]. Inhabitants also showed that mulching their plant nursery with branches of *Cedrus deodara* and *Abies pindrow* was also beneficial in retaining moisture in the soil, keeping pests away and controlling weeds. Some plants were difficult to find in the wild and some was used to enhance their economy therefore, people have started cultivation of such species in their fields. For instance, *P. pashia* is used for the establishment of pear orchards and this species is abundant in the wild and locals collect their seeds and grow them in their fields. Similarly, it was difficult to collect herbs such as *Valeriana jatamansi* and *Bergenia ciliata,* so they are grown by the villagers in their gardens. These approaches to preserving wild plants have been employed by many communities throughout the world [87–90].

Therefore, proper documentation, conservation and pharmaceutical studies are needed to find some important medicinal plants from unexplored regions of Himachal Pradesh in India. In the literature study, it was found that *Aruncus dioicus, Asplenium dalhousiae, Galinsoga quadriradiata, Gentiana argentea, Malva pusilla, Silene vulgaris* and *Viburnum grandiflorum* were documented for the first time for ethnoveterinary purposes from the study area of Maraog region in Shimla district, Himachal Pradesh, India. Future pharmacological studies for the illnesses suggested by current survey respondents could be particularly interesting for these species. Increased interest in the chemical profile and biological activity of these species is expected as a result of this new knowledge. Their significance lies in the possibilities of discovering new medical plant uses and herbal therapies in veterinary medicine.

5. Conclusions

The rural people of Maraog region in tehsil Chopal of district Shimla in Himachal Pradesh, India, used ethnoveterinary plants to treat their livestock diseases. The current study documents the ethnoveterinary medicines, which can be used as a database for scientific research studies in the future. It was observed that, from all categories of plants, herbs and shrubs were the most documented ethnoveterinary plants by the native informants of study site. In this study, most of the plants are first time documented for ethnoveterinary purposes from Maraog region in tehsil Chopal of district Shimla, so its urgent need to document different medicinal plants from unexplored regions of Himachal Pradesh. In the study area, internally and externally medicinal formulations were used to treat livestock illnesses. The male informants of the study site possess good traditional knowledge as compared to the female informants. The rural people reported that new generation is not much interested in traditional knowledge due to the social, cultural and modernization, so it is urgently needed to document and conserve ethnomedicinal plants used for both human and livestock diseases in the rural areas of Shimla district, Himachal Pradesh, India.

Supplementary Materials: The following are available online at www.mdpi.com/article/10.3390/horticulturae7100351/s1, Supplementary Information S1: (A) Demographic Data, (B) Ethnoveterinary Plant Uses and (C) Informants Declaration.

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