

Ethnoveterinary Practices of Wild Medicinal Plants in Pakistan: A Review

Muhammad Jamil Ahmed*, Farooq Ahmed, Javaid Qayyoom Swati

Department of Botany, University of Azad Jammu and Kashmir, Muzaffarabad, Pakistan

*Corresponding Author: Muhammad Jamil Ahmed, Department of Botany, University of Azad Jammu and Kashmir, Muzaffarabad, Pakistan.

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Abstract

Today, ethnic communities throughout the world retain sound indigenous ethnoveterinary knowledge and mainly depend on medicinal plants as alternative treatments for various livestock ailments. The present review aims to provide the current compilation of wild medicinal plant species practiced as ethnoveterinary herbal medicine by traditional societies of Pakistan. Data was gathered from online databases regarding ethnoveterinary studies in Pakistan from 2000 - 2018. The botanical name, families, parts used, method of administration and diseases treatments were presented by literature review. The literature search revealed a total of 255 wild plant species belonging to 203 genera and 88 families were being in common use to cure 17 categories of livestock diseases. The highest number of wild plant of Asteraceae, followed by Fabaceae, Lamiaceae Euphorbiaceae, Polygonaceae and Solanaceae were used as ethnoveterinary herbal medicine. The most privilege diseases were abdominal worm, mastitis, ague, foot and mouth diseases, skin diseases, lungs and respiratory disorder. Worms's infestation and parasitic ailments were treated with 67 plant species followed by gastrointestinal ailments, reproductive ailments and miscellaneous category accounted for 66, 43 and 29 species respectively. The highly consumed parts of plant were leaves (29.59%) followed by whole plants (15.98%), aerial parts (10.65%), roots (10.65%) and fruits (8.28%). It is suggested that, the present review will serve as databank and stimulate further pharmacological, clinical investigation for novel drug discovery from natural resource and benefited worldwide.

Keywords: Ethnoveterinary; Medicinal Plants; Animal Disease; Livestock; Pakistan

Introduction

Ethnoveterinary health management practices are common in developing countries owing to privilege poverty and socio-economic aspects [1]. The term ethnoveterinary mean people's understandings, indigenous skills, knowledge and practices related to veterinary health care management of livestock [2]. On the other hand, introduction and adaptation of modern synthetic drugs instead of herbal pharmaceutical products exposed potential health risk effects on livestock and in turn human also. For instance, 61 tons of antibiotics were sold in Switzerland to treat infections in livestock during year 2011, a number of synthetic antibiotic and synthetic products being fruitless day by day and also rendering hidden side effects on animals [3]. Whereas, plants derived herbal medicines presented safe natural product both for animals and humans, being prefer worldwide as these are ecofriendly, inexpensive, biocompatible and having diversity of secondary metabolites [4,5]. Pakistan is an agricultural country and world's 5th largest

milk producing country, almost 80% of its population is dependent on agriculture and livestock for their basic needs and economic [6]. Wild medicinal plants have immense role in basic health care system among various communities in the area of Pakistan [7]. The flora of Pakistan show great diversity of plants due to its unique geographical features. The wild medicinal plants have great importance for basic health care managements since the evolution of human and these indigenous practices were passed generation to generation. The literature survey revealed that the wild medicinal plants are being traditionally used to treat various animal diseases among ethnic communities of Pakistan [3,8-11].

Although, there is an increasing the studies have primarily focused on records of traditional uses of medicinal plants for livestock diseases. On the other hand, in some reports botanical names and families of plant species have not scientific validation and have been changed in recent databases [11]. For the standardization

and effectiveness of combination of herbal remedy for basic health care management, scientific validation of botanical names for further pharmacological and clinical research necessity to be updated. Still, there is dearth of compilation of up-to date ethnoveterinary practices for livestock ailments in Pakistan [5]. Therefore, the present review aims to provide the current collation of traditional use of wild medicinal plants to treat various livestock ailments among ethnic societies of Pakistan (Figure 1). This review serves as basis for a databank of ethnoveterinary uses of wild medicinal plants for further pharmacological investigation and clinical trial for validation of herbal remedies.

Figure 1: Ethnoveterinary practice management among ethnic communities of Pakistan.

Review Methodology

A literature search was conducted to find relevant articles published between the year 2000–2018 using the familiar scientific databases; Pubmed, Science Direct, Google Scholar, Web of Science and Scopus. Although, search on databases screened 36 articles; yet 22 articles were selected based on detail studies on ethnoveterinary uses of medicinal plants. The selected articles were studied thoroughly and chosen only wild medicinal plants and excluded cultivated or ornamental species. The search terms were selected from keywords included; ethno-medicinal, ethno-veterinary, livestock diseases, and folklore medicine for livestock/animals. At the first step, completed whole scientific reports and tabulated all traditionally used medicinal plant that was obviously described with ethnoveterinary uses. Then only wild medicinal plants were chosen, the cultivated/agricultural based medicinal plants were screened and omitted. The wild medicinal plant species were selected for further nomenclature verification. The botanical names were verified using online databases; Tropicos, flora of Pakistan [12] and ThePlantList [13]. If author use synonym of plants species in his/her report/studies, it is given in parenthesis along with accepted botanical name and corrected family name.

Results and Discussion

The present review represented a total of 255 wild plant species belonging to 203 genera and 88 families were being in com-

mon practices as traditional therapy for 17 different categories of livestock diseases (Table 1). The highest number of wild plant used as traditional herbal remedy belonging to family Asteraceae (22 species), followed by Fabaceae (13 Species), Lamiaceae (12 species), Polygonaceae (9 species) and Apocynaceae, Euphorbiaceae, Malvaceae, Solanaceae, (8 species each). Previous report revealed that the highest number of species recorded belonging to the family Solanaceae (14), followed by Lamiaceae (13), Fabaceae (11), and Leguminosae (10) were uses for various traditional as ethnoveterinary herbal remedy for livestock in South Asia [6]. The detail check list of wild medicinal plants and their traditional uses against various ailments is given table (Table 1).

Antibiotics resistance and increasing public awareness about the adverse effects of synthetic drugs in animal health and production have further increased the importance of ethnoveterinary medicines [8]. Herein, literature survey revealed that the worms's infestation and parasitic ailments were reported to be treated with 67 wild plant species followed by gastrointestinal illnesses (66), reproductive diseases (43), miscellaneous category accounted for 29 wild species and 26 species used for skin, 22 species for lactation and general body disorder problems and 17 species for urinary infection. Table 2 contains the major categories of ailments including disease features that were being treated using various plants by various indigenous societies of Pakistan. Herein, the major disease groups are discussed.

It is important to be noted that mostly synthetic drugs have the potential toxic reactions in livestock such as allergic or hypersensitivity reactions [14]. For example, b-lactam antibiotics can cause cutaneous outbursts, dermatitis, gastrointestinal complications at very small dosage [15]. Synthetic drugs and natural herbal products have quite due difference in compatibility to animals including humans [2]. Gastrointestinal diseases in animals lead to significant economic losses in livestock husbandry. Gastrointestinal complaint might be due to constipation, indigestion, diarrhoea, cholera, dysentery. The present review revealed a total of 67 wild plant species were being practice in folklore uses to treat stomach related ailments. The most frequently stated wild species were *Bergenia ciliata*, *Capparis decidua*, *Celtis australis*, *Chenopodium album*, *Grewia optiva* and *Saussurea costus* used against gastrointestinal trouble as ethnoveterinary herbal therapy [3,15-19]. *Cedrela serrata*, *Mentha longifolia* and *Valeriana jatamansi* were also frequent practices medicinal plants against stomach complications among different ethnic communities of Pakistan [8,10,20,21].

The wild medicinal plants being effective in the treatment of different parasitic problems reported herein and have been tradition-

Sr. No	Botanical name	Family	Part used	Disease treated	Application	Citations
1	<i>Achyranthes aspera</i> L.	Amaranthaceae	L	Conjunctivitis, Urolith, Placenta retention, Lochia, Ecto-parasitic	Topical, Oral	[2, 3, 18]
2	<i>Acacia nilotica</i> (L.) Delile (<i>Acacia arabica</i> (Lam.) Willd.)	Mimosaceae	Fr, L, Br, Pd	Genital prolapse, Stomach disorder, Infertility, Dysentery Mouth ulcer	Oral	[10, 16, 22, 25, 26]
3	<i>Acacia lebeck</i> (L.) Willd.	Mimosaceae	Br, L, Fr	Anti-lice and eye disease	Topical	[11]
4	<i>Acacia modesta</i> Wall.	Mimosaceae	Br, Fr, Gum	Lactation, Sex tonic, Joint problems, Placenta retention, Muscular, Skin problems, wounds	Oral, Topical	[3, 7, 9, 11, 20, 22, 24, 30]
5	<i>Acorus calamus</i> L.	Acoraceae	Rh	Low body temperature, Ague (charmaik)	Oral	[1]
6	<i>Aconitum violaceum</i> Jack. ex Stapf.	Ranunculaceae	Rh	Lungs problems	Oral	[19]
7	<i>Adiantum incisum</i> Forssk.	Pteridaceae	L	Stomach pain	Oral	[16]
8	<i>Aesculus indica</i> (Wall. ex Cambess.) Hook.	Sapindaceae	Fr	General weakness, respiratory, Stomach ailment	Oral	[8, 16, 19, 21]
9	<i>Aerva javanica</i> (Burm.f.) Juss. ex Schult.	Amaranthaceae	Rt, Ap, S	Skin infection, Gastrointestinal ailments	Topical and oral	[16, 18, 26]
10	<i>Ailanthus altissima</i> (Mill.) Swingle (<i>Ailanthus excels</i> Roxb.)	Simaroubaceae	L	Malarial fever; Anestrous, Galactagogue	Oral	[9, 18-20, 22]
11	<i>Astragalus bakaliensis</i> Bunge	Papilionaceae	Wp	Lactation	Oral	[11]
12	<i>Ajuga integrifolia</i> Buch.-Ham. (<i>Ajuga bracteosa</i> Wall. ex Benth.)	Lamiaceae	Wp, L	Abdominal pain, Vermifuge, Skin problems	Oral	[3, 9, 16, 22]
13	<i>Albizia lebeck</i> (L.) Benth.	Leguminoasae (Fabaceae)	L	Anthelmintic, eye souring, Gastrointestinal problems, Fever	Oral	[3, 17, 22, 23]
14	<i>Allium jacquemontii</i> Kunth	Amaryllidaceae	Bl	Mammary gland disorder	Topical	[16]
15	<i>Aloe barbadensis</i> Mill.	Liliaceae	Rt	Gastrointestinal problems	Oral	[2]
16	<i>Amaranthus viridis</i> L.	Amaranthaceae	L, S, Wp	Malarial fever, Weakness, Gastro problems, Diuretic	Oral	[8, 16, 19, 20, 22]
17	<i>Anagallis arvensis</i> L.	Primulaceae	L, Fr St	Anthelmintic	Oral	[22]
18	<i>Anamirta cocculus</i> (L.) Wight and Arn.	Menispermaceae	Fr	Anti-lice	Topical	[18]
19	<i>Areca catechu</i> L.	Arecaceae	S	Genital prolapse	Oral	[25]
20	<i>Arisaema flavum</i> (Forssk.) Schoot	Araceae	L, Rh, S	Mouth and foot diseases, Milk deficiency, Wounds "Rani Khait" disease	Oral	[8, 15, 19, 21]
21	<i>Arisaema jacquemontii</i> Blume	Araceae	WP	Cholera, Flu, Gastrointestinal, Snakebite	Oral	[8]
22	<i>Artemisia absinthium</i> L.	Asteraceae	Wp	Anthelmintic	Oral	[9, 20]
23	<i>Artemisia maritima</i> L.	Asteraceae	Ap	Round worm, Wound healing	Oral	[19, 24]
24	<i>Artemisia scoparia</i> Waldst. and Kit.	Asteraceae	L	Gastrointestinal ailments and skin	Oral, Topical	[9, 20]
25	<i>Artemisia vulgaris</i> L.	Asteraceae	Wp	Stomach problems and anthelmintic	Oral	[19]
26	<i>Angelica glauca</i> Edgew.	Apiaceae	Wp	Ague	Oral	[8]

27	<i>Aquilegia pubiflora</i> Wall. ex Royle	Ranunculaceae	Ap	Anthelmintic	Oral	[8]
28	<i>Asphodelus tenuifolius</i> Cav.	Xanthorrhoeaceae	L	Constipation	Oral	[16, 22]
29	<i>Azadirachta indica</i> A.Juss.	Meliaceae	L	Ecto/ Endo-parasites, Vermifuge, Myiasis	Topical/ Oral	[3, 16, 17, 23, 26]
30	<i>Aizoon carariense</i> L.	Aizoaceae	Ap	Myiasis	Topical	[29]
31	<i>Bacopa monnieri</i> (L.) Wettst. (<i>Herpestis monniera</i> L.) Kunth)	Plantaginaceae	Ap	Anthelmintic		[17]
32	<i>Balanites aegyptiaca</i> (L.) Delile	Zygophyllaceae	S	Constipation, Anthelmintic	Oral	[18]
33	<i>Bambusa arundinacea</i> (Retz.) Willd.	Poaceae	L	Anthelmintic		[17]
34	<i>Barleria acanthoides</i> Vahl	Acanthaceae	L	Foot and mouth	Topical	[18]
35	<i>Bauhinia variegata</i> L.	Leguminosae/ Fabaceae	Fl	Diarrhea, Foot and mouth disease	Oral	[3]
36	<i>Berberis calliobotrys</i> Bien. exKoehne	Berberidaceae	Rt	Muscular pain	Oral	[7]
37	<i>Berberis lycium</i> Royle	Berberidaceae	Br, Rt	Bone fracture, Myiasis, Internal injury	Oral	[9, 15, 16, 19, 20]
38	<i>Bergenia ciliata</i> (Haw.)Sternb.	Saxifragaceae	Rh, L	Chronic stomachic and intestinal trouble, Wounds healing	Oral	[8, 15, 16, 19]
39	<i>Blepharis scindica</i> Stocks ex T.Anderson (<i>Blepharis sindica</i>) L.	Acanthaceae	L	Galactagogue	Oral	[18]
40	<i>Boerhavia erecta</i> L.	Nyctaginaceae	Wp	Skin problems	Topical	[9, 20]
41	<i>Boerhavia diffusa</i> L.	Nyctaginaceae	Wp, Rt	Urinary problems, Stomachic	Oral	[3, 11]
42	<i>Boerhavia procumbens</i> Banks ex Roxb.	Nyctaginaceae	Rt	Respiratory problems	Oral	[26]
43	<i>Buddleja asiatica</i> Lour.	Scrophulariaceae	L	Ticks and mites	Topical	[19]
44	<i>Buxus wallichiana</i> Baill.	Boxaceae	L	Mange	Topical	[7]
45	<i>Calluna vulgaris</i> (L.) Hull	Ericaceae	S	Genital prolapse	Oral	[25]
46	<i>Calotropis procera</i> (Aiton) W.T. Aiton	Apocynaceae	L, Lt, Ap	Wound healing, Rabies diseases silent estrous/delayed puberty, Vermifuge	Topical	[2, 3, 9, 11, 20, 22, 25, 26]
47	<i>Calligonum polygonoides</i> L.	Polygonaceae	Ap	Fly repellent, Skin ailments	Topical	[26]
48	<i>Capparis decidua</i> (Forssk.) Edgew. (<i>Capparis aphylla</i> Hayne ex Roth.)	Capparaceae	Tw, Fr, Br St	Anti-lice, Vermifuge, Stomachic, Anorexia, Healing bone and wounds	Oral topical	[7, 11, 16-18, 20, 24, 29]
49	<i>Capparis spinosa</i> L.	Capparaceae	S	Genital prolapse , Respiratory	Oral	[25, 26]
50	<i>Carissa spinarum</i> L. (<i>Carissa carandas</i> L.)	Apocynaceae	Rt	Foot and mouth	Oral	[21]
51	<i>Carthamus oxyacantha</i> M. Bieb.	Asteraceae	Fl, S	Fever, Skin	Topical, Oral	[22]
52	<i>Cannabis sativa</i> L.	Cannabaceae	L, St	Skin problems, Pediculosis, Genital prolapse, Anti-leach and lice	Topical	[2, 9, 15, 16, 19, 20, 22, 25]
53	<i>Celtis australis</i> L.	Cannabaceae	Br	Gastrointestinal disorder	Oral	[9, 20]
54	<i>Cassia angustifolia</i> Vahl	Caesalpiniaceae	Wp	Anthelmintic	Oral	[11]
55	<i>Catunaregam spinosa</i> (Thunb.) Tir- veng. (<i>Randia dumetorum</i> Lamb.)	Rubiaceae	Fr	Anestrous	Oral	[25]

56	<i>Cedrus Libani</i> A.Rich. <i>Cedrus deodara</i> (Roxb. ex D.Don) G.Don	Pinaceae	Wd, O	Pediculosis, Anthelmintic , Stomachic, Sex tonic	Topical, oral	[9, 15, 20]
57	<i>Cedrella serrata</i> Royle	Meliaceae	L	Stomachic	Oral	[19]
58	<i>Chamaecyparis obtuse</i> (Siebold and Zucc.) Endl.	Cupressaceae	Fr	Anestrous	Oral	[9, 20]
59	<i>Chenopodium album</i> L.	Chenopodiaceae	Wp, L	Skin infection, Measles Wound Stomachic	Topical	[2, 3, 9, 16, 17, 20-22]
60	<i>Cistanche tubulosa</i> (Schenk) Wight	Orobanchaceae	Wp	Respiratory	Oral	[11]
61	<i>Cissampelos pariera</i> L.	Menispermaceae	L	Tonic	Oral	[19]
62	<i>Clematis grata</i> Wall.	Ranunculaceae	L	Eco-parasitic, Wound healing	Topical	[3, 16, 22]
63	<i>Cleome brachycarpa</i> (Forssk.) Vahl ex DC.	Capparaceae	L	Maggots, Ague	Oral	[18, 23, 26]
64	<i>Cocculus hirsutus</i> (L.) W. Theob.	Menispermaceae	Ap	Weakness	Oral	[26]
65	<i>Cochlospermum religiosum</i> (L.) Alston	<i>Bixaceae</i>	L	Genital prolapse	Oral	[25]
66	[11] Sm.	Lamiaceae	L	Maggots	Topical	[19]
67	<i>Corchorus depressus</i> (L.) Stocks	Malvaceae	Ap	Diuretic	Oral	[26]
68	<i>Cordia dichotoma</i> G.Forst. <i>(Cordia obliqua</i> Willd)	Boraginaceae	Fr	Respiratory	Oral	[16]
69	<i>Cordia myxa</i> L.	Boraginaceae	Fr	Lactation	Oral	[11]
70	<i>Convolvulus arvensis</i> L.	Convolvulaceae	Ap	Anthelmintic, Constipation, Bone fracture, Lactation	Oral	[9, 11, 16, 17, 20, 26]
71	<i>Crotalaria albida</i> Roth (<i>Crotalaria burhia</i> Benth.)	Leguminosae / Fabaceae	Ap	Skin ailments	Topical	[26]
72	<i>Crotalaria juncea</i> L.	Leguminosae/ Fabaceae	S	Lactation	Oral	[19]
73	<i>Cuscuta reflexa</i> Roxb. <i>(Cuscuta reflexa</i> Decne.)	Convolvulaceae	L, Fr, Wp	Anthelmintic, Galactagogue, Fertility	Oral	[9, 11, 16, 17, 20, 26]
74	<i>Cymbopogon jwarancusa</i> (Jones) Schult.	Poaceae	Ap	Respiratory, Sex tonic for bull, Genital prolapse	Oral	[11, 26]
75	<i>Cynodon dactylon</i> (L.) Pers.	Poaceae	L	Burn injuries	Topical	[16]
76	<i>Cynoglossum lanceolatum</i> Forssk.	Boraginaceae	Rt	Cold fever	Oral	[2]
77	<i>Cynanchum viminale</i> (L.) L. <i>(Sarcostemma viminale</i> (L.) R.Br.) S	Apocynaceae	Rt	Snake scorpion	Topical	[18]
78	<i>Dalbergia sissoo</i> Dc.	Leguminosae/ Fabaceae	Br, L, S	Gastric problems, Genital prolapse , Diarrhea, Hepatic disorder	Oral	[3, 11, 16, 17, 22, 25]
79	<i>Daphne gnidium</i> L.	Thymelaeaceae	L	Testicular swelling, Skin wounds	Oral	[20, 24]
80	<i>Daphne oleoides</i> Schreb.	Thymelaeaceae	L, Fl	Vermifuge	Oral	[9, 20]

81	<i>Daphne mucronata</i> Royle	Thymelaeaceae	L	Pediculosis, Vermifuge	Topical oral	[15]
82	<i>Daphne papyracea</i> Wall. exG. Don.	Thymelaeaceae	Ap	Mange and stomachic	Oral, Topical	[7]
83	<i>Datura innoxia</i> P. Mill.	Solanaceae	Fl, L	Silent anestrous, anti-lice, wounds healing		[2, 16, 22, 25]
84	<i>Datura stramonium</i> L.	Solanaceae	L	Agu (charmaik)	Oral	[1]
85	<i>Datura metel</i> L. (<i>Datura alba</i> Rumph. ex Ness)	Solanaceae	L, Fr, Rt	Vermicide, Respiratory, Anestrous, Snake bite	Oral	[3, 11]
86	<i>Debregeasia saeneb</i> (Forssk.) Hepper and J.R.I. Wood (<i>Debregeasia salicifolia</i> (D. Don.) Rendle)	Urticaceae	L	stomach disorder	Oral	[21, 22]
87	<i>Dioscorea deltoidea</i> Wall.	Dioscoreaceae	Ae	Myiasis	Topical	[15]
88	<i>Digera muricata</i> L.	Amaranthaceae	Wp	Anthelmintic	Oral	[17]
89	<i>Dipterygium glaucum</i> Decne.	Capparaceae	Ap	Body Infection	Oral	[26]
90	<i>Dodonaea viscosa</i> (L.) jacq.	Sapindaceae	L	Wounds, Anestrous, Sex tonic for goat	Topical, Oral	[1, 11, 19, 22]
91	<i>Dysphania botrys</i> (L.) Mosyakin and Clemants (<i>Chenopodium botrys</i> L.)	Chenopodiaceae	St	Anthelmintic	Oral	[22]
92	<i>Eclipta prostrate</i> (L.) L.	Asteraceae	Ap	Pneumonia	Oral	[15]
93	<i>Echinops echinatus</i> Roxb.	Asteraceae	Wp	Tonic	Oral	[11]
94	<i>Encostemma hyssopifolium</i> (Willd.) Verdoorn	Gentianaceae	Wp	Snake bite	Topical	[18]
95	<i>Erigeron canadensis</i> L. (<i>Conyza Canadensis</i> (L.) Cronquist)	Asteraceae	Wp	Urinary problems, Stomachic	Oral	[3, 19]
96	<i>Eryngium biehersteinianum</i> (M. Bieb.) Nevski	Apiaceae	St, L	Liver problem	Oral	[9]
97	<i>Ephedra gerardiana</i> Wall. ex Stapf.	Ephedraceae	Ap	Wounds Healing	Topical	[7]
98	<i>Eucalyptus camaldulensis</i> Dehnh.	Myrtaceae	Fl, L	Cold & Fever	Topical	[16]
99	<i>Euphorbia caducifolia</i> Haines (= <i>E. neriifolia</i> Auctt.)	Euphorbiaceae	Lt	Scorpion and snake bite	Topical	[18]
100	<i>Euphorbia dracunculoides</i> Lam.	Euphorbiaceae	Wp	Lactation	Oral	[11]
101	<i>Euphorbia prostrata</i> Ait.	Euphorbiaceae	Wp, L	Urinary tract infection, Anthelmintic	Oral	[3, 11, 22]
102	<i>Euphorbia hirta</i> L.	Euphorbiaceae	L	Lactation	Oral	[22]
103	<i>Euphorbia wallichii</i> Hook.f.	Euphorbiaceae	Lt	Skin rashes wound	Topical	[16, 22]
104	<i>Euphorbia granulata</i> Forssk.	Euphorbiaceae	Lt	Snake and scorpion	Topical	[26]
105	<i>Fagonia indica</i> Burm.f.	Zygophyllaceae	Wp	Indigestion	Oral	[16]
106	<i>Fagonia arabica</i> L.	Zygophyllaceae	Wp	Stomachic	Oral	[11, 22]
107	<i>Fagopyrum acutatum</i> (Lehm.) Mansf.exK. Hammer	Polygonaceae	Ae	Antimicrobial, Diuretic	Oral	[8]
108	<i>Fagopyrum esculentum</i> Moench	Polygonaceae	Ae	Antimicrobial, Diuretic	Oral	[8]
109	<i>Ficus benghalensis</i> L.	Moraceae	Rt, L, Br	Genital prolapse	Oral	[25]
110	<i>Flacourtia indica</i> (Burm.f.) Merr. (<i>Flacourtia sepiaria</i> Roxb.)	Salicaceae	L	Snake bite	Oral	[18]

111	<i>Flueggea leucopyrus</i> Willd. (<i>Securinega</i> (<i>Leucopyrus</i> (Willd) Muell. Arg.)	Phyllanthaceae	L	Myiasis	Topical	[18]
112	<i>Fumaria indica</i> (Hauskn.) Pugsley	Papaveraceae	Wp	Diarrhoea	Oral	[16, 22]
113	<i>Fumaria officinalis</i> L.	Papaveraceae	L, S	Diarrhoea, Fever	Oral	[16]
114	<i>Galium aparine</i> L.	Rubiaceae	L, S	Mastitis	Oral	[25]
115	<i>Geranium wallichianum</i> D. Don ex. Sweet	Geraniaceae	Rt	Lactation	Oral	[1]
116	<i>Glycyrrhiza glabra</i> L.	Leguminosae/ Fabaceae	L, Rt	Birth problems, Lactation	Oral	[9, 20]
117	<i>Gossypium hirsutum</i> L.	Malvaceae	S	Anestrous, Dystocia	Oral	[25]
118	<i>Gossypium arboreum</i> Parl.	Malvaceae	L, Fl	Lactation, Galactagogue	Oral	[9, 20, 25]
119	<i>Grewia optiva</i> J.R. Drumm. ex Burret	Malvaceae	Br	Gastrointestinal problems, Wounds Anthelmintic, Galactagogue,	Oral	[1, 9, 15, 19, 20]
120	<i>Grewia villosa</i> Willd.	Malvaceae	Wp	Stomachic		[9, 20]
121	<i>Haloxylon recurvum</i> Bunge ex Boiss. (unresolved)	Amaranthaceae	Ap	Anthelmintic	Oral	[26]
122	<i>Haloxylon salicornicum</i> (Moq.) Bunge ex Boiss.	Amaranthaceae	Ap	Anthelmintic		[26]
123	<i>Hedera nepalensis</i> K. Koch	Apocynaceae	L	Ecto-parasitic	Topical	[2]
124	<i>Helleborus niger</i> L.	Ranunculaceae	L	Anthelmintic		[17]
125	<i>Heracleum candicans</i> Wall. ex DC.	Apiaceae	Rt	Fertility	Oral	[9, 20]
126	<i>Himalaiella heteromala</i> (D. Don) Raab-Straube (<i>Sassuria heteromala</i> (D. Done.) Hand-Mazz.)	Asteraceae	S, Rh	Stomachic, Lactation	Oral	[3, 7, 21]
127	<i>Heliotropium crispum</i> Desf. <i>Heliotropium eichwaldi</i> Steud (Unresolved)	Boraginaceae	L	Otitis	Ora	[18, 26]
128	<i>Hibiscus cannabinus</i> L.	Malvaceae	Ap	Antipyretic	Oral	[26]
129	<i>Hypericum perforatum</i> L	Hypericaceae	Wp	Increase temperate	Oral	[1]
130	<i>Impatiens scabrida</i> DC.	Balsaminaceae	Wp	Laxative, Diuretic	Oral	[8]
131	<i>Indigofera heterantha</i> Brandis	Papilionaceae	Tw	Meat and milk	Oral	[8]
132	<i>Isodon rugosus</i> (Wall. ex Benth.) Codd	Lamiaceae	Ap, Wp	Retention of fetal membrane	Topical oral	[8, 25]
133	<i>Justicia adhatoda</i> Mart. Ex Nees (<i>Adhatoda vasica</i> Nees)	Acanthaceae	L, Rt	Cough, Vermifuge Stomachic, Fever, Fly repellent	Oral	[3, 16, 21, 22]
134	<i>Lactuca brunoniana</i> (DC.) Wall. ex C.B. Clarke	Asteraceae	Wp	Pinworms	Oral	[8]
135	<i>Lactuca serriola</i> L.	Asteraceae	St	Skin infection	Topical	[22]
136	<i>Lamium amplexicaule</i> L.	Lamiaceae	L	Anthelmintic	Oral	[26]
137	<i>Launaea nudicaulis</i> (L.) Hook.f.	Asteraceae	L	Wounds healing	Topical	[26]
138	<i>Launaea procumbens</i> (Roxb.) Ramayya and Rajagopal	Asteraceae	Wp	Galactagogue	Oral	[9, 20]
139	<i>Leptadenia pyrotechnica</i> (Forssk.) Decne. (<i>Leptadenia spartium</i> Wight)	Apocynaceae	Ap	Placenta prolapse	Oral	[26]

140	<i>Lepidium didymum</i> L. (<i>Cronopus didymus</i> L.)	Brassicaceae	Wp	Maggots	Topical	[19]
141	<i>Lepidium sativum</i> L.	Brassicaceae	S	Genital prolapse, Stomachic	Oral	[10, 19, 25]
142	<i>Lens culinaris</i> Medik.	Fabaceae/ Leguminosae	S	Genital prolapse	Oral	[25]
143	<i>Leptopus cordifolius</i> Decne. (<i>Andrachne cordifolia</i> (Dene) Muell.)	Phyllanthaceae	L, Rt	Anthelmintic	Oral	[8, 21]
144	<i>Linum usitatissimum</i> L.	Linaceae	S	Anestrous, Lactation	Oral	[3, 25]
145	<i>Litsea monopetala</i> (Roxb.) Pers.	Lauraceae	St	Jaundice	Oral	[7]
146	<i>Lotus corniculatus</i> L.	Leguminosae/ Fabaceae	L, St	Sex tonic and urinary infection	Oral	[9, 20]
147	<i>Mallotus philippensis</i> (Lam.) Mull. Arg.	Euphorbiaceae	S, Wp, Fr	Anthelmintic, Ague (charmaik)	Oral	[1, 3, 16, 17, 21]
148	<i>Malva neglecta</i> Wallr	Malvaceae	L, Rt	Flatulence	Oral	[1, 20]
149	<i>Malvastrum coromandelianum</i> (L.) Garcke	Malvaceae	St	Lactation	Oral	[22]
150	<i>Medicago monantha</i> (C.A.Mey.) Trautv. (<i>Trigonella monantha</i> C. A. Meyer.)	Papilionaceae	Wp	Lactation	Oral	[11]
151	<i>Medicago sativa</i> L.	Leguminosae/ Fabaceae	Ap	Anthelmintic		[17]
152	<i>Medicago laciniata</i> (L.) Mill.	Leguminosae/ Fabaceae	Wp	Lactation	Oral	[11]
153	<i>Mentha longifolia</i> (L.) L.	Lamiaceae	L, Wp	Bloating, Diarrhea Stomachic, Ague (charmaik)	Oral	[8, 10, 20-22]
154	<i>Melia azedarach</i> L.	Meliaceae	S, L	Anthelmintic, Anorexia, Genital prolapse, Stomach flatulence, Foot and mouth, Snake bite, Respiratory, Galactagogue	Oral topical	[1-3, 8-11, 16, 19, 20, 22, 23, 25]
155	<i>Micromeria biflora</i> (Buch.-Ham. ex D.Don) Benth.	Lamiaceae	Wp	Wound healing	Topical	[22]
156	<i>Mollugo nudicaulis</i> Lam.	Molluginaceae	Ap	Wound healing	Oral	[18, 26]
157	<i>Myristica fragrans</i> Houtt.	Myristicaceae	S	Dystocia	Oral	[25]
158	<i>Myrsine africana</i> L.	Primulaceae	L	Anthelmintic		[16]
159	<i>Nannorrhops ritchiana</i> (Griff.) Aitch.	Arecaceae	L	Foot and mouth diseases	Oral	[7, 20]
160	<i>Narcissus tazetta</i> L.	Amaryllidaceae	L	Retention of placenta	Oral	[20]
161	<i>Nasturtium officinale</i> R.Br.	Brassicaceae	St	Blood purifier	Oral	[22]
162	<i>Neurada procumbens</i> L.	Neuradaceae	Ap	Nerve tonic	Oral	[26]
163	<i>Nerium oleander</i> L.	Apocynaceae	L, Wp	Ecto-parasitic, Stomachic	Topical	[2, 9, 20]
164	<i>Nepeta laevigata</i> (D. Don) Hand.-Mazz.	Lamiaceae	St	Urinary and stomach problems	Oral	[22]
165	<i>Nicotiana rustica</i> L.	Solanaceae	L	Ecto-parasites	Topical	[1]
166	<i>Olea ferruginea</i> Wall. ex Aitch.	Oleaceae	Fr, L, Ap	Indigestion, Nerve tonic Anthelmintic, Bone fracture	Oral topical	[7, 11, 16, 20]
167	<i>Olea europaea</i> L.	Oleaceae	O	Broken bones	Topical	[9, 20]
168	<i>Oligochaeta ramosa</i> Wagenitz	Asteraceae	Ap	Antipyretic	Oral	[26]
169	<i>Opuntia littoralis</i> (Engelm.) Cockereell	Cactaceae	Wp	Anti-inflammatory	Topical	[9, 20]

170	<i>Oxalis corniculata</i> L.	Oxalidaceae	Rt, St	Lactation	Oral	[22]
171	<i>Panicum antidotale</i> Retz	Poaceae	Ap	Respiratory	Oral	[26]
172	<i>Paeonia emodi</i> Royle	Paeoniaceae	Rt	Internal injury		[9, 19, 20]
173	<i>Papaver somniferum</i> L.	Papaveraceae	Lt	Blood clotting	Topical	[9, 20]
174	<i>Pedaliium murex</i> L.	Pedaliaceae	L	Diuretic	Oral	[18]
175	<i>Peganum harmala</i> L.	Nitrariaceae	Ap	Mastitis, fly repellent Mange, wound healing	Topical	[7, 11, 16, 19, 23, 26]
176	<i>Periploca aphylla</i> Decne.	Apocynaceae	St	Respiratory	Topical	[11]
177	<i>Phragmites australis</i> (Cav.) Trin. ex Steud.	Poaceae	Rh	Pregnancy survival	Oral	[22]
178	<i>Pinus gerardiana</i> Wall. ex.D.Don	Pinaceae	Wp, O	Skin, wounds, Stomachic, Respiratory problems	Oral topical	[7, 20, 24]
179	<i>Pinus roxburghii</i> Sar.	Pinaceae	O, Ap, Gum	Mange, Myiasis, Snake bite, Wound healing	Topical	[3, 9, 15, 20, 22, 29]
180	<i>Pinus wallichiana</i> A.B. Jacks.	Pinaceae	Wp, O	Cough; Endo-parasites Stomachic, Respiratory	Oral	[7]
181	<i>Phyllodium pulchellum</i> (L.) Desv.	Leguminosae/ Fabaceae	Rt	Fever, Weakness	Oral	[16]
182	<i>Phyllanthu acidus</i> (L.) Skeels	Phyllanthaceae	L, Rt	Snake bite	Topical, Oral	[3]
183	<i>Phyllanthus nirurii</i> L.	Phyllanthaceae	Rt, L	Stomachic, Wound	Topical oral	[18]
184	<i>Plantago major</i> L.	Plantaginaceae	L	Hoof infection	Topical	[16]
185	<i>Plantago depressa</i> Willd	Plantaginaceae	S	Laxative	Oral	[11]
186	<i>Plantago lanceolata</i> L.	Plantaginaceae	L	Anti-inflammation	Topical	[22]
187	<i>Persicaria amplexicaulis</i> (D. Don) Ronse Decr. (<i>Polygonum amplexicaule</i> D. Don.)	Polygonaceae	Rt	Fever	Oral	[16]
188	<i>Polygonum plebeium</i> R.Br.	Polygonaceae	Ap	Antipyretic	Oral	[26]
189	<i>Portulaca oleracea</i> L.	Portulacaceae	Wp	Mastitis	Topical	[22, 23]
190	<i>Primula denticulata</i> Sm.	Primulaceae	Wp, St	Hepatic fever, dysuria and hemoglobinuria, eye infection	Oral	[8, 9, 20]
191	<i>Prosopis cineraria</i> (L.) Druce	Fabaceae/Leguminosae	Fl	Rheumatism	Oral	[18]
192	<i>Prosopis glandulosa</i> Torr.	Fabaceae/Leguminosae	L, Fr	Bone fracture	Topical	[18]
193	<i>Prunus brahuica</i> (Boiss.) Aitch and Hemsl.	Rosaceae	Wp	Foot and mouth muscular r	Oral	[7]
194	<i>Quercus baloot</i> Griff.	Fagaceae	L, Fr	Urinary infections	Oral	[1, 18]
195	<i>Quercus incana</i> Bartram	Fagaceae	L, S	Lactation		[19]
196	<i>Quercus oblongata</i> D. Don	Fagaceae	Fr,L, Br	Astringent, Diuretic, anti-asthma, anorexia, Internal infection	Oral	[8, 9, 20]
197	<i>Ranunculus muricatus</i> L.	Ranunculaceae	Wp	Constipation		[19]
198	<i>Ribes alpestre</i> Wall. exDecne	Grossulariaceae	Rt	Muscular	Oral	[7]
199	<i>Ricinus communis</i> L.	Euphorbiaceae	Fr, L, O	Constipation, Myiasis anthelmintic, Silent estrous/delayed puberty Prolapse of uterus, Cold fever	Oral	[2, 7, 9-11, 16-18, 20, 22, 25]

200	<i>Rheum australe</i> D. Don (<i>Rheum emodi</i> Wall.ex. Miessn.)	Polygonaceae	Wp	Weakness	Oral	[1]
201	<i>Rhazya stricta</i> Decne.	Apocynaceae	Rt	Maggots, wounds	Topical	[24]
202	<i>Rumex dentatus</i> L	Polygonaceae	Rt	Muscular	Oral	[7]
203	<i>Rumex nepalensis</i> Spreng.	Polygonaceae	L	Skin inflammation, Hepatitis, Malarial fever, Dysuria and red urination	Topical oral	[8, 16, 19]
204	<i>Rumex hastatus</i> D. Don	Polygonaceae	Rt, Wp	Myiasis, Appetizer, Wound healing	Oral, Topical	[1, 2, 9, 15, 19, 20, 22]
205	<i>Ruta graveolens</i> L.	Rutaceae	S	Retention of fetal membrane	Oral	[25]
206	<i>Rydingia limbata</i> (Benth.) Scheen and V.A.Albert (<i>Otostegia limbata</i> (Benth) Baiss)	Lamiaceae	L, Fl	Wounds healing		[19]
207	<i>Saccharum bengalense</i> Retz.	Poaceae	Rt	Anthelmintic	Oral	[16]
208	<i>Sageretia thea</i> (Osbeck) M.C. Johnst.	Rhamnaceae	St	Skin problems	Topical	[22]
209	<i>Salvia moorcroftiana</i> Wall. ex Benth.	Lamiaceae	Rt, L	Internal wounds skin Toxic fever, digestive	Oral topical	[1, 9, 18-20, 22]
210	<i>Salvadora oleoides</i> Decne	Salvadoraceae	L, Rt	Genital prolapse, Lochia	Oral	[11, 18, 25]
211	<i>Salix tetrasperma</i> Roxb.	Salicaceae	Br	Cough, Infection	Oral	[9, 20]
212	<i>Salix Babylonica</i> L.	Salicaceae	L	Skin problems	Topical	[9]
213	<i>Saussurea costus</i> (Falc.) Lipsch. (<i>Saussurea lappa</i> (Decne.) Sch.Bip.)	Asteraceae	Rt	Stomachic	Oral	[15, 19]
214	<i>Senecio chrysanthemoides</i> DC.	Asteraceae	Ap, Rt	Anthelmintic, antiscorbutic and diaphoretic, Joint problem	Oral	[8, 16]
215	<i>Semecarpus anacardium</i> L. f. (Unresolved)	Anacardiaceae	Fr	Reproductive disorder	Oral	[25]
216	<i>Silene villosa</i> Forssk.	Caryophyllaceae	Wp	Lactation	Oral	[11]
217	<i>Skimmia laureola</i> Franch.	Rutaceae	L	Cold, shivering (ague) diarrhea, dysentery, and anthelmintic	Oral	[8]
218	<i>Sideroxylon mascatense</i> (A.DC.) T.D. Penn. (<i>Edgeworthia buxifolia</i> Falc.) A.D.)	Spotaceae	L	Abdominal pain, Taste of milk	Oral	[1, 20]
219	<i>Silybum marianum</i> (L.) Gaertn.	Asteraceae	L	Urinary and liver problems	Oral	[22]
220	<i>Sinopodophyllum hexandrum</i> (Royle) T.S. Ying (<i>Podophyllum emodi</i> Wall. ex Hook. f. and Thomson)	Berberidaceae	Ap, Rt	Myiasis, Internal injury	Topical	[1, 15]
221	<i>Solanum surratense</i> Burm.f.	Solanaceae	L	Genital prolapse Myiasis, Wound healing, Fever	Oral	[2, 16, 22, 25, 29]
222	<i>Solanum virginianum</i> L. (<i>Solanum xanthocarpum</i> Schrad. and H. Wendl.)	Solanaceae	L, Ap	Anthelmintic, Pneumonia, fever, Milk production	Oral	[9, 15, 17, 20]
223	<i>Sophora mollis</i> (Royle)	Caesalpinaceae	L	Internal infection	Oral	[20]
224	<i>Sorbaria sorbifolia</i> (L.) A. Braun	Rosaceae	Ap	Stimulant	Oral	[8]
225	<i>Sorghum halepense</i> (L.) Pers.	Poaceae	Rt	Mastitis	Topical	[11, 21]
226	<i>Spiraea canescens</i> D. Don	Rosaceae	Br	Stomachic, Respiratory problems	Oral	[7]
227	<i>Streblus asper</i> Lour.	Moraceae	Fr	Cooling effect	Oral	[9, 20]

228	<i>Swertia paniculata</i> Wall.	Gentianaceae.	Wp	Ague, Indigestion and constipation	Oral	[8]
229	<i>Tagetes minuta</i> L.	Asteraceae	L	Skin infection	Topical	[2]
230	<i>Tamarix aphylla</i> (L.) H. Karst.	Tamaricaceae	Fr, L	Anthelmintic and ectoparasites		[2, 11, 16, 17, 22, 23]
231	<i>Taraxacum officinale</i> F.H. Wigg.	Asteraceae	Wp	Milk deficiency	Oral	[3, 21]
232	<i>Taraxacum campyloides</i> G.E. Haglund	Asteraceae	Wp	Galactagogue	Oral	[20]
233	<i>Tecomella undulata</i> (Sm.) Seem.	Bignoniaceae	Ap	Urinary infection	Oral	[11]
234	<i>Thymus linearis</i> Benth.	Lamiaceae	Wp	Lactation		[19]
235	<i>Thymus serpyllum</i> L.	Lamiaceae	L	Mastitis		[23]
236	<i>Tribulus terrestris</i> L.	Zygophyllaceae	Wp, L	Worms, Joint pain Respiratory and digestive problems	Oral	[9, 17, 18, 20, 22]
237	<i>Trianthema portulacastrum</i> L.	Aizoaceae	Wp	Anthelmintic	Oral	[17]
238	<i>Trichodesma indicum</i> (L.) Lehm.	Boraginaceae	Rt, L, Wp	Mastitis, Snake bite, Stomach disorder	Topical oral	[3, 16, 21]
239	<i>Toona ciliata</i> M.Roem. (<i>Cedrella toona</i> Roxb. ex. Rottle Willd)	Meliaceae	Br	Gastro disorders	Oral	[21]
240	<i>Tulipa stellata</i> HK. F.	Liliaceae	Fl	Galactagogue	Oral	[20]
241	<i>Valeriana jatamans</i> Jones	Caprifoliaceae	L	Gastrointestinal problems	Oral	[7]
242	<i>Verbascum thapsus</i> L.	Scrophulariaceae	L, S, F	Diarrhea	Oral	[16, 19, 22]
243	<i>Vernonia anthelmintica</i> (L.) Willd.	Asteraceae	S	Mastitis, Anthelmintic	Topical	[17]
244	<i>Viburnum cotinifolium</i> D. Don	Adoxaceae	Fr	Release placenta	Oral	[19]
245	<i>Viola stocksii</i> Boiss.	Violaceae	Wp	Dysentery	Oral	[11]
246	<i>Viola kashmiriana</i> W. Becker	Violaceae	WP	Foot and mouth diseases	Topical	[3]
247	<i>Visnaga daucoides</i> Gaertn.	Apiaceae	Fr	Diarrhea, Placenta retention	Oral	[9, 20]
248	<i>Vitex negundo</i> L.	Lamiaceae	L, S	Mange, Joint pain, Vermifuge, Stomachic	Oral	[11, 15, 19]
249	<i>Withania coagulans</i> (Stocks) Dunal	Solanaceae	L, Fr	Anthelmintic, Gastric, muscular and respiratory problems	Oral	[7, 10, 11, 17, 20, 22, 24]
250	<i>Withania somnifera</i> (L.) Dunal	Solanaceae	S, Rt, L	Infertility, Mastitis, Diarrhea, Antipyretic, Sexual tonic	Oral	[9, 11, 16, 20]
251	<i>Xanthium strumarium</i> L.	Asteraceae	L	Maggots		[19]
252	<i>Zanthoxylum armatum</i> DC.	Rutaceae	Fr, S, L	Infertility, Vomiting, Parturition, Foot and mouth, Ague (charmakh)	Oral	[1, 9, 16, 19-22]
253	<i>Ziziphus nummularia</i> (Burm.f.) Wight and Arn. (<i>Rhamnus purpurea</i> Edgew)	Rhamnaceae	Fr, L	Itch; Wounds, Anestrous. Genital prolapse	Topical oral	[16, 18, 21, 22, 25]
254	<i>Ziziphus jujube</i> Mill. (<i>Ziziphus mauritiana</i> Lam.	Rhamnaceae	L, Fr	Anthelmintic, Lactation Dysentery, Diuretic		[9, 11, 17]
255	<i>Ziziphus oxyphylla</i> Edgew.	Rhamnaceae	Rt	Liver infection	Oral	[9, 20]

Table 1: List of wild medicinal plants practices as ethno-veterinary herbal medicine in Pakistan.

Note: Part(s) of the plant used: Ap: Aerial Parts; Br: Bark; Bl: Bulb; L: Leaves; Fl: Flower; Fr: Fruit; Gum: Gums; Pd: Pods; Rh: Rhizome; S: Seed; Rt: Root; O: Oil; St: Stem; Tw: Twigs; Lt: Latex; Wd: Wood; Wp: Whole Plant.

Category	Common diseases and features	Number of species used
Gastrointestinal ailments	Abdominal pain, Bloating, Constipation, Diarrhoea, Cholera, Digestive problems, Dysentery, Gastrointestinal parasites, Indigestion, Internal wounds, Flatulence, Anorexia, Piles	67
General body disorders	Heat Stroke, Rheumatism, Skeleto- muscular problems, Infections, General weakness, Hoof infection	22
Skin ailments	Burn injuries, Measles, Itch, Wounds, Mange	26
Antidote	Snake bites, Scorpion bite	9
Galactagogue		9
Ecto/ Endo-parasites	Liver flukes, other parasites (Anti-lice), Intestinal worms (Anthelmintic), Myiasis, Pediculosis, Ticks and mites	66
Mastitis	Mammary gland disorder and inflammation	7
Hepatic disorder		5
Respiratory Ailments	Bronchitis, Cough, Lung infection, Asthma	12
Foot and mouth Ailments	Mouth and hoofs blisters	10
Reproductive ailments	Placenta retention, Genital prolapse (Prolapse of uterus), Menstrual problems, Infertility, Lochia, Sex tonic, Testicular swelling, Anestrous, Dystocia	43
Lactation problems	Milk deficiency, Taste of milk	22
	Malarial fever (Ague),	11
Eye ailments	Conjunctivitis, general eyes	3
Ear ailments	Otitis	1
Urinary ailments	Infections, Dysuria and red urination, Urolith,	17
Miscellaneous	Common cold and fever, Flue "Rani Khait" disease, Fractured bones, Internal injury, Fly repellent, Rabies diseases	29

Table 2: Diseases categories documented by various ethnic communities of Pakistan.

ally used against various ecto and endo-parasites in livestock. The literature survey exposed that the most common wild plants used traditionally in various rural area of Pakistan as anthelmintic are *Artemisia absinthium*, *Mallotus philippensis*, *Melia azedarach* and *Withania coagulans* [2,20,22-24] and *Myrsine africana* was less common used to remove intestinal worms [7]. Medicinal plants possessed immense therapeutic potential could be benefits globally for treating the health issues of livestock [8]. It has been reported that the reproductive and urinary disorders are also major threats for increasing morbidity and mortality of domestic animals [25]. Literature review documentation revealed that numerous wild plant species were being used for the treatment of reproductive disorders among different societies of Pakistan. The seeds of *Areca catechu*, *Lepidium sativum* and *Melia azedarach* were used in case of genital prolapse [11,16,19,25]. The whole plant species of *Primula denticulata* and *Rumex nepalensis* were used traditionally for red urination [8,19,20]. On the other hand, *Cynanchum viminale*, *Enicostemma hyssopifolium*, *Euphorbia caducifolia*, *Flacourtia indica*, *Phyllanthus acidus* and *Melia azedarach* medicinal

plants were used as antidote against snake and scorpion sting [3, 18]. *Nannorrhops ritchiana* plant species was used for foot and mouth diseases [7], *Skimmia laureola* for ague [8]. *Lactuca serriola* for skin infection [22], *Ephedra gerardiana* for wound healing [7], *Colebrookea oppositifolia* were being used for treatment of maggots [19,24,26]. *Withania coagulans*, *Capparis spinosa* and *Spiraea canescens* is being used for respiratory problems reported in various region of Pakistan [7,17,25,26]. It has been confirmed on evidence basis that various societies of Pakistan mainly depend on ethnoveterinary medicines as traditional herbal remedy for livestock's health management.

Moreover, the highly consumed parts of wild plant species were leaves (29.59%) followed by whole plants (15.98%), aerial parts (10.55%), roots (10.65%), fruits (8.28%), seeds (7.40%) and bark (4.14%) (Figure 2). The mode of herbal formulation common in practices were decoction, infusion, fermentation, powder, raw material and often use single or in combination of other herbal plant species (Figure 1). The route of dose administration was common-

Figure 2: Percentage of wild medicinal plants parts uses.

ly orally among ethnic communities of Pakistan. Indigenous uses of wild medicinal plants play an important role in basic health care system of livestock; which is very economic for farmers as well as local communities. The poor people are unable to purchase much expensive synthetic chemical drugs and antibiotics in developing country; primarily rely on tradition herbal remedy as alternative therapeutic agents.

Ethnoveterinary reported practices of medicinal plants in traditional folk culture to treat animal's diseases have been validated on scientific basis continuously [9]. For example, *Trianthema portulacastrum* and *Musa paradisiaca* showed positive results against gastrointestinal nematodes of sheep [27]. It has been confirmed that the leaves and fruits of *Azadirachta indica* have anti-parasitic and anti-coccidal potential in animals [28]. The medicinal plants traditional uses is country old knowledge that passed generation to generation and medicinal plants have important secondary metabolites that validates their therapeutic potential against various ailments [8]. The present review exposed that a few plants were reported against a specific single ailment, for instance *Cordia dichotoma* for respiratory problems [19] and *Cynoglossum lanceolatum* for cold fever [2]. However, many wild medicinal plants have been practices for various diseases management among ethnic communities in various regions of Pakistan [1-3,7-11,15-26,29,30].

Furthermore, the interesting point is that some authors' record a same plant for specific ailment in one region, but in other region of Pakistan the same specie has been practiced for different disease of livestock. Therefore, precise consideration should be made also for the medicinal plants which were being used traditionally for distinct disease categories in different societies of Pakistan. Some authors reported leaves of *Ailanthus altissima* is used against

Galactagogue [9], while Barkatullah, *et al.* (2018) reported that leaves were used as laxative [22]. Likewise, according to Abbasi, *et al.* (2013) documentation that leaves of *Rumex nepalensis* is used as anti-inflammatory and antiseptic [16], but in other ethnic communities the whole plant of *R. nepalensis* used traditionally to cure red urination in livestock [8]. The review also revealed that a single plant has been used traditionally against various distinct ailments of livestock among different communities of Pakistan. The uses of more than one plants against specific ailments indicated that the local community merely not dependent on a single plant species for livestock health management practices. The present review also suggests that the pronounced results would be obtained if mixtures of these plant/plant parts being practiced on pharmacological and clinical research. Although, the quantitative ethno-botanical approaches among the local communities resulted in complementary and possibly cross-cultural validation of traditional knowledge about specific plant species against ailment leading to a way of drug discovery and drug formulation. Other validation levels are possible: Probing the literature for available information on the ethnobotany, phytochemistry, and *in-vitro*, *in-silico* (i.e. computer-based) and *in-vivo* tests and other relevant aspects, conducting laboratory tests, and clinical tests on model organism [6]. The present review documented wild medicinal plant uses for livestock elementary health care system. It needs to validate the country old indigenous knowledge of medicinal plants for health care system of both animals and humans. It is suggested that this review will provoke further studies on phytochemical, pharmacological and clinical trial on experimental model organism.

Conclusion

Gastrointestinal problems, parasitic, reproductive problems and viral disease such as Ague, foot and mouth disease are major ailments observed in livestock in various regions of Pakistan. In conclusion, the wild medicinal plants persist as alternative traditional therapy in the ethnic communities of Pakistan. The present review represents that leaves, whole plant, aerial parts were commonly used to cure various diseases of livestock in form of decoction, infusion and powder form. The single plant species or more than one species, or the part in single dose or in mixture was commonly practices. The present review might be suitable to find out some active constituents from therapeutic plants and inspiring ethno-medicinal verdicts for provoking future studies on pharmacological and clinical bases trial to improve the efficacy of wild plants for veterinary health management.

Conflicts of Interest

The authors declare no conflict of interest.

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