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Assessing graziers' perception about livestock production and ethnoveterinary plants of Cholistan rangelands, Pakistan

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Abstract

This study was conducted to document the ethnoveterinary medicinal (EVM) practices for the treatment of different parasitic diseases of livestock in the Cholistan desert, Pakistan. Information was gathered on a total of 111 plant species and 40 families, of which 51 species were utilized to treat cattle disorders, according to the researchers. Cholistan rangeland has been documented to have a variety of cattle ailments, including diarrhea, Anthelmintic, skin disorders, digestive difficulties, sores, constipation, and rheumatism. A total of 51 plant species spanning 30 families were identified as potentially effective in the treatment of parasitic disorders. The plants included*: Aerva javanica*, *Achyranthes aspera*, *Amranthus tricular*, *Barleria prionites*, *Butea monosperma*, *Calotropis procera*, *Cassia senna, Citrullus colocynthis*, *Commiphora wightii, Calligonium polygonoides*, *Cyperus rot*undus, *Heliotropium europium*, *Prosopis glandulosa*, *Prosopis cineraria*, *Salvadora oleiodes, Sarcostemna viminale*, *Tribulus terrestris, Tamarix aphylla, Withania coagulans and Ziziphus mauritiana*. Whole plants (17%), seeds (17%), root pieces (13%), and fruits (9 %) were the most often reported plant parts utilized in the illness of animals. It was discovered that 51 species have palatability to varying degrees, whereas just three species were determined to be non-palatable, according to the palatability categorization. Livestock fed on the leaves of 33 species, the shoots of 35 species, the flowers of 13 species and the fruit of 02 species found among palatable species. Out of 51 species, cattle prefer 16 different plant species, goats prefer 26 species, sheep prefer 32 species, camels prefer 35 species and donkeys prefer to feed on 33 species. The local herders had a wealth of traditional knowledge about plant remedies that they used to heal their animals; nevertheless, agricultural growth was the most significant danger to medicinal plants in the research region. As a result, raising public awareness about the need for plant conservation and documentation should be undertaken.

1 Introduction

The Cholistan desert is today primarily a desert wasteland. Due to an increase in cattle, the rangeland productivity is diminishing; as a result, the area's carrying capacity is falling. The yearly rainfall determines the viability of life in this desert. During the summer months, the weather is quite harsh, resulting in the partial destruction of some xeric plant species.

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Unappetizing species with fewer nutritional qualities, on the other hand, are becoming more common. Desertification of the desert by an increasing human population and an even greater growth in livestock (Akhter and Arshad, 2006). Most people in Cholistan rely on camels, cattle, sheep and goat herds, although buffalo farming is also common. Cattle production is the primary source of income of the area community, and the economy depends totally on it (Akbar *et al*., 1996). People living in rural areas rely heavily on livestock for their livelihoods, which may help alleviate poverty by improving the socioeconomic situations of nomadic people (Gadahi *et al*., 2009; Rahman *et al*., 2025). Since ancient times, the livestock industry has been occupied by small farmers, and it is still regarded as a reliable beginning of financial gain for little farm out and the landholding hapless, as well as a resource of job creation at the rural level, and this is still the case today (Gadahi *et al*., 2009; Khajuria *et al*., 2012).

Ethno botany, known as "ethnoveterinary medicine" (EVM) is the study of traditional medical practices, a wisdom of many cultures, including folk medicines and clinical procedures for treating animal diseases, as well as animal husbandry and production (McCorkle, 1986). Its resources and people with knowledge and skill in the fields of medicine, health care, nutrition, and spirituality are included in the scope of the material provided here (Mathias, 2004).

Traditional livestock keepers in the Cholistan Desert (Roohelay in the local dialect) use medicinal plants to support their animals' health and well-being, which they readily obtain from the untamed pasturage. Ethnobotanical and ethnopharmacological research can still be conducted in the Cholistan Desert, despite attempts to convert the desert into cultivable land. In underdeveloped nations, animal health treatment relies heavily on ethnoveterinary herbs. Some of the most common ailments treated by traditional medicine include mild diarrhea, skin conditions, intestinal parasites, wounds, and reproductive problems, which can be addressed with indigenous herbs (Martin *et al*., 2001; Sumra *et al*., 2023).

Plant species and ethnoveterinary practices utilized by locals in Cholistan to cure cattle diseases were documented in this study's objectives. Native ethnic communities and alternative medicine practitioners in the area have inspired the ethnoveterinary recipes given here. It is intended that the ethno-veterinary results of this study would stimulate additional pharmacological and phytochemical research on Cholistan plants, as ethnoveterinary research has enabled the discovery of several pharmacologically active elements from medicinal plants (Hussain *et al*., 2008). Biological variety and social and cultural systems interact dynamically, and Ethnobotany helps us to better comprehend these linkages (Mahmood *et al.,* 2011).

The past of ethno-botanic development is as old as human development (Sarojini *et al*., 2012) and nearly everyone in Indo-Pakistan and many other developing nations has depended on plants to treat both their animals and their own health for thousands of years (McCorkle, 1995; Jabbar *et al*., 2006). 80% of people in underdeveloped countries, or 60% of humanity, are considered. Because of the ongoing quest for novel and more treatments available for cattle illnesses, the research of flower medicines has gotten a lot of attention lately (Mathias, 2004).

Plants not only provide necessities for humans, but they have also served as a reliable source of medicine for the care of a broad scope of ailments for thousands of years. It has been recognized by the World Health Organization that plants are essential in the prevention of a wide range of human and animal disorders. As history passes on, the ethnobotany in Pakistan will develop, and much research has been recorded from different sections of the nation (Ahmad *et al*.,2014).

Ethnobotanicals may play a significant part in animal production systems and livelihood development in many disadvantaged rural communities, and they frequently become the only accessible way of alleviating diseases. Ethnobotanical treatments derived from medicinal plants are cost-effective, safe and typically free of drug resistance. This makes them ideal alternatives to conventional anthelmintic. The farmer may readily obtain, manufacture, and give these therapies, all of which are free or low-cost for the farmer (Jabbar *et al*., 2005; Yasin *et al*., 2024). In fact, they are often regarded as the most effective treatments for parasite infections (Kone *et al*., 2012).

The primary goal of this ethnobotanical research was to compile a comprehensive database of local people's knowledge of plants. An important goal of the ethnobotanical data acquired is to address a number of issues, such as preserving the therapeutic plants of the Cholistan Desert and establishing a scientific foundation for future studies.

2 Material and methods

2.1 Description of study area

This investigation was carried out in the Cholistan Desert, which is located in the southern section of Pakistan's Geographical area. Cholistan Desert is a portion of the Large Asian Desert, which also includes the Thar Desert in Pakistan's Sindh state and the Rajasthan Desert in the Republic of India's Rajasthan state. Between the angular distance 690 52' and 75 ° 24' E and the line of latitude 270 42' and 290 45' N, it encompasses about 2.6 million hectares and is located in the eastern hemisphere (Arshad *et al*., 2008). The width of this desert ranges from 32 to 192 kilometers, and its length is around 480 kilometers. It is possible to divide this desert into 2 geomorphic parts settled on the raise substantial, topography, vegetation, and soil; one in the south is referred to as Lesser Cholistan and screens approximately 18,130 km2; the other in

the north is referred to as Lesser Cholistan and covers approximately 7,770 km2 and is located along canal irrigated areas (Akbar *et al*., 1996; Akbar and Arshad, 2000).

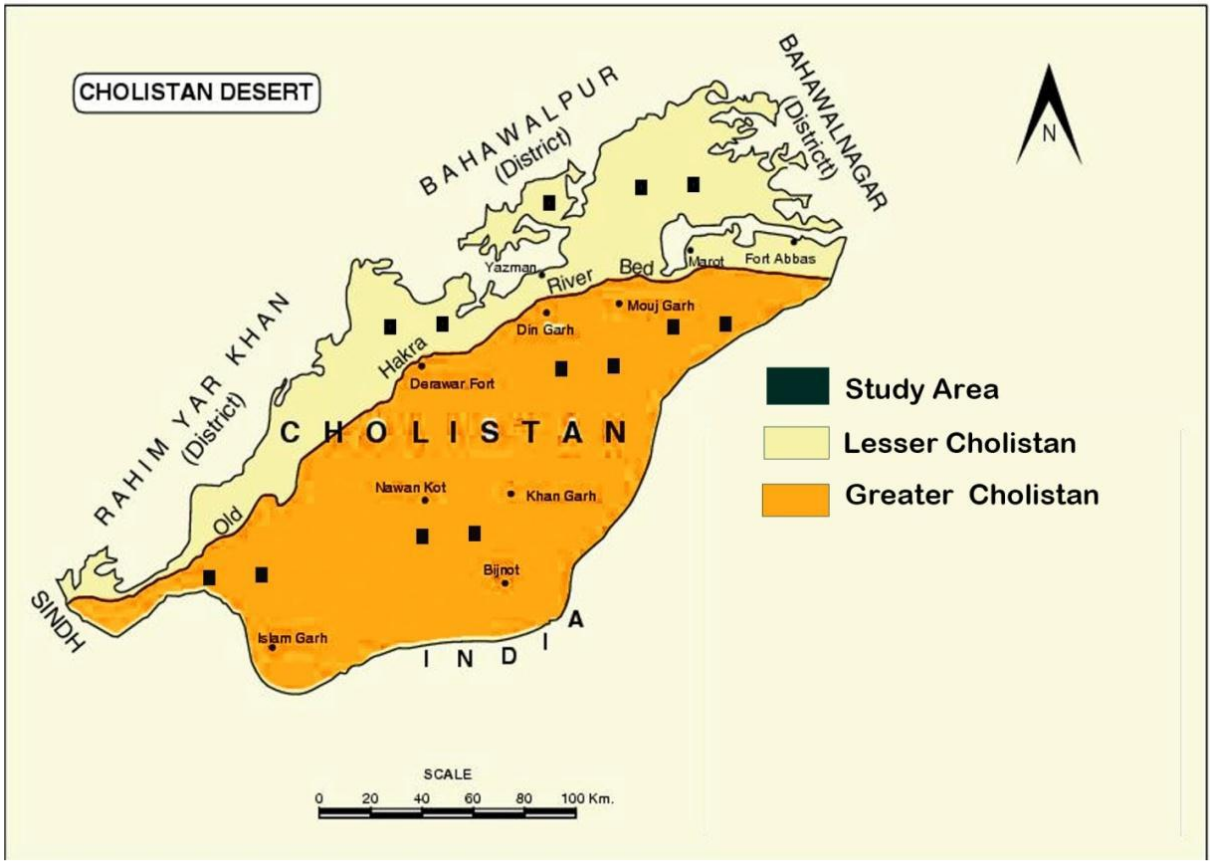


Fig. 2.1. Map of study area; the Cholistan Desert

2.2 Socioeconomic Aspects

There are around 0.12 million nomadic pastoralists living in the Cholistan desert, which is the world's driest desert. The vast majority of them reside in the section of the biome, whereas the interior of the biome is lightly inhabited. The economic system of this location is mostly based on herder farming, and the inhabitants have been living an unsettled lifestyle for one hundred years. The inhabitants have several cattle, camels, donkeys, sheep, and goats ranging in size from tiny to huge. Since there are no contemporary communication networks in the desert's interior, people travel by camel or jeep over sand roads (Arshad *et al*., 1994). The result of adverse conditions in Cholistan is defined by the significant number of groups and animals that travel across the country throughout the year in search of food and water. The migratory form of an unsettled animal group is largely influenced by the timing and dispersion of rainy season rains, which begin and end at different times each year (Akhter and Arshad, 2006).

2.3 Data collection

2.3.1 Reconnaissance survey and study sites

In October 2021, a reconnaissance mission study was carried out to get an image of the site characteristics, to gather information on availability, to perform an assessment of plant gathering, and to identify the specimen and information collecting procedures to be used in the project. Before conducting the real survey, a quick investigation survey was conducted. In order to gather preliminary information for the structured survey, which was used to determine the distribution and population of animals, main farming techniques, and the number of ethnoveterinary physicians, it was necessary to collect preliminary information.

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2.3.2 Questionnaire

The information was gathered from some capital and alternative sources. Among the major sources were a questionnaire survey as well as observations, interviews, and focus group discussions. Published and unpublished works were included in the category of secondary sources, as a result of the talks around generic information. A variety of information regarding cattle production techniques in the area, including animal feeding management, product handling, and production limits, was acquired.

2.3.3 Interviews

The information on indigenous knowledge on animal husbandry techniques was acquired via interviews with key sources from the gathering, utilizing an organized interviewing technique. Those responders were mostly male seniors in their sixties, seventies and 50 years old. Approximately 25 to 30 seniors per site location were chosen from a total of 175 respondents for the study. The survey questionnaire was used to gather information. Human face-to-face interviews with 100 livestock farmers (LF) and 20 farm animals improve (LH), all of whom kept flocks dominated by sheep and goats, were conducted in accordance with the schedule over two consecutive years, i.e., 2021 and 2022. An organized form with open-ended and blocked sections was utilized for the human face-to-face interrogation. Several questions were pre-tried with 12 workplaces and then modified as needed; the questionnaire included the following topics: major areas:

2.3.4 Floristic composition of ethnoveterinary plants

A full floristic listing, including groups, genera, and common names, was prepared for each browsing species that was sampled or seen at each range location. The list included species from every family and every genus. The indigenous peoples were questioned in order to learn the names of species of plants that were indigenous to the area. During plant collection and vegetation analysis, the collection and mention of the growth season (rainy season, springtime, wintertime, and the entire year), habit (mountaineer, herbaceous plant, shrub, and tree), and quantity (v. common) were collected at the place.

2.3.5 Degree of Palatability

A field observation of the livestock was conducted to evaluate their preference and to establish the degree of palatability of the plant species being offered to the cattle. Breeders in the area were also approached for more information. For the purposes of measuring the degree of palatability, Husain and Durani (2009) split plants into two categories: palatable and unpleasant. They defined palatable plant species as follows in order to quantify the degree of palatability.

i. Non-palatable (NP): Livestock do not graze it.
ii. Highly Palatable (HP): Plants that are particularly well-liked by livestock.
iii. Mostly Palatable (MP): Mostly livestock graze it.
iv. Less Palatable (LP): Livestock graze less palatable.

3 Results

3.1 Floristic composition of ethnoveterinary plants

In this baseline study, a display that Gramineae were most controlling household with 8 species (7.20%), 7 Papilionaceae has 7 species (6.3 %), Asteraceae has 6 species (5.4%), Capparidaceae, Asclepiadaceae, Mimosaceae, Aizoaceae and Chenopodiaceae each have 5 species (4.5% cucurbitaceae, zygophyllaceae with 4 species each (3.6%), Polygonaceae, Euphorbiacea, with 3 species each (2.7%), Papaveraceae, Asphodeliaceae, Amaranthaceae, Nyctaginaceae, Cyperaceae, Convolvulaceae, Tamariaceae, Portulaceae, Brassicaceae with 2 species each have (1.08%), Lamiaceae, Resedaceae, Neuradaceae, Fabaceae, Geraniaceae, Flaciurtaceae, Ephedraceae, Salvadoraceae, Tiliaceae, Apiaceae, Malvaceae and Orobanchaceae with 1 species each have (0.90%) correspondingly (Table 1). The local name and habit of species from the research region were also documented in the event of identification, as specified in the study protocol. An entire of 111 plants were canned in the desert of the Cholistan rangelands, with 10 species of trees (9.09%), 60 species of herbs (54 %), 29 species of shrubs (26.1%), 8 species of grasses (7.20%), 2 species of sedges (1.80%), and 2 species of climbers (1.80%). In the dry rangelands of the Cholistan Desert, taxonomic categories belonging to 95 genera and 40 family units have been discovered. These arid rangelands are utilized in a variety of ways by the nomadic people of the Cholistan Rangeland, and they have been documented. The Family is very important, according to the Family Significance Value**.** The recorded floral species were composed of 10 species of trees (9.09%), herbaceous plants were the least common habit with 60 taxa (54%), 29 species of shrubs (26.1),8 species of grasses (7.20%),2 species of sedges (1.80%) and 2 species of climbers (1.80%) were in the desert of Cholistan rangelands.

Table 1 Family Importance value of Cholistan desert plants species

Sr.No.	Family	No. of Genera	No. of Species	Percent
1	Amaranthaceae	2	2	1.80
2	Asclepiadaceae	5	5	4.50
3	Asteraceae	5	6	5.40
4	Capparidaceae	3	5	4.50
5	Chenopodiaceae	4	5	4.50
6	Ephedraceae	1	1	0.90
7	Malvaceae	1	1	0.90
8	Mimosaceae	3	5	4.50
9	Papilonaceae	6	7	6.30
10	Polygonaceae	2	3	2.70
11	Rhamnaceae	1	2	1.80
12	Solanaceae	4	4	3.60
13	Tamaricaceae	1	2	1.80
14	Papaveraceae	1	2	1.80
15	Boraginaceae	4	5	4.50
16	Poaceae	4	8	7.20
17	Cucurbitaceae	4	4	3.60
18	Nyctoginaceae	1	2	1.80
19	Acanthaceae	1	1	0.90
20	Caesalpinaceae	1	1	0.90
21	Orobanchoceae	1	1	0.90
22	Tiliaceae	3	1	0.90
23	Convolvalaceae	3	2	1.80
24	Cyperaceae	1	2	1.80
25	Euphorbiaceae	2	4	3.60
26	Flacourtiaceae	2	1	0.90
27	Brassicaceae	3	2	1.80
28	Molluginaceae	3	2	1.80
29	Aizoaceae	5	5	4.50
30	Geraniaceae	2	1	0.90
31	Fabaceae	2	1	0.90
32	Neuradaceae	2	1	0.90
33	Resedaceae	1	2	1.80
34	Portulaceae	1	2	1.80
35	Salvadoraceae	1	1	1.80
36	Zygophyllaceae	4	4	3.60
37	Lamiaceae	1	2	1.80
38	Apiaceae	2	2	1.80
39	Asphodeliaceae	2	2	1.80
40	Scrophulariaceae	1	1	0.90
	Total	**95**	**111**	**100**

There were 51 species of medicinal flora belonging to 30 families that were used in the care of 35 cattle ailments. These plants were divided into 30 families. Following Euphorbiaceae, which had 05 species, were Amarantaceae with 04 species, Fabaceae with 04 species, Boraginaceae with 03 species, and the other families Asclepiadaceae, Capparidaceae, Burseraceae, Solanaceae, Cucurbitaceae, Acanthaceae, and Verbenaceae, which had each had 02 species (Table 2). The remaining families were made up of one species from each group. According to the information gathered from the participants, assorted parts of plants are used in the creation of remedies, and different parts of flora are used in the formulation of curative remedies. The leaves were the most utilized plant parts (33%), followed by aerial parts (17%), seeds (19%), roots (13%), fruits (9%), and entire plants (13.72%) in veterinary medicines, according to the study. There were 51 species of plant-based remedies belonging to 30 families, which were used to treat 60 livestock diseases. Two majority diseases was to treat diarrhea and rheumatism with 07 species (11.66%), followed by wounds 06 species (10%), skin problem and indigestion with 05 species (8.33%), chronic, digestion problem, stomach ailments, boil and pimple 03 (5%),

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constipation, anorexia purgative, lactagogue and colic with 02 species (3.33%) and other less species 01 (1.66% each) were treated by livestock diseases (Table 2).

Table 2: Ethnoveterinary medicinal utilization of flora in the Cholistan rangelands

Sr	Scientific name	Vernacular name	Family	Mode of use	Part utilized	Disease treated
1	*Aerva javanica*	Bui	Amaranthaceae	Decoction	Seeds	Diarrhea, Hematuria
2	*Achyranthes*	Puth kanda	Amaranthaceae	Powder	Leaves	Urolith, Anthelmintic
3	*Ailanthus*	Mahanimba	Simaroubaceae	Paste	Leaves	Malarial fever
4	*Alhagi camelorum*	Javan,kas	Papilionaceae	Decoction	Leaves	Impaction in livestock
5	*Amaranthus tricular*	Lal sag	Amaranthaceae	Decoction, Powder	Aerial part	Indigestion, dysentery
6	*Anamitra cocculus*	Kakanari	Menispermaceae	Decoction	Fruit	Skin problem
7	*Argemone mxicana*	Peela dhatora	Papveraceae	Paste, Decoction	Seeds	Chronic ulcerous wounds, Malarial fever
8	*Anethum graveolens*	Soya	Apiaceae	Powder	Seeds	Lactagogue, Antiflatulence
9	*Amberboa ramose*	Tirkanda	Asteraceae	Juice, Decoction	Seeds	Skin disease, boil, Pimple, skin irritation
10	*Balanites aegyptiaca*	Hinghot	Simaroubaceae	Decoction	Seeds	Anthelmintic, Purgative, Colic
11	*Barleria prionites*	Karunta, Kala bansa	Acanthaceae	Decoction	Leaves	Foot, Mouth, Diarrhea
12	*Blepharis sindica*	Asad	Acanthaceae	Decoction	Leaves	Galactagogue
13	*Butea monosperma*	Palasha, Chichrah, Dhak	Fabaceae	Powder	Seeds	Anthelmintic
14	*Calotropis procera*	Ak	Asclepiadaceae	Powder, Paste	Leaves, Milk, latex	Flatulence, Anorexia, Snakebite Indigestion, Paralyzed limb
15	*Cassia senna*	Sanna makki	Caesalpinaceae	Paste	Leaves	Rheumatism, Skin disease, Intestinal worms
16	*Citrullus colocynthis*	Tuma	Cucurbitaceae	Powder	Ash	Wounds. Jaundice, Rheumatism.
17	*Capparis decidua*	Kar,kary	Capparidaceae	Powder	Bark, Fruit	Diarrhea, Anorexia, Indigestion, Rheumatism
18	*Cleombrachya*	Kaustori	Capparidaceae	Powder	Leaves	Eliminate maggots
19	*Commiphora wightii*	Guggul	Burseraceae	Decoction	Leaves	Respiratory distress
20	*Clerodendron phlomoides*	Tankar,Arni	Verbenaceae	Decoction, Powder	Roots	Indigestion, Edema
21	*Calligonium polygonoides*	Phog	Polygonaceae	Decoction	Aerial parts	Stomach ailments
22	*Crotalaria medicaginea*		Fabaceae	Juice, Paste	Leaves	Salivation
23	*Cyperus rotundus*	Dela	Cyperaceae	Decoction	Roots	Diarrhea, Pyrosis, Stomach Problems
24	*Citrullus colocynthis*	Kaur Tuma	Cucurbitaceae	Paste	Roots, Seeds	Toothache, Constipation
25	*Celosia argentea*	Kalga	Amarantaceae	Powder, Decoction	Seeds	Diarrhea, Leucorrhoea, Uterine bleeding
26	*Convolvulus arvensis*	Wand vehri	Convolvulaceae	Powder	Leaves	Digestion problems
27	*Datura fastuosa*	Dhatura	Solanaceae	Decoction	Leaves	Asthma, Swellings

28	*Euphorbia caducifolia*	Dhodhi	Euphorbiaceae	Juice	Leaves	Scorpion snake bite
29	*Euphorbia thymifolia*	Hazar dani	Euphorbiaceae	Powder	Leaves	Diarrhea, Dysentery
30	*Farsetia hamiltonii*	Lathia	Brassicaceae	Powder	Whole plant	Constipation, digestive Problems, stomach
31	*Grewia optiva*	Pastawory	Tiliaceae	Powder	Bark, stem	Diarrhea, weakness
32	*Heliotropium eichwaldi*	Uthchara	Boraginaceae	Decoction	Leaf	Ear pain
33	*Heliotropium europeum*	Hathi sundi	Boraginaceae	Paste	Leaves	Skin disease,
34	*Heliotropium strigosum*	Gorak pan	Boraginaceae	Juice	Whole plant	Jaundice, Liver
35	*Haloxylon salicornicum*	Lana	Chenopodiaceae	Powder	Whole plant	Analgesic, Antipyrine
36	*Lycium deppressum*	Chirchita	Solanaceae	Powder	Bark	Wounds healing
37	*Launaea residifolia*	Bhattal	Asteraceae	Paste	Leaves	Itch of skin, Boils and Pimples
38	*Pedalium murex*	Rangatio	Molluginaceae	Decoction	Roots	Eye, Antipyretic
39	*Pedalium murex*	Farid booti	Pedaliaceae		Fruits	Diuretic
40	*Phyllanthus nirurii*	Bhumi,Amala	Euphorbiaceae	Powder	Roots, Leaves	Indigestion, Wounds
41	*Prosopis cineraria*	Kandi,Jandi	Fabaceae	Decoction	Flowers	Rheumatism
42	*Prosopis glandulosa.*	Khejari devi	Fabaceae	Paste	Leaves	Relieve pain, Bone Fracture
43	*Ricinus communis*	Arandi	Euphorbiaceae	Decoction, Powder	Seeds Leaves	Purgative, severe Impaction of rumen
44	*Salvadora oleoides*	Pilo,Jhal	Salvadoraceae	Powder	Fruit	Rheumatism, expulsion Of lochia
45	*Sarcostemma viminale*	Sooma	Asclepiadaceae	Decoction	Roots	Wounds, Scorpion Snakebite
46	*Tribulus terrestris*	Kundai,Bahkra	Zygophyllaceae	Juice	Leaves	Colic, Chronic cough

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47	*Tamarix aphylla*	Khaggal	Tamariaceae	Decotion Pste	Leaves	Measles
48	*Vitex negundo*	Banah,nirgud	Verbenaceae	Paste Decoction	Seeds, Leaves	Rheumatism, arthritis Vermifuge
49	*Withania coagulans*	Paneer	Solanaceaea	Paste Powder	Fruits, Leaves	Boil, Pimple, Abdominal Pain, Digestive
50	*Zizypus nummularia*	Jangra,Ber	Rhamnaceae	Paste, Powder	Leaves	Itch, Chronic, ulcerous Wounds
51	*Ziziphus mauritiana*	Beri	Rhamnaceae	Paste	Fruits, Leaves	Diabetes, spermatorrhoea Body pain

3.2 Degree of palatability

This grade was created based on the palatability of animals in the Cholistan desert. There were 51 (94 percent) palatable species among the total species tested, and three (5.5 percent) non-palatable species were discovered among the total species tested. In the group of palatable species, 20 species (37 percent) were considered extremely pleasant, 16 species (29.62 percent) were considered moderately palatable, and 15 species (27.77 percent) were considered less appealing. There were 05 different kinds of trees in the extremely pleasant category. (9.25%), 10 species of herbs (18.51%),01 species of grass (1.85%),01 species of climber (1.85%),01 species of sedges (1.85%) and 03 species of shrubs (5.55%). Moderately palatable species consisted of 02 species of trees (3.70%),06 species of herbs (11.11%),01 species of grass (1.85%) and 07 species of shrubs (12.96%). The less palatable class was composed of 06 species of shrubs (11.11%),07 species of herbs (12.96%),01 species of tree (1.85%) and 01 species of grass (1.85%), while the non-palatable class consisted of only 01 species of herb (1.85%) and 02 species of shrubs (3.70%).

Table 3 Palatability Classification of Livestock Species

Sr.no.	Botanical name	Grade of Palatability				Palatability by part utilized				Palatabilty by Farm animal				
		Hp	Mp	Lp	Np	Lv	Sh	Fl	Fr	Ca	Go	Sh	Cm	Do
1	*Aerva javanica*				+	+					+			
2	*Vachellia nilotica*	+	_	_	_	+	+	+	+	+	+	+	+	+
4	*Acacia jacquemontii*	+	_	_	_	+	+	+	_	+	+	+	+	+
5	*Abutilon muticum*			+		+							+	
6	*Anticharis linearis*			+		+	+				+	+		+
7	*Capparis decidua*	_	+	_	_	_	+	_	_	_	_	_	+	_
8	*Calotropis procera*			+		+				+	+	+		+
9	*Calligonum polygonoides*		+				+	+					+	
10	*Cenchrus ciliaris*	+				+	+			+	+	+		+
11	*Cleome brachycarpa*	_	_	+	_	_	+	_	_	_	_	_	+	+
12	*Cressa cretica*		+			+	+			+	+	+		+
13	*Crotalaria burhia*			+		+							+	
14	*Cymbopogon iwarancusa*			+		+	+			+		+		+
15	*Cyperus conglomeratus*	+				+	+			+	+	+	+	+
16	*Dipterygium glaucum*			+			+						+	+
17	*Ephedra ciliata*		+				+	+					+	
18	*Fagonia cretica*	_	_	+	_	+	_	_	_	_	_	+	_	_
19	*Farsetia hamiltonii*	_	_	+	_	_	+	_	_	_	+	+	_	+
20	*Glinus lotoides*			+		+	+	+		+	+	+	+	+
21	*Haloxylon stocksii*		+				+				_		+	
22	*Haloxylon salicornicum*	_	_	+	_	_	+	_	_	_	_	_	+	_
23	*Heliotropium crispum*		+			+	+					+	+	+
24	*Helitropium strigosum*	+				+	+				+	+	+	+
25	*Indigofera argentea*	+	_	_	_	+	+	+	_	_	+	+	_	+
26	*Indigofera siseliflora*	+	_	_	_	+	+	+	_	_	+	+	_	+
27	*Indigofera hochstetleri*	+				+	+	+			+	+		+
28	*Launaea resedifolia*			+		+	+				+	+	+	+
29	*Launaea nudicaulis*	_	_	+	_	+	+	_	_	_	+	+	+	+
30	*Limeum indicum*	+					+				_	+	+	+
31	*Leptadenia pyrotechnica*				+						_			
32	*Mukia madaraspatana*	+				+					+	+		+
33	*Neurada procumbens*	+	_	_	_	+	_	+	_	_	+	+	_	+
34	*Panicum turgidum*	+				+				+	+	+	+	+
35	*Panicum antidotale*		+			+				+	+	+	+	+
36	*Prosopis cineraria*	+				+	+	+	+	+	+	+	+	+
37	*Prosopis juliflora*			+		+					_		+	
38	*Pulicaria crispa*			+		+					_		+	
39	*Salsola imbricate*		+				+				_		+	
40	*Salvadora oleoides*	+	_	_	_	+	+	_	_	+	+	+	+	+
41	*Suaeda fruticose*		+			+	+						+	
42	*Sporobolus iocladus*		+			+				+	+	+	+	+
43	*Sesuvium sesuvioides*		+				+					+	+	+
44	*Tamarix aphylla*	_	+	_	_	_	+	_	_	_	_	_	+	_
45	*Tribulus longipetalus*	+	_			+	+	+		+	+	+	+	+
46	*Tephrosia purpurea*	+	_											
47	*Trianthema triquetra*	_	+	_	_	_	+	_	_	_	_`	+	+	+
48	*Tamarix dioica*	_	+	_	_	_	+	_	_	_	_	_	+	_
49	*Tribulus terrestris*	+	_	_	_	+	+	+	_	+	+	+	+	+
50	*Withania coagulens*	+	_	_	_	_	_	_	_	_	_	_	_	_
51	*Withania somnifera*	+	_	_	_	_	_	_	_	_	_	_	_	_
52	*Xanthium indicum*	_	_	_	+	_	_	_	_	_	_	_	_	_
53	*Zaleya pentandra*	_	+	_	_	_	+	_	_	_	_	+	+	+
54	*Zizyphus nummularia*	+	_	_	_	+	_	_	_	+	+	+	+	+

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4 Discussions

It was found that most respondents owned a single animal herd, such as a cow herd, sheep herd, or goat herd, and also kept camels and donkeys for transporting baggage. However, in certain places, combined herds of sheep and goats were observed, which was unusual. In the same vein, some families kept camels and/or donkeys for transporting baggage alongside their primary herd of sheep or cows. Cows and sheep were the most common types of livestock. According to Ahmad (2005), the mean herd size in the herder village of Cholistan was small, with a total of 1720 physical unit, of which the majority were sheep (29 percent), cattle (35 percent), and goats (14 percent). There was a variety of herd sizes, but most herds contained cows, sheep, goats, and camels (Ahmad, 2001; Khan, 2009). Although camels are no longer used for baggage transportation, they remain important in certain Baloch homes for milk and wool production, as do donkeys (Iqbal and colleagues, 2005; Farooq and colleagues, 2008).

A diversified and abundant flora would suggest that a given region has a high level of plant diversity and variety. Any phytogeography, environmental, or conservation research requires an understanding of the floristic makeup of the region. The primary purpose of this research was to compile a plant diversity assessment of the Cholistan rangeland. According to the findings, the floristic list includes 111 species separated into 40 families. Poaceae, Papilionaceae, Asreaceae, Mimosaceae, Boraginaceae, Asclepiadaceae, Aizoaceae, Zygophyllaceae, Euphorbiaceae and Polygonaceae were regarded as prominent families, with a primary contribution to the flora of the Cholistan rangeland. A dry environment characterized the vegetation, with xerophytes having a very low humidity, temperatures, and large fluctuations in soil conditions. (Arshad and Akbar, 2002). Furthermore, 35 percent of the species reported to be numerous were *Aerva javanica*, *Capparis decidua*, *Cenchrus ciliaris*, *Haloxylon salicornicum*, *Haloxylon stockii*, *Suaeda fruticosa*, *Solanum surratense*, *Indigofera sisseliflora*, *Salsola imbricata* and Abutilon indicum. 30% species, which include *Calotropis* procera, *Leptadenia pyrotechnica*, *Abutilon muticum*, *Crotalaria burhia*, *Cleom scaposa*, *Panicum antidotate*, *Calligonum polygonoides*, and *Zizyphus nummularia* were found common. Vegetation of the Cholistan Desert was mostly thick seasonal bushes with a few scattered trees. According to the research, *Calatropis gigantae*, *Xanthium strumarium*, *Ephedra ciliate*, *Prosopis juliflora*, *Polygalaerioptra*, *Withania coagulens*, *Withania somnifera* and *Tamarix dioica* are among the species that are uncommon in the Cholistan Desert. According to verbal evidence supplied by nomads and professionals, the degradation of flora in the Cholistan grasslands is mostly caused by extreme weather conditions, overgrazing, and exploitation by local people (Akbar and Arshad, 2000; Akhtar and Arshad, 2006). The flora of the Cholistan Desert has been documented in several written documents. Arshad and Rao (1994) conducted a preliminary analysis to establish a baseline for the Cholistan Desert's flora. There have been no more studies in this field since then. As a result, the purpose of this research was to investigate the status of shrubs in the Cholistan grasslands. Much research has been published in the United States and elsewhere. A similar study has been conducted in the Cholistan Desert in the Indian Desert. There has been little published research in other nearby areas (Qureshi, 2008; Qureshi and Bhatti, 2010; Durani and Razaq, 2010; Qureshi *et al*., 2011**).**

Palatability, the palatability of a plant's qualities, determines whether grazing cattle will accept it. In terms of productivity and palatability, grazing animals first preferred the fodder plants that were more pleasant to them (Hussain and Durrani, 2009). The grazing season in the Cholistan Desert begins with the arrival of monsoon rains (April to August) and ends in March or April due to a lack of water and food in the desert (Akbar *et al*., 1996; Khan *et al*., 2023). This unpalatability might be caused by alkaloids, phenolics, saponins, and other harmful chemicals found in the feed of grazing animals, according to certain theories (Kayani *et al*., 2007; Sabir *et al*., 2023). It is extremely difficult to distinguish between nonpoisonous and dangerous plants since animals avoid feeding because of unpleasant sensations or physical pain caused by toxins or an excess or deficit of nutrients. This syndrome is evident when grazing cattle show little interest in even favored food or when replacements are offered (Provenza, 1995). Livestock's preferences for many plant species or plant sections as a diet varied substantially. The kind and amount of forage available to grazing animals determine the selectivity of forages as a source of nutrition for them (Hussain and Durrani, 2009; Afzal *et al*., 2020).

5 Conclusions

Plant palatability is determined by cattle's feeding requirements and available resources. Camels grazed on 64% of the palatable species, whereas goats grazed on 48% of the palatable species. Sheep grazed on 59% of the species, cattle on 29%, and donkeys on 61%. Furthermore, there is no need to supplement small ruminants with nutrients and minerals. The most prevalent diseases that affect diverse livestock animals include diarrhea, rheumatism, skin problems, gastrointestinal infections, wounds, indigestion, digestive problems, foot-and-mouth disease, camel pox, endo- and ectoparasites, and so on. Pastoralists in the Cholistan desert region use a variety of plant-based indigenous medicines to treat various livestock ailments, but scientific evidence of the cures' effectiveness is limited. The current material not only provides a foundation for identifying this undocumented knowledge but will also aid in the conservation of such an important desert species as

Cholistan. It also provides a pathway for additional research into new approaches to improving human healthcare, addressing numerous disorders.

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