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ETHNO-VETERINARY MEDICINAL USAGE OF FLORA OF GREATER CHOLISTAN DESERT (PAKISTAN)

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ABSTRACT

A study on the ethno-veterinary usage of wild medicinal plants of Greater Cholistan desert of Pakistan was conducted from January, 2007 to December, 2008. Information regarding 35 plant species was collected. According to the results, *Blepharis sindica* was used as galactagogue. *Butea monosperma, Calotropis procera and Phyllanthus nirurii* were used as emollient, demulcent and antiphlogistic. *Amaranthus trilocular, Capparis decidua, Clerodendron phlomoides, Phyllanthus nirurii* and *Ricinus communis* were used as carminative and stomachic. *Capparis decidua* and *Calotropis procera* were used as appetizer. *Prosopis glandulosa* had anodyne properties, *Achyranthes aspera* had antilithic, while *Pedalium murex, Tribulus terrestris* and *Barleria prionites* had diuretic value. *Achyranthes aspera, Argemone mexicana, Balanites aegyptiaca, Butea monosperma, Cassia senna, Citrullus colocynthis* and *Vitex negundo* were used as vermifuge. *Alhagi camelorum* and *Balanites aegyptiaca* had aperient properties. *Barleria prionites* and *Mollugo nudicaulis* had their role in the ripening of an abscess. *Ricinus communis* and *Salvadora oleoides* aided in the removal of placenta and lochia. *Anamitra cocculus* and *Argemone mexicana* were used as febrifuge. *Aerva javanica, Ailanthus excelsa, Amaranthus trilocular, Capparis decidua* were used in diarrhoea and dysentery. *Argemone mexicana* and *Ailanthus excelsa* were used in ague.

Key words: Cholistan desert, ethno-veterinary, medicinal plants, livestock.

INTRODUCTON

The Cholistan desert (*Rohi* in local dialect), located in Southern Punjab (Pakistan) between latitudes 27º42´ and 29º45´North and longitudes 69º52´and 75º24´East, covers about 2.6 million hectares. Based on topography, this desert is divided into two geomorphic regions: the Lesser Cholistan (the Northern 7,770 km² region) and the Greater Cholistan (the Southern 18,130 km² region).

Greater Cholistan is a wind-resorted sandy desert, characterized by large sand dunes with flat interdunal areas. The dunes reach an average height of about 100 meters in Greater Choistan. Vegetation cover is poor on unstable sand dunes. Some interdunal areas (*Dahar* in local dialect) have better vegetation, depending on the water-retention capacity of the soil. It is a hot hyper-arid sandy desert, with the mean annual rainfall varies from less than 100 mm in the West to 200 mm in the East, chiefly falling during monsoon (July through September). Rainfall is very inconsistent in quantity and duration and prolonged droughts are common once every 10 years. The mean summer temperature (May through July) is 34-38°C, reaching as high as 51.6°C (Akhter and Arshad, 2006; Nadiem, 2009). Camels, cattle, sheep and goats are the predominant types of livestock. Notable breed of Cholistani goat is Jattal. Cholistani, Hasari and Buchi, Khadali, Sipli are the breeds of Cholistani cattle and sheep, respectively. Two breed of camel *viz*. Marecha and Brella are found in Greater Cholistan.

In Cholistan, two agro-pastoral systems prevail *viz*. nomadic and transhumanie. In transhumanie system, pastoralists stay in the desert at rainwater harvesting sites (*Toba* in local dialect) during monsoon, as forage is abundant for grazing. Migration to semi-permanent settlements having wells (*Khoo* and *Kund* in local dialect) occurs during October-November (post-monsoon), as water or forage is depleted at and around *Tobas.* During spring (March-April), pastoralists migrate towards the fringes of the canal-irrigated areas. Under nomadic system, camels and goats remain in the desert throughout the year. During winter (December through February) and summer (May through July), these nomadic animals drink from wells and *kunds* at the semi-permanent settlements. During the monsoon and post-monsoon, they drink from *tobas* like all the other animals. Natural grazing is the exclusive nutritional source for the nomadic animals living permanently in the desert (Ahmad, 2005; Nadiem, 2009).

Ethno-Veterinary Medicine (EVM) or Veterinary Anthropology refers to holistic and interdisciplinary study of traditional knowledge, skills, methods, practices and folk beliefs of the people about the health care, healthful husbandry and production of livestock (McCorkle, 1986). It encompasses information on

diseases and their control; remedies and clinical practices for treatment and prevention; management, feeding and breeding strategies; spiritual elements; and the human resources that hold the information and experience (Mathias, 2004). The aborigines of Cholistan desert (*Roohelay* in local dialect), that are mobile livestock keepers, use herbs as therapeutic agents and medicament for the well being of their livestock, which they are able to procure easily in the pasturage of wilderness. Even today, despite earnest efforts to transform desert into cultivable land, Cholistan desert is rich in indigenous herbal resources that offer a great scope for ethno-botanical and ethno-pharmacological studies.

The objective of the present study was to report on plant species and ethno-veterinary methods being used as traditional veterinary phytotherapy by the inhabitants of Cholistan for the control and treatment of various livestock ailments. The ethno-veterinary recipes presented here are based on traditional usage by the native ethnic tribes and evidences gathered by native veterinary practitioners of complementary medicine. As ethno-veterinary research has made it possible to discover some pharmacologically active constituents from medicinal plants, it is hoped that ethno-veterinary findings of the present work would provoke further pharmacological and phytochemical research on Cholistani plants.

MATERIALS AND METHODS

Season wise excursions were made in Greater Cholistan region of Punjab, Pakistan for the collection of plant samples and interviewing the local pastoralists from January, 2007 to December, 2008, particularly during the monsoon. Information regarding the vernacular names of plants and their ethno-veterinary medicinal usage was gleaned from the local pastoralists, veterinary practitioners of alternative medicine, quacks and guides of the area through open-ended interviews and guided dialogue technique. The plants were authentically identified with the help of "Flora of Pakistan" and other available literature (Khan, 1965; Awan *et al*., 1992; Shafi *et al*., 2001).

RESULTS

Cholistani plants, with their vernacular names and ethno-veterinary medicinal usage, are enumerated alphabetically by their botanical names in Table 1.

Table 1: Some plants of ethno-veterinary importance found in Cholistan, Pakistan

Sr. No.	Binomial names	Family	Vernacular names	Ethno-veterinary medicinal usage
1	*Achyranthes aspera* Linn.	Amaranthaceae	Puth Kanda	Leaves are used to remove urolith in billy goats. Paste of leaves is mixed in butter and is applied to wounds to prevent myiasis. The flowers are used as an anthelmintic in cattle. Fresh root extract is used to expel placenta and lochia after parturition.
2	*Aerva javanica* (Burm, f.) Juss. ex Schult.	Amaranthaceae	Boil	The infructescence and seeds are used in cases of diarrhoea and haematuria in cattle.
3	*Ailanthus excelsa* Roxb.	Simaroubaceae	Mahanimba	Decoction of leaves is used in ague (malarial fever) in cattle, sheep, goats and camel.
4	*Alhagi camelorum* Fisch.	Papilionaceae	Javan, Jawasa, Kas	Decoction of leaves and thorns is used in impaction in cattle, sheep, goats and camels.
5	*Amaranthus trilocular* Linn.	Amarnathaceae	Lal Sag	Used in case of indigestion in cattle and dysentery in goats.
6	*Anamitra cocculus* Linn.	Menispermaceae	Kakanari, Kakanasa	Lotion made from ripe fruits is used to kill lice on the skin coat of animals. Decoction of leaves is used in cases of intractable fever.
7	*Argemone mxicana* Linn.	Papaveraceae	Peela dhatoora, Satianasee	Pale milk of the plant and oil from seeds are applied on chronic ulcerous wounds. Oil from seeds is used as an anthelmintic in animals. Juice of leaves is given to animals suffering from malarial fever.
8	*Balanites aegyptiaca* Linn.	Simaroubaceae	Hinghot	Seeds are used as anthelmintic and purgative. Ground seeds are given to camels to cure impaction and colic.

9	*Barleria prionites* Linn.	Acanthaceae	Karunta, Kala bansa	Paste of leaves is used as hot poultice to ripen abscess. Decoction of bark and leaves is given to animals as an astringent in diarrhoea. Paste of leaves is applied to interdigital space in animals suffering from foot and mouth disease.
10	*Blepharis sindica* Linn.	Acanthaceae	Asad	Fresh leaves are given to cattle as a galactagogue agent.
11	*Butea monosperma* (Lamk) Tanbert (=*Butea frondosa* Roxb)	Fabaceae (Leguminosae)	Palasha, Chichrah, Dhak	Seed powder alone or in combination with honey is given as an anthelmintic. Poultices made of flowers are applied to inflamed and bruised areas of skin.
12	*Calotropis procera* (Willd.) R.Br.	Asclepiadaceae	Ak	Milky latex of plant is applied on inflamed areas to relieve inflammation and on snakebite to neutralize poison. The leaves and flowers are crushed and the paste is mixed with honey to cure flatulence, anorexia, indigestion and intestinal worm infestation. The root powder is mixed with butter and this ointment is applied to rabid dog bite. This ointment is also applied on the paralyzed limbs.
13	*Capparis decidua* (Forsk) Edgew (= *C. aphylla* Roxb)	Capparidaceae	Kar, Kary	Fruit is used to cure diarrhea in cattle and goats. Bark powder is used in cases of anorexia, indigestion and rheumatism.
14	*Cassia senna* Linn.	Caesalpiniaceae	Sanna makki	Powder of dried leaves and pods is used as cathartic in cases of impaction. Also used in rheumatism, skin diseases and against intestinal worms.
15	*Citrullus colocynthis* Schard	Cucurbitaceae	Tuma	Ash of dried burnt plant is mixed in honey and is used to treat wounds in animals. Mashed vine is used as anthelmentic in camel. Roots are used as purgative in ascities, jaundice and rheumatism. Dried fruit is ground into powder and then mixed with common salt and the preparation is given to cattle and camel in cases of rheumatism.
16	*Cleome brachycarpa* Vahl ex. DC.	Capparidaceae	Kasturi	Finely ground powder of dried leaves is blown into the nostrils of camel to eliminate maggots in the nostrils.
17	*Clerodendron phlomoides* Linn. & = *C. phlomoides* Willd., *C. phlomidis* Linn.)	Verbenaceae	Tankar, Arni	Decoction of root is used orally to treat indigestion and generalized edema in cattle and camel.
18	*Commiphora wightii* (Arnott) Bhandari	Burseraceae	Guggul	Its incense is given to animals in respiratory distress. It is fumigated to repel midges and mosquitoes.
19	*Enicostemma hyssopifolium* (Willd.) Verdoorn	Gentianaceae	Nandho	Fresh plant is crushed and is applied on the area of snakebite.
20	*Euphorbia caducifolia* Haines (= *E. neriifolia* Auctt.)	Euphorbiaceae	Danda thor, Dhodhi	Milky juice of leaves is given to animals to neutralize the effects of scorpion or snake poison. This juice is also applied on the bite.

21	*Flacourtia sepiaria* Roxb.	Flacourtiaceae	Amaloka	Leaves are crushed and applied topically on the point of snakebite. Liniment prepared of this plant is used in cases of rheumatism and paresis in animals.
22	*Heliotropium eichwaldi* Steud	Boraginaceae	Uthchara	In cases of otitis in animals the fresh leaf of this plant is rolled up and is inserted into the ear canal to relieve ear pain.
23	*Lycium deppressum* Stocks	Solanaceae	Chirchita	The bark of the plant is grinded and the powder is blown into the nostrils of animals to open choked air passage in catarrh.
24	*Mollugo nudicaulis* Lamk	Molluginaceae	Rangatio khar	Paste of fresh leaves is applied to ripen abscesses.
25	*Pedalium murex* Linn.	Pedaliaceae	Farid booti	Its fruit is used as a diuretic in cattle and goats.
26	*Phyllanthus nirurii* Linn.	Euphorbiaceae	Bhumi amala, Dodia	Powder of roots is given to camels suffering from indigestion. Juice of leaves is applied to wounds and inflamed areas.
27	*Prosopis cineraria* Linn.	Fabaceae (Leguminosae)	Kandi, Jandi, Khejari	The flowers are used in the form of poultices to treat rheumatism in cattle, sheep, goats and camels.
28	*Prosopis glandulosa*	Fabaceae (Leguminosae)	Devi	The paste of leaves and fruit is applied to relieve the pain associated with bone fracture in animals.
29	*Ricinus communis* Linn.	Euphorbiaceae	Arandi	The oil of seeds is used as a purgative in animals. This oil is mixed with decoction of Javan (*Alhaji camelorum*) leaves and thorns and is given to cattle suffering from severe impaction of rumen. The extract of its leaves is used to hasten the expulsion of placenta in cattle.
30	*Salvadora oleoides* Dcne.	Salvadoraceae	Pilo, Jhal, Mithi Wan	Peelon (dried fruit) is used to treat rheumatism in animals. Dried fruit is given to animals after parturition during winter to facilitate the expulsion of lochia.
31	*Sarcostemma viminale* Linn.	Asclepiadaceae	Sooma	The fresh roots are powdered and the poultice is applied to wound caused by scorpion or snakebite. Whole plant infusion is given to animals bitten by rabid dog.
32	*Securinega leucopyrus* (Willd) Muell. Arg. (= *Flueggea leucopyrus*) (Koen) Willd	Euphorbiaceae	Hartho	Poultice of leaves is applied to wounds to treat myiasis and promote healing.
33	*Tribulus terrestris* Linn.	Zygophyllaceae	Kundai, Bahkra, Gokhru	The juice of fresh leaves is given to animals in cases of colic and chronic cough.
34	*Vitex negundo* Linn.	Verbenaceae	Banah, Nirgud	An infusion of the seeds, given orally, is used to treat rheumatism and arthritis. The boluses made of dried leaves in honey are used as vermifuge in cattle and camels.
35	*Zizypus nummularia* W. &A.	Rhamnaceae	Kaken Ber, Jangra, Badari, Bordi	Paste of leaves is used to cure itch and chronic ulcerous wounds in animals.

DISCUSSION

In the present work, information that was gleaned from nomadic pastoralists of Cholistan desert was scrutinized minutely and critically and only the information asserted, averred and advocated by the native veterinary practitioners of alternative medicine and quacks is presented. Although the local healers, in clinical cases, have tested the medicinal value of these plant species for ages, yet their confidence regarding the medicinal value of these plant species was not sufficient to validate their claims. Documentation of the present EVM knowledge regarding traditional Cholistani phytomedicinal preparations demands validation on the touchstone of modern biochemical and pharmacological assays which, as Githiori *et al*. (2005) has pointed out, should consist of both *in vivo* and *in vitro* assays. Some of the medicinal properties of the plant species, mentioned in the present work, have already been scientifically validated on the touch of pharmacological assays e.g., Kumar and Roy (2007) showed experimentally that latex of *C. procera* affords protection against inflammation. Shrimali *et al*. (2000), Lavhale and Mishra (2007) and Dell'Agli *et al*. (2008) have proved the therapeutic potential of *A. excelsa* to be antifungal, antiplasmodial, antibacterial, antipyretic, leishmanicidal and antineoplastic. Iqbal *et al*. (2006) has demonstrated the *in vivo* anthelmintic activity of *B. monosperma* against Trichostrongylid nematodes in sheep. Yesmin *et al*. (2008) found that the leaves of *C. procera* possess strong antioxidant and antibacterial properties. Khan (1980) found the antibacterial activity of the root bark of *C. deciduas* and leaves of *P. glandulosa*. Iqbal *et al*. (2005) found that the flowers of *C. procera* possess good anthelmintic activity against nematodes of sheep, while methanol and petroleum ether extracts of *Trachyspermum ammi* seeds showed antihyperlipidaemic effect in albino rabbits (Javed *et al*., 2006).

Tipu *et al.* (2006) has given a detailed account of medicinal properties of different plants. According to these workers, these plant act as antibacterial, antioxidant, anticarcinogenic, antifungal, analgesic, insecticidal, anticoccidial and growth promoters. These plant extracts complete with the synthetic drugs. Majority of medicinal plants do not have the residual effects. *Azadirachta indica*, *Zizyphus valgaris*, *Ocimum gratissimum* and *Atlanta monophylla* have strong antibacterial activity, whereas ocimum plant has strong antioxidant, anticarcinogenic, antifungal, analgesic and antipyretic properties. Leaves of *Azadirachta indica* are used for feeding and reducing the parasitic load of animals. The fruit of *Azadirachta indica* also has the anticoccidial activity for poultry.

As geonautical variation in the efficacy of medicaments exists, it is stressed that the true therapeutic potential of the EVM information presented in the present work would only be realized and validated when experimental studies would be conducted in the microclimate of Greater Cholistan desert and on Cholistani breeds of livestock. Wealth of these medicinal plant species is under increasing pressure of expending agricultural demands. Gradual settlement of the desert into villages and the provision of modern civic facilities to settlers are placing the ecological equilibrium of the desert at stake, with the consequent loss of habitat for most of these medicinal plants. This scenario not only demands the collection, systematic documentation and inventorization of this valuable empirical folklore knowledge about the therapeutic value of Cholistani flora but also the conservation of the flora of Cholistan desert in its natural habitat and preservation of the ecosystem of Cholistan desert. It is hoped that the present work and work done by Farooq *et al*. (2008) would be the impetus for further pharmacological and phytochemical research.

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