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## Abstract

**Background:** A survey relative to the use of plants for the cure of animals in Tunisia was conducted in order to make a comparison with the same species (or similar ones) in central and southern Italy.

**Materials and methods:** available bibliographical data both for Italy and for Tunisia were consulted.

**Results:** Thirty-nine plants, representing 22 families, used in Tunisia in ethnoveterinary medicine were reported, and comparisons made with close species used in Central and Southern Italy. Seven of the 39 species (about the 18% of the total) are not present in Italian flora. Fourteen of the 39 species (35% of the total) are also used in Italy. Camelidae (dromedaries and camels) are the most valuable types of domestic animals cured in Tunisia, but ovines, horses, bulls, dogs are also treated. Some uses coincide with those existing in different Italian regions. The plants used are the most common and most easily found in these areas.

**Conclusion:** The present study confirms the convergence in ethnoveterinary medicine between Tunisia and Italy, even if it appears less significant than in human ethnobotany. Further studies are required in areas of Tunisia that have not yet been studied, in order to get the possibility of an evaluation of active compounds.

**Key words:** Ethnoveterinary medicine; Plants; Tunisia; Italy.

## Introduction

As a continuation of a former comparative study on medicinal plants used in Italy and in Tunisia (Leporatti and Ghedira, 2009), in which only one species was cited as a cure for animals (*Capsicum annuum* for cattle and sheep trachoma), we have examined bibliographic references related to the use of plants for the cure of animals in Tunisia in order to make a comparison with the same species (or similar species) in central and southern Italy (Viegi et al., 2003; Bullitta et al., 2007).

The aim of this study, besides the preservation of traditional knowledge of local communities, is to compare and possibly evaluate active compounds from the most significant species, as valuable source of new ideas and information.

## Materials and methods

Available bibliographical data for Italy (Viegi et al., 2003; Guarrera, 2006; Bullitta et al., 2007; Viegi, 2010; Viegi and Vangelisti, 2010) and different handbooks, articles and web sites for Tunisia were examined (Trabut, 1935; Le Mordant et al., 1977; Boulos, 1983; Le Floch, 1983; Boukef, 1986; [http://www.uicnmed.org/nabp/database/NA\\_Plants.htm](http://www.uicnmed.org/nabp/database/NA_Plants.htm)). The used scientific nomenclature is according to Conti et al. (2005) for Italian species, and <http://www.theplantlist.org/1/> for Tunisian species.

## Results and Discussion

A total of thirty-nine species belonging to 22 plant families were individuated (one Pteridophytae, two Gymnosperms, 19 Angiosperms in which 17 are Dicotyledons and two Monocotyledons), which were used by shepherds, breeders and farmers for the treatment of various animal diseases in Tunisia (Tab.1).

For each species, we have considered scientific and vernacular name, therapeutic use (animals), used part, manipulation, bibliographical reference (numbers). The family with the greatest number of medicinal plants was Asteraceae (four species), confirming its preponderance in the folk botanical literature (Viegi et al., 2003). This was followed by Fabaceae, Brassicaceae and Cupressaceae (three species each), and by a series of different families with two or one species each.

Seven of the 39 species (about 18% of the total), *Calligonum comosum* (Le Floch, 1983; [http://www.uicnmed.org/nabp/database/NA\\_Plants.htm](http://www.uicnmed.org/nabp/database/NA_Plants.htm)), *Cymbopogon schoenanthus* (Boulos, 1983; Le Floch, 1983; [http://www.uicnmed.org/nabp/database/NA\\_Plants.htm](http://www.uicnmed.org/nabp/database/NA_Plants.htm)), *Diplotaxis acris* var. *duveyrierana* (Le Floch, 1983), *Haloxylon scoparium* (sub *Arthrophyton schmittianum*) (Le Floch, 1983), *Pituranthos scoparius* (Boukef, 1986), *Retama raetam* (Boukef, 1983; [http://www.uicnmed.org/nabp/database/NA\\_Plants.htm](http://www.uicnmed.org/nabp/database/NA_Plants.htm)), *Callitris articulata* (sub *Tetraclinis articulata*) (Le Floch, 1983) are not present in Italian flora. In Italy (Sicily and Calabria), a subspecies, *Retama raetam* subsp. *gussonei*, has been described, for which no medicinal use is known.

Just four species are currently used only in Tunisia (*Calotropis procera* (Boulos, 1983), *Capparis spinosa* (Le Floch, 1983), *Diplotaxis harra* ([http://www.uicnmed.org/nabp/database/NA\\_Plants.htm](http://www.uicnmed.org/nabp/database/NA_Plants.htm)), *Thymelaea hirsuta* (Le Floch, 1983; [http://www.uicnmed.org/nabp/database/NA\\_Plants.htm](http://www.uicnmed.org/nabp/database/NA_Plants.htm)).

Fourteen of the 39 species (35% of the total) are also used in Italy: *Allium sativum* (Boulos, 1983; De Capite and Menghini, 1973; Ferri, 1977; Chiavoni and Raffo, 1994; Nardelli, 1987; Guarrera and Tammaro, 1991; Guarrera, 1994, De Simoni and Guarrera, 1994; Ciccodicola, 1995; Atzei, 2003; Pieroni et al., 2004; Guarrera 2005; Guarrera et al., 2008; Salerno and Guarrera, 2008; Viegi, 2010); *Atriplex halimus* (Le Floch, 1983; De Capite and Menghini, 1973); *Capsicum annuum* (Boukef, 1986; Guarrera, 1994,1995; Ciccodicola, 1995); *Centaurea calcitrapa* (Boukef, 1986; Atzei, 2003); *Cerantonia siliqua* (Boukef, 1986; Atzei, 2003; Salerno and Guarrera, 2008); *Dryopteris filix-mas* (Le Floch, 1983; De Capite and Menghini, 1973); *Ecballium elaterium* (Boukef, 1986; Lentini and Aleo, 1991; Pieroni et al., 2002; Pieroni et al., 2004);



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<i>Dryopteris filix-mas</i> (L.) Schott	sarkhas		dismatosis of sheep		rhizome		powder		27
				vermifuge (in particular taenia or tapeworm)		rhizome		ethereal extract , i.u.	16
<b>Asteraceae</b>									
<i>Artemisia herba-alba</i> Asso	shih		parasiticide		essential oil		essential oil distilled from plant		4
<i>Carlina involucreta</i> Poir.			veterinary use						27
<i>Centaurea calcitrapa</i> L.	bounaggar		jaundice		roots		water soaking (maceration) i.u.		3
<i>Senecio cineraria</i> DC.	aqhouan abiadh		care of wounds						27
<b>Boraginaceae</b>									
<i>Heliotropium bacciferum</i> Forssk.			anti-scabies		plasters				4
<b>Brassicaceae</b>									
<i>Diplotaxis acris</i> (Forsskål) Boiss. var. <i>duveyrierana</i>			veterinary use						27
<i>Diplotaxis harra</i> (Forsk.) Boiss.	harra		a rub for scab (animals)		seeds or leaves		decoction		iucnmed
<i>Lepidium sativum</i> L.	rched		fattening (bulls); care of wounds (horse, camel)		seeds		food; grinded seeds mixed with henna		27
<b>Capparidaceae</b>									
<i>Capparis spinosa</i> L.			veterinary use						27
<b>Caprifoliaceae</b>									
	okkez sidi moussa		laxative		fruit, stem bark				27
<i>Sambucus nigra</i> L.		sambuco		to reduce udders inflammation after labour (cattle)		aerial parts		decoction, suffumigations, e.u.	13
		sambuco		for gastrointestinal ailments (chicken)		bark		water macerate, i.u.	9; 8
				healing (cattle)		bark		ointment, e.u.	45
				laxative (dogs)		fruits		juice, i.u.	16



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			veterinary use						27
<i>Colocynthis vulgaris</i> Schrader (syn. <i>Citrullus</i> <i>colocynthis</i> (L.) Schrader)	handal;		certain skin diseases of camels; against scorpion stings		hot sap of plant ; sap of unripe green fruits				4
			cattle fodder						Iucnmed
<i>Ecballium elaterium</i> (L.) A. Rich.	faqous h'mir, faqous el bhayem		jaundice		fruit		sap (nose instillation), e.u.		3
		cucumaridde		antiseptic on suppurating wounds (cattle, goats, sheep)		fruits		juice, local, e.u.	39
				vulnerary (cattle)				juice, e.u.	38
		milunedda di surci		purgative (mules)		fruits		dietary supplement, i.u.	30
<b>Cupressaceae</b>									
<i>Tetraclinis articulata</i> (Vahl) Masters (syn <i>Callitris articulata</i> (Vahl) Link., <i>C. quadrivalvis</i> Rich.)	araar		parasitic diseases, scabies (camel), inflamed wound		tar (dried distilled wood)		cream for application		27
<i>Juniperus oxycedrus</i> L., <i>J. oxycedrus</i> subsp. <i>oxycedrus</i>	taga		antiseptic, parasiticide, cutaneous diseases		tar or cade oil (dried distilled wood)				27
	taga, aaraar		animal's skin diseases						Iucnmed
				lameness (livestock), scab and ulcer (sheep)		resin		e.u.	35
		inibbre		to favour placenta expulsion (cows)		cones		decoction, i.u.	34
		tinneberu		limb abrasions (sheep)		resin		e.u.	5
				ulcers, skin affections due to parasites and scabes (animals)		resin		oil from trunk by pyrogenation, e.u.	1
<i>Juniperus phoenicea</i> L.			veterinary use						27
<b>Fabaceae</b>									

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<i>Ceratonia siliqua</i> L.	kharroub		leucoma		Leaves		decoction as eye instillation, e.u.		3
				dietary supplement (horses, mules)		fruits		i.u.	1
		sciussella, erba cavalli		animals (horses)		dried fruits		fodder, i.u.	40
<i>Retama raetam</i> Webb & Berthel.	rtam		scabies		aerial parts		poultice, e.u.		3, iucnmed
<i>Trigonella foenum-graecum</i> L.	helba		fodder crop; purgative		all parts; seeds		food, i.u.		27
		dragonelle		pigeons		seeds		fodder, i.u.	38
				fodder (pregnant sheep and goats)		aerial parts		i.u.	38
<b>Lamiaceae</b>									
<i>Ajuga iva</i> (L.) Schreber	chandgoura		rabies (dog)		aerial parts		mixture with food, i.u.		3
<i>Salvia verbenaca</i> L.	tamerzouga		care of wound (horse)		Leaves		powder applied on wounds, e.u.		27
		schiaraluce		haemostatic, antiseptic (swines)		small branches		in the ears, e.u.	17
<b>Liliaceae</b>									
<i>Allium sativum</i> L.	thoum, toum		veterinary use						4
		Aglio		vermifuge (calves)		bulb		e.u.	Maccioni, Marchini, pers. com.
		Aglio		vermifuge		bulb		-	10
		Aglio		skin diseases		bulb		e.u.	18
		-		tonic, diuretic, antiseptic, anticatarrhal; antiparasitic;		bulb		dietary supplement, i.u.	16
				irritating, clearing up				e.u.	16
				digestive (cattle)				i.u.	36
		egl'; agl		anthelmintic		bulb		dietary supplement, i.u.	11

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		-	intestinal diseases (poultry)	bulb	dietary supplement, i.u.	20
		-	worms (sheep)	aerial parts	dietary supplement, i.u.	20
		Ajo	disinfectant (poultry)	bulb	water soaked (also with ash or vinegar), i.u.	22
		Aje	disinfectant (poultry)	bulb	water soaked (also with ash or vinegar), i.u.	17
		Aglio	dietary supplement, vermifuge (dogs), iu	bulb	lard pills with garlic inside, i.u.	24
			dietary supplement, iu, vermifuge (dairies, calves, goats, lambs)	bulb	with crushed aerial parts of <i>Ruta chalepensis</i> , i.u.	26
		Aglio	anthelmintic (cattle, sheep)	bulb	cold soaked with aerial parts of <i>Calamintha sylvatica</i>	38
			worms			11
		Agliu	bronchitis (farmyards birds)	bulb	water soaked, i.u.	40
			diuretic (horses)	bulb	crushed bulb, egg white, wine; i.u.	1
			brocken winded horses		mixed with ash, e.u..	1
			horn cuts (cattle)		with vinegard and salt; e.u.	1
			after emasculation (animals)		crushed, mixed with brine, e.u.;	1
			colic analgesic (horses)		dried, in suffumigation; e.u.	1
			pneumonia (cattle, horses)		in suffumigation with dried orange peel, sugar, "orbace"	1
			wound disinfectant (poultry)		oil emulsion; e.u.	1
			helmintiasis (swines)		cooked with mash, i.u.	1
			helmintiasis (animals)		cloves decoction, i.u.	1
			intestinal worms (cattle, equines,		mixed with vinegar, i.u.	6

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				ovines)					
				antiseptic in hoof infections (cattle, equines, ovines)			soaked, e.u.		6
			rat poison				red squill is dried, powdered		4
<i>Urginea maritima</i> (L.) Baker	Aansal		fowl diseases		Bulb		decoction, i.u.		3
		cipuddazzu		with broad beans and horse beans to ward off pests (insects and mice) from the barns, silos, etc..		plant		e.u.	De Fine, pers. com.
				to remove the mice from cattle		bulb		cut and rubbed on the skin, e.u.	25
		cipuddazzu		repellent for mice		bulb		e.u.	30
		cipuddazzu		pruritic dermatitis		cataphylls		e.u.	29
				wounds		bulb		e.u.	29
		scipuddazzu		rodenticide		bulb		e.u.	31
		cibùdda de kòga		"zoppina" (goats), disinfectant, vulnerary		bulb		crushed and blended, e.u.	1
				ichthyotoxic				unaltered	1
<b>Pinaceae</b>									
<i>Pinus pinaster</i> Aiton	snouber		veterinary use				ointment		27
		pin, pin sarvego, pin servàdegu		for dealing distortions and to treat the injured limb (especially sheep)		resin		plasters, e.u.	7
<b>Poaceae</b>									
	ied elkhir		veterinary use						27
<i>Cymbopogon schoenanthus</i> (L.) Spreng.	sha' ret et-trab		wounds of camels				cataplasm		4
			dromedary wounds						iucnmed
<b>Polygonaceae</b>									
<i>Calligonum comosum</i> L'Hér.	Arta		scabies (camel)		roots				27, iucnmed
<i>Rumex tuberosus</i> L.	hommidh, hommidha		jaundice		roots		water soaking (maceration) i.u.		3



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<b>Solanaceae</b>									
<i>Capsicum annuum</i> L.	felfel		trachoma		fruit		powder of dried fruit applied in the eyes, e.u.		3
		peperoncino		to increase eggs production (chicken)		fruits		dietary supplement, i.u.	20, 21
		peperoncino		revulsive on swollen glands (livestock)		fruits		cataplasms, e.u.	11
		peperoncino		to fatten animals				dietary supplement, i.u.	11
<i>Nicotiana glauca</i> Graham	dokhane		leucoma		leaves		chewed and squeezed in the eyes, e.u.		3
<b>Tamaricaceae</b>									
<i>Tamarix aphylla</i> (L.) H.Karst. (syn. <i>T. articulata</i> Vahl.)	tarfa		scabies (camel)		gall		tar		27, iucnmed
<b>Thymelaeaceae</b>									
<i>Thymelaea hirsuta</i> Endl.	methnan		cold and nose flow (ewe)		a.p. (ash)		ash applied on nose of ewe, e.u.		27
	mithnane		colds (ewes)				branches and ashes		Iucnmed

Abbreviations: a.p. aerial parts; e.u., external use; i.u., internal use; pers. com., personal communication.

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*Juniperus oxycedrus* (Le Floch, 1983; [http://www.uicnmed.org/nabp/database/NA\\_Plants.htm](http://www.uicnmed.org/nabp/database/NA_Plants.htm); Manzi, 1989; Mearelli and Tardelli, 1995; Bruni *et al.*, 1997; Atzei, 2003); *Nerium oleander* (Boulos, 1983; Bellomaria and Della Mora, 1985; Lentini *et al.*, 1988; Chiavoni and Raffo, 1994; Atzei, 2003); *Pinus pinaster* (Le Floch, 1983; Camangi *et al.*, 2009); *Salvia verbenaca* (Le Floch, 1983; De Simoni and Guarrera, 1994); *Sambucus nigra* (Le Floch, 1983; De Capite and Menghini, 1973; Corsi *et al.*, 1981; Guarrera, 1987, Nardelli, 1987; Manzi, 1989; Guarrera, 1994; Camangi and Uncini Manganelli, 1999; Viegi *et al.*, 1999; Atzei, 2003; Scherrer *et al.*, 2004; Passalacqua *et al.*, 2006; Bullitta *et al.*, 2007; Guarrera *et al.*, 2008); *Trigonella foenum-graecum* (Le Floch, 1983; Pieroni *et al.*, 2004); *Urginea maritima* (Boulos, 1983; Boukef, 1986; Lentini, 1987; Lentini *et al.*, 1988; Lentini and Aleo, 1991; Atzei, 2003; Guarrera *et al.*, 2005).

Eighteen of the 39 species (46% of the total) belong to genera and/or families similar to those used in Italy: *Ajuga iva* (Boukef, 1986), *Apium graveolens* (Boulos, 1983), *Artemisia herba-alba* (Boulos, 1983), *Calotropis procera* (Boulos, 1983), *Carlina involucreta* (Le Floch, 1983), *Citrullus colocynthis* (Boulos, 1983; Le Floch, 1983), *Cuminum cyminum* (Boulos, 1983), *Diploaxis acris* var. *duveyrierana* (Le Floch, 1983), *D. harra* ([http://www.uicnmed.org/nabp/database/NA\\_Plants.htm](http://www.uicnmed.org/nabp/database/NA_Plants.htm)), *Juniperus phoenicea* (Le Floch, 1983), *Nicotiana glauca* (Boukef, 1986), *Pituranthos scoparius* (Boukef, 1986), *Rhus pentaphylla* (Le Floch, 1983), *Rumex tuberosus* (Boukef, 1986), *Sambucus nigra* (Le Floch, 1983), *Senecio cineraria* (Le Floch, 1983), *Tamarix aphylla* (Le Floch, 1983; [http://www.uicnmed.org/nabp/database/NA\\_Plants.htm](http://www.uicnmed.org/nabp/database/NA_Plants.htm)), *Thymelaea hirsuta* (Le Floch, 1983; [http://www.uicnmed.org/nabp/database/NA\\_Plants.htm](http://www.uicnmed.org/nabp/database/NA_Plants.htm)).

The Tunisian literature quotes twenty-one species for generic veterinary use in Tunisia, eight for curing camelidae, five for ovines, two for horses, and one each for bulls, dogs and fowl.

The most utilized plant parts, both in Tunisia and Italy, are aerial parts, followed by fruits, leaves, roots and seeds.

The main uses in Tunisia are for the treatment of scabies, particularly in camelidae (eight species), for wounds (six species), jaundice and dermatosis (three species each), to cure parasitosis, as a laxative, for leucoma, fattening (two species for each), to induce an abortion, as an antiseptic, for trachoma, dismatosis, trypanosomiasis, rabies, and cold (one species).

In particular, 9 Tunisian species are used as follows: roots of *Calligonum comosum* are effective for scabies (Camelidae); tar (dried distilled wood) of *Callitris articulata* is used to cure parasitic diseases, scabies (camelidae), and inflamed wounds; cataplasms of *Cymbopogon schoenanthus* cures the wounds of dromedaries; *Haloxylon scoparium* to cure sheep scabies (powder mixed with tobacco powder and oil, applied on scabies plaque); fumigation (inhalation of burned aerial parts) of *Pituranthos scoparius* is used for scabies (sheep); poultice of aerial parts of *Retama retam* to combat scabies; ash of *Thymelaea hirsuta* for colds and nose flow (ewes); *Capparis spinosa*, *Diploaxis acris* var. *duveyrierana*, are reported for general "veterinary use"

The same species, or ones belonging to the same plant families, are used in both Italy and Tunisia as follows: *Pituranthos scoparius* against scabies (acaridae) in Tunisia (Boukef, 1986) and *Carum carvi* for dog scabies in Italy, notably in Umbria (De Capite and Menghini, 1973); *Heliotropium bacciferum* as an anti-scabies treatment in Tunisia (Boulos, 1983), while in Italy (Tuscany), *Cynoglossum officinale* is used to treat eczema (de Bellis, 1978,1988), *Echium vulgare* for "vaiiolella" (similar to smallpox) and bovine tinea in Tuscany (Viegi *et al.*, 2003), and for snakebites (ovines, dogs) in Abruzzo (Tammara, 1976). Amongst the *Brassicaceae*, in Tunisia *Lepidium sativum* is used for fattening (bulls) and for the treatment of wounds (horses, camelidae) (Le Floch, 1983), while in Italy (Umbria), *Brassica nigra* is used as a revulsive, a rubefactant and a vesicant for livestock (De Capite and Menghini, 1973); *B. oleracea* is used to treat ovine and bovine mastitis in Abruzzo (Manzi, 1989). In Tunisia *Juniperus oxycedrus* is used as an antiseptic, parasiticide, and for cutaneous diseases (Le Floch, 1983; [http://www.uicnmed.org/nabp/database/NA\\_Plants.htm](http://www.uicnmed.org/nabp/database/NA_Plants.htm)) and in Italy (notably in Tuscany) for ulcers, skin affections due to parasites and scabies (Mearelli and Tardelli, 1995) and to treat limb abrasions (sheep) in Sardinia (Bruni *et al.*, 1997). *Salvia verbenaca* is a cure for wounds (horses) in Tunisia (Le Floch, 1983) and in Italy (Abruzzo) as a haemostatic and antiseptic for swine, (De Simoni and Guarrera, 1994). The fruit of *Sambucus nigra* is used as a laxative in Tunisia (Le Floch, 1983), and in Italy (Umbria) it is used as a laxative for dogs and a purgative for cattle (De Capite and Menghini, 1973; Nardelli, 1987); *Trigonella foenum-graecum* is known as a fodder crop; in Tunisia it is used as a purgative (Le Floch, 1983), while in Italy (Lucania) it is used as fodder for pigeons, sheep and pregnant goats (Pieroni *et al.*, 2004); *Urginea maritima* is used as a rat poison both in Tunisia (Boulos, 1983) and in Italy (Sicily) (Lentini and Aleo, 1991); *Nerium oleander* is used to cure ulcers in animals in Tunisia (Boulos, 1983); in Italy (Tuscany) it is used for cutaneous mycosis in dogs (Chiavoni and Raffo, 1994) and in Calabria, for eczema behind the ears in dogs and cats (Passalacqua *et al.*, 2006); in Tunisia *Nicotiana glauca* is a cure for leucoma (Boukef, 1986); in Italy (notably in Sardinia) *Nicotiana tabacum* is used as an antiseptic for eye infections in sheep and goats, (Atzei, 2003); in Tunisia *Dryopteris filix-mas* is used in cases of distomatosis (due to *Fasciola hepatica*) (Le Floch, 1983), and in Italy (notably in Umbria) as a vermifuge, particularly for taenia or tapeworm (De Capite and Menghini, 1973); *Artemisia herba-alba* is used as a parasiticide in both Tunisia (Boulos, 1983) and in Italy, notably in Tuscany (Mambrini and Vicarelli, 1983); *Artemisia abrotanum* is used as a parasiticide in kennels (dogs, cats); *Senecio cineraria* is used for the treatment of wounds in Tunisia (Le Floch, 1983); *Senecio vulgaris* is used against snake bites (cattle, sheep, goats) in Italy, notably in Lucania (Pieroni *et al.*, 2004).

## Conclusion

The present study confirms the convergence between Tunisia and Italy (Leporatti and Ghedira, 2009) in therapeutic uses of several plant species also in ethnoveterinary medicine, even if it appears less significant than in human ethnobotany. This could serve to guide future research, and particularly to seek information on plant remedies for animals in areas of Tunisia that have not yet been studied. New data might be collected in collaboration with herbalists in the towns and with collectors in rural regions, where species are collected in the wild.

Herbal remedies used for hundreds of years by people in both Italy and Tunisia could be put to commercial use as plant resources, to sensitize the government for sustainable utilization and long term conservation of plants in areas. Traditional knowledge obviously needs to be validated in order to verify the safety and efficacy of treatments in animals.

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