

Hagyományos állategészségügy

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Népi állatgyógyászat szerepe a XXI. században

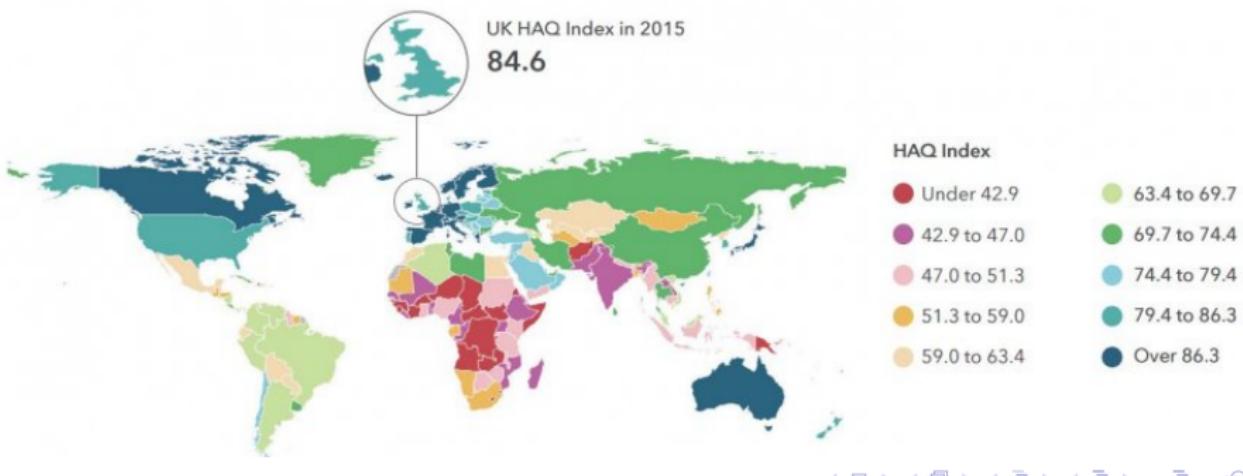
Bioinformatikai Központ
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Mit értünk népi állatgyógyászat alatt?

- a haszonállatok hagyományokon alapuló egészségügyi ellátásával és egészséges tenyésztsével kapcsolatos helyi ismeretek, készségek, gyakorlatok, hiedelmek, gyakorló szakemberek és társadalmi struktúrák tanulmányozása (McCorkle, 1986)
- történelmi idők-napjaink: 80% → oka: állatorvos/gyógyszerek hiánya

Mapping personal healthcare access and quality worldwide in 2015

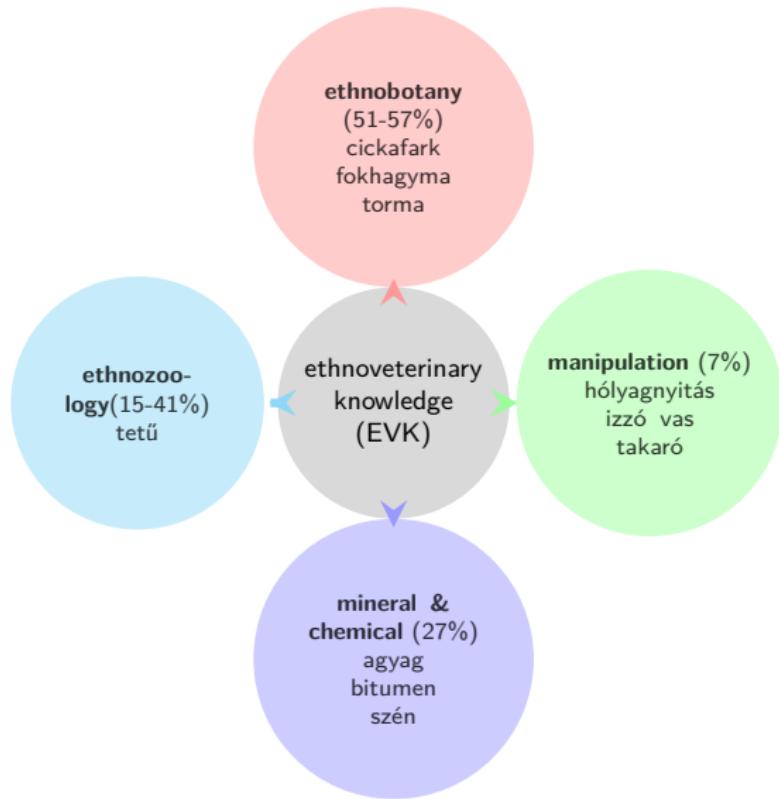


- Ennek a tudásnak a megszerzése korántsem volt és ma sem könnyű feladat.
- Alapvetően a „**próba és hiba**” tanulás logikájára támaszkodott:
 - ismételt próbálkozások, amelyeket a sikerig vagy addig folytatnak, amíg a gyakorló fel nem hagy a próbálkozással.



- Feltehetően, ez sok halálos áldozatot követelt, mielőtt eljutott abba az állapotba, amikor bevált és elterjedt.
- Kiválogattak növényeket, amelyeket meg tudtak vagy nem tudtak megenni, és fel-felfedezték bizonyos tulajdonságaikat, mint például fájdalomcsillapítás, nyugtatás, lázcsillapítás vagy más, számukra hasznos hagyományos egészségügyi gyakorlat.

Milyen részei vannak?



Népi állatgyógyászat kutatásának céljai: adatrögzítés

- pásztorok
 - gyakorlatilag együtt élnek az állatokkal, olyan tapasztalattal, ami más állattartónál nem létezik
 - szájhagyomány, apáról fiúra
 - prevenció, detekció, terápia
- következő órára:
 - Egy délután a legelőn Máté János gulyással
 - Egy délután a legelőn Sáfián László juhással



Népi állatgyógyászat kutatásának céljai: módszereinek vizsgálata

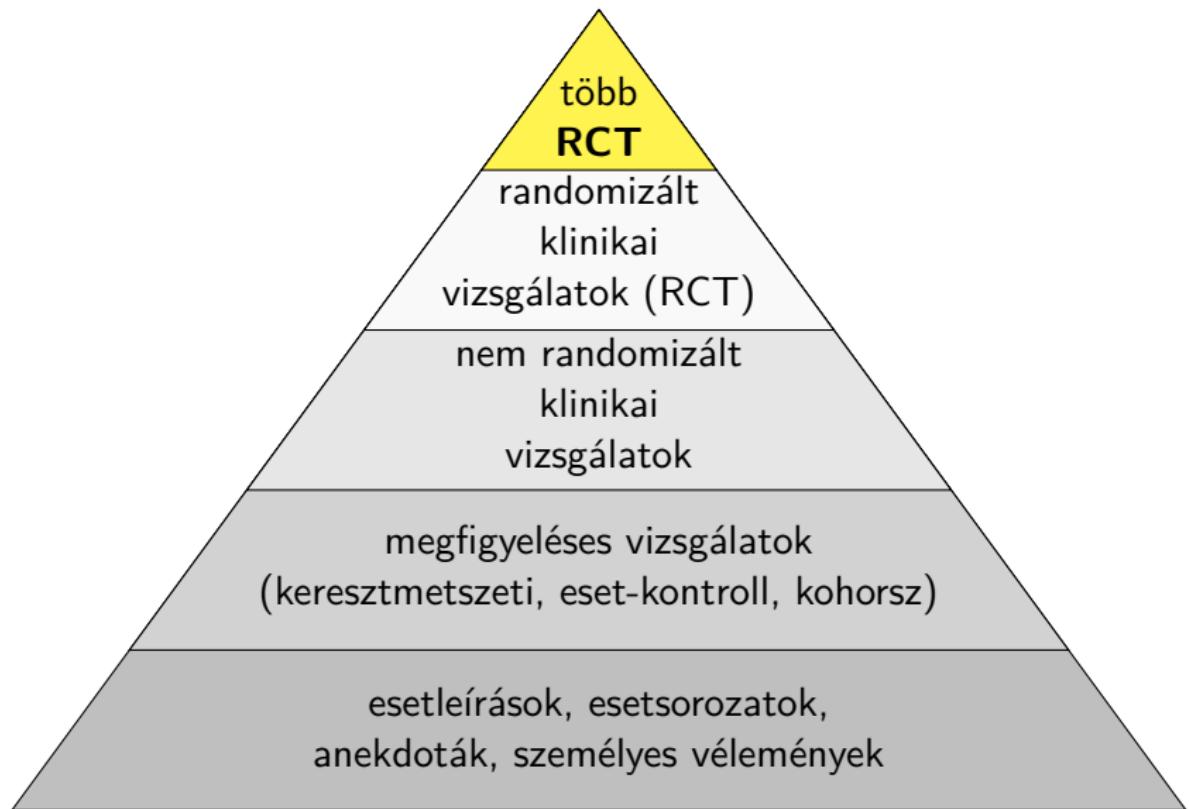
- oka: értéktelen-értékes → gyógyszerfejlesztés
- valid, egyértelmű, pontos, megismételhető, egyszerű, ézszerű költségen
- magas szennitivitás, magas specificitás
- in vitro → in vivo
- In vitro standard - anti-infekív hatás vizsgálata:
 - referenciatorzs
 - modellezés (sejttenyészet)
 - párhuzamos citotoxicitási vizsgálatok
 - adekvát dózis meghatározása (dózis-válasz görbék)
 - IC50 értékek
 - helyes előkészítési, tárolási, feldolgozási gyakorlat
 - kontrolcsoportok megléte (+, -, növekedési)
 - in vitro megfelelő → in vivo modellek

Népi állatgyógyászati módszerek vizsgálata: nehézségek

- komplex praktikák rendszere → félrevezető eredmények
- nem megfelelő diagnózis
- pontatlan dózis
- nem olyan hatékony, mint az ortodox módszerek → nem elég hatékony eredmények
- módszer pontos vizsgálata (gyűjtés, előkészítés, tárolás, felhasználás)
- több növényfaj keveréke
- növényfaj meghatározása
- egy faj több területről történő gyűjtése
- antiparazitikus/protozootikus hatás
- in vitro – in vivo extrapoláció
- in vivo (laborkörülmények) – gyakorlat extrapoláció
- 200-ból 27 vizsgált faj (Katerere and Luseba, 2010)

- Az agroökológiai vagy ökológiai mezőgazdasági gyakorlatban, amely egyre terjedő ágazat Nyugat-Európában, pl. a hagyományos állatgyógyászati fitoterápiai ismeretek új terephez juthatnak.
- Az Európai Tanács ökológiai gazdálkodásról szóló rendelete (834/2007. és 889/2008. sz. rendelet) támogatja az állatgyógyászati kiegészítő gyógymódokat, azaz a fitoterápiás termékeket, az állatállomány betegségeinek kezelésére.
- A kémiaiag szintetizált, allopátiás állatgyógyászati készítmények, beleértve az antibiotikumok csak a Tanács szabályainak (EC no. 834/2007) szigorú betartása mellett alkalmazhatók.
- A népi állatgyógyászat egyes gyakorlatai a fenntartható állatorvoslás fontos elemei lehetnek (antimikrobiális rezisztencia).







- Ember- és állatgyógyászat
 - Etnofarmakológia
 - Prevenció!
- Élelmiszer-biztonság
 - Reziduumok (ökotoxikológia)
 - Kontamináció mérgező növényekkel
 - Élelmiszerellátás ínséges időkben
 - Organikus termékek
- Ökológia
 - Legeltetés - növényismeret
 - Környezetszenyezés
- Kulturális aspektusok





Állati eredetű gyógymódok - Zooterápia

- Főként a múltban volt elterjedt
- Erős összefonódás az emberek és állatok között
- Gyógyító zsír és tojássárgája - mágikus medicina
- Tudományosan alátámasztott misztikum?
 - Kutyanyál
 - Csiganyál
 - Vér a szembe
 - Tojáshéj
 - AB szinergista zsír
 - +1 Tehénkullancs bárányhimlőre
- Felhasználási nehézségek:
 - Kiragadás a környezetből - Fertőző betegségek
 - Reziduumok akkumulációja (pl. faggyú)

Table 1Summary of different actions and their mechanism of garlic extract (*Allium sativum* L.).

Actions	Mechanism of Actions	References
Anticoccidial	Decreases <i>Eimeria vermiciformis</i> oocysts output in mice Prophylactic effect against hepatic coccidiosis in rabbits	[14] [15]
Amebicidal	Inhibition of <i>Acanthamoeba castellanii</i> life cycle	[16]
Antipseudomonas	Inhibition biofilm coated <i>Pseudomonas aeruginosa</i> bacteria that leads to failure of antibacterial treatment and humoral immunity	[17]
Antibacterial	Significantly inhibits the growth and division of oral pathogens Food preservatives so prevent food poisoning crises	[18] [19-21]
Antioxidant	Potent antioxidant activity Antagonizes β-hexosaminidase enzyme release so it has a potent antiallergic effect	[22,23] [24]
Antileishmaniasis	Immunostimulant via activation the efficacy of macrophages to engulf the intracellular protozoan Leishmania	[25,26]
Antischistosomiasis	Potent broad spectrum against all stages of <i>Schistosoma</i> life cycle	[27-29]
Hepatoprotective	Increases all the hepatic biomarkers antioxidant enzymes concerned with oxidative stresses	[30]
Antithrombus	Inhibition of prostaglandin synthesis through cyclooxygenase pathway and prevents platelets aggregations in blood vessels or lungs	[31]
Antifungal	Inhibition of saprophytic fungal growth that induced external mycosis Inhibition of metabolism process of <i>Candida albicans</i> by NADH oxidation and glutathione depletion, and increased reactive oxygen species (ROS)	[32] [33]
Insecticide	Potent natural larvicidal activities against the filarial mosquito <i>Culex quinquefasciatus</i>	[34,35]
Anticancer	Suppress the growth of human breast cancer cells <i>in vitro</i> through several mechanisms the activation of metabolizing enzymes, the suppression of DNA, antioxidant activity, and stop cell division	[36-39]
Aquacultures	Highly efficacious in most infectious fish diseases Immunostimulant and antiprotozoal activities in different aquacultures	[40] [41]

Table 2

Summary of different antibacterial extracts and oils with their mechanisms and susceptible bacterial species.

Plant	Scientific name	Mechanism of action on bacteria	Susceptible bacteria	References
<i>Extracts</i>				
Cumin seeds	<i>Cuminum cyminum</i> J.F.Gmel.	Damage to the cell membranes and loose of intracellular organelles	<i>Escherichia coli</i> , <i>Pseudomonas aeruginosa</i> , <i>Staphylococcus aureus</i> , <i>Bacillus pumilus</i>	[57]
Ginger rhizome	<i>Zingiber officinale</i> Roscoe	Inhibits bacterial multiplication	<i>Pseudomonas aeruginosa</i>	[58]
Clove flowers	<i>Syzygium aromaticum</i> (L.) Merr. & L.M.Perry	Enhanced membrane permeability and oxidative stress of bacteria	<i>Staphylococcus aureus</i> , <i>Pseudomonas aeruginosa</i> , <i>Escherichia coli</i>	[59,60]
Pomegranate peel	<i>Punica granatum</i> L.	Interferes with bacterial protein secretions	<i>Listeria monocytogenes</i> , <i>Staphylococcus aureus</i> , <i>Escherichia coli</i> and <i>Yersinia enterocolitica</i>	[61,62]
Thyme leaves	<i>Thymus vulgaris</i> L.	Cell wall lysis of bacteria	<i>Escherichia coli</i> , <i>Pseudomonas aeruginosa</i> , <i>Staphylococcus aureus</i> , <i>Enterococcus</i>	[63,64]
<i>Oils</i>				
Coriander seeds	<i>Coriandrum sativum</i> L.	Damage of cell membrane, leads to cell death	<i>Staphylococcus aureus</i> , <i>Escherichia coli</i> , <i>Salmonella typhi</i> , <i>Klebsiella pneumonia</i> , <i>Proteus mirabilis</i> ,	[65,66]
Black cumin	<i>Nigella sativa</i> L.	Anti-biofilm activity	<i>Bacillus cereus</i> , <i>Bacillus subtilis</i> , <i>Staphylococcus aureus</i> , and <i>Pseudomonas aeruginosa</i>	[67,68]
Fennel seeds	<i>Foeniculum vulgare</i> Mill.	Leakage of electrolytes, the losses of cellular contents	<i>Pseudomonas syringae</i> , <i>Bacillus subtilis</i> , <i>Escherichia coli</i> , <i>Staphylococcus sp.</i> , and <i>Aeromicrobium erythreum</i>	[69–71]
Rosemary leaves	<i>Rosmarinus officinalis</i> L.	Anti-R-plasmid activity Elimination of R-plasmids	<i>Staphylococcus aureus</i> and <i>Escherichia coli</i>	[72]
Caraway seeds	<i>Carum carvi</i> L.	Inhibition of <i>S. aureus</i> growth		
Peppermint leaves	<i>Mentha piperita</i> L.	Change cell morphology Forming elongated filamentous forms	<i>Salmonella enteritidis</i> , <i>Escherichia coli</i> , methicillin-resistant <i>Staphylococcus aureus</i> (MRSA)	[73]
Savory leaves	<i>Satureja montana</i> L.	Affected cell membrane of bacteria and induced depletion of the intracellular ATP	<i>Escherichia coli</i> and <i>Listeria monocytogenes</i> .	[53]
Chamomile dried flowers	<i>Matricaria chamomilla</i> L.	Alterations of bacterial Morphology	<i>Bacillus cereus</i> , and <i>Staphylococcus aureus</i>	[74]
Carrot umbels	<i>Daucus carota</i> L.	Cell Membrane/Protein Synthesis Inhibition	<i>Campylobacter jejuni</i> <i>Vibrio</i> , <i>Aeromonas hydrophila</i>	[75,76]

Table 3

Summary of different antiparasitic plants with their bioactive compounds and uses.

Plant	Scientific name	Secondary bioactive metabolites	Uses	References
Nematodes Garlic bulb	<i>Allium sativum</i> L.	thiosulfinate, such as allicin	<i>Haemonchus contortus</i> in goats sheep	[85] [86]
Walnut Leaves& peels	<i>Juglans regia</i> L.	naphthoquinone	nematodes	[87]
Chicory forage	<i>Cichorium intybus</i> L.	terpenoids or phenolic compounds coumarins	lungworm in deers <i>Ostertagia ostertagi</i> in cattle GIT nematode in lambs	[88] [89] [90]
Wormseed	<i>Chenopodium ambrosioides</i> L.	ascaridole	<i>Haemonchus contortus</i> in goats	[91]
<i>Coccidiosis</i> Garlic bulb	<i>Allium sativum</i> L.	allicin	<i>Eimeria ninakohlyakimovae</i> in goats hepatic coccidiosis in rabbits	[85] [92]
Pine bark	<i>Pinus radiata</i> D.Don	Tannins	<i>E. tenella</i> , <i>E. maxima</i> , and <i>E. acervulina</i>	[93]
Green tea	<i>Camellia sinensis</i> (L.) Kuntze	polyphenolic compounds	inactivate the enzymes for coccidian sporulation	[94]
Barberry root bark	<i>Berberis lycium</i> Royle	isoquinoline alkaloid berberine	inhibition of the sporozoites of <i>E. tenella</i> in chickens via induction of oxidative stress.	[95]
Guar bean	<i>Cyamopsis tetragonoloba</i> L. Taub	Saponins which could lyse oocysts	suppression of coccidiosis in chickens	[96]
Olive tree	<i>Olea europaea</i> L.	Maslinic acid	increases the anticoccidial index	[97]
Grape seed	<i>Vitis vinifera</i> L.	Proanthocyanidin	diminishes coccidiosis via downregulation of oxidative stress.	[98]
Turmeric rhizome	<i>Curcuma longa</i> L.	Curcumin (diferuloylmethane)	destroyed sporozoites of <i>E. tenella</i> and diminished gut damage in poultry	[99] [100]
Coneflowers	<i>Echinacea purpurea</i> (L.) Moench	Flavonoid echinolone chicoric acid,	elicit humoral immune response against coccidial infection in chickens	[101]
Emblic fruits	<i>Phyllanthus emblica</i> L.	Tannins		[102]
Aloe leaves	<i>Aloe vera</i> (L.) Burm.f.	acemann sugars anthraquinones,	<i>Aloe vera</i> -supplemented group showed significantly fewer intestinal lesions	[103]

Table 4

Summary of growth promoters in chickens with their bioactive compounds and uses.

Plant	Scientific name	Secondary bioactive metabolites	Actions	References
Aloe leaves	<i>Aloe vera</i> (L.) Burm.f.	Acemann	growth promoter, immune-modulator	[107,114]
Turmeric rhizome	<i>Curcuma longa</i> L.	Curcumin	Increases the feed utilization	[115]
Thyme leaves & flowers	<i>Thymus vulgaris</i> L.	Essential oils	Improves the absorption and digestion in the small intestine	[116]
Star anise seeds	<i>Illicium verum</i> Hook. f.			[117]
Moringa leaves	<i>Moringa oleifera</i> Lam.	Proteins 9% Polyphenols	Protein supplement and economically uses in broiler production	[118]
Black cumin seeds	<i>Nigella sativa</i> L.	Thymoquinone	Immunostimulant, hepatoprotective,	[119]
Onion bulb	<i>Allium cepa</i> L..	Organic sulphur compounds, flavonoids and phenolic acids	Improves the role of microflora in digestion	[120,121]
Cinnamon bark	<i>Cinnamomum cassia</i> (Nees & T.Nees) J.Presl	Cinnamaldehyde, eugenol and carvacrol	Potent growth promoter in broilers diet	[122,123]
Grape seed	<i>Vitis vinifera</i> L.	Catechins tetrameric proanthocyanidins	Hypolipidemic, antioxidant and antibacterial	[124]
Olive leaf	<i>Olea europaea</i> L.	Oleuropein	Modifies lipid metabolic patterns and microflora counts	[125]
Pomegranate peel	<i>Punica granatum</i> L.	Proanthocyanidin		[126]
Ginger rhizome	<i>Zingiber officinale</i> Roscoe	Ginerol and shagaol	Improves the feed conversion ratio and meat quality	[127,128]
Rosemary leaves	<i>Rosmarinus officinalis</i> L..	Oil	High antioxidant capacity	[129]

Table 2

Plant species used in ethnoveterinary medicine, families, traditional uses, parts used, preparation and administration forms and citations.

Scientific name (voucher number)	Family	Traditional use	Part used	Prep.	Use type	Rep*	Med.	Source
<i>Adiantum capillus-veneris</i> L. (GDA54094)	Adiantaceae	Birth	Leaves	D	IU	1	x	1, 2, 3, 4
<i>Agave americana</i> L. (GDA53864)	Agavaceae	Wound healing	Leaves	DA	EU	-	x	1,2
		Scabies	Leaves	D	EU	-		3
<i>Alkanet tinctoria</i> (L.) Tausch (GDA53942)	Boraginaceae	Wound healing	Roots	D, MO	IU	1	x	4
<i>Allium cepa</i> L.	Liliaceae	Birth	Bulb	D	IU	3	x	4
<i>Bupleurum gibraltaricum</i> Lam. (GDA54110)	Apiaceae	Wound healing	Leaves	D, MO	EU	4	x	3, 4
<i>Cinnamomum verum</i> J.Presl	Lauraceae	Birth	Fruits	D	IU	2	x	1, 4
<i>Cistus albidus</i> L. (GDA54044)	Cistaceae	Birth	Leaves	D	IU	1		1, 4
<i>Cistus laurifolius</i> L. (GDA54046)	Cistaceae	Birth	Leaves	D	EU	1		4
		Wound healing	Leaves	D	EU	-		4
<i>Cytisus scoparius</i> subsp. <i>reverchonii</i> (Degen and Hervier) Rivas Goday and Rivas Mart. (GDA53909)	Fabaceae	Wound healing	Flowering Stems	D	EU	1		4
<i>Dactylis glomerata</i> L. subsp. <i>hispanica</i> (Roth.) Nyman (GDA54066)	Poaceae	Eyes	Inflorescence Stems	DA	IU	3		1, 4
<i>Daphne gnidium</i> L. (GDA53805)	Thymelaeace	Birth	Bark	DA	EU-M	12		1, 2, 3, 4
		Diarrhoea	Bark	DA	EU-M	3		3, 4
		Dislocation	Leaves	D	EU	7		2, 4
<i>Digitalis obscura</i> L. (GDA53945)	Scrophulariaceae	Wound healing	Flowering Stems	D, MO	EU	12	x	3
<i>Dittrichia viscosa</i> (L.) Greuter (GDA54164)	Asteraceae	Toothache	Flowering Stems	D	IU	1		4
<i>Eryngium campestre</i> L. (GDA54112)	Apiaceae	Wound healing	Flowering Stems	D	EU	3	x	4
<i>Eucalyptus globulus</i> Labill.	Mirtaceae	Cold	Leaves	D	IU	-	x	3
<i>Ferula communis</i> L. (GDA54105)	Apiaceae	Dislocation	Roots	DA	EU-M	-	x	1, 2, 3
<i>Festuca scariosa</i> (Lag.) Ascherson & Graebner (GDA54048)	Poaceae	Eyes	Stems	DA	EU	2		4
<i>Ficus carica</i> L. (GDA53804)	Moraceae	Flatulence	Stems	DA	IU	1	x	4
<i>Fnemiculum vulgare</i> Mill. (GDA54111)	Apiaceae	Wound healing	Whole plant	D	IU	1	x	4
<i>Hyoscyamus albus</i> L. (GDA54123)	Solanaceae	Wound healing	Leaves	D	EU	-	x	2
		Dislocation	Leaves	D	EU	-		3
<i>Juglans regia</i> L.	Juglandaceae	Contraceptive	Leaves	D	IU	1	x	4
<i>Juniperus oxycedrus</i> L. (GDA54020)	Cupressaceae	Birth	Resin	D	IU	2	x	4
		Purgative	Resin	D	IU	3		1, 4
		Uric acid	Resin	D	IU	1		4
		Scabies	Resin, Leaves	DA, D	EU	-		3
<i>Juniperus phoenicea</i> L. (GDA54019)	Cupressaceae	Depurative	Leaves	D	IU	1		4
		Mineral salts	Ash	DA	IU	2		4
<i>Lavandula lanata</i> Boiss. (GDA53906)	Lamiaceae	Cold	Flowering Stems	D, J	IU	-	x	3
<i>Lavandula latifolia</i> Medik. (GDA54312)	Lamiaceae	Cold	Flowering Stems	D, J	IU	-	x	3
<i>Marrubium supinum</i> L. (GDA53899)	Lamiaceae	Cold	Flowering Stems	D	IU	-	x	3
<i>Marrubium vulgare</i> L. (GDA53900)	Lamiaceae	Cold	Flowering Stems	D	IU	-	x	2, 3
<i>Mentha pulegium</i> L. (GDA53895)	Lamiaceae	Birth	Flowering Stems	D	IU	7	x	4
		Fleas	Flowering Stems	D, DA	EU	-		3

Table 2 (Continued)

Scientific name (voucher number)	Family	Traditional use	Part used	Prep.	Use type	Rep*.	Med.	Source
<i>Mentha suaveolens</i> Ehrh. (GDA53894)	Lamiaceae	Fleas	Flowering Stems	D, DA	EU	4	x	1, 4
<i>Nerium oleander</i> L. (GDA53843)	Apocynaceae	Analgesic	Stems	DA	EU-M	1		4
<i>Nicotiana glauca</i> R. C. Graham (GDA54004)	Solanaceae	Wound healing	Leaves	D	EU	1		4
<i>Olea europaea</i> L. var. <i>europaea</i>	Oleaceae	Detoxifying	Oil	DA	IU	1	x	4
<i>Paeonia broteroi</i> Boiss. & Reut. (GDA54006)	Paeoniaceae	Wound healing	Bulb	DA	EU	1	x	4
<i>Pallenis spinosa</i> (L.) Cass.	Asteraceae	Wound healing	Flowering Stems	D	EU	1	x	4
<i>Petroselinum crispum</i> (Mill.) A.W. Hill (GDA54108)	Apiaceae	Wound healing	Whole plant	I	EU	1	x	4
<i>Phlomis lychnitis</i> L. (GDA53880)	Lamiaceae	Birth	Flowering Stems	D	IU	1		4
<i>Phlomis purpurea</i> L. (GDA53901)	Lamiaceae	Birth	Flowering Stems	D	IU	9	x	4
<i>Phlomis purpurea</i> L. (GDA53901)	Lamiaceae	Wound healing	Flowering Stems	D	EU	3		4
<i>Pistacia lentiscus</i> L. (GDA53849)	Anacardiaceae	Distemper	Leaves	DA	EU-M	1		4
<i>Plantago coronopus</i> L. (GDA54031)	Plantaginaceae	Birth	Whole plant	DA	EU-M	1	x	4
<i>Plumbago europaea</i> L. (GDA53860)	Plumbaginaceae	Vermic	Whole plant	M	EU	4	x	4
<i>Quercus rotundifolia</i> Lam. (GDA53814)	Fagaceae	Birth	Bark	D	IU	5	x	4
<i>Retama sphaerocarpa</i> (L.) Boiss. (GDA53934)	Fabaceae	Birth	Bark & Roots	D	IU	2	x	4
		Dislocation	Bark	DA	EU	7		4
		Bone fracture	Bark	DA	EU	2		1, 2, 3, 4
		Other	Spines	DA	EU	2		4
<i>Rhamnus saxatilis</i> Jacq. (GDA54133)	Rhamnaceae	Purgative	Whole plant	DA	IU	1	x	2, 4
<i>Rorippa nasturtium-aquaticum</i> (L.) Hayek (GDA54035)	Brassicaceae	Birth	Flowering Stems	D	IU	3	x	3, 4
<i>Rosmarinus officinalis</i> L. (GDA54003)	Lamiaceae	Birth	Leaves	D	IU	1		4
<i>Rubus ulmifolius</i> Schott (GDA53963)	Rosaceae	Birth	Leaves	D	IU	1		4
<i>Ruta angustifolia</i> Pers. (GDA53813)	Rutaceae	Birth	Whole plant	D	IU	2	x	1, 2, 4
<i>Ruta chalepensis</i> L. (GDA19351)	Rutaceae	Scabies	Whole plant	D	EU	-	x	3
<i>Ruta montana</i> (L.) L. (GDA53867)	Rutaceae	Birth	Whole plant	D	IU	7	x	4
<i>Salvia lavandulifolia</i> subsp. <i>veilleae</i> (Cuatrec.) Rivas Goday (GDA53896)	Lamiaceae	Other (nutraceutical)	Whole plant	DA	IU	1	x	4
<i>Scirpoides holoschoenus</i> (L.) Soják (GDA54074)	Scirpaceae	Toothache	Leaves	DA	IU	2	x	4
		Cold	Leaves	DA	IU	2		2, 3, 4
		Diuretic	Leaves	DA	IU	1		4
<i>Sideritis hirsuta</i> L. (GDA54007)	Lamiaceae	Wound healing	Flowering Stems	D, MO	EU	16	x	2, 3, 4
		Birth	Flowering Stems	D	IU	1		4
		Scabies	Flowering Stems	D	IU	1		4
		Inflorescence	Inflorescence Stems	DA	IU	1		4
		Analgesic	Inflorescence Stems	DA	EU	3	x	4
<i>Stipa lagascae</i> Roem. and Schult. (GDA54058)	Poaceae	Eyes	Inflorescence Stems	DA	IU	1		4
<i>Stipa tenacissima</i> L. (GDA54052)	Poaceae	Birth	Leaves	D	IU	3		3, 4
		Eyes	Inflorescence Stems	DA	IU	4		4
		Cold	Leaves	D	IU	2		4
		Distemper	Leaves	DA	EU-M	3		3, 4
<i>Thapsia villosa</i> L. (GDA54101)	Apiaceae	Dislocation	Stems	DA	EU	1	x	4
<i>Thymus mastichina</i> (L.) L. (GDA53890)	Lamiaceae	Wound healing	Flowering Stems	D	EU	2	x	4
<i>Urginea maritima</i> (L.) Baker (GDA54075)	Liliaceae	Alopecia	Bulb	DA	EU	1	x	4
<i>Urtica dioica</i> L. (GDA54151)	Urticaceae	Invigorating	Whole plant	DA	IU	2	x	4
<i>Verbascum thapsus</i> L. (GDA53944)	Scrophulariaceae	Wound healing	Leaves	D	EU	1	x	4
<i>Verbena officinalis</i> L. (GDA53831)	Verbenaceae	Wound healing	Leaves	D	EU	1	x	4

Source: 1. Muñoz-Leza (1989); 2. González-Tejero (1990); 3. González-Tejero et al. (1999); 4. Benítez (2009).

Prep.: preparation form; D: decoction; DA: direct application; MO: medicinal oil; I: infusion; Use type: IU: internal use; EU: external use; M: magico-religious use. Rep*: number of reports in Benítez (2009) for the western part of the province. Med.: medicinal species also used in human ethnopharmacology (indicated with "x"). Underlined uses are the same for human folk medicine.

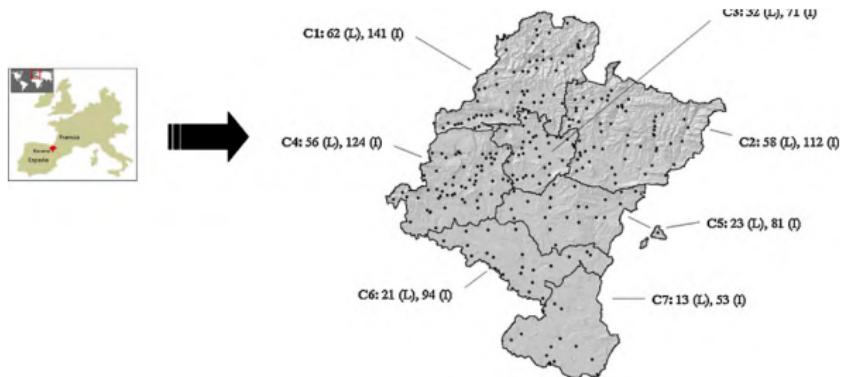


Fig. 1. Distribution of localities and informants as agricultural regions. C1: Region 1; C2: Region 2; C3: Region 3; C4: Region 4; C5: Region 5; C6: Region 6; C7: Region 7; L: number of localities where ethnobotany information has been obtained; I: number of informants; (●) Situation of the localities.

Table 2

Ethnoveterinary uses of medicinal plants in Navarra.

Family/scientific name	Local names	Part used	Popular use (therapeutic category)	Preparation	A ^a	C ^b	R ^c
Aquifoliaceae							
<i>Ilex aquifolium</i> L. (PAMP 22899)	Acebo	Aerial part	To cure scabies in animals (Dm)	Rite	(F)	1	C4
		Aerial part	To combat ringworm of cattle (Dm)	Rite	(F)	1	C4
	Colositos, Bolostios	Aerial part	To cure skin problems in cows (Dm)	Rite	(F)	1	C2
Aspleniaceae							
<i>Asplenium trichomanes</i> L. subsp. <i>trichomanes</i> (PAMP 21116)	Hierba de las mujeres	Whole plant	For the expulsion of the placenta and clean the animal after having pups (Rp)	Infusion	Internal (F)	1	C4
Buxaceae							
<i>Buxus sempervirens</i> L. (PAMP 18660)	Boj	Leaf	Purgative (Dg)	Infusion	Internal (I)	1	C4
Campanulaceae							
<i>Campanula trachelium</i> L. (PAMP 21143)	Auxina hila	Aerial part	Pig diseases (Vr)	Infusion (cold)	Internal (I)	1	C1
Cannabaceae							
<i>Humulus lupulus</i> L. (PAMP 21144)	Lupibelarra	Aerial part	Pig diseases (Vr)	Direct application in incision	External (F)	2	C1
Caprifoliaceae							
<i>Sambucus nigra</i> L. ssp. <i>nigra</i> (PAMP 18663)	Sáúco	Bark (internal)	Mastitis (Rp)	Poultice	External (F)	1	C2
	Flota	Inflorescence	For diseases of cows and mules, mostly bad bronchial (Rs)	Smoke inhalation	External (D)	1	C3
Compositae							
<i>Achillea millefolium</i> L. ssp. <i>millefolium</i> (PAMP 21185)	Camomila	Inflorescence	Stomach ache (Dg)	Infusion	Internal (D)	2	C5
			Sore-throat (Rs)	Vapour inhalation	Internal (D)	1	C5

<i>Anthemis arvensis</i> L. ssp. <i>arvensis</i> (PAMP 18758)	Manzanilla para los animales	Inflorescence	Animal diseases (Vr)	Infusion	Internal (D)	1	C1	
<i>Chamaemelum nobile</i> (L.) All. (PAMP 18762)	Manzanilla	Inflorescence	To the bloating of the ewes in spring (Dg) Animal diseases (Vr)	Infusion	Internal (D)	1	C1	
<i>Tanacetum parthenium</i> (L.) Schultz Bip. (PAMP 21310)	Jasonia tuberosa (L.) DC. (PAMP 21275)	Té	Flowered aerial part	Colic and bloated feeling in the stomach (Dg)	Infusion (with <i>Tanacetum parthenium</i>) Decoction	Internal (D)	1	C6
<i>Santolina chamaecyparissus</i> L. ssp. <i>squarrrosa</i> (DC.) Nyman (PAMP 18777)	Hierba para el mal de las gallinas	Inflorescence	Chicken diseases (Vr)	Infusion	Internal (D)	1	C1	
<i>Cupressaceae</i>								
<i>Juniperus communis</i> L. ssp. <i>communis</i> (PAMP 21363)	Manzanilla del ganado	Inflorescence	Animal diseases (Vr)	Infusion (with <i>Chamaemelum nobile</i>)	Internal (D)	1	C1	
<i>Ericaceae</i>								
<i>Arctostaphylos uva-ursi</i> (L.) Spreng. (PAMP 21407)	Ginebro, orrea	Trunk oil	Sheep diseases (Vr)	Comestible	Internal (F)	1	C3	
<i>Euphorbiaceae</i>								
<i>Euphorbia amygdaloides</i> L. ssp. <i>amygdaloides</i> (PAMP 21500)	Bicharuelo	Leaf	For the kidneys (Ur)	Decoction	Internal (I)	3	C5	
<i>Geraniaceae</i>								
<i>Geranium robertianum</i> L. (PAMP 21548)	Auskurrumia	Aerial part	Contraceptive for cows (Rp)	Decoction	Internal (F)	1	C1	
<i>Gramineae</i>								
<i>Avena sativa</i> L. (PAMP 2)	Zaingorri	Aerial part	Diarrhoea (Dg)	Infusion	Internal (F)	1	C1	
	Hierba para diarrea de gorrines	Aerial part	Diarrhoea in calves and piglets (Dg)	Decoction	Internal (F)	1	C1	
	Avena	Aerial part	To reactivate rumination in steers, carminative (Dg)	Comestible	Internal (I)	1	C4	

Guttiferae <i>Hypericum perforatum</i> L. (PAMP 21555)	Hipérico	Flowered aerial part	Wounds (Dm)	Maceration (in olive oil)	External (F)	1	C7
Juglandaceae <i>Juglans regia</i> L. (PAMP 22072)	Noguera	Leaf	Anticolic in horses (Dg)	Decoction	Internal (F)	4	C4, C5
	Nogal	Leaf Leaf buds	Wounds (Dm) Wounds (Dm)	Decoction Decoction	External (F) External (F)	2 1	C2 C2
Labiateae <i>Lamium maculatum</i> (L.) L. (PAMP 21574)	Auxina hila	Aerial part	Pig diseases (Vr)	Infusion (cold)	Internal (F)	1	C1
<i>Marrubium vulgare</i> L. (PAMP 21596)	Marruego	Aerial part	Animal diseases (Vr)	Decoction	Internal (F)	1	C5
<i>Origanum vulgare</i> L. ssp. <i>vulgare</i> (PAMP 21637)	Orégano	Flowered aerial part	Cold (Rs)	Infusion	Internal (D)	1	C2
Liliaceae <i>Allium sativum</i> L. (PAMP 21718)	Ajo	Bulb	Distemper in dogs and cats (Rs)	Rite	(F)	1	C2
Loranthaceae <i>Viscum album</i> L. ssp. <i>album</i> (PAMP 21819)	Muérdago o mermasangre	Aerial part	Hypertension (Cd)	Decoction	Internal (F)	1	C2
			For the expulsion of the placenta (Rp)	Infusion	Internal (F)	1	C1
Lythraceae <i>Lythrum salicaria</i> L. (PAMP 18707)	Salicaria, makilbelarra	Aerial part	Diarrhoea, vomiting or gastroenteritis (Dg)	Infusion	Internal (I)	1	C1
Malvaceae <i>Althaea officinalis</i> L. (PAMP 18805)	Malvavisco	Root	Sore-throat (Rs)	Vapour inhalation	External (F)	1	C5
<i>Malva neglecta</i> Wallr. (PAMP 21824)	Malva	Flower	Stomach ache (Dg)	Infusion	External (F)	1	C5
		Aerial part	Wounds (Dm)	Poultice	External (F)	1	C2
			Laxative in horses (Dg)	Decoction	Internal (F)	1	C5

<i>Malva sylvestris</i> L. (PAMP 21836)	Malva	Flower Aerial part	Cattle evil tripe (Dg) Wounds (Dm) Catarrh (Rs) Pig diseases (Vr) Respiratory problems in horses (Rs) Wounds in cattle (Dm) Colic in horses (Dg) Anti-inflammatory (Vr) To reactivate rumination, carminative (Dg) Animal diseases (Vr) Horse wounds (Dm)	Infusion Poultice Smoke inhalation Infusion más harina Decoction Decoction Decoction Decoction Infusion	Internal (F) External (F) Internal (D) Internal (F)	1 2 4 1	C1 C1, C2 C5 C2
		Flowered aerial part Whole plant					C6 C1 C6 C2 C3
Oleaceae							
<i>Fraxinus angustifolia</i> Vahl ssp. <i>angustifolia</i> (PAMP 21846)	Fresno	Leaf	Depurative (Dp)	Comestible	Internal (F)	1	C4
Onagraceae							
<i>Epilobium parviflorum</i> Schreb. (PAMP 21856)	Auxina hila	Aerial part	Pig diseases (Vr)	Infusion (cold)	Internal (I)	1	C1
Primulaceae							
<i>Anagallis arvensis</i> L. (PAMP 19649)	Pasmobelarra	Aerial part Whole plant	Wounds disinfection (Dm) Wounds disinfection (Dm)	Decoction (with <i>Verbena officinalis</i>) Decoction	External (F) External (I)	2 1	C1 C1
Rosaceae							
<i>Crataegus monogyna</i> Jacq. (PAMP 21922)	Elorri zuria	Flowered aerial part	For snake venom for sheep (Vr) For snake venom for sheep (Vr)	Poultice Infusion	External (F) Internal (F)	1 1	C1 C1
Tiliaceae							
<i>Tilia platyphyllos</i> Scop. ssp. <i>platyphyllos</i> (PAMP 18752)	Tilo	Inflorescence	Chicken diseases (Vr) Animal diseases (Vr)	Decoction Infusion	Internal (D) Internal (D)	1 1	C4 C2

Urticaceae							
<i>Urtica dioica</i> L. (PAMP 19658)	Auxina	Leaf buds	Pig diseases (Vr)	Comestible	Internal (F)	1	C1
	Oxina	Aerial part	To the bloating of the ewes in spring (Dg) Spots on the skin of piglets (Dm)	Infusion	Internal (F)	1	C1
<i>Urtica urens</i> L. (PAMP 21761)	Ortiga	Whole plant		Decoction	Internal (F)	1	C7
Verbenaceae							
<i>Verbena officinalis</i> L. (PAMP 21792)	Berbenabelarra	Flowered aerial part	Chicken diseases (Vr)	Infusion	Internal (F)	2	C1
	Kolpebelarra	Aerial part	Wounds (Dm)	Decoction (With <i>Anagallis arvensis</i>)	External (F)	1	C1
	Verbena	Aerial part	Wounds of cattle (Dm) For wounds and problems in the udders of cows – mastitis (Rp)	Poultice con clara de huevo Poultice con clara de huevo	External (F)	1	C4 C3

Therapeutic category: Dg (Digestive); Dm (Dermatology); Rs (Respiratory); Rp (Reproductive); Ur (Urinary); Dp (Depurative); Cd (Cardiovascular); Vr (Various).

^a A: administration; F: fresh; D: dry; I: without distinction.

^b C: frequency of citation.

^c R: agricultural regions.

Table 3

Taxa most employed in each therapeutic category and region for veterinary disorders. No. of uses (U) and percentage (%), no. of taxa (T) and FIC.

Disorders	U	%	T	FIC	Taxa (most used)	%
Digestive General	19	24.36	12	0.39	<i>Juglans regia</i>	21.05
C1	6	31.58	5	0.20	<i>Geranium robertianum</i>	33.33
C3	1	5.26	1	0	<i>Malva sylvestris</i>	100
C4	3	15.79	3	0	<i>Buxus sempervirens; Juglans regia; Avena sativa</i>	33.33
C5	7	36.84	4	0.50	<i>Juglans regia; Achillea millefolium</i>	42.86
C6	2	10.53	2	0	<i>Malva sylvestris; Jasione tuberosa</i>	50.00
Dermatology General	18	23.08	8	0.59	<i>Malva sylvestris</i>	22.22
C1	6	33.33	3	0.60	<i>Anagallis arvensis</i>	50.00
C2	6	33.33	4	0.40	<i>Juglans regia</i>	50.00
C4	3	16.67	2	0.50	<i>Ilex aquifolium</i>	66.67
C7	3	16.67	3	0	<i>Urtica urens; Hypericum perforatum; Malva sylvestris</i>	33.33
Respiratory General	10	12.82	6	0.44	<i>Malva sylvestris</i>	50.00
C2	2	20.00	2	0	<i>Origanum vulgare ssp. vulgare, Allium sativum</i>	50.00
C3	1	10.00	1	0	<i>Sambucus nigra ssp. nigra</i>	100
C5	6	60.00	3	0.60	<i>Malva sylvestris</i>	66.67
C6	1	10.00	1	0	<i>Malva sylvestris</i>	100
Reproductive General	5	6.41	5	0.00	<i>Euphorbia amygdaloides, Viscum album, Sambucus nigra, Verbena officinalis, Asplenium trichomanes</i>	
C1	2	40.00	2	0	<i>Euphorbia amygdaloides ssp. amygdaloides; Viscum album ssp. album</i>	50.00
C2	1	20.00	1	0	<i>Sambucus nigra ssp. nigra</i>	100
C3	1	20.00	1	0	<i>Verbena officinalis</i>	100
C4	1	20.00	1	0	<i>Asplenium trichomanes ssp. trichomanes</i>	100
Urinary General	3	3.85	1	1.00	<i>Arctostaphylos uva-ursi</i>	100
C5	3	100	1	1.00		
Depurative General	1	1.28	1	0	<i>Fraxinus angustifolia ssp. angustifolia</i>	100
C4	1	100	1	0		
Cardiovascular General	1	1.28	1	0	<i>Viscum album ssp. album</i>	100
C2	1	100	1	0		
Various General	21	26.92	16	0.25	<i>Malva sylvestris</i>	14.29
C1	14	66.67	11	0.23	<i>Verbena officinalis; Humulus lupulus; Crataegus monogyna</i>	14.29
C2	4	19.05	2	0.67	<i>Malva sylvestris</i>	75.00
C3	1	4.76	1	0	<i>Juniperus communis ssp. communis</i>	100
C4	1	4.76	1	0	<i>Tilia platyphyllos ssp. platyphyllos</i>	100
C5	1	4.76	1	0	<i>Marrubium vulgare</i>	100

Table 4

Ethnoveterinary uses of medicinal plants in Navarra.

Therapeutic category	Family/scientific name	Veterinary references	Human references
Digestive	<i>Achillea millefolium</i> ssp. <i>millefolium</i>	Agelet and Vallès (1999), Agelet et al. (2002) and Pinto (2005)	+3
	<i>Althaea officinalis</i>	Fernández (1990) and Lans et al. (2007)	+3
	<i>Avena sativa</i>	Raja (1995) and Bonet and Vallès (2007)	+3
	<i>Buxus sempervirens</i>	+3	+3
	<i>Chamaemelum nobile</i>	Fernández (1990) and Pardo de Santayana (2004)	+3
	<i>Geranium robertianum</i>	0	+3
	<i>Jasonia tuberosa</i>	0	+3
	<i>Juglans regia</i>	Guarrera (1999) and Pardo de Santayana (2004)	+3
	<i>Lythrum salicaria</i>	Pardo de Santayana (2004) and Bonet and Vallès (2006, 2007)	+3
	<i>Malva neglecta</i>	Agelet and Vallès (1999) and Pardo de Santayana (2004)	+3
	<i>Malva sylvestris</i>	+3	+3
Dermatology	<i>Urtica dioica</i>	Agelet et al. (2002), Pardo de Santayana (2004) and Lans et al. (2007)	+3
	<i>Anagallis arvensis</i>	0	+3
	<i>Hypericum perforatum</i>	+3	+3
	<i>Ilex aquifolium</i>	Verde (2002)	Fernández (1981, 1990) and Lakar and Telletxea (2006)
	<i>Juglans regia</i>	+3	+3
	<i>Malva neglecta</i>	Blanco et al. (1999)	+3
	<i>Malva sylvestris</i>	+3	+3
	<i>Urtica urens</i>	Galán (1993)	+3
	<i>Verbena officinalis</i>	Agelet et al. (2002)	+3
Respiratory	<i>Achillea millefolium</i> ssp. <i>millefolium</i>	0	+3
	<i>Allium sativum</i>	+3	+3
	<i>Althaea officinalis</i>	0	+3
	<i>Malva sylvestris</i>	Fernández (1990)	+3
	<i>Origanum vulgare</i> ssp. <i>vulgare</i>	0	+3
	<i>Sambucus nigra</i> ssp. <i>nigra</i>	0	+3

Reproductive	<i>Asplenium trichomanes</i> ssp. <i>trichomanes</i> <i>Euphorbia amygdaloides</i> ssp. <i>amygdaloides</i> <i>Sambucus nigra</i> ssp. <i>nigra</i>	0 0 Agelet (1999), Vallès et al. (2004) and Bonet and Vallès (2006) 0 Pardo de Santayana (2004)	Pieroni and Quave (2005) 0 +3 Raja (1995) San Miguel (2004) and Kültür (2007)
Urinary	<i>Arctostaphylos uva-ursi</i>	0	+3
Depurative	<i>Fraxinus angustifolia</i> ssp. <i>angustifolia</i>	0	+3
Cardiovascular	<i>Viscum album</i> ssp. <i>album</i>	Villar et al. (1987), Fernández (1990) and Agelet et al. (2002)	+3
Various	<i>Anthemis arvensis</i> ssp. <i>arvensis</i> <i>Campanula trachelium</i> <i>Chamaemelum nobile</i> <i>Crataegus monogyna</i> <i>Epilobium parviflorum</i> <i>Humulus lupulus</i> <i>Juniperus communis</i> ssp. <i>communis</i> <i>Lamium maculatum</i> <i>Malva sylvestris</i> <i>Marrubium vulgare</i> <i>Santolina chamaecyparissus</i> ssp. <i>squarrosa</i> <i>Tanacetum parthenium</i> <i>Tilia platyphyllos</i> ssp. <i>platyphyllos</i> <i>Urtica dioica</i> <i>Verbena officinalis</i>	<i>Galán</i> (1993) and Pardo de Santayana (2004) 0 Pinto (2005) 0 0 0 0 +3 0 +3 +3 +3 +3 +3 +3 +3 +3 +3 Agelet et al. (2000)	Rigat (2005) and Rigat et al. (2007) +3 +3 0 0 +3 +3 Villar et al. (1987), San Miguel (2004) and Pinto (2005) +3 +3 +3 +3 +3 +3 +3 +3

0: no references; +3: more than three references.

Table 2 Plant taxa used in ethnoveterinary medicine of the selected villages

Used plants and voucher code	Family	Local name	Medicinal use	Status*	Number of citations
<i>Achillea millefolium</i> L. (EV-03)	Asteraceae	cickafarrok, cickafarkkörö, pulykafű, egérfarkú virág, egérfarkúfű, egérfarkúvirág	herb as a tea for rumination [cattle]	W	3
<i>Allium sativum</i> L. (EV-22)	Amaryllidaceae	folkagyoma	bulb for anthelmintics [pig]	C	76
<i>Aristolochia clematitis</i> L. (EV-23)	Aristolochiaceae	farkasalma	leaf for wounds and skin injuries [cattle, horse, pig, sheep]	W	54
<i>Armoracia rusticana</i> G. Gaertn., B. Mey. & Schreb. (EV-11)	Brassicaceae	torma	root for respiratory disorders [horse]	C	71
<i>Artemisia absinthium</i> L. (EV-13)	Asteraceae	üröm, fehér üröm	herb for stomach heat, inflammation, and ache [cattle] for diarrhea [cattle, horse]	W	4
<i>Calendula officinalis</i> L. (EV-12)	Asteraceae	sárgavirág	flower as a cream for inflamed udder and mastitis [cattle]	C	4
<i>Cucurbita pepo</i> L. (EV-21)	Cucurbitaceae	tök	ground seed and seed oil for rumination [cattle] for anthelmintics [pig]	C	3
<i>Daucus carota</i> L. subsp. <i>sativus</i> Hoffm. (EV-04)	Apiaceae	murok	root for anthelmintics [horse]	C	4
<i>Eryngium planum</i> L. (EV-17)	Apiaceae	kék tilinkő, szamárcsípke, bojtörján	herb for inflamed udder and mastitis [cattle, horse]	W	7
<i>Euphorbia amygdaloides</i> L. (EV-01)	Euphorbiaceae	árió	herb for wounds and skin injuries [horse, pig]	W	6
<i>Gentiana asclepiadea</i> L. (EV-15)	Gentianaceae	gyertyagyökerű, gyertyagyúkerű, sárgagyöker	root as a tea for stomach heat, inflammation, and ache [cattle]	W	4
<i>Juglans regia</i> L. (EV-16)	Juglandaceae	dió	leaf against flies as a rub [horse]	C	47
<i>Juniperus communis</i> L. (EV-14)	Cupressaceae	borsika	pseudofruit for respiratory disorders [horse]	W	6
<i>Matricaria chamomilla</i> L. (EV-10)	Asteraceae	kamillavirág	flower as a tea and wash for inflamed udder and mastitis [cattle]	W	11
<i>Petroselinum crispum</i> (Mill.) Fuss (EV-09)	Apiaceae	zöld peterzselyem	leaf for rumination and after delivery [cattle] for diuretics [horse]	C	9
<i>Plantago lanceolata</i> L. (EV-25)	Plantaginaceae	kigyónyelvűfű hegesűtilapi, kigyónyelvű útifű, keskeny útifű lándzsás/keskeny útifű	leaf for stomach heat, inflammation, and ache [cattle]	W	12
<i>Polygonum minus</i> Huds. (EV-02)	Polygonaceae	árió, veresszánfű	herb as a washing for wounds and skin injuries [cattle, horse]	W	11
<i>Potentilla anserina</i> L. (EV-05)	Rosaceae	pipefű, lüdlabfű, lüdfű	leaf for diarrhea [cattle, horse, pig, sheep]	W	71
<i>Quercus petraea</i> (Matt.) Liebl. (EV-19)	Fagaceae	cserefa, cseremakk, cserháncs	nut for anthelmintics [pig, cattle] young bark as a tea for diarrhea [pig]	W	4
<i>Quercus robur</i> L. (EV-20)	Fagaceae	cserefa, cseremakk, cserháncs	nut for anthelmintics [pig, cattle]	W	4

Table 2 Plant taxa used in ethnoveterinary medicine of the selected villages (Continued)

<i>Rumex acetosella</i> L. (EV-07)	Polygonaceae	lósóslí, lósóksa	young bark as a tea for diarrhea [pig]	W	5
<i>Rumex obtusifolius</i> L. (EV-06)	Polygonaceae	lósóslí, lósóksa	fruit for diarrhea [cattle, horse, pig, sheep]	W	75
<i>Salix alba</i> L. (EV-24)	Salicaceae	fűzfá	fruit for diarrhea [cattle, horse, pig, sheep]	W	75
			leaf as fodder for stomach heat, ache, inflammation, and rumination, leafy branches and bark for rumination [cattle]	W	24
<i>Secale cereale</i> L. (EV-26)	Poaceae	rozs	fruit for anthelmintics [horse]	C	4
<i>Symptrium officinale</i> L. (EV-18)	Boraginaceae	fekete nadály, nadály, forrasztatófű	root with bran for rumination [cattle]	W	5
<i>Veratrum album</i> L. (EV-08)	Melanthiaceae	dzsza, (fehér)zázsza	ground root as a rub against lice [horse]	W	5

*Status: W = growing in wild habitat; C = cultivated in gardens.

Table 3 Animals and other materials used in ethnoveterinary medicine of the study area

Animals	Medicinal use	Number of citations
Menyet (<i>Mustela nivalis</i> L.)	skin as an embrocation by itself or soaked in milk for mastitis [cattle]	29
Tetű (lice)	put into the urethra as a diuretic [horse]	3
Minerals and other substances		Number of citations
Bread	for rumination [cattle]	11
Clay	by itself or with salt as an embrocation for mastitis [cattle]	9
Cobweb	as an embrocation for skin injuries [horse]	3
"hótszén" (hot embers quenched in water)	for diarrhea [pig]	4
Glass (powdered)	blown into the eyes for cataract [cattle]	63
"szénamurha" (hay)	by itself or poured with urine for respiratory diseases [horse]	31
Injection	for respiratory diseases [horse]	3
Milk	for stomach heat, inflammation, ache [cattle], with <i>Allium sativum</i> as an anthelmintic [pig]	22
Oil	for stomach heat, inflammation, ache, rumination [cattle]	25
Salt	with water and vinegar as a wash or embrocation for mastitis [cattle]	7
Sugar (powdered)	blown into the eyes for cataract [cattle]	61
Turpentine	for respiratory diseases [horse]	2
Toast	for rumination [cattle]	9
Urine (human)	poured onto "szénamurha" for respiratory diseases [horse]	5
Vinegar	with water and salt as a wash or embrocation for mastitis [cattle]	18
Water	with vinegar and salt as a wash or embrocation for mastitis [cattle]	19
	poured beside the animals as a diuretic [horse]	7
	put into the shed to vaporize and induce urination [sheep]	6
Whey powder	anthelmintics [pig]	3

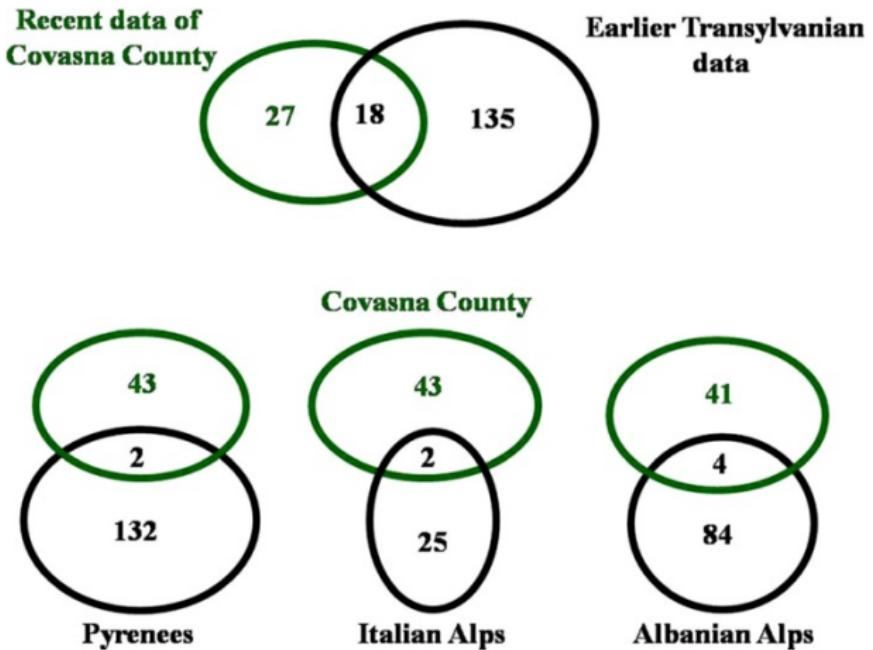


Figure 4 Overlaps of ethnoveterinary data involving plant- and animal-based materials and other substances used in Covasna County, Pyrenees, Italian and Albanian Alps [3,7,10,11,16,53-57,59-62].



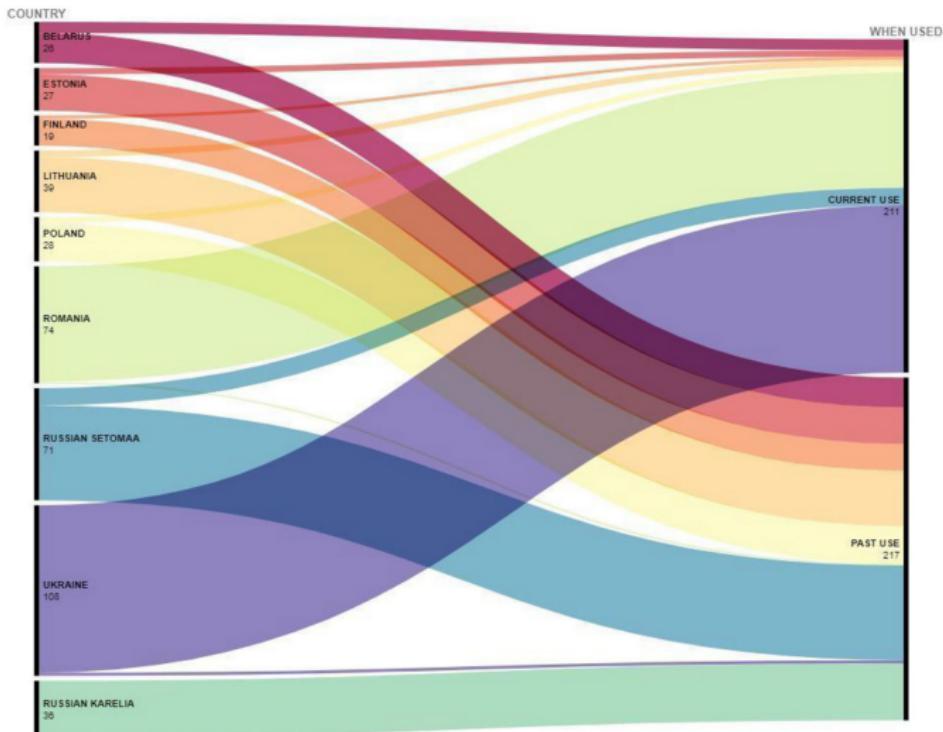


FIGURE 4 | Alluvial graph of the number of ethnoveterinary remedies (colored stripes), country (on the left), and time of use (on the right).

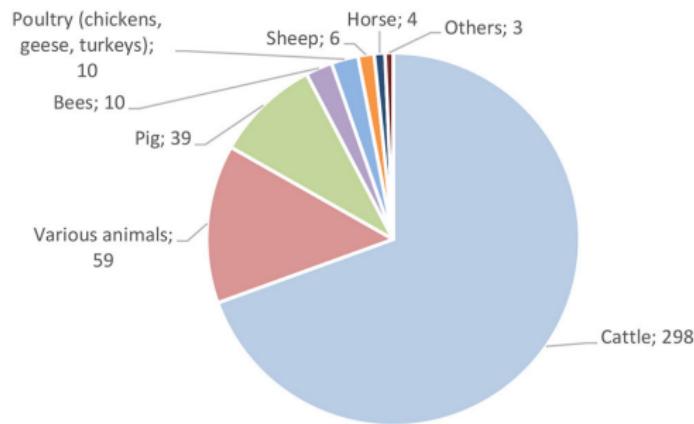


FIGURE 3 | Distribution of ethnoveterinary use reports by animal category.

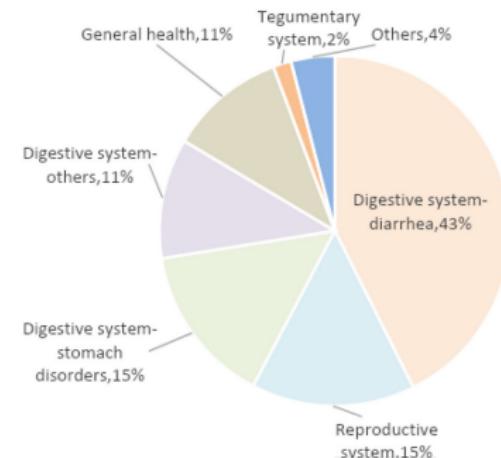


FIGURE 5 | Distribution of detailed use reports (DUR) related to cattle ethnoveterinary remedies.

TABLE 2 | Plant taxa used for improving the technological quality of some animal products.

Latin name and family	Local name	Part used	Preparation	Use	Use reports (*past)
<i>Arctium tomentosum</i> Mill. (Asteraceae) [W]	Лопух (RS)	Leaves	Fresh	Improving cow milk quality	RS
<i>Cheilidonium majus</i> L. (Papaveraceae) [W]	Чистотел (UA); Чистоголов (UA)	Aerial parts	Fresh; Infusion	Improving cow milk quality	2 UA; LT*
<i>Chenopodium album</i> L. (Amaranthaceae) [W]	Баланда (BL)	Aerial part	Fresh	Improving pork meat quality	LT*
<i>Linum catharticum</i> L. (Linaceae) [C]	Линуцил, линуция (LT)	Seeds	Infusion	Improving cow milk quality (increase fat in the milk)	LT*
<i>Linum usitatissimum</i> L. (Linaceae) [C]	Лен (RS)	Seeds	Fresh	Improving pig bristle quality	RS*
<i>Rumex confertus</i> Willd. (Polygonaceae) [W]	Имбир (UA)	Leaves	Fresh	Improving sheep milk and wool quality	UA
<i>Salix</i> spp. (Salicaceae) [W]	Паду (FI)	twigs and leaves	Fresh or dried	Improving cow milk quality	FI*
<i>Stellaria media</i> (L.) Vill. (Caryophyllaceae) [W]	Жиже (LT)	Aerial parts	Fresh	Improving pork meat quality	LT*
<i>Trifolium</i> spp. (Leguminosae) [W]	Трифол (UA)	Aerial parts	Fresh	Improving cow milk quality	UA
<i>Urtica dioica</i> L. (Urticaceae) [W]	Дильгеле (LT); Урзика (RO); крапива (UA)	Aerial parts	Infusion	Improving cow milk quality	4 RO; 2 UA
			Fresh	Improving pork meat quality	LT*

W, Wild species; C, Cultivated species; LT, Lithuania; RO, Romania; RS, Russian Setomaa; UA, Ukraine. *No longer in use, number of use reports (UR) is indicated if more than 1.



FIGURE 6 | Possible drivers of the persistence of ethnoveterinary knowledge in Bukovina (left) compared to possible drivers of ethnoveterinary knowledge erosion in Setomaa, Dzukija, and Karelia (Credits: Johanna Lohrengel).

Table 4

Plant species and plant parts in 278 use reports of 230 homemade single-species herbal remedy reports (HSHR). Route of administration, category of use and target animal species are described.

Plant species with ≥ 3 named HSHR (Number of use reports)	Routes of administration			Categories of use (ATCvet Code)						Target animal species					
	External administration		Oral	(Numbers use reports)											
	IS ^a	AS ^b	Oral	QA ^d	QP ^e	QR ^f	QG ^g	QM ^h	Mastitis	GS ⁱ	Others ^j	Cattle	NSAS ^k	Others ^l	Total
Apiaceae		8	2	2	8						9		1		10
<i>Sanicula europaea</i> L. (8)															
Folium (4)		4				4						4			
Herba (4)		4				4						3		1	
<i>Others</i> ^m (2)			2		2							2			
Aquifoliaceae		1	4	4	1							5			5
<i>Ilex aquifolium</i> L. Herba (5)		1	4	4	1							5			
Aspidiaceae		1	2								3	1		2	3
<i>Dryopteris filix-mas</i> L. (SCHOTT) Folium (3)		1	2								3	1		2	
Asteraceae	10	47	29	22	49	1	5	3	4	2	70	4	12		86
<i>Achillea millefolium</i> L. (3)						1						1			
Flos (1)			1			1						1			
Herba (2)		2	1									2			
<i>Arnica montana</i> L. Flos (11)	6	3	2		3		4	1	3		10		1		
<i>Artemisia absinthium</i> L. (7)												2	5		1
Herba (6)		2		4	4							2			
Folium (1)		1		1								1			
<i>Calendula officinalis</i> L. (19)						16			1			14	4		
Flos (17)	1	16				2			1						
Petal (2)		2											1		
<i>Matricaria recutita</i> L. Flos (32)		17	15	15	17							26		6	
<i>Senecio ovatus</i> (P.GEARTEN et al.) WILLD Herba (8)	1	7			7		1					8			
<i>Others</i> ⁿ (6)		2	4	2	4						3		3		



Berberidaceae		5	5		5		5
<i>Berberis vulgaris</i> L. Herba (5)		5	5		5		
Boraginaceae	2	1	1	1	1	2	
<i>Sympodium officinale</i> L. (3)							
Radix (2)	2				2		2
Folium (1)		1		1			1
Others ^a (1)			1		1		1
Fagaceae		6	6			4	2
<i>Quercus robur</i> L. Cortex (6)		6	6			4	2
Hypericaceae	2	5		5	1	1	
<i>Hypericum perforatum</i> L. Flos (7)	2	5		5	1	1	7
Lamiaceae	3	3	3	1	3	2	10
<i>Mentha arvensis</i> L. var <i>piperascens</i> Folium (3)	2		1	1		1	3
<i>Thymus vulgaris</i> L. (3) Herba (2)	1		1	1	3		3
Others ^b (7)		3	1	3		1	4
Linaceae	1	1	10	10	1	1	12
<i>Linum usitatissimum</i> L. (12) Semen (12)	1	1	10	10	1	1	12
Malvaceae (4)	6	3	2	6	1		9
<i>Malva neglecta</i> Wallr. Herba (6)	5	1	1	5			6
Others ^c (3)	1	2	1	1	1		3
Pinaceae	5	12	2	12	1	2	
<i>Picea abies</i> (L.) H. Karst. (17)							
Resina (17)	5	12		12	1	1	
Herba (1)			1		1	2	
Other ^d (1)			1		1		1

Poaceae	7	4		3	7		7									
<i>Avena sativa</i> L. Fructus (7)	7	4		3	7											
Rhamnaceae	4	4			4		4									
<i>Rhamnus catharticus</i> L. Herba (3)	3	3			3											
Others ^s (1)	1	1			1											
Rosaceae	1	9	4	3	5	4	2	12	2	14						
<i>Alchemilla vulgaris</i> L. EM. FRÖHNER (3)																
Folium (1)	1				1											
Herba (2)	2				2		2			1						
Others ^t (11)	1	6	4	3	5	1	2	10	1							
Rubiaceae	13	12				1	13		13							
<i>Coffea</i> L. Fructus (13)	13	12				1	13									
Rutaceae	3	3					3		3							
<i>Citrus x limon</i> (L.) Burm. f. Fructus (3)	3	3					3									
Theaceae	1	8	6	1	1		1	6	1	2	9					
<i>Camellia sinensis</i> (L.) O. Kuntze. Folium (9)	1	8	6		1		1	6	1	2						
Urticaceae	2	10	2	2			7	1	9	3	12					
<i>Urtica dioica</i> L. (12)																
Herba (10)	1	9	1	2			7		7							
Radix (2)	1	1	1				1	2			3					
Others ^u all (40)	8	11	20	1	9	10	2	2	3	4	1	9	32	1	7	40
Total (278)	31	98	128	21	82	116	9	10	12	13	18	18	233	9	36	278

QA, gastrointestinal diseases and metabolic dysfunction; QD, skin disorders; QG, genito urinary system and sex hormones; QM, the musculo-skeletal system; QR, respiratory system

^a intact skin

^b altered or sore skin

^c treatment of housing environment

^d alimentary tract and metabolism

^e dermatologicals

^f respiratory system

^g genito-urinary system and sex hormones

^h musculo-skeletal system

ⁱ general strengthening

^j parasites (6 applications), varia

^k no specification of the animal species (external administration)

^l goat, horse, sheep, hen, dog, cat

^m *Foeniculum vulgare* Mill. (2)

ⁿ *Bellis perennis* L.(2); *Echinacea purpurea* (L.) MOENCH (1); *Lentopodium alpinum* CASS. (1); *Solidago virgaurea* L. (2)

^o *Pulmonaria officinalis* L. (1)

^p *Glechoma hederacea* L. (2); *Salvia officinalis* L. (2)

^q *Malva sylvestris* L. (1); *Theobroma cacao* L. (1); *Tilia cordata* Mill. (1)

^r *Abies alba* MILL. (1)

^s *Rhamnus alpina* L. (1)

^t *Alchemilla conjuncta* aggr. Buser.(1); *Crateagus leavigata* (POIRET) DC. (2); *Potentilla anserina* L. (1); *Potentilla erecta* (L.) RÄUSCHEL (1); *Prunus spinosa* L. (2); *Prunus fruticosus* L. (2); *Rubus idaeus* L. (2)

^u **Brassicaceae;** *Brassica oleracea* L. (convar. *capitata* var. *alba*) (1); *Capsella bursa-pastoris* (L.) MEDIK (1); **Cannabaceae;** *Cannabis sativa* L. (3); **Cupressaceae;** *Juniperus communis* ssp. *Alpina* CELAK; *Juniperis communis* L. (1); (3) **Ericaceae;** *Arctostaphylos uva-ursi* (L) Sprengel (1); *Vaccinium myrtillus* L., **Gentianaceae;** *Gentiana lutea* L.(1), **Geraniaceae;** *Geranium robertianum* L. (1); **Juglandaceae;** *Juglans regia* L. (2); **Lauraceae;** *Cinnamomum camphora* L. (1); *Cinnamomum verum* J. PRESEL (2); *Laurus nobilis* L. (1), **Liliaceae;** *Allium cepa* L. (2); *Allium sativum* L. (1); **Meliaceae;** *Azadirachta indica* A. JUSS. (2); **Myristicaceae;** *Myristica fragrans* HOUTT (2); **Myrtaceae;** *Syzgium aromaticum* (L.) MERRILL & PERRY (1); **Oleaceae;** *Olea europaea* L. (2); **Plantaginaceae;** *Plantago media* L. (2); **Polygonaceae;** *Rumex alpinus* L. (1); *Rumex obtusifolium* L. (2); **Scrophulariaceae;** *Euphrasia officinalis* L. (4)

Table 4 Ethno-veterinary remedies against ecto- and endo-parasites

Animals	Components of remedy**	Procedure	Areas
Mange			
Pigs, cows	Lentisk oil	Scrubbed on skin	Gallura
Pigs	(*) <i>Ozzu porchinu</i> (fat from lard)	Mixed, scrubbed on nose	Monte Acuto
Dogs	Copper sulphate	Scrubbed on infested skin	Goceano
Dogs	Copper sulphate, olive oil	Scrubbed on infested skin	Nurra
Pigs, dogs	(*) Copper sulphate, ozzu casu (fat obtained by boiling the cream of milk with flour), pumice stone	The skin was scrubbed using a pumice stone prior applying the mixture	Sassarese, Nurra
Dogs	(*) Copper sulphate, ozzu seu (dried peritoneum of sheep)	Mixed, scrubbed on nose	Goceano
Dogs	(*) Burnt cork	Scrubbed on nose	Goceano
Cows	Albanian spurge (<i>Euphorbia characias</i>) stems	Stems of the plant applied on the infected skin	Sassarese
Pigs	(*) Olive oil	Scrubbed on skin	Sassarese
Pigs, oxen	(*) Ozzu brujadu (Reusable motor oil)	Applied on the skin with a brush	Monte Acuto, Sassarese, Nurra, Gallura, Anglona
Pigs	Seed oil, copper sulphate	Scrubbed on skin	Nurra
Pigs	Cuttlefish (<i>Sepia officinalis</i>) bone	The powder scrubbed on skin	Sassarese
Pigs	Diesel oil	Applied on the skin	Nurra
Cattle ^a , horses, pigs, dogs, cats, hens	Dregs of olive oil, copper sulphate	Applied on the skin	Campidano di Oristano
Lice			
Cattle ^a	Olive oil	Applied on the skin	Gallura
Hens	Lesser calmint (<i>Calamintha nepeta</i>)	The plant was placed in the hen house so that the smell kept away lice	Sassarese
Forest fly (<i>musca caddina</i>)(<i>Hippobosca equina</i> L.)			
Horses, cows	Vinegar, olive oil	Applied to the skin	Monte Acuto
Cattle ^a	(*) Olive oil	Applied to the skin	Gallura
Cattle, horses, pigs, dogs, cats, hens	Navelwort (<i>Umbilicus rupestris</i>) leaves	Crushed fresh leaves applied onto the wound	Gallura
Su solde (Wounds infected by maggots)			
Cattle ^a , horses	(*) Plum tree (<i>Prunus spinosa</i>) leaves	Crushed fresh leaves applied onto the wound and wrapped with a bandage	Monte Acuto,
Cattle ^a , pigs	Lesser calmint (<i>Calamintha nepeta</i>)	The fresh plants were smashed into a glass then the juice applied onto the wound	Monte Acuto, Meilogu
Cattle ^a , horses, pigs	Ozzu casu (fat obtained by boiling the cream of the milk with flour)	Massaged on wound	Monte Acuto
Foot rot			
Oxen	Knife	Needed to extract the worms	Monte Acuto
Horses	Seawater	Hoof washed with sea water	Gallura



Table 4 Ethno-veterinary remedies against ecto- and endo-parasites (*Continued*)

Animals	Components of remedy**	Procedure
Cattle ^a	Lime and water	Animals run through a foot bath
Cattle ^a	Hot ozzu seu (dried peritoneum of sheep)	Applied to the skin
cattle ^a , pigs	Copper sulphate	Copper sulphate was ground and the powder was then applied to the foot
Liver flukes		
Cattle ^a	Brandy (distilled from grapes)	Given as a drink, administered as a preventive

^aCure for cows, calves, and oxen

(*)Remedies still in use

(**)Typed in bold are components of remedies showing highest indices in the quantitative analysis

Table 5 Ethno-veterinary remedies against gastrointestinal diseases and hearth's disease

Animal	Components of remedy*	Procedure	Areas
Gastrointestinal infection, colics, diarrhoea			
Cattle ^a	Wild carrot (<i>Daucus carota</i>) leaves	Decoction given as feed	Barbagia di Nuoro
Cattle ^a , pigs	Wheat bran	Bran mixed with water and given as feed	Gallura, Sassarese
Cattle ^a	Wheat bran, coal	Coal grinded and mixed with wheat bran	Gallura
Cattle ^a	Mallow (<i>Malva sylvestris</i>), chamomile (<i>Matricaria chamomilla</i>), olive oil	Decoction given as feed	Anglona
Cats	Water, salt	Given to drink	Gallura
Cats, horses	Olive oil	Given to drink	Gallura
Cows, oxen	Linseed oil	Mixed with water and given to drink	Monte Acuto
Horses, cattle ^a	(*) Brewer's yeast , water	Yeast mixed with water, given to drink	Monte Acuto, Anglona
Horses	Barley (<i>Hordeum vulgare</i>), water	Barley flour boiled with water given as feed	Monte Acuto
Horses	Warm clothes	Warm clothes on belly	Monte Acuto
Little pigs (Piglets)	(*) Dry clay	Given as feed	Sassarese
Little pigs (Piglets)	Dry clay, barley (<i>Hordeum vulgare</i>) flour	Given as feed	Sassarese
Cattle ^a	Blades of prickly pear (<i>Opuntia ficus-indica</i>)	Cut into pieces and given as feed	Sassarese
Cattle ^a	Vinegar	Given to drink	Barbagia di Nuoro
Cattle ^a	Brandy (distilled from grapes)	Given to drink	Barbagia di Nuoro
Oxen	Pellitory of the wall (<i>Parietaria officinalis</i>), water	Decoction of the plants filtered and given to drink	Monte Acuto
Cattle ^a	(*) Hay	Given as feed	Nurra
Cattle ^a , horses, pigs	Mallow (<i>Malva sylvestris</i>), water	Decoction of the plants filtered and given to drink	Gallura
Cows, oxen	Mallow (<i>Malva sylvestris</i>), water	Decoction of the plants filtered and given to drink	Monte Acuto
Oxen	Tree mallow (<i>Lavatera olbia</i>)	Decoction of the plant filtered and given to drink	Monte Acuto
Cattle ^a	Fababeans (<i>Vicia faba</i>), barley (<i>Hordeum vulgare</i>), water	Beans and barley flour boiled in water given as feed	Anglona
Horses, oxen, calves	Chamomile (<i>Matricaria chamomilla</i>), water	Decoction of the plants filtered and given to drink	Meilogu, Goceano, Monte Acuto
Horses	Lemon (<i>Citrus limon</i>) juice, water	Decoction of juice given to drink	Goceano

Table 5 Ethno-veterinary remedies against gastrointestinal diseases and heath's disease (Continued)

Animal	Components of remedy**	Procedure	Areas
Cattle ^a	Flax-leaved daphne (<i>Daphne gnidium</i>) berries	Some berries mixed with forage and given as feed	Gallura
Abbentadura (Bloat)			
Cattle ^a	Olive oil	One liter of olive oil given to drink after 2 or 3 days of fasting	Gallura, Monte Acuto
Cattle ^a	Rancid olive oil	Given to drink	Nurra
Cattle ^a	Warm water	Given to drink	Monte Acuto
Cattle ^a	Petroleum	Given to drink	Nurra
Cattle ^a	Mallow (<i>Malva sylvestris</i>), chamomile (<i>Matricaria chamomilla</i>), olive oil	Decoction given as feed	Anglona
Cows	Milk, salt, olive oil	The mixture given to drink	Monte Acuto
Cattle ^a	Lard , parsley (<i>Petroselinum crispum</i>), onion (<i>Allium cepa</i>)	Onion bulbs, parsley and lard chopped, mixed, and given as feed to promote burping	Monte Acuto
Cows, cattle ^a	(*) Brewer's yeast , water	Mixed and given to drink	Monte Acuto, Sassarese, Meilogu
Cows	Lard, wine, vinegar	Mixed and given as feed	Monte Acuto
Cattle ^a	(*) Lard , onion (<i>Allium cepa</i>)	Mixed and given as feed to promote burping	Monte Acuto
Cattle ^a	Onion (<i>Allium cepa</i>)	Crushed and given as feed	Monte acuto
Cattle ^a	Lard	Crushed and given as feed	Gallura, Monte Acuto Sassarese, Meilogu, Anglona
Cows	Lard , wet clothes	The lard was crushed and given as feed then a wet cloth was put on the animal	Monte Acuto
Cattle ^a	Naphtha (diesel oil)	Three quarters of a liter of naphtha given in a bottle	Monte Acuto
Cattle ^a	(*) Rancid lard	Crushed and given as feed, to promote burping	Monte Acuto, Nurra
Cattle ^a	(*) Beer	Given to drink, to promote burping	Nurra, Sassarese
Horses	Mallow (<i>Malva sylvestris</i>), vinegar , water	Decoction given to drink	Sassarese
Cattle ^a	Olive oil, boiled wine	Mixed and given to drink	Monte Acuto, Gallura
Cattle ^a	(*) <i>Frammentalzu</i> (mother yeast for bakery)	Dissolved in water and given to drink	Monte Acuto, Sassarese
Cattle ^a	<i>Frammentalzu</i> (mother yeast for	Crushed and given as feed	Monte Acuto

Table 5 Ethno-veterinary remedies against gastrointestinal diseases and hearth's disease (Continued)

Animal	Components of remedy ^{**}	Procedure	Areas
Cattle, horses, pigs, dogs, cats, hens	bakery), lard, olive oil Lentisk (<i>Pistacia lentiscus</i>) wood	Used to swab after incision of the vein under the belly	Campidano di Oristano
Cows, cattle ^a	Pellitory of the wall (<i>Parietaria officinalis</i>)	Decoction of plants filtered and given to drink	Sassarese
Horses	Galloping	Deflation occurred after the galloping of horses in a field	Goceano
Cows	Olive oil, milk, salt	Give to drink	Monte Acuto
Poisoning			
Cattle ^a	(*) Brewer's yeast , water	As feed supplement	Nurra
Oxen	Mallow (<i>Malva sylvestris</i>), water	Decoction of plants filtered and given to drink	Monte Acuto
Constipation			
Cattle ^a , horses, pigs, dogs, cats, hens ^a ,	Vinegar and olive oil	Mixed and given to drink	Anglona
Cows	Mallow (<i>Malva sylvestris</i>), water	Decoction of plants filtered and given to drink	Barbagia di Orosolo
Cattle ^a	Olive oil	Given to drink	Anglona
Horses	Lentisk fruits and leaves, water	Decoction of fruits and some leaves given to drink	Monte Acuto
Refreshing			
Horses	<i>Smirnium olusatrum</i>	The plant was collected in the summer and administered as feed	Monte Acuto
Cattle ^a	Brewer's yeast , water	Mixed and given to drink	Nurra
Oxen	Chamomile (<i>Matricaria chamomilla</i>), water	Decoction of leaves given to drink	Monte Acuto
Oxen	Pellitory of the wall (<i>Parietaria officinalis</i>), water	Decoction of leaves given as beverage	Monte Acuto
Post-partum collapse			
Cattle ^a	(*) Wine , sugar	Given to drink	Anglona
Cattle ^a	Coffee, wine , sugar	Given to drink	Monte Acuto
Angina pectoris			
Horses	Lard, olive oil	Massaged on the chest	Meilogu
High blood pressure			
Cattle ^a	Leech (<i>Hirudo medicinalis</i>)		Anglona
Lack of appetite			

Table 5 Ethno-veterinary remedies against gastrointestinal diseases and heath's disease (Continued)

Animal	Components of remedy**	Procedure	Areas
Cattle ^a	Barley flour with water or milk	Given to drink	Monte Acuto
Cows	Fool's-water-cress (<i>Apium nodiflorum</i>)	Fresh plant given as feed	Monte Acuto
Indigestion			
Horses	Barley (<i>Hordeum vulgare</i>), avena (<i>Avena sativa</i>), corn (<i>Zea mays</i>), flax (<i>Linum usitatissimum</i>) seed, water, salt	Decoction of mixture given to drink	Sassarese
Cattle ^a	Olive oil	One liter of olive oil after 2 or 3 days of fasting given to drink	Gallura
Intestinal worms			
Cattle ^a	Garlic (<i>Allium sativum</i>), vinegar	Two cloves of crushed garlic in half a liter of vinegar given as feed	Anglona
Horses	Bracken (<i>Pteridium aquilinum</i>) root	Burnt fern root fumes were breathed by horses covered with a blanket	Monte Acuto
Horses	Lavender cotton (<i>Santolina chamaecyparissus</i>), barley (<i>Hordeum vulgare</i>),	The dried plants given as feed	Barbagia di Nuoro
Horses	Giant cane (<i>Arundo donax</i>) leaves	The leaves given as feed and after 4 days the horse was fine	Meilogu

^aCure for cows, calves, and oxen

(*) Remedies still in use

(**) Typed in bold are components of remedies showing highest indices in the quantitative analysis

Table 6 Ethno-veterinary remedies against viral and bacterial diseases

Animals	Components of remedy**	Procedure	Areas
Foot and mouth disease (aphtha)			
Oxen	Pins	Pinching the blister	Gallura
Oxen	Fool's-water-cress (<i>Apium nodiflorum</i>)	Fresh plant massaged in the tongue	Anglona
Oxen	Watercress (<i>Nasturtium officinale</i>)	Fresh plant massaged in the tongue	Anglona
Cattle ^a	Seawater	Mouth washes	Anglona
Cows, oxen	Needle	Blisters on tongue were stung with a needle	Monte Acuto
Cows	Needle, scissors, salt	The vein under the tongue was stung with a needle, then the blisters were cut with scissors and salt was added on the wounds	Monte Acuto, Gallura
Cows	(*) Needle, salt	Blisters of tongue was stung with a needle and added with salt	Monte Acuto
Cattle ^a	Vinegar, salt	Blisters of tongue were cut with a knife (or with a scissors) and tongue was disinfected with the mixture	Monte Acuto
Oxen	Vinegar, salt	Mouth washes	Anglona
Oxen	River	Oxen bathed in the river for several times	Monte Acuto
Pigs, cows	Barley (<i>Hordeum vulgare</i>), water	Barley flour boiled with water given as feed	Monte Acuto
Oxen	Vinegar	Mouth washes	Meilogu
Cattle ^a	Brine	Applied to the tongue	Gallura
Cattle ^a	Brine, vinegar	Applied to the tongue with a cloth	Goceano
Cattle ^a , horses, pigs, dogs, cats, hens	Mud	Applied to the tongue	Anglona
Swine fever			
Pigs	Milk goats	Intravenous injection	Monte Acuto
Pigs	Blood of rabbit	Intravenous injection	Barbagia di Nuoro
Fever			
Oxen	Mallow (<i>Malva sylvestris</i>)	Decoction of plants was filtered and given to drink	Monte acuto
Mastitis			
Cows	Peg	The mammary vein was excised and then left bleeding, the haemorrhage was stopped by pinching the vessel with a peg	Sassarese
Cattle ^a	Ashes , water	Ashes boiled in water and applied with a bandage	Monte Acuto, Sassarese, Anglona
Cattle ^a	Vinegar , ash	Massaged on udder	Monte Acuto
Cattle ^a , horses, pigs, dogs, cats, hens	Downy cork (<i>Quercus pubescens</i>) cortex, water	Cortex boiled in water until reddish, then the water was used to wash the udder	Barbagia di Nuoro

Table 6 Ethno-veterinary remedies against viral and bacterial diseases (Continued)

Animals	Components of remedy**	Procedure	Areas
Cattle ^a	Ozzu casu (fat obtained by boiling the cream of the milk with flour)	Massaged on udder	Sassarese, Nurra, Gallura
Eyes infection			
Cattle ^a	Cuttlefish (<i>Sepia officinalis</i>) bone	Powder inserted into the eye or massaged around the eyes	Monte Acuto, Meilogu, Anglona
Cattle ^a , horses	Cuttlefish (<i>Sepia officinalis</i>) bone	Powder inserted into the eye	Gallura, Sassarese
Cattle ^a	Wild teasel (<i>Dipsacus fullonum</i>)	Eye washed with the plant decoction	Anglona
Hoof infection			
Horses, oxen	Garlic (<i>Allium sativum</i>)	Crushed garlic application after nail clipping	Sassarese
Horses, oxen	Burnt lard	Burnt lard application after nail clipping	Sassarese
Oxen	Burnt sugar	The sugar was burnt over the wound	Monte Acuto
Horses	Rope made of goat's hair	Incision of the nail with a knife then hoof dressed with the hairy rope	Monte Acuto
Cattle ^a	Clay , water	Applied on the hoof with a bandage	Gallura
Blood poisoning (septicemia)			
Cows	Knife	Bleeding by incising the neck vein	Goceano
Pigs	Cow's milk	Intravenous injection	Monte Acuto
Carbuncle			
Horses, cattle ^a	Red-hot iron	Cauterization of the vesicles	Barbagia di Nuoro, Goceano, Monte Acuto
Respiratory diseases			
Dogs	Anagyris (<i>Anagyris foetida</i>)	The plant was put as a collar to the cold affected dog	Barbagia di Nuoro
Calves, oxen	Chamomile (<i>Matricaria chamomilla</i>), water	Decoction of plants given as drink	Monte Acuto
Oxen	Mallow (<i>Malva sylvestris</i>)	Decoction of plants given as drink	Anglona, Meilogu,
Cattle ^a	Pellitory of the wall (<i>Parietaria officinalis</i>), water	Decoction of leaves given as drink	Anglona
Oxen	Wild ficus tree (<i>Ficus carica</i> var., <i>caprifolia</i>)	The oxen covered with a blanket had to breathe the fumes of burnt leaves of wild fig tree for 3 days	Monte Acuto
Horses	Hot bran (<i>Hordeum vulgare</i> , <i>Triticum durum</i>)	Decoction of plant given as feed	Gallura

^aCure for cows, calves, and oxen

(*) Remedies still in use

(**) Typed in bold are components of remedies showing highest indices in the quantitative analysis

Table 7 Ethno-veterinary remedies relative to wounds, sprains, and bruises

Animals	Components of remedy**	Procedure	Areas
Wounds			
Oxen	Field mushroom	Dry powder applied on the wound	Monte Acuto
Horses	Burnt lard	Massaged on the wound	Monte Acuto
Horses	Acetylsalicylic acid	Massaged on the wound	Monte Acuto, Sassarese
Horses	Coke	Massaged on the wound	Sassarese
Horses	Cicatrene	Bought at the pharmacy	Sassarese
Horses	(*) Camellia (<i>Camellia sp.</i>)	Decoction of the plant massaged on the wound	Barbagia di Nuoro
Horses	Downy oak (<i>Quercus pubescens</i>) cortex, water	Cortex boiled in water applied on the wound, which was then wrapped up with a bandage	Anglona
Oxen	Tobacco (<i>Nicotiana tabacum</i>) leaves	Massaged on the wound	Monte Acuto
Oxen	Navelwort (<i>Umbilicus rupestris</i>) leaves	Pounded fresh leaves applied to the wound	Monte Acuto
Cattle ^a , horses, pigs, dogs, cats, hens	Elderberry (<i>Sambucus nigra</i>)	Pounded fresh leaves applied to the wound	Gallura, Anglona
Cattle ^a , horses, pigs, dogs, cats, hens	Powder from stem (without bark) or bark from stem of lentisk (<i>Pistacia lentiscus</i>)	Stern powder or ground bark applied on the wound	Anglona, Monte Acuto
Cattle ^a	Powder of bark from stem of lentisk (<i>Pistacia lentiscus</i>) salt	Applied on the wound	Sassarese
Cattle ^a , horses, pigs, dogs, cats, hens	Navelwort (<i>Umbilicus rupestris</i>) leaves	Minced fresh leaves applied to the wound	Gallura
Horses, cattle ^a	Mallow (<i>Malva sylvestris</i>), water, soap	The wound was washed with soap and water, then decoction of leaves or root applied on the wound, which was then wrapped with a bandage	Sassarese, Gallura
Cattle ^a , horses, pigs, dogs, cats, hens	Olive oil	Applied on the wound	Anglona, Gallura
Pigs, cattle	Ozzu casu (fat obtained by boiling the cream of milk with flour)	Applied on the wound	Campidano di Oristano
Pigs, dogs	(*) Copper sulphate , ozzu casu (fat obtained by boiling the cream of milk with flour), pumice stone	Applied on the wound	Nurra
Pigs	Olive oil , ashes	Mixture as emollient cream for wound treatments	Campidano di Oristano, Monte Acuto
Pigs, cows	Lentisk oil	Applied on the wound	Gallura
Cat	Olive oil	Applied on the wound	Gallura
Cattle ^a	Butter	Applied on the wound	Monte Acuto
Castration			
Pigs	Olive oil	Applied to the skin with a paintbrush	Sassarese
Pigs	Ozzu brujadu (Reusable motor oil)	Applied to the skin with a paintbrush	Sassarese
Pigs	Olive oil , ashes	Mixture as emollient cream for wound treatments	Campidano di Oristano
Pigs	Ozzu casu (fat obtained by boiling the cream of milk with flour)	Applied on the wound	Campidano di Oristano



Table 7 Ethno-veterinary remedies relative to wounds, sprains, and bruises (Continued)

Animals	Components of remedy**	Procedure	Areas
Pigs	Urine, ashes	Applied on the wound	Monte Acuto
Pigs	Urine, piece of pig's tail	Applied on the wound	Monte Acuto
Pigs	Ethyl alcohol (or creolin in water), cord, hot wax	Ethyl alcohol (or creolin in water) and then the wound was sutured with a waxed thread	Monte Acuto
Pigs, horses	Ashes	Applied on the wound	Anglona
Pigs	Mallow (<i>Malva sylvestris</i>), Creolin, water	Applied on the wound	Anglona
Horses		Applied on the wound	Anglona
Sprains			
Cattle ^a , horses	Downy oak (<i>Quercus pubescens</i>) cortex, salt, vinegar, clay	The cork boiled with salt and vinegar, crushed, then mixed with clay, applied to the sore area, wrapped with a bandage	Monte Acuto
Horses	Pellitory of the wall (<i>Parietaria officinalis</i>), mallow (<i>Malva sylvestris</i>), Nettle (<i>Urtica dioica</i>), water	Decoction and plants wrapped in a bandage on the sore part	Monte Acuto
Dogs	(*) Burnt cork	Applied to the wound	Gocano
Bruises			
Cattle ^a , horses, pigs	Nettle (<i>Urtica dioica</i>)	Decoction and plants wrapped in a bandage on the sore part	Anglona
Cattle ^a , horses, pigs	Pellitory of the wall (<i>Parietaria officinalis</i>)	Decoction and plants wrapped in a bandage on the sore part	Anglona
Cattle ^a , horses, pigs	Mallow (<i>Malva sylvestris</i>), water	Decoction and plants wrapped in a bandage on the sore part	Anglona
Horses	Mallow (<i>Malva sylvestris</i>), water, vinegar	Decoction and plants wrapped in a bandage on the sore part	Sassarese
Wounds from saddle			
Horses	Ashes	Applied on the wound	Nurra, Gallura
Wound from yoke			
Oxen	<i>Cistus</i> (<i>Cistus monspeliensis</i>)	The leaves applied at the inner base of the horns	Monte Acuto
Oxen	Soap, water	The mixture applied at the inner base of the horns	Monte Acuto
Pimples (Furuncles)			
Cows	<i>Chijnada</i> (ashes and water)	Ashes boiled in water and then the filtrate applied on the pimple	Monte Acuto
Cows	Urine	As disinfectant	Monte Acuto
Cows	Soap, water	Soap boiled in water and then the filtrate applied on the pimple	Monte Acuto
Calves ^a	(*) Sarsaparille (<i>Smilax aspera</i>)	Decoction of plants wrapped in a bandage and put on the pimples	Monte Acuto
Fissures			

Table 7 Ethno-veterinary remedies relative to wounds, sprains, and bruises (Continued)

Animals	Components of remedy**	Procedure	Areas
Cows	(*) <i>Ozzu porchinu</i> (fat from lard), ozzu seu (dried peritoneum of sheep), beeswax	The mixture was boiled and stored in a jar until use	Monte Acuto
Cows	(*) Beeswax	Massaged around the nipple	Monte Acuto
Cows	(*) Greater plantain (<i>Plantago major</i>), ozzu seu (dried peritoneum of sheep)	The mixture was boiled and was used when milking	Monte Acuto
Cows	Tincture of iodine, <i>ozzu porchinu</i> (fat from lard), ozzu seu (dried peritoneum of sheep), penicillin	The mixture massaged on the udder	Monte Acuto
Swelling udder			
Cows	Silver coin (five liras)	Massaged on the udder	Monte Acuto
Swelling throat			
Pigs	Rough stone	The throat was rubbed	Monte Acuto
Hens	Vinegar , water	The mixture was applied on the throat	Anglona
Cattle ^a	Wheat bran , water	Boiled brans placed in a bag and tied in the throat	Anglona
Swelling limbs			
Horses	Clay	Applied to the limbs	Sassarese
Horses	Lead acetate	Applied to the limbs	Sassarese
Horses	(*) Clay, vinegar, salt	The mixture applied to the limbs	Sassarese
Horses	Clay, vinegar , water	The mixture applied to the limbs	Monte Acuto
Horses	Lead acetate, water	The mixture applied to the limbs	Sassarese
Swelling shank			
Horses	Red hot pin	Puncture with an iron pin	Monte Acuto

^a Cure for cows, calves and oxen

(*) Remedies still in use

(**) Typed in bold are components of remedies showing highest indices in the quantitative analysis

Treatment for endoparasites in pets and pigs in British Columbia

Scientific name	Common name	Plant part used	Use
<i>Allium sativum</i> L. (Alliaceae) not collected	Garlic	Clove	Intestinal worms, <i>Ascaris suum</i> and <i>Giardia</i> in pigs
<i>Artemisia cina</i> O. Berg and C.F. Schmidt (Asteraceae)	Wormseed	Aerial parts	Roundworms and pinworms and amoebal infections
<i>Artemisia annua</i> (Asteraceae) JS105	Wormwood	Aerial parts	Roundworms, pinworms, <i>Giardia</i> in pigs
<i>Artemisia vulgaris</i> L. (Asteraceae) JS016	Mugwort	Leaves, root	Roundworms
<i>Calendula officinalis</i> L. (Asteraceae) JB84	Calendula	Flowers	Intestinal worms, amoebal infections
<i>Cucurbita pepo</i> L. (Cucurbitaceae) not collected	Pumpkin	Seeds	Tapeworms
<i>Echinacea purpurea</i> (L.) Moench (Asteraceae) JBCL 07	Echinacea	Roots	Microbial infections
<i>Eugenia caryophyllata</i> Thunb (Myrtaceae) purchased product	Cloves	Flowers	Roundworms, tapeworms
<i>Gentiana lutea</i> L. (Gentianaceae)	Gentian	Roots	Roundworms, tapeworms
<i>Hydrastis canadensis</i> L. (Ranunculaceae)	Goldenseal	Leaves	Antibiotic replacement
<i>Juglans nigra</i> L. (Juglandaceae)	Black walnut	Leaves, husks	Roundworms, helminths, protozoa
<i>Mentha piperita</i> L. (Lamiaceae) JS024	Peppermint	Leaves	Roundworms, <i>Giardia</i> and amoebal infections
<i>Olea europaea</i> L. (Oleaceae)	Olive	Leaf	Roundworms
<i>Ruta graveolens</i> L. (Rutaceae) not collected	Rue	Aerial parts	Roundworms, tapeworms
<i>Salvia officinalis</i> L. (Lamiaceae) JS035	Sage	Aerial parts	Roundworms

Treatments used in British Columbia for pets and pigs with stomach problems

Scientific name	Common name	Plant part used	Use
<i>Achillea millefolium</i> L. (Asteraceae) JS 041	Yarrow	Flowers	Stop diarrhoea
<i>Aloe vera</i> (L.) Burm. f. (Asphodelaceae) Purchased product	Aloe vera	Gel	Vomiting and irritation
<i>Elytrigia repens</i> (L.) Desv. ex Nevska (Poaceae)	Couch grass	Aerial parts	Self-medication for gastroenteritis
<i>Frangula purshiana</i> (DC.) Cooper (Rhamnaceae)	Cascara	Bark	Constipation
<i>Juniperus communis</i> L. (Cupressaceae)	Juniper	Berries	Stop diarrhoea
<i>Melissa officinalis</i> L. (Lamiaceae) JS006	Lemon balm	Leaves	Toner, stop diarrhoea, gastroenteritis
<i>M. piperita</i> L. (Lamiaceae) JS024	Peppermint	Oil	Gastroenteritis
<i>Petroselinum crispum</i> L. (Apiaceae) not collected	Parsley	Aerial parts	Stop diarrhoea
<i>Plantago major</i> L. (Plantaginaceae) JB62a	Plantain	Seeds	Stop diarrhoea, constipation
<i>Plantago ovata</i> Forssk. (Plantaginaceae)	Psyllium	Seeds	Constipation
<i>Rumex crispus</i> L. (Polygonaceae) JS116	Yellow dock	Root	Constipation
<i>Rumex obtusifolius</i> L. (Polygonaceae) JB63	Yellow dock	Seed heads	Stop diarrhoea
<i>Ulmus fulva</i> Michx. (Ulmaceae) purchased product	Slippery elm	Bark powder	Gastroenteritis, food poisoning, colon health, stop diarrhoea
<i>Zingiber officinalis</i> Roscoe (Zingiberaceae) purchased product	Ginger	Rhizome	Colon health

Non-experimental validation of plants used for pets and pigs in British Columbia

Medicinal plant	Validation information	Reference
<i>Allium sativum</i>	Experiments with the intestinal parasite <i>Entamoeba histolytica</i> have shown that pure allicin inhibits both the cytopathological effects associated with infection and the growth of the parasite. Allicin is said to be the active principle against <i>Haemonchus contortus</i> in ruminant hosts. Diluted liquid allicin proved useful against cryptosporidium parasites in humans in preliminary tests. Whole garlic extract gave an IC(50) at 24 h of 0.3 mg/ml against the microaerophilic flagellate <i>Giardia intestinalis</i> . Most of the components of garlic also assayed were inhibitory to the organism. Mid-level validity as an anthelmintic	Coppi et al. (2006), Githiori et al. (2006), Anon. (1996), and Harris et al. (2000)
<i>Achillea millefolium</i>	Different species from the <i>Achillea millefolium</i> aggregate are used against gastrointestinal and hepato-biliary disorders in traditional European medicine. An <i>Achillea</i> fraction produced choleresis that was two-to threefold higher than that of cynarin. Two yarrow compounds stimulated bile flow more effectively than cynarin. Due to their polar structure, these compounds are quantitatively extracted into teas and tinctures; and may be the choleretic active principles in the traditional application forms of yarrow. Yarrow contains sesquiterpene lactones, a germacrene derivative, flavonoid derivatives, apigenin, luteolin, rutin and chlorogenic acid. Mid-level validity for stomach problems	Benedek et al. (2005) and Innocenti et al. (2007)
<i>Aloe vera</i>	Fresh <i>Aloe vera</i> leaves are used to obtain a bitter yellow juice (exudate) with high content of 1,8-dihydroxyanthraquinone derivatives (aloe emodin, chrysophanol) and their glycosides (aloins), which are used for their cathartic effects. The antiparasitic action of an aqueous extract of <i>Aloe barbadensis</i> Miller against <i>in vitro</i> culture of <i>Trichomonas vaginalis</i> (three strains) was established. Within 24 h, percentages of inhibition greater than 50% were obtained from concentrations of 20.8 µg/ml. Barbaloin is said to be the most active component in <i>Aloe vera</i> . The anthraquinonic fraction showed activity against <i>Bacillus subtilis</i> in ethanol extracts of the leaf. A report of clinical cases suggested that the gel was bactericidal towards <i>Pseudomonas aeruginosa</i> . Inhibitory activity was reported against <i>Trichophyton</i> spp., by <i>A. ferox</i> 'juice'. Weak inhibitory activity was shown against <i>T. mentagrophytes</i> by high molecular weight components of <i>A. arborescens</i> leaves. Growth of the yeast <i>Candida albicans</i> was inhibited by <i>A. ferox</i> 'juice'. Extracellular killing of <i>Candida</i> by acemannan-stimulated macrophages was demonstrated. High-level validity for stomach problems	Vázquez et al. (1996), Reynolds and Dweck (1999), Rojas et al. (1995), and Ho et al. (2007)
<i>Artemisia annua</i>	A 1762 publication recommended wormwood for the treatment of "flatworms". Traditional treatments of the period for roundworms also included wormwood. An extract of leaves and stalks of <i>Artemisia asiatica</i> improved the survival rate of broiler chicks infected with <i>Eimeria tenella</i> (90%). An extract of the whole plant of <i>Artemisia annua</i> gave an 80% survival rate. Artemisinin fed for 4 weeks at levels of 2, 8.5, and 17 ppm for 3 weeks to chicks undergoing immunization with a live vaccine, significantly reduced oocyst output from separate <i>E. acervulina</i> and <i>E. tenella</i> infections and a dual species infection. When fed over a period of 3 weeks at a level of 5%, a dried leaf supplement of <i>A. annua</i> provided significant protection against lesions due to <i>Eimeria tenella</i> . <i>Artemesia santonica</i> has activity against <i>Ascaris lumbricoides</i> . The anthelmintic effects of crude aqueous (CAE) and methanol extracts (CME) of <i>Artemisia brevifolia</i> (whole plant) on live <i>Haemonchus contortus</i> as evident from their paralysis and/or mortality at 6 h post exposure was shown in sheep naturally infected with mixed species of gastrointestinal nematodes. Maximum reduction (67.2%) in eggs per gram (EPG) of faeces was recorded on day 14 post-treatment in sheep treated with <i>Artemisia brevifolia</i> CAE at 3 g kg ⁻¹ b.w. Levamisole produced a 99.2% reduction in EPG. An increase in EPG reduction was noted with an increase in the dose of <i>Artemisia brevifolia</i> administered as CP, CAE and CME. <i>Artemisia afra</i> water and ethanol extracts showed anthelmintic activity when tested against the free living nematode <i>Caenorhabditis elegans</i> . Thujone from <i>Artemisia</i> species is fatal in rats at a dose of 120 mg/kg. A typical human dose of <i>Artemisia afra</i> aqueous extract is 100 mg/kg. <i>Artemisia afra</i> aqueous extract proved relatively non-toxic in a 3-month chronic toxicity study with rodents, caused no apparent organ damage, and in high doses had a hepatoprotective effect. The anti-inflammatory effect of santonin a sesquiterpenoid found in <i>Artemisia</i> and other members of the Compositeae family is similar to that of diclofenac sodium, an inhibitor of cyclooxygenase. <i>Artemisia absinthium</i> showed positive results against Crohn's disease in a double-blind placebo-controlled study of 40 patients. High-level validity as an anthelmintic	Wynn (1996), Youn and Noh (2001), Githiori et al. (2006), Iqbal et al. (2004), Poppenga (2007), McGaw et al. (2000), Omer et al. (2007), Mukinda and Syce (2007), and Allen et al. (1997)

Lans et al. (2007a)

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Hagyományos állategészségügy



C. officinalis

C. officinalis has many pharmacological properties. It is used for the treatment of skin disorders, pain and also as a bactericide, antiseptic and anti-inflammatory. The butanolic fraction of *C. officinalis* possesses a significant free radical scavenging and antioxidant activity. Chronic hyposecretory gastritis, chronic hepatocolecystitis and angiocholitis were treated with a herbal complex which included *Achillea millefolium*, *Urtica dioica*, *Cichorium* (aerial part), *Polygonum*, *Matricaria chamomilla* (flowers), *Helichrysum arenarium*, *Calendula* (flowers), corn stigmas, *Humulus lupulus* (races) in proportion 3:3:1:1:2:1:1:2:1, respectively. The herbal decoction was to be taken three times daily before meals. *C. officinalis* had an immunomodulation effect against three different live viruses in broiler chickens. Mid-level validity for amoebal infections, low-level validity as an anthelmintic

Cordova et al. (2002), Klouček-Popová et al. (1982), Krivenko et al. (1989), and Barbour et al. (2004)

Cucurbita pepo

Cucurbitine from crushed pumpkin seeds is 55% efficacious against *Taenia saginata*. Cucurbitine is active on trematodes but inactive against nematodes and cestodes. Another study claims that cucurbitine is active against Taenia but a purge is necessary to expel the parasite. A fourth study indicates that the seeds are effective against Ascaris, Taenia and Oxyuris parasites. The median effective single dose of seeds in humans against the cestode, *Taenia saginata* L. (Taeniidae) is 42.8 ± 5.3 and the worm expulsion time is 10.1 ± 1.7 h. Mid-level validity as an anthelmintic

Wynn (1996), Oliver Bever (1986), Desta (1995), Akhtar et al. (2000), and Kozan et al. (2006)

Echinacea sp.

Echinacea can modulate the antigen-specific immune response, providing a sustained primary and secondary IgG response. Dried roots, rhizomes, tincture and fluidextracts of botanicals containing berberine such as *Echinacea angustifolia* are being prescribed for treatment of trichomonial infections. Mid-level validity for microbial infections

Rehman et al. (1999) and Vermani and Garg (2002)

Elytrigia repens

Agropyron repens reportedly contains a mucilaginous compound, triticin, and an antibiotic, agropirene. Mid-level validity if zoopharmacological observations are included

Viegi et al. (2003)

Eugenia caryophyllata

The antibacterial activity of different extracts of *Eugenia caryophyllata* was demonstrated against pathogenic bacteria. The fungicidal activity of the essential oil of *E. caryophyllata* was demonstrated against several food-borne fungal species, on fungi isolated from onychomycosis and on the yeast model *Saccharomyces cerevisiae*. Clove essential oil has shown acaricidal activity against *Dermatophagoides farinae* and *D. pteronyssinus* with eugenol identified as the acaricidal constituent; and it also has activity against *Psoroptes cuniculi* and antiviral activity. Low-level validity as an anthelmintic

Fichi et al. (2007), Burt and Reinders (2003), Feres et al. (2005), Larshini et al. (2001), Ranasinghe et al. (2002), Gayoso et al. (2005), Chami et al. (2005), and Chaiqb et al. (2007)

Gentiana lutea

Terpenoids, linalool, decanal, and benzaldehyde may contribute to any insecticidal activity of *Gentiana lutea*. Benzoic acid and its derivatives possess antibacterial and antifungal activity. It is found in *G. lutea* and *G. punctata*. Two sulfones are found in *G. lutea*. Isoorientin was isolated from the EtOAc extract of *Gentiana oliveri* and is the active antihelminthic and antioxidant component. Isoorientin has antibacterial activity against *Staphylococcus aureus*, *Bacillus subtilis* and *P. aeruginosa* as well as a myotic effect on uterus smooth muscles in rats and guinea pigs. *Gentiana lutea* roots had an MIC of 100 µg/ml, with a range of 3.125–100 µg/ml against 15 strains of *Helicobacter pylori*. Gentian tincture reportedly elevates gastric secretion in dogs. Mid-level validity as an anthelmintic

Georgieva et al. (2005), Wynn and Fougeré (2007), Sezik et al. (2005), and Mahady et al. (2005)

H. canadensis

Goldenseal can modulate the antigen-specific immune response, enhancing the acute primary IgM response. Phytochemical-mediated modulation of cytochrome P450 (CYP) activity may underlie many herb-drug interactions. Botanical supplements containing goldenseal strongly inhibited CYP2D6 and CYP3A4/5 activity *in vivo* therefore serious adverse interactions may result from the concomitant ingestion of goldenseal supplements and drugs that are CYP2D6 and CYP3A4/5 substrates. Extracts of botanicals containing berberine such as *H. canadensis* are being suggested as treatments for trichomonial infections. Mid-level validity as an antibiotic substitute

Rehman et al. (1999), Blumenthal (2000), Luo et al. (1998), and Vermani and Garg (2002)

Juglans nigra

Six compounds were isolated from the MeOH extract of the leaves of *Juglans sinensis*. Compounds **1**, **2**, and **5** showed protective effect against nitrofurantoin-induced cytotoxicity, and compound **5** also exhibited a moderate protective effect on amiodarone-induced cytotoxicity in Hep G2 cells. Walnut (*Juglans regia* L.) bark is claimed to possess anti-inflammatory, blood purifying, anticancer, depurative, diuretic and laxative activities. It contains several therapeutically active constituents, especially polyphenols. Walnut bark extract has antioxidant potential against oxidative stress-mediated urototoxicity in mice. Plumbagin and a series of other structurally related naphthoquinones are found in the roots, leaves, bark, and wood of *Juglans regia*, *Juglans cinerea*, and *Juglans nigra*. Plumbagin has anti-proliferative, proapoptotic, anti-metastatic and anti-inflammatory properties. *Juglans regia* has shown anthelmintic activity against *Haemonchus contortus* from goats. Juglone and naphthoquinone are reported to be the anthelmintic compounds. Mid-level validity as an anthelmintic

An et al. (2005), Akhtar et al. (2000), Bhatia et al. (2006), Sandur et al. (2006), Duke (1990), and Githiori et al. (2006)

Medicinal plant	Validation information	Reference
<i>Juniperus communis</i>	The aqueous ethanol extract of <i>Juniperus communis</i> (bark) showed pancreatic lipase inhibitory activity. Hexane extracts from <i>Juniperus communis</i> and methanol extracts of <i>Juniperus communis</i> inhibited the growth of <i>Mycobacterium tuberculosis</i> . Mid-level validity for diarrhoea	Kim and Kang (2005), Jimenez-Arellanes et al. (2003), and Kozan et al. (2006) Khayyal et al. (2001)
<i>Melissa officinalis</i>	Extracts from the plants <i>Iberis amara</i> , <i>Melissa officinalis</i> , <i>Matricaria recutita</i> , <i>Carum carvi</i> , <i>Mentha × piperita</i> , <i>Glycyrrhiza glabra</i> , <i>Angelica archangelica</i> , <i>Silybum marianum</i> and <i>Chelidonium majus</i> , singly and combined into a commercial preparation, STW 5 (Iberogast) and a modified formulation, STW 5-II, lacking the last three plants, were tested for their potential anti-ulcerogenic activity against indometacin induced gastric ulcers of the rat. All extracts produced a dose dependent anti-ulcerogenic activity associated with a reduced acid output and an increased mucus secretion. The most beneficial effects were seen with the combined formulations STW 5 and STW 5-II in a dose of 10 ml/kg b.w., comparable with cimetidine in a dose of 100 mg/kg b.w. High-level validity for stomach problems	
<i>M. piperita</i>	<i>M. piperita</i> possesses anti-hociceptive and anti-inflammatory effects that are dose dependent. <i>Mentha cordifolia</i> contains beta-sitosterols and glucosides and has been tested against <i>Ascaris suum</i> displaying similar activity to synthetic anthelmintic mebendazole on contact of the parasite with the preparations. <i>Menta</i> spp., have also been tested against <i>Haemonchus contortus</i> in ruminant hosts. <i>Menta arvensis</i> var. <i>piperacens</i> is active against zoonotic enteropathogens including <i>Salmonella</i> spp., <i>Escherichia coli</i> O157, <i>Campylobacter jejuni</i> and <i>Clostridium perfringens</i> . The fungicidal activity of peppermint oil was demonstrated in 11 fungi, including <i>Candida albicans</i> , <i>Trichophyton mentagrophytes</i> , <i>Aspergillus fumigatus</i> and <i>Cryptococcus neoformans</i> , at an MIC range of 0.25–10 µg/ml. Animal model studies demonstrated a relaxation effect on gastrointestinal (GI) tissue, analgesic and anesthetic effects in the central and peripheral nervous system and immunomodulating actions. Mid-level validity as an anthelmintic. High-level validity for stomach problems	Atta and Alkofahi (1998), Githiori (2004), McKay and Blumberg (2006), and Wannissorn et al. (2005)
<i>O. europaea</i>	<i>O. europaea</i> is considered to have anti-malarial and anthelmintic activity in Kenya. The bark of <i>O. europaea</i> var. africana did not show anthelmintic activity in sheep infected with <i>Haemonchus contortus</i> . Oleuropein has shown microbial activity. Secoiridoïdes (oleuropein and derivatives), polyphenols found in olives and olive oil, inhibit or delay the rate of growth of a range of bacteria and microfungi. Oleuropein was ineffective against <i>Haemophilus influenzae</i> and <i>Moraxella catarrhalis</i> . Low-level validity as an anthelmintic	Njoroge and Bussmann (2006), Githiori et al. (2004), Fleming et al. (1973), and Bisignano et al. (1999)
<i>Plantago major</i> , <i>Plantago ovata</i>	<i>Plantago major</i> contains five classes of biologically active compounds: a benzene compound (vanillic acid), flavonoids (baicalein, baicalin, luteolin), iridoid glycoside (aucubin), phenolic compounds (caffeoic acid, chlorogenic acid, ferulic acid, p-coumaric acid) and triterpenes (oleanolic acid, ursolic acid). <i>Plantago major</i> has immune-stimulating properties. Plantain induces dose dependent proliferation patterns in human lymphocyte cultures. High concentrations (400, 600 µg/ml) of <i>Plantago major</i> enhanced phagocytosis in laying hens. Some hypercholesterolemia patients benefited from the use of psyllium (<i>Plantago psyllium</i>), a good source of soluble fiber (10–12% mucilage). <i>Plantago major</i> is weakly active against <i>S. aureus</i> . The median effective single dose of <i>Plantago lanceolata</i> whole plant in humans against the cestode, <i>Taenia saginata</i> L. (Taeniidae) is 60.2 ± 4.9 and the worm expulsion time is $18.0 \pm .2.4$ h. Pounded leaf extract or juice obtained from the fresh leaves of <i>Plantago lanceolata</i> has anthelmintic activity in aqueous and EtOH leaf extracts against pinworms <i>Syphacia obvelata</i> and <i>Aspiculuris tetraepetra</i> , in mice. Mid-level validity for stomach problems Cascara bark (<i>Rhamnus purshiana</i>) needs drying and curing for one to 2 years to be safe otherwise it is too strong a laxative. Long-term use or abuse of <i>Rhamnus purshiana</i> can increase loss of serum potassium, which potentiates the toxicity of cardiac glycosides and antiarrhythmic agents (e.g., quinidine). Potassium deficiency can be increased by simultaneous use of thiazide diuretics, corticosteroids, or licorice root. The FDA study on drug efficacy of 1990 considered cascara bark to be safe and effective. The Food and Drug Administration (FDA) issued a final rule stating that the stimulant laxative ingredients aloe (including aloe extract and aloe flower extract) and cascara sagrada (including casanthal, cascara fluidextract aromatic, cascara sagrada bark, cascara sagrada extract, and cascara sagrada fluidextract) in over-the-counter (OTC) drug products are not generally recognized as safe and effective or are misbranded (Food and Drug Administration, HHS).	Chieng et al. (2002), Dorhoi et al. (2006), Craig (1999), Holetz et al. (2002), Desta (1995), and Kozan et al. (2006)
<i>Rhamnus purshiana</i> <i>Frangula purshiana</i>	High-level validity for constipation	Blumenthal (2000), Food and Drug Admin., HHS (2002)

Rumex crispus,
Rumex obtusifolius

R. graveolens

Salvia officinalis

U. fulva

Z. officinalis

Crude extracts of leaves of *Rumex nervosus* and the root of *Rumex abyssinicus* have antibacterial activity against *Streptococcus pyogenes* and *S. aureus* and activity against Coxsackie virus B3 and influenza A. *Rumex abyssinicus* contains oxalic acid, chrysophanic acid, chrysophanol, emodine and physcion. An acetone:water (7:3) extract obtained from the leaves of *Rumex obtusifolius* contains epicatechin a chemical with activity against giardia. High-level validity for stomach problems. *R. graveolens* possesses an anti-nociceptive effect. The leaves of *R. graveolens* inhibit the growth of several bacteria including *Bacillus subtilis* and *S. aureus*. The essential oil has a slight anthelmintic effect attributed to nonylmethyl ketone. *R. graveolens* odour is less effective in inhibiting the fifth-instar of the triatomine *Rhodnius prolixus* than cinnamon odour. Mid-level validity as an anthelmintic.

Salvia officinalis L. showed enhanced inhibitory activity against bacterial strains derived from 100 urine samples taken from subjects diagnosed with urinary tract infection living in the community. The extract showed 100% efficiency against *Klebsiella* and *Enterobacter* species, 96% against *E. coli*, 83% against *Proteus mirabilis*, and 75% against *Morganella morganii*. *Salvia officinalis* leaves had an minimum inhibitory concentration MIC ($\mu\text{g/ml}$) of 100 and an MIC range ($\mu\text{g/ml}$) of 25–100 when tested against 15 strains of *Helicobacter pylori*. *Salvia miltiorrhiza* extract reduced the injury area and depth of gastric mucosa caused by hemorrhagic shock and reperfusion, and protected gastric mucosa in a rat study. Low-level validity as an anthelmintic.

Ulmus macrocarpa improved the survival rate of broiler chicks infected with *Emmeria tenella* (100% survival). Herbal remedies used by patients for treatment of inflammatory bowel disease include slippery elm, fenugreek and devil's claw. Slippery elm scavenged superoxide dose-dependently. Oxygen radical release from biopsies was reduced after incubation with slippery elm which has antioxidant effects. High-level validity for stomach problems

Zingiber officinale is active against *Helicobacter pylori* strains, and also has anti-inflammatory, antioxidant and antitumoral activity. An extract from the root of *Zingiber officinale* reduced the minimum inhibitory concentrations of aminoglycosides in vancomycin-resistant enterococci. The effective compound [10]-gingerol with its detergent-like effect potentiated the antimicrobial activity of the aminoglycosides. Extracts of *Zingiber officinale* had an MIC of 25 $\mu\text{g/ml}$ against 15 strains of *H. pylori*. The chloroform extracts from *Zingiber zerumbet*, had an IC50 of <100 $\mu\text{g/ml}$ against trophozoites of *Giardia intestinalis*. Rhizomes of *Zingiber zerumbet* showed good *in vitro* anthelmintic activity against human *Ascaris lumbricoides*. Ginger rhizomes (ethyl acetate extract) contain one or more compounds that are active against adult *Schistosoma mansoni* and these compounds kill more male than female worms. A dose of at least 200 mg/l is needed. High-level validity for colon health

Getie et al. (2003),
Lee et al. (2006),
Spencer et al. (2007),
and Barbosa et al. (2007)
Atta and Alkofahi (1998),
Anon. (1999), and
Abramson et al. (2007)

Pereira et al. (2004),
Zhang et al. (2005),
and Mahady et al. (2005)

Youn and Noh (2001)
and Langmead
et al. (2002)

Nostro et al. (2006),
Nagoshi et al. (2006),
Akhtar et al. (2000),
Mahady et al. (2005),
Sanderson et al. (2002),
and Sawangjaroen
et al. (2005)

Table I: Ethnoveterinary medicines used for ruminants in British Columbia

Scientific name, (botanical family) Voucher specimen number	Local name	Part(s) used	Ethnoveterinary use
<i>Acer macrophyllum</i> Pursh (Aceraceae) JB043	Big leaf maple	leaves	bedding
<i>Achillea millefolium</i> L. (Asteraceae) JS 041	yarrow	Aerial parts	Mastitis, wounds, sternal abscess
<i>Achlys triphylla</i> (Smith) DC. (Berberidaceae) JS018	Vanilla leaf	leaves	flies
<i>Alchemilla vulgaris</i> L. (Rosaceae) JS011	Lady's mantle	aerial parts	Retained placenta
<i>Allium cepa</i> L. (Alliaceae) not collected	onion	Skins	endoparasites
<i>Allium sativum</i> L. (Amaryllidaceae) not collected	garlic	minced cloves	Endoparasites, respiratory tonic
<i>Althaea officinalis</i> L. (Malvaceae) not collected	marshmallow	Aerial parts	Diarrhea, scours
<i>Anethum graveolens</i> L. (Apiaceae) JS010	Dill	seed	Diarrhea, scours, milk production
<i>Apium graveolens</i> L. (Apiaceae) not collected	celery	Aerial parts	endoparasites
<i>Arctium lappa</i> L. (Asteraceae) JB32	Burdock	root	mastitis
<i>Arnica</i> sp. (Asteraceae) JB92	Wild arnica	Leaves or flowers	wounds
<i>Artemisia</i> sp. (Compositae) JS105	wormwood	leaves	endoparasites
<i>Artemisia vulgaris</i> L. (Asteraceae) JS016	mugwort	plant	Zinc deficiency
<i>Azadirachta indica</i> A. Juss. purchased product	neem	powder	lice
<i>Berberis aquifolium</i> Pursh. <i>Mahonia aquifolium</i> (Berberidaceae) JB6	Oregon grape	roots	wounds
<i>Blechnum spicant</i> (L.) Roth (Polypodiaceae) not collected	Deer fern	Aerial parts	Magnesium imbalance
<i>Bovista pilosa</i> Berk. & M. A. Curtis, <i>Bovista plumbea</i> Pers. (Lycoperdaceae) JB1	puffball	Spore mass	Disbudding, cuts, wounds, sternal abscess
<i>Calendula officinalis</i> L. (Asteraceae) JB84	calendula	Flower oil	Cuts, scratches, diarrhea, sore stomachs
<i>Capsella bursa-pastoris</i> (L.) Medic. (Brassicaceae) not collected	shepherd's purse	leaves	wounds
<i>Cinnamomum zeylanicum</i> Blume (Lauraceae) purchased product	cinnamon	Inner bark	Diarrhea, scours
<i>Curcuma longa</i> L. (Zingiberaceae) purchased product	turmeric	rhizome	Caprine arthritis encephalitis palliative, proud flesh
<i>Cymbopogon nardus</i> (L.) Rendle (Poaceae) purchased product	citronella	oil	flies
<i>Daucus carota</i> L. (Apiaceae) not collected	carrots	Roots & tops	endoparasites
<i>Echinacea purpurea</i> (L.) Moench (Asteraceae) JBCL 07	Echinacea	root	abscess, Pre-show protection, wounds, respiratory tonic

<i>Epilobium angustifolium</i> L. (Onagraceae) not collected	fireweed	Fresh or dry plant	Appetite stimulant
<i>Eugenia caryophyllata</i> Thunb (Myrtaceae) purchased product	cloves	Essential oil	flies
<i>Euphrasia officinalis</i> agg. (Scrophulariaceae) purchased product	eyebright	Aerial parts	Eye problems
<i>Galium aparine</i> L. (Rubiaceae) JB3	cleavers	Aerial parts	mastitis
<i>Gaultheria shallon</i> Pursh. (Ericaceae) JS014	salal	Aerial parts	Rumen tonic, ketosis
<i>Hedera helix</i> L. (Araliaceae) not collected	English ivy	leaves	Retained placenta
<i>Helianthus annuus</i> L. (Asteraceae) purchased product	sunflower	seeds	endoparasites
<i>Hypericum perforatum</i> L. (Hypericaceae) JS027	St. John's Wort	Infused oil of flowers	Proud flesh, wounds
<i>Juniperus communis</i> L. (Cupressaceae)	juniper	branches	Endoparasites, liver fluke
<i>Lavandula officinalis</i> L. (Labiatae)	lavender	Essential oil	Flies, proud flesh
<i>Mahonia nervosa</i> (Pursh) Nutt (Berberidaceae) JS104	Oregon grape	Root decoction	Abscess, Respiratory tonic
<i>Malva sylvestris</i> (Malvaceae) JS002	mallow	plant	wounds
<i>Matricaria chamomilla</i> L. (Compositae) JB43	chamomile	flower	eye problems
<i>Medicago sativa</i> L. (Leguminosae) purchased product	alfalfa	Pellets from high-selenium regions, aerial parts	Selenium deficiency, nutrition after calving
<i>Melaleuca alternifolia</i> L. (Myrtaceae) purchased product	Tea tree oil	drops	endoparasites
<i>Mentha piperita</i> L. (Lamiaceae) JS024	peppermint	Essential oil	flies
<i>Mentha pulegium</i> L. (Lamiaceae)	pennyroyal	Aerial parts	Flies, lice
<i>Nepeta cataria</i> L. (Lamiaceae) not collected	catnip	Aerial parts	Pain killer
<i>Pastinaca sativa</i> L. (Apiaceae) not collected	parsnip	tops	endoparasites
<i>Petroselinum crispum</i> L. (Apiaceae) not collected	parsley	Aerial parts	endoparasites
<i>Pinus ponderosa</i> Douglas ex Lawson (Pinaceae) JB98	long needle yellow pine	branches	Diarrhea grey pasty young animals, endoparasites
<i>Plantago lanceolata</i> L. (Plantaginaceae) JS042	plantain	leaves	diarrhea
<i>Polystichum munitum</i> (Kaulf.) Presl. (Polypodiaceae) JS047	Sword fern	Aerial parts	Stimulate digestion
<i>Portulaca oleracea</i> L. Portulacaceae not collected	purslane	shoot	Zinc deficiency
<i>Potentilla recta</i> L. (Rosaceae) JB93	cinquefoil	Aerial parts	Appetite stimulant, diarrhea, scours
<i>Prunella vulgaris</i> L. (Lamiaceae) JS111	self heal	plant	wounds

<i>Pseudotsuga menziesii</i> (Mirbel) Franco (Pinaceae) JS049	Douglas fir	Top branches	Appetite stimulant, coccidiosis, endoparasites
<i>Quercus alba</i> L. (Fagaceae) not collected	White oak	shoot	Zinc deficiency
<i>Rubus</i> sp. (Rosaceae) not collected	thornless raspberry	leaves	Milk production
<i>Rubus ursinus</i> L. JS115 and <i>Rubus laciniatus</i> Willd. (Rosaceae)	blackberry	leaves	Unknown illness
<i>Ruta graveolens</i> L. (Rutaceae) not collected	rue	leaves	flies
<i>Salix alba</i> L. var. <i>sericea</i> Gaudin (Salicaceae) not collected	White willow	bark	Diarrhea, scours, mastitis, pain, unknown illness
<i>Salix scouleriana</i> Barratt ex Hook., <i>Salix lucida</i> Muhl. ssp. <i>lasiantha</i> (Benth.) E. Murr. (Salicaceae) JS101	Scoulers willow, Pacific willow	Branches	Caprine arthritis encephalitis palliative
<i>Salvia officinalis</i> L. (Lamiaceae) JS035	Garden sage	leaves	Drying off
<i>Senna</i> sp. (Fabaceae) purchased product	senna	pod	Diarrhea, scours
<i>Symphoricarpos albus</i> var. <i>laevigatus</i> (Caprifoliaceae) JS103	snowberry	branches	endoparasites
<i>Symplynum officinale</i> L. (Boraginaceae) JBCL 08	comfrey	Leaves fresh/dry	Abscess, wounds, diarrhea, flystrike, proudflesh
<i>Symplynum officinale</i> L. (Boraginaceae) JBCL 08	comfrey	Aerial parts	Increase butterfat; laxative, ketosis, udder edema
<i>Syzygium aromaticum</i> (L.) Merr. & Perry. (Myrtaceae) purchased product	clove	bud	coccidia
<i>Taraxacum officinale</i> L. (Asteraceae) JB96	dandelions	leaves	Udder edema
<i>Teucrium scorodonia</i> L. (Labiateae) not collected	woodsage	Tincture	mastitis
<i>Thuja plicata</i> Donn ex D. Don (Cupressaceae) JBR 21	cedar	Bark shavings	lice
<i>Thuja plicata</i> Donn ex D. Don (Cupressaceae) JS036	Red cedar	branches	Copper deficiency, endoparasites
<i>Ulmus fulva</i> Michx. (Ulmaceae) purchased product	Slippery elm	Bark powder	Blood in stool
<i>Ulmus fulva</i> Michx. (Ulmaceae) purchased product	Slippery elm	Inner bark	Diarrhea, scours
<i>Urtica dioica</i> L. (Urticaceae) JS023	nettle	Ground seeds	endoparasites
<i>Urtica dioica</i> L. (Urticaceae) JS023	nettles	Aerial parts	Pre-show protection, zinc deficiency, diarrhea
<i>Usnea longissima</i> Ach. (Parmeliaceae) JB2a	usnea	Aerial parts	Dehorning adults, foot rot, sternal abscess
<i>Vaccinium parvifolium</i> Sm. (Ericaceae) JS045	huckleberry	plant	ketosis
<i>Valeriana officinalis</i> L. (Valerianaceae) JS008	valerian	roots	Pain killer
<i>Verbascum thapsus</i> L. (Scrophulariaceae) JS118	mullein	flower	Respiratory tonic
<i>Vitis</i> sp. (Vitaceae) not collected	grape	leaves	Unknown illness
<i>Zea mays</i> L. (Poaceae) not collected	cornsilk	Silk (style, stigma)	Udder edema
<i>Zingiber officinale</i> Roscoe (Zingiberaceae) purchased product	ginger	rhizome	Diarrhea, scours

Table 2: Plants used as food for ruminants in British Columbia

Scientific name	Local name	Part(s) used	Additional Use
<i>Fucus vesiculosus</i> L. (Fucaceae; Brown Algae) JBCL 11	kelp	Plant	Healthy fleece
<i>Fucus vesiculosus</i> L. (Fucaceae; Brown Algae) JBCL 11	bladderwrack	Plant	Iodine, trace minerals
<i>Abies grandis</i> (Douglas ex D. Don) Lindley not collected	grand fir	Branches	maintain body heat
<i>Acer macrophyllum</i> Pursh (Aceraceae) JB 043	big-leaf maple	inner bark	--
<i>Achillea millefolium</i> L. (Asteraceae) JS041	yarrow	aerial parts	--
<i>Achillea millefolium</i> L. (Asteraceae) JS041	yarrow	aerial parts	--
<i>Achlys triphylla</i> (Smith) de Candolle (Berberidaceae) JS018	vanilla leaf	aerial parts	--
<i>Adenocaulon bicolor</i> Hook. (Asteraceae) not collected	silver-green/pathfinder	aerial parts	--
<i>Alnus rubra</i> Bong. (Betulaceae) JB 108	red alder	aerial parts	maintain body heat
<i>Anaphalis margaritacea</i> (L.) Benth. (Asteraceae) JS034	pearly everlasting	aerial parts	--
<i>Arbutus menziesii</i> Pursh (Ericaceae) JS013	Arbutus	fresh and dried leaves	maintain body heat
<i>Arctium lappa</i> L. (Asteraceae) JB32	Burdock	aerial parts	--
<i>Artemisia dracunculus</i> L. (Asteraceae) JS025	Tarragon	aerial parts	--
<i>Berberis aquifolium/Mahonia aquifolium</i> (Berberidaceae) JB79	Oregon grape	aerial parts	--
<i>Chenopodium album</i> L. (Chenopodiaceae) JBR 94	lamb's quarters	aerial parts	--
<i>Cichorium intybus</i> L. (Asteraceae) not collected	Chicory	aerial parts	--
<i>Cirsium arvense</i> (L.) Scop. (Asteraceae) JS030	Canada thistle	aerial parts	Vitamin A
<i>Claytonia perfoliata</i> Donn ex Willd. ssp. <i>perfoliata</i> (Portulacaceae) JB20	miners lettuce	aerial parts	--
<i>Cornus sericea</i> (Cornaceae) not collected	red osier dogwood	aerial parts	Winter feed
<i>Crepis capillaris</i> (L.) Wallr. (Asteraceae) JS106	Crepis/Hawk's beard	aerial parts	--
<i>Cucurbita pepo</i> L. (Cucurbitaceae) not collected	pumpkin	Fruit	Vitamin A
<i>Cystisus scoparius</i> L (Leguminosae)	broom	aerial parts	cardiac tonic
<i>Epilobium angustifolium</i> L. (Onagraceae) not collected	fireweed	aerial parts	--
<i>Equisetum palustre</i> L. (Equisetaceae) JB60	horsetail	aerial parts	minerals
<i>Galium aparine</i> L. (Rubiaceae) JS107	cleavers	aerial parts	coats
<i>Gaultheria shallon</i> Pursh. (Ericaceae) JS100	salal	aerial parts	--
<i>Holodiscus discolor</i> (Pursh.) Maxim. (Rosaceae) JB5	Ocean spray	aerial parts	gives sweet flavour to the milk
<i>Hypochaeris radicata</i> L. (Asteraceae) JB11	Hairy cats ear	Stems	--
<i>Lactuca muralis</i> (L.) Fresen. (Asteraceae) JB23	Wax lettuce	aerial parts	--
<i>Linum usitatissimum</i> L. (Linaceae) not collected	flax	Seeds	coat
<i>Lonicera caprifolium</i> L. (Caprifoliaceae) not collected	honeysuckle	aerial parts	--
<i>Malus</i> spp. (Rosaceae) not collected	Apple	Pulp	--
<i>Melissa officinalis</i> L. (Lamiaceae) JS006	Lemon balm	aerial parts	calming

<i>Origanum</i> sp. (Lamiaceae) JS003	oregano	aerial parts	--
<i>Phalaris arundinacea</i> L. (Poaceae) JB30	Reed canary grass	aerial parts	--
<i>Plantago major</i> L. (Plantaginaceae) JB62a	plantain	aerial parts	--
<i>Pseudotsuga menziesii</i> (Mirbel) Franco (Pinaceae) JS049	Douglas fir	young or thin branches	--
<i>Rosa nutkana</i> K. Presl (Rosaceae) JS013	Nootka rose	Aerial parts	--
<i>Rosa gymnocarpa</i> Nutt. (Rosaceae) JS044	Baldhip, native and domestic rose and rose hips	aerial parts	--
<i>Rubus idaeus</i> L. ssp. <i>idaeus</i> (Rosaceae) not collected	raspberry	aerial parts	--
<i>Rubus idaeus</i> L. ssp. <i>idaeus</i> (Rosaceae) not collected	raspberry	aerial parts	--
<i>Rubus parviflorus</i> Nutt. (Rosaceae) JB25	thimbleberry	aerial parts	--
<i>Rubus discolor</i> Weihe & Nees JS028, <i>Rubus ursinus</i> Cham. & Shlecht. JS115 and <i>Rubus laciniatus</i> Willd. (Rosaceae) JB55	blackberry	Branches	--
<i>Rubus spectabilis</i> Pursh (Rosaceae) JB 038	Salmonberry	aerial parts	--
<i>Rumex acetosella</i> L. JS047	Sheep sorrel	aerial parts	--
<i>Salvia officinalis</i> L. (Lamiaceae) JS035	Sage	aerial parts	--
<i>Sambucus racemosa</i> L. (Caprifoliaceae) not collected	red elderberry	aerial parts	--
<i>Sonchus arvensis</i> L., (Asteraceae) not collected	Sow thistle	aerial parts	--
<i>Stellaria media</i> (L.) Cyrill. (Caryophyllaceae) JS108	chickweed	aerial parts	--
<i>Taraxacum officinale</i> (L.) Weber (Asteraceae) JB96	dandelions	aerial parts	--
<i>Thuja plicata</i> Donn ex D. Don (Cupressaceae) JBR 21	red cedar	inner bark and fronds	--
<i>Thymus vulgaris</i> L. (Lamiaceae) JB61, JB73	thyme	aerial parts	--
<i>Tsuga heterophylla</i> (Raf.) Sarg. (Pinaceae) JB113	hemlock	aerial parts	maintain body heat
<i>Urtica dioica</i> L. (Urticaceae) JS023	nettles	Aerial parts	tonic
<i>Vaccinium membranaceum</i> Dougl., <i>Vaccinium parvifolium</i> Smith (Ericaceae) JS045	huckleberry	Foliage, berries	carotene, manganese, energy

Table 4: Plants used as pregnancy feeds for ruminants in British Columbia

<i>Fucus vesiculosus</i> L. (Fucaceae; Brown Algae) JBCL 11	Kelp	plant
<i>Rubus idaeus</i> L. ssp. <i>idaeus</i> (Rosaceae) not collected	raspberry	leaves
<i>Urtica dioica</i> L. (Urticaceae) JS023	Nettles	plant
<i>Taraxacum officinale</i> (L.) Weber (Asteraceae) JB96	dandelions	leaves & flowers
<i>Pseudotsuga menziesii</i> (Mirbel) Franco (Pinaceae) JS049	Douglas fir	branches
<i>Tsuga heterophylla</i> (Raf.) Sarg. (Pinaceae) JS113	Western hemlock	branches
<i>Salix lucida</i> Muhl. (Salicaceae) not collected	Willow	branches
<i>Epilobium angustifolium</i> L. (Onagraceae) not collected	Fireweed	plant
<i>Pisum</i> sp. (Fabaceae) not collected	Pea vines	plant
<i>Taraxacum officinale</i> (L.) Weber (Asteraceae) JB96	dandelions	plant
<i>Lonicera involucrata</i> (Richards.) Banks ex Spreng (Caprifoliaceae) not collected	black Siamese-twinberry	plant
<i>Rubus idaeus</i> L. (Rosaceae) not collected	Wild raspberry	leaves



Table 5: Non-experimental validation of plants used for ruminants in British Columbia

Medicinal plant	Validation information	Reference
<i>Acer macrophyllum</i>	<i>Acer macrophyllum</i> young shoots were eaten raw in spring by the Thompson Indians. The bark slips off easily at that time. The leaves of <i>Acer saccharum</i> contain less than 2% percent calcium, 0.24 percent magnesium, 0.75 percent potassium, 0.11 percent phosphorus, 0.67 percent nitrogen, and 11.85 percent ash (dry weight). Mid level validity as bedding.	10, 13, 14
<i>Achillea millefolium</i>	Achilles reportedly staunched the wounds of his soldiers with this plant thus providing the name of the genus <i>Achillea</i> . <i>Achillea millefolium</i> is also used traditionally as an emmenagogue. An <i>in vitro</i> assay using the crude extract of the aerial parts of <i>A. millefolium</i> showed estrogenic activity. Apigenin and luteolin are reportedly the most important estrogenic compounds. The aqueous extract of <i>Achillea millefolium</i> (0.3–1.2 g/kg, p.o./day) was effective in protecting the gastric mucosa of male and female Wistar rats against acute gastric lesions induced by ethanol and indomethacin and in healing chronic gastric lesions induced by acetic acid with (ED_{50}) = 32 mg/kg, p.o.). Mid level validity for all uses.	9, 16, 17
<i>Achlys triphylla</i>	The use of this plant as a fly repellent is Native American in origin. Four new flavonol glycosides were isolated from the underground parts of <i>Achlys triphylla</i> in addition to eight known compounds. Mid level validity as a fly repellent	8, 15
<i>Alchemilla vulgaris</i>	Lady's mantle has the nickname, "a woman's best friend", and this is reflected in the ethnoveterinary use for retained placenta. Extracts from <i>Alchemilla vulgaris</i> L. inhibited 50% of the activity of porcine pancreas elastase at concentrations of 0.16 mg/ml, against a synthetic substrate. This study claimed a possible role by the extract in the protection of conjunctive and elastic tissues adversely affected by proteolytic enzymes. Mid level validity for retained placenta.	12, 18
<i>Allium cepa</i>	<i>Allium cepa</i> oil given at 5 mg/kg body weight/day for 2 weeks showed anthelmintic activity in rats experimentally infected with <i>Trichinella spiralis</i> with a decline in the adult worms and muscle larvae. It was less effective as a prophylactic treatment prior to <i>Trichinella spiralis</i> infection. Mid level validity for endoparasites.	19
<i>Allium sativum</i>	Experiments with the intestinal parasite <i>Entamoeba histolytica</i> have shown that pure allicin inhibits both the cytopathological effects associated with infection and the growth of the parasite by blocking its cysteine proteases. Other studies with allicin have shown that it has inhibitory effects on a wide range of bacteria, on some fungi and on a few protozoans. Mid level validity for all uses.	20
<i>Allium sativum</i>	Treatment with garlic extract has been shown to activate macrophages, and suppress lesion growth in <i>L. major</i> infected mice. A garlic extract, showed no significant effect in the reduction of <i>L. chagasi</i> parasite load. The maximal survival of the garlic treated animals, despite their high parasitic burden, might be explained by a mild non-specific protective effect of the garlic treatment. In a <i>L. major</i> model, garlic treatment was more effective than chemotherapy with the first line drug glucantime, showing an additive effect with the antibiotic. There may be a protective effect of garlic treatment if administered previous to infection, in an immunoprophylactic vaccination schedule against visceral leishmaniasis. Mid level validity for all uses.	21

<i>Althaea officinalis</i>	Originally from China, this plant was an ingredient in the original marshmallows eaten by Egyptians and Romans. Over 1000 species in the Malvaceae family contain healing mucilage. The methanol extract of <i>Althaea officinalis</i> roots was active against <i>P. gingivalis</i> , <i>Prevotella</i> spp. and <i>Actinomyces</i> spp. (9 of 12 strains had a MIC \leq 3125 mg/L). The decoction had higher MIC values (4096–8192 mg/L). The strains of <i>C. gingivalis</i> , <i>V. parvula</i> , <i>E. corrodens</i> and <i>Peptostreptococcus</i> spp. were inhibited by an MIC = 8192 mg/L, those of <i>F. nucleatum</i> by an MIC \geq 16384 mg/L. Mid level validity for diarrhea.	12, 22
<i>Anethum graveolens</i>	The ancient Egyptians and Greeks recorded the medicinal value of dill. The monoterpene carvone is a major constituent (50%–60%) of the essential oil. This monoterpene has a calming effect and is used in gripe water preparations. Falcarindiol exhibited the greatest activity of the three active principles isolated from the whole herb of <i>Anethum graveolens</i> with minimum inhibitory concentration (MIC) values in the range 2–4 μ g/mL against mycobacteria (<i>Mycobacterium fortuitum</i> , <i>Mycobacterium phlei</i> , <i>Mycobacterium aurum</i> and <i>Mycobacterium smegmatis</i>). Plant compounds oxypeucedanin and oxypeucedanin hydrate also showed moderate anti-mycobacterial activity against the same mycobacteria with MIC values in the range 32–128 μ g/mL. Mid level validity for diarrhea.	12, 23, 24
<i>Apium graveolens</i>	The Greeks recorded the medicinal value of wild celery. The ascariidal efficacy of the oil of <i>Apium graveolens</i> tested <i>in vitro</i> against the eggs and larvae of <i>Ascaris lumbricoides</i> was less effective than the aqueous extracts of 1% <i>Artemesia</i> and 5% of <i>Albizzia</i> and <i>Inula</i> . Mid level validity for endoparasites.	12, 25
<i>Arctium lappa</i>	<i>Arctium lappa</i> has anti-bacterial and antifungal activity, diuretic, anti-oxidant and anxiolytic action, a platelet anti-aggregating effect and HIV-inhibitory action. <i>Arctium lappa</i> constituents inhibited the tested endodontic pathogens <i>Enterococcus faecalis</i> , <i>Staphylococcus aureus</i> , <i>Pseudomonas aeruginosa</i> , <i>Bacillus subtilis</i> and <i>Candida albicans</i> . A previous study on three forms of the rough extract of this plant (20% tincture, extract concentrated by rotaevaporation and lyophilized extract), found that the lyophilized extract was the most effective against <i>B. subtilis</i> and <i>C. albicans</i> . Mid level validity for mastitis.	26
<i>Arnica</i> sp.	<i>Arnica montana</i> is indigenous to Central Europe. The methanol extract of <i>Arnica montana</i> flowers had a better antibacterial activity than the decoction (with MICs two or three times lower). The inhibiting concentrations of the methanol extract against <i>P. gingivalis</i> (3 of 5 strains), <i>Prevotella</i> spp., <i>E. corrodens</i> , <i>Peptostreptococcus</i> spp. and <i>Actinomyces</i> spp. had acceptable values (MIC \leq 2048 mg/L) for the use in mouthwashes for the correct hygiene of the oral cavity. <i>C. gingivalis</i> and <i>V. parvula</i> (MIC 4096 mg/L) were less sensitive and so was <i>F. nucleatum</i> (MIC 16384 mg/L). Mid level validity for mastitis.	9, 22
<i>Artemisia</i> sp., <i>Artemisia</i>	Tarragon leaves are rich in iodine, minerals and vitamins C and A. This study compared the <i>in vitro</i> and <i>in vivo</i> anthelmintic activity of <i>Artemisia brevifolia</i> with levamisole. <i>In vitro</i> studies revealed anthelmintic effects of crude aqueous (CAE) and methanol extracts (CME) of <i>Artemisia brevifolia</i> (whole plant) on live <i>Haemonchus contortus</i> as evident from their paralysis and/or mortality at 6 h post exposure. For <i>in vivo</i> studies, the whole plant of <i>Artemisia brevifolia</i> was administered as crude powder (CP), CAE and CME at graded doses (1, 2 and 3 g kg ⁻¹) body weight (b.w.) to sheep naturally infected with mixed species of gastrointestinal nematodes. Maximum reduction (67.2%) in eggs per gram (EPG) of faeces was recorded on day 14 post treatment in sheep treated with <i>Artemisia brevifolia</i> CAE at 3 g kg ⁻¹ b.w. Levamisole produced a 99.2% reduction in EPG. However, increase in EPG reduction was noted with an increase in the dose of <i>Artemisia brevifolia</i> administered as CP, CAE and CME. Mid level validity for endoparasites.	12, 27
<i>Azadirachta indica</i>	Groups of 11–12 angora goats were treated with an azadirachtin-rich extract of neem seeds with an azadirachtin concentration of 650 ppm or 125 ppm, with Neguvon(R), or untreated (control). Their louse burden (<i>Damalinia limbata</i> Phthiraptera) was assessed for 22 weeks. A reduction in louse densities of 76–96% was observed from week 2 to week 18 after treatment with the neem solution containing azadirachtin at a concentration of 650 ppm. At the lower test concentration (125 ppm) a reduction of 60–92% was recorded from week 2 to week 14. The extract reduced the survival of both adult and nymph stages of <i>Damalinia limbata</i> . Mid level validity for ectoparasites.	28

<i>Berberis aquifolium/Mahonia aquifolium</i>	Berberine is an isoquinoline alkaloid that has been isolated from <i>Berberis aquifolium</i> (Oregon grape), <i>Berberis aristata</i> (tree turmeric) and <i>Berberis vulgaris</i> (barberry). It has antibiotic, antitumor and antidiarrheal activities. Berberine may have multiple effects on the cardiovascular system. Mid level validity as a respiratory tonic and for wounds.	29-32
<i>Blechnum spicant</i>	Low level validity for magnesium imbalance but the plant is reported to grow in magnesium rich soil.	33
<i>Bovista pilosa</i>	The basidiomycete <i>Bovista</i> sp contains psathyrellon B. The hexacyclic metabolite bovistol exhibited very weak antibacterial (MIC <i>Micrococcus luteus</i> 100 µM) and antifungal (MIC <i>Mucor miehei</i> 100 µM) activities. Mid level validity for wounds.	34
<i>Bovista plumbea</i>	Puffball has been traditionally used to stem bleeding and promote healing. Penicillin acylase (penicillin amidohydrolase, EC 3.5.1.11) was isolated in the basidiomycete <i>Bovista plumbea</i> . Mid level validity for wounds.	35
<i>Calendula officinalis</i>	Culpepper describes <i>Calendula</i> flowers as a "comforter of the heart and spirits". The methanol extract of <i>Calendula officinalis</i> flowers had antibacterial activity; it inhibited <i>Actinomyces</i> spp. at MICs ≥ 8192 mg/L. Mid level validity for wounds and diarrhea.	9, 22
<i>Capsella bursa-pastoris</i>	Culpepper recorded the use of the European plant <i>Capsella</i> for wounds. <i>Capsella bursa-pastoris</i> is included in the VIIIth and IXth editions of USSR pharmacopoeia and is an official remedy in other countries. It is used for uterine bleeding, malignant ulcers and cancer of the stomach, tumors, uterine cancer and fibroma, and for all types of kidney bleeding and diseases in homeopathy. Extracts of leaves and roots contain neutral lipids (62.6 and 58.5%), glyco-(20.8 and 17.8%), and phospholipids (16.6 and 23.7%, respectively). The seed oil contains fatty acids (FA) up to 50% linolenic and ~1% erucic acid. Beta-carotene and beta-sitosterol were identified in the aerial part. Mid level validity for wounds but more data is needed.	9, 36
<i>Cinnamomum zeylanicum</i>	An anecdotal report described the resolution of <i>Salmonella</i> in a chronic carrier by the use of cinnamon. There are other reports that cinnamon is a natural antimicrobial. A potent inhibitor of bacterial infection endotoxin is present in cinnamon bark. <i>Cinnamomum beloglotta</i> essential oils had activity against <i>Salmonella</i> spp. isolated from poultry (<i>S. agona</i> , <i>S. braenderup</i> , <i>S. derby</i> , <i>S. gallinarum</i> , <i>S. hadar</i> , <i>S. mbandaka</i> , <i>S. montereo</i> , <i>S. saintpaul</i> , <i>S. schwarzengrund</i> , <i>S. senftenberg</i>) and <i>E. coli</i> O157. Pasteurized apple juice with nisin (0, 25, 50, 100, and 200 ppm, wt/vol) and cinnamon (0 and 0.3%, wt/vol) accelerates the death of <i>Salmonella typhimurium</i> and <i>E. coli</i> O157:H7 in apple juice enhancing product safety. Essential oils obtained from fresh leaves of <i>Cinnamomum aromaticum</i> were effective against the flagellated poultry parasites <i>Tetrahymenopsis gallinarum</i> and <i>Histomonas meleagridis</i> . High level validity for diarrhea.	37-41
<i>Curcuma longa</i>	Curcumin, a yellow pigment of turmeric (<i>Curcuma longa</i>), is known to possess chemopreventive properties in various animal tumor models. Curcumin can effectively suppress the DEN-induced development of AHF in rat liver. The aqueous and alcoholic extracts isolated from turmeric are as effective as butylated hydroxy anisole in their anti-oxidative activity. There is a strong correlation between antioxidant activity and antiinflammatory activities of curcuminoids. Curcumin was also found to possess antiviral potential. <i>Curcuma longa</i> has an anti-thrombotic effect in mice. Mid level validity for proud flesh and caprine arthritis and as a palliative.	42-46
<i>Cymbopogon nardus</i>	Mosquito coils made from the leaves of <i>Cymbopogon nardus</i> had moderate knockingdown but insignificant killing effects on <i>Aedes aegypti</i> . High concentrations of <i>C. nardus</i> , were effective when screened against the mosquito <i>Aedes aegypti</i> under laboratory conditions using human subjects. <i>Cymbopogon nardus</i> provided at least 2 h complete repellency. The protection times of this oil was less when diluted. At 50% concentration, <i>C. nardus</i> showed 50 min protection and the repellent activity decreased to 30 min or less when diluted to 10%. The undiluted oil of <i>C. nardus</i> provided better protection against <i>Ae. aegypti</i> , <i>Cx quinquefasciatus</i> and <i>An. dirus</i> . Mid level validity as a fly repellent.	47, 48

<i>Cytisus scoparius</i>	Broom (<i>Cytisus scoparius</i> , syn. <i>Sarothamnus scoparius</i>) is a leguminous species with low contents of extractable condensed tannins, which would be unlikely to affect the digestion of nutrients in ruminants and has a high protein content. The young shoot tips of the broom, <i>Cytisus scoparius</i> , contain greater concentrations of sparteine than older leaves. Sparteine and the analogue BRB-I-28 produced a dose-dependent reduction in heart rate and blood pressure over the dose range 1–64 $\mu\text{mol}/\text{kg}/\text{min}$ in pentobarbitone-anaesthetized rats subjected to left-ventricle electrical stimulation and occlusion of the left anterior descending coronary artery. High level validity as a cardiac tonic and browse plant.	49-51
<i>Daucus carota</i>	The LC50 values for <i>Daucus carota</i> against 4th instars of <i>Culex annulirostris</i> using acetone, ethanol, hexane, and methanol extracts were 236.00, 36.59, 77.19, and 241.8 mg/liter, respectively. Mid level validity for endoparasites.	52
<i>Echinacea purpurea</i>	<i>Echinacea purpurea</i> has been investigated for its potential to enhance immune function, primarily through activation of innate immune responses. A time course study, using the time of SRBC immunization to mimic the onset of illness, examined the effects of 8 and 4 days of <i>Echinacea purpurea</i> treatment at 0.6 mL/kg/day. Only in the 4-day administration, with dosing beginning 1 hour after SRBC immunization, was there an observed enhancement of the antibody forming cell response. This supports the acute use of <i>Echinacea purpurea</i> as suggested by anecdotal reports, and demonstrates the potential for enhancement of humoral immune responses as well as innate immune responses. High level validity for immune protection.	53
<i>Epilobium angustifolium</i>	Fireweed (<i>Epilobium angustifolium</i>) has an abundance of vitamin C and was used by Indians and settlers who picked and boiled the fresh green sprouts in springtime. A tea was also made from the leaves. Fireweed (<i>Epilobium angustifolium</i> L.) extracts showed inhibitory activity against metalloproteinases. Fireweed contains several flavonoids and phenolic acids and an ellagitannin with anti-inflammatory activity. The dimeric macrocyclic ellagitannin oenothein B and other polyphenols may partly support the use of <i>Epilobium</i> extracts in folk medicine for prostate conditions. <i>Epilobium angustifolium</i> , <i>Epilobium hirsutum</i> , <i>Epilobium palustre</i> , <i>Epilobium tetragonum</i> and <i>Epilobium rosmarinifolium</i> ethanol extracts showed antimicrobial activity in a range of concentrations between 10 and 650 microg/ml of dry extract. <i>Epilobium angustifolium</i> and <i>Epilobium rosmarinifolium</i> had broad spectrum activity against bacteria, yeasts and fungi. The analgesic properties of <i>Epilobium angustifolium</i> (Ea) was established using the dry extract of Ea obtained by evaporating a commercially available mother tincture. High level validity as a tonic feed.	54-56
<i>Equisetum arvense</i>	The short-term actions of <i>Equisetum arvense</i> and <i>Lavandula officinalis</i> dry extracts, and of isoquercitrin, a flavonoid found in <i>Equisetum arvense</i> , on <i>in vitro</i> fermentation by rumen microbes was investigated. The addition of <i>Lavandula officinalis</i> and <i>Equisetum arvense</i> enhanced the fermentation rate of the hay only substrate by 50%, through an increased release of acetate and propionate. Isoquercitrin lowered the fermentation rate of the other two diets. High level validity as a source of minerals.	57
<i>Eugenia caryophyllata</i> (synonym <i>Syzygium aromaticum</i> L., <i>Eugenia aromatica</i> L., <i>Caryophyllus aromaticus</i> L.)	The antibacterial activity of different extracts of <i>Eugenia caryophyllata</i> was demonstrated against pathogenic bacteria. The fungicidal activity of the essential oil of <i>E. caryophyllata</i> was demonstrated against several food-borne fungal species, on fungi isolated from onychomycosis and on the yeast model <i>Saccharomyces cerevisiae</i> . The inhibition of adult emergence by <i>E. caryophyllata</i> extracts was demonstrated on <i>Culex pipiens</i> larvae. The essential oil of this plant showed repellency on the mosquitoes <i>Aedes aegypti</i> , <i>Culex quinquefasciatus</i> and <i>Anopheles dirus</i> . Extracts showed insecticidal activity on <i>Pediculus capitis</i> and acaricidal activity on <i>Dermatophagoides farinae</i> and <i>D. pteronyssinus</i> . High level validity as a fly repellent.	58-64

<i>Euphrasia officinalis</i>	The major bioactive components in <i>Euphrasia</i> species are tannins, phenolic acids, flavones and iridoid glycosides. Compounds show a variety of effects including anti-inflammation, antioxidant, antibacterial, antiallergic, asthma and antihistamine activity. Eye drops made from <i>Euphrasia rostkoviana</i> Hayne have been used in anthroposophical medicine for more than 70 years for the structuring of the fluid organism in the eye, especially in inflammatory and catarrhal conjunctivitis. A prospective cohort trial was undertaken to describe the efficacy and tolerability of these eye drops in a community-based setting. Sixty-five (65) patients were involved. Complete recovery was seen in 53 patients (81.5%) and a clear improvement in 11 patients (17.0%). No serious adverse events were observed. A dosage of one drop three times a day was the general prescribed dosage. High level validity for eye problems.	65, 66
<i>Fucus sp.</i>	<i>Fucus vesiculosus</i> has antioxidant activity. High level validity as a feed supplement.	67
<i>Galium aparine</i>	Water distilled essential oils from aerial parts of <i>Galium aparine</i> and <i>Galium odoratum</i> contained seventy-two compounds. The major component of the essential oil of <i>G. aparine</i> was hexadecanoic acid (22.3%), and the major components of the essential oil of <i>G. odoratum</i> were thymol (30.6%) and isothymol (22.8%). <i>Galium aparine</i> oil contained mostly fatty acids and four terpenoids. The major components of the oil of <i>G. odoratuni</i> were thymol (30.6%) and isothymol (22.8%). Low level validity for mastitis.	70
<i>Gaultheria shallon</i>	High antioxidant activity was obtained from the extracts of <i>Gaultheria shallon</i> . Catechin and epicatechin, potent polyphenolic antioxidants, were identified in the EtOAc extracts of <i>Gaultheria shallon</i> . <i>Gaultheria shallon</i> fruits have high antioxidant activity and vitamin C. Salal foliage contains 21% condensed tannins by weight. High level validity as a feed supplement.	68, 69
<i>Hedera helix</i>	The secretolytic and bronchodilating properties found in <i>Hedera helix</i> extract are due to isaponins, especially alfa hederin. <i>H. helix</i> decreased arterial pressure in cats and also decreased stomach ulcer formation in rats. Extracts from <i>H. helix</i> wood presented spasmolytic, anti-inflammatory and anti-tussive activity. The saponagens of <i>Hedera helix</i> L., non-competitively inhibit hyaluronidase activity in a dose-dependent fashion, showing comparable IC50 values (hederagenin IC50 = 280.4 microM; oleanolic acid IC50 = 300.2 microM); the saponins hederacoside C and alpha-hederin are very weak inhibitors. Hyaluronidase, a proteoglycan-degrading enzyme, may have an influence on collagenolysis in bovine placenta and take part in the separation processes of the placenta in cows. High level validity for retained placenta.	71-73
<i>Helianthus annuus</i>	Salicylic acid (SA)-treated sunflower leaves displayed potent antimicrobial activity against a set of phytopathogens which was due to proteins of approximately 60 kDa. Seeds of <i>Helianthus</i> species contain trypsin and subtilisin which are used in plant defense. Sunflower has allelopathic compounds which may include phenols and terpenes. Mid level validity for endoparasites.	74-76
<i>Hypericum perforatum</i>	The flowering tops of <i>Hypericum perforatum</i> contain a resinous substance, hypericin and pseudohypericin, a flavonoid, hyperoxide, essential oil, tannic and mucilaginous substances. The resin and the essence contribute to the vulnerary and epithelising properties of the plant and explain its use in folk phytotherapy as a topical remedy against ulceration and burns. An experiment was carried out on 24 female patients of a mean age of 33 ± 3 years, who had had a caesarean section. The tested substance was a mixture of 70% oily extract of <i>Hypericum</i> and 30% oily extract of <i>Calendula</i> . The surface perimeter area of the surgical wound in the group treated with the <i>Hypericum-Calendula</i> mixture was reduced by $37.6 \pm 9.9\%$ compared to a reduction of $15.83 \pm 4.64\%$ in the control group (wheat germ oil). High level validity for proud flesh and wounds.	77

<i>Juniperus communis</i>	Acetone extracts of the fruits of <i>Juniperus sabina</i> showed prominent antifeedant and stomach toxic effects to <i>Pieris rapae</i> . The extract also showed strong antifeedant activity against <i>Mythimna separata</i> Walker and <i>Plutella xylostella</i> L, inhibited the population growth of <i>Sitophilus zeamais</i> Motschulsky and <i>Tribolium castaneum</i> Herbst and disrupted the growth of <i>Helicoverpa armigera</i> Hübner. The insecticidal compound was identified as deoxypodophyllotoxin. Hexane and methanol extracts from <i>Juniperus communis</i> inhibited the growth of <i>Mycobacterium tuberculosis</i> . <i>Mycobacterium avium</i> was inhibited by <i>Juniperus communis</i> hexane extract. High level validity for endoparasites.	78, 79
<i>Lavandula officinalis</i>	<i>Lavandula</i> was used as a strewing herb due to its insect-repellent properties. The essential oil of <i>Lavandula officinalis</i> showed repellent activities against <i>Culex pipiens pallens</i> on hairless mice. Essential oils were extracted by steam distillation from flowers of <i>Lavandula stoechas</i> . Compounds found were fenchone, 1,8-cineole, bornyl acetate, myrtenyl acetate, myrtenol, alpha-pinene and viridiflorol. High level validity as a fly repellent. Mid level validity for prouf flesh.	12, 80, 81
<i>Malvasp.</i>	Dioscorides, Pliny and Arab physicians described similar medicinal uses for <i>Malva</i> as the ethnoveterinary uses in this paper. Hexane extracts from <i>Malva parviflora</i> inhibited the growth of <i>Mycobacterium tuberculosis</i> . <i>Mycobacterium avium</i> was inhibited by the methanol extract of <i>Malva parviflora</i> . Aerial parts of <i>Malva neglecta</i> protected two of six rat stomachs from ethanol-induced ulcerogenesis. Hexane and methanol extracts made from the roots of <i>Malva parviflora</i> were active against both Gram-positive and Gram-negative bacteria. These extracts also had high cox-I inhibiting activity. Extracts made from the creeping prostate and upright forms showed variation in antibacterial activity but the cox-I anti-inflammatory activity was similar for all of the extracts. High level validity for wounds.	9, 82, 83, 79
<i>Matricaria chamomilla</i>	A comprehensive review of chamomile was published in 2006. Chamomile flowers contain more than 120 constituents. The flower head contains 10% mucilage, which in turn consists of amino acids, polysaccharides and fatty acids. The compounds found in the essential oil derived from the flowers include the terpenoids alpha-bisabolol and its oxides and azulenes, including matricin. The antioxidant capacity of chamomile is relatively low (<18 mmol/100 g). German chamomile oils (<i>Matricaria chamomilla</i>) were slightly more effective against 25 different Gram-positive and Gram-negative bacteria and 20 strains of <i>Listeria monocytogenes</i> than oil from Roman 'chamomile' (<i>Chamaemelum nobile</i>). Chamomile aqueous extracts showed significant antiplatelet activity <i>in vitro</i> . A freeze-dried extract of chamomile given to Wistar albino rats suppressed both the inflammatory effect and leukocyte infiltration induced by a simultaneous injection of carrageenan and prostaglandin E1. Mid level validity for eye problems.	84
<i>Medicago sativa</i>	Cattle fed diets high in Se from agricultural products such as high Se wheat and alfalfa hay will accumulate substantial amounts of Se in the meat without developing signs of Se toxicity. High level validity for selenium deficiency.	85
<i>Melaleuca alternifolia</i>	<i>Melaleuca alternifolia</i> Cheel essential oil and its major component terpinen-4-ol had anti-staphylococcal activity against strains resistant to mupirocin, fusidic acid, vancomycin, methicillin and linezolid. <i>Melaleuca alternifolia</i> oil has antiprotozoal activity. <i>Melaleuca alternifolia</i> oil caused a 50% reduction in growth (compared to controls) of the protozoa <i>Leishmania major</i> and <i>Trypanosoma brucei</i> at concentrations of 403 mg/ml and 0.5 mg/ml, respectively. This activity was attributed to terpinen-4-ol. <i>Melaleuca alternifolia</i> oil at 300 mg/ml killed all cells of <i>Trichomonas vaginalis</i> . High level validity for endoparasites.	86, 87
<i>Melissa officinalis</i>	Lemon balm tea reportedly gives long life by dispelling melancholy. <i>Melissa officinalis</i> (lemon balm) and <i>Valeriana officinalis</i> (valerian) were assessed on their anxiolytic properties during laboratory-induced stress in a double-blind, placebo-controlled, randomized, balanced cross-over experiment. 24 healthy volunteers received three separate single doses (600 mg, 1200 mg, 1800 mg) of a standardized product containing <i>M. officinalis</i> and <i>V. officinalis</i> extracts, plus a placebo, on separate days separated by a 7 day wash out period. The 600 mg dose of the combination product ameliorated the negative effects of the stress. The highest dose (1800 mg) produced an increase in anxiety. High level validity for anxiety.	12, 88



<i>Mentha piperita</i> , <i>Mentha pulegium</i>	Pulegium was named by Pliny for its reputation of driving away fleas. <i>Mentha piperita</i> is effective in controlling the larvae of <i>C. quinquefasciatus</i> Say. Extracts of <i>Mentha longifolia</i> (L.) Huds., <i>Melissa officinalis</i> L., and <i>Mentha pulegium</i> L. were tested against the house mosquito <i>C. pipiens</i> . Ethanol extracts of <i>Melissa officinalis</i> , <i>Mentha longifolia</i> exhibited complete (100%) larvicidal activity at 200 ppm. At this concentration, mortality was not significantly different from that of the reference temephos, although 200-fold more material was needed to achieve that result. At this same concentration <i>Mentha pulegium</i> extracts resulted in 90% mortality. In addition, the extracts of <i>Mentha longifolia</i> and <i>Melissa officinalis</i> also showed good (>85%) larvicidal activity at 100 ppm. The volatile oils of <i>Mentha microphylla</i> was tested against adult <i>Lucilia sericata</i> implicated in myiasis. The LC50 was 130 ppm by <i>Mentha microphylla</i> . High level validity as a fly repellent.	9, 89, 90
<i>Nepeta caesarea</i>	The Roman town of Nepeti grew catnip as a medicine. The leaves contain vitamin C and the infusion reportedly relieves colds by inducing sleep and increasing perspiration without a corresponding body temperature increase. <i>Nepeta caesarea</i> showed significant analgesic activity, besides marked sedation, which was also blocked by naloxone, indicating involvement of opioid receptors but excluding mu-opioid receptors. The main antinociceptive component of the plant is nepetalactone. High level validity for pain relief.	12, 91, 92
<i>Origanum × majoricum</i>	The medicinal properties of <i>Origanum</i> were known to the ancient Greeks and Egyptians. Sweet marjoram was introduced to Europe during the Middle Ages. <i>Origanum × majoricum</i> , <i>Origanum vulgare</i> ssp. <i>hirtum</i> , and <i>Poliomintha longiflora</i> have higher phenolic contents as compared to other culinary herbs. Rosmarinic acid was the predominant phenolic compound in <i>Salvia officinalis</i> , <i>Thymus vulgaris</i> and <i>Origanum × majoricum</i> . High level validity as a feed supplement.	12, 93
<i>Pastinaca sativa</i>	There are at least seven furanocoumarins present in green tissues of wild parsnip that deter plant pests. Mid level validity for endoparasites.	94
<i>Petroselinum crispum</i>	Homer reported that warriors fed parsley to their horses. <i>Petroselinum crispum</i> produces a complex mixture of phenylpropanoids, coumarins, and terpenoids. The tested species contained phenylpropanoids, myristicin and parsley apiole; three linear furanocoumarins, xanthotoxin, imperatorin, and bergapten and two monoterpenes. The myristicin from parsley oil showed insecticidal activity. Mid level validity for endoparasites.	12, 95
<i>Pinus ponderosa</i>	Pine oil had larvicidal activity against mosquitoes with LC50 values ranging between 82 and 112 ppm. The pine oil provided 100% repellent protection against <i>Anopheles culicifacies</i> for 11 h and 97% protection against <i>Culex quinquefasciatus</i> for nine hours. Pycnogenol® is a phytochemical extracted from the bark of <i>Pinus pinaster</i> Ait. Pycnogenol® consists of standardized proportions of monomeric and oligomeric procyanidins and phenolic acids (derivatives of benzoic acid and cinnamic acid). Pycnogenol was tested for its antimicrobial activity against 23 different pathogenic prokaryotic (gram-positive and gram-negative) and eukaryotic (yeast and fungi) microorganisms. Pycnogenol inhibited the growth of all the tested microorganisms in minimum concentrations ranging from 20 to 250 microg/mL. Dilution of the Pycnogenol®-containing media re-initiated the proliferation of microorganisms. High level validity for diarrhea.	96, 97
<i>Plantago major</i>	EH0202 is a health-food additive from Japan. It is a mixture of four herbal extracts known to stimulate macrophage activity (interferon inducers). They are: pumpkin seeds (<i>Cucurbita moschata</i>), plantain seeds (<i>Plantago asiatica</i>), Japanese honeysuckle (<i>Lonicera japonica</i>), and safflower (<i>Carthamus tinctorius</i>). EH0202 administration decreases the incidence of viral pneumonia and the mortality rate in pigs with porcine reproductive and respiratory syndrome. EH0202 acts to stimulate immunological systems and may improve endocrine dysfunction. Hot water extracts of <i>Plantago major</i> and <i>Plantago asiatica</i> were investigated <i>in vitro</i> on herpesviruses (HSV-1 and HSV-2) and adenoviruses (ADV-3, ADV-8 and ADV-11). The hot water extract of <i>Plantago asiatica</i> possessed significant inhibitory activity on viral infection (HSV-2 and ADV-11). <i>Plantago major</i> and <i>Plantago asiatica</i> both showed dual effects of immunodulatory activity, enhancing lymphocyte proliferation and secretion of interferon-gamma at low concentrations (< 50 microg/ml), but inhibiting this effect at high concentration (> 50 microg/ml). High level validity for diarrhea.	98, 99



<i>Polystichum munitum</i>	The acetone extract of <i>Polystichum pungens</i> inhibited five gram-positive bacteria. <i>Bacillus cereus</i> , <i>Bacillus pumilus</i> , <i>Bacillus subtilis</i> , <i>Micrococcus kristinae</i> and <i>Staphylococcus aureus</i> . The methanol extracts of <i>Polystichum pungens</i> inhibited the growth of both the gram-positive as well as the gram-negative bacteria, with the exception of <i>E. coli</i> at 5.0 mg/ml. The water extract of <i>Polystichum pungens</i> showed activity against four of the gram-positive bacteria and <i>Enterobacter cloacae</i> . <i>Polystichum squarrosum</i> is associated with microscopic enzootic bovine haematuria in cattle. Mid level validity as a digestive stimulant.	100, 101
<i>Portulaca oleracea</i>	<i>Portulaca oleracea</i> and <i>Portulaca intraterranea</i> have a zinc content of 6.5 mg/100 g. The genus <i>Portulaca</i> contains oxalates and an oxalic acid content of up to 9%. These plants also contain alkaloids, coumarins, flavonoids and anthraquinone glycosides. <i>Portulaca oleracea</i> nutritive values are: ash (32.5%), crude protein (17.9%), ether extract (5.6%), crude fibre (20.3%), moisture (97.3%) soluble carbohydrate (23.6%), calcium (1.8%), magnesium (3.5%), phosphorus (0.3%), and calcium: phosphorus ratio (5.9%). Nubian goats fed fresh <i>Portulaca oleracea</i> (5 g/kg BW) showed weakness of the fore and hind limbs with inability to stand, greenish watery diarrhoea and polyuria. The aqueous extract of the <i>Portulaca oleracea</i> leaves and stems might act in part on postsynaptic α-adrenoceptors and interfere with transmembrane calcium influx. The plant was not recommended for daily use when fresh and in large quantities. Mid level validity for zinc deficiency.	102, 103
<i>Potentilla tormentilla</i> , <i>Potentilla pacifica</i>	The name Tormentil is said to come from the Latin <i>tormentum</i> , referring to the gripings of the intestines that the herb will serve to relieve. A randomized, double blinded, placebo-controlled trial was conducted at Children's Hospital for Infectious Diseases #3, St. Petersburg, Russia in 40 children ranging in age from 3 months to 7 years with rotavirus diarrhea. There were 2 comparison groups: a treatment group that consisted of 20 children treated with tormentil root extract (<i>Potentilla tormentilla</i>); and a control group of 20 children who received a placebo. Administration of tormentil root extract in controlled doses shortened the duration of rotavirus diarrhea and decreased the requirement for rehydration solutions. Tormentil root extract was said to be an effective treatment for rotavirus diarrhea in children. A root extract of <i>Potentilla arguta</i> completely inhibited respiratory syncytial virus. High level validity as an appetite stimulant.	9, 104, 105
<i>Prunella vulgaris</i>	Gerard describes <i>Prunella</i> as a wound herb. <i>Prunella vulgaris</i> L. contains polysaccharides with antiviral activity. <i>Prunella vulgaris</i> contains oleanolic, betulinic, ursolic, rosmarinic (antioxidant), caffeic and other acids, triterpenoids, flavonoids, tannins and the antiviral polysaccharide prunelline. The aqueous fraction of the plant inhibits anaphylactic shock, allergic reactions, protects rat erythrocytes against haemolysis and kidney and brain homogenates against lipid peroxidation. Antimicrobial activity was also found. This study concluded that the ethnomedicinal use of <i>Prunella vulgaris</i> for wound healing and as an anti-inflammatory remedy is supported. High level validity for wounds.	9,106, 107
<i>Pseudotsuga menziesii</i>	<i>Pseudotsuga menziesii</i> oils contain about 60 compounds with monoterpenes (especially sabinene and beta-pinene) as the major constituents. These had antimicrobial effects against bacteria, fungi and worms. Mid level validity for coccidiosis, endoparasites and as an appetite stimulant.	108
<i>Quercus alba</i> <i>Rosa nutkana</i>	<i>Quercus robur</i> leaves contain 141 ± 16 ppm (dry weight) zinc. Mid level validity for zinc deficiency. The extracts of <i>Rosa nutkana</i> and <i>Amelanchier alnifolia</i> were very active against an enteric coronavirus. High level validity as a feed supplement.	109 105
<i>Rubus ursinus</i> , <i>Rubus laciniatus</i>	Pharmacological studies of the leaf extract of <i>Rubus idaeus</i> on the uterus <i>in vitro</i> and other smooth muscle preparations have found activity. Specific compounds in <i>Rubus pinfaensis</i> (triterpenoids, phenols) and <i>Rubus imperialis</i> (triterpenes) have antibacterial and antinociceptive properties, respectively. The leaves of <i>Rubus idaeus</i> have volatile compounds and waxes. Diterpene glycosides are found in the leaves of <i>Rubus chingii</i> and <i>Rubus swartzianus</i> and triterpenes in the leaves of <i>Rubus imperialis</i> and <i>Rubus pinfaensis</i> . Compounds in the leaves of <i>Rubus idaeus</i> , produce a relaxant response on a transmurally stimulated guinea-pig ileum <i>in vitro</i> , and are polar in nature. Mid level validity for milk production and to treat unknown illnesses.	110



<i>Ruta graveolens</i>	Rue has historically been a strewing herb and anti-plague plant. Common rue (<i>Ruta graveolens</i>) has an antifeedant activity against mahogany shootborer larvae (<i>Hypsipyla grandella</i>). Mid level validity as a fly repellent.	12, 111
<i>Salix</i> sp.	The principal active component of <i>Salix</i> sp. is salicin, however the species also contains phenolic glycosides (salicortin, fragilin, tremulacin) in the bark. A standardized willow bark extract was examined in 127 outpatients with osteoarthritis and rheumatoid arthritis in 2 randomized, controlled, double-blind trials with follow up for 6 weeks. The difference between willow bark extract and placebo was not statistically significant in either trial. Ethanolic <i>Salix</i> extract 1520L inhibits COX-2-mediated PGE2 release through compounds other than salicin or salicylate. The <i>Salix</i> extract is a weak inhibitor of pro-inflammatory cytokines. Mid level validity for mastitis and unknown illnesses.	92, 112-114
<i>Salix</i> sp.	210 patients with an exacerbation of chronic low back pain who reported current pain of 5 or more (out of 10) on a visual analog scale were randomly assigned to receive an oral willow bark extract with either 120 mg (low dose) or 240 mg (high dose) of salicin, or placebo, with tramadol as the sole rescue medication, in a 4-week blinded trial. The principal outcome measure was the proportion of patients who were pain-free without tramadol for at least 5 days during the final week of the study. The numbers of pain-free patients in the last week of treatment were 27 (39%) of 65 in the group receiving high-dose extract, 15 (21%) of 67 in the group receiving low-dose extract, and 4 (6%) of 59 in the placebo group ($P < 0.001$). Significantly more patients in the placebo group required tramadol ($P < 0.001$) during each week of the study. One patient suffered a severe allergic reaction, perhaps to the extract. High level validity for pain. Mid level validity for caprine arthritis.	114
<i>Salvia</i> sp.	In the 17 th century the Dutch found that the Chinese would trade three chests of tea for one of sage leaves. The ingestion of 200, 400 and 800 mg/kg of aqueous or 400 mg/kg of ethanolic extracts of <i>Salvia fruticosa</i> from day one to day six of pregnancy by female rats did not cause pregnancy failure. However, the ingestion of an ethanolic extract reduced the number of viable fetuses and increased the number of resorptions in the pregnant rats. A highly significant fetal resorptive effect was seen with the ethanolic extract, with 37% fetuses degenerated, while the aqueous extract showed significant activity with 31% of fetuses resorbed. The ingestion of <i>Salvia fruticosa</i> by adult male rats had no effect on the fertility of females impregnated by the treated males. However, the number of implantation sites and the number of viable fetuses were reduced. These losses appear to be due to either faulty preimplantation development or decrease in sperm function. Mid level validity for drying off.	12, 115
<i>Senna</i> sp.	Ten Nubian goats were given oral doses of the fresh fruits and leaves of <i>Cassia senna</i> at 1, 5, and 10 g/kg/day. Eight goats died within 30 days and two others were slaughtered in a poor condition on days 18 and 29. The clinical signs shown were diarrhoea, inappetence, loss of condition, and dyspnea. <i>Senna</i> is not carcinogenic to rats given dosages of up to 300 mg/kg/day daily for 2 years. Mid level validity for diarrhea.	116, 117
<i>Symporicarpus albus</i> var. <i>laevigatus</i>	<i>Symporicarpus albus</i> was found to have phenolic acids in the extracts and fractions from leaves, flowers and fruit with antimicrobial activity. Mid level validity for endoparasites.	119
<i>Symphytum officinale</i>	The ethnoveterinary uses of comfrey are related to medicinal uses recorded in Gerard and Culpepper. The antiinflammatory activity of comfrey (<i>Symphytum officinale</i>) is linked to rosmarinic acid, which has antioxidant, antiviral, bactericidal and viricidal activities. The soothing and wound healing properties are due to allantoin with reported anti-inflammatory, immunostimulant and vulnerary activities. Mid level validity as a laxative, for ketosis and to increase butterfat. High level validity for proud flesh, wounds and udder edema.	9, 120
<i>Syzygium aromaticum</i>	Undiluted clove oil gave the longest duration of 100% repellency (2–4 h) against all tested species of mosquito: <i>Aedes aegypti</i> , <i>Culex quinquefasciatus</i> and <i>Anopheles dirus</i> . Low level validity for coccidia.	48

<i>Taraxacum officinale</i>	Dandelion was first described as a medicine by Arabian physicians of the tenth and eleventh centuries. A comprehensive review of all studies conducted on dandelion has been recently published. One study found a partial inhibition of rat paw oedema induced by carrageenan and following intraperitoneal treatment with 100 mg/kg dm. A dried 80% ethanolic extract of <i>Taraxacum officinale</i> root administered orally at 100 mg/kg body weight 1 h before oedema elicitation inhibited carrageena-induced rat paw oedema by 25%, versus a 45% inhibition with indomethacin at 5 mg/kg. The methanolic extract of flowers of <i>Taraxacum officinale</i> and <i>Taraxacum platycarpum</i> showed inhibition rates of 95 and 87%, respectively, of tetradecanoylphorbol-13-acetate (TPA)-induced ear oedema in mice. The triterpene uvaol isolated from dried flowers of <i>Taraxacum platycarpum</i> inhibited the TPA-induced inflammation at an equivalent level to indomethacin with 0.1 mg/ear being the 50% inhibitory dose. Extracts of <i>Taraxacum officinale</i> leaf and roots exhibited slightly lower inhibition rates of 69 and 51%, respectively, in the same assay. Dandelion leaf extract was also shown to have an anti-inflammatory activity on the central nervous system. Mid level validity forudder edema and high level validity as a feed.	9, 121
<i>Teucrium scorodonia</i>	Ethyl acetate, chloroform and n-butanol extracts of <i>Teucrium montanum</i> showed a wide range of inhibiting activity against both Gram (+) and Gram (-) bacteria. Mid level validity for mastitis.	122
<i>Thuja plicata</i>	Ethanolic and acetone extracts of <i>Thuja orientalis</i> were studied against III instar larvae of <i>Anopheles stephensi</i> and <i>Culex quinquefasciatus</i> . The ethanolic extract of <i>T. orientalis</i> was effective against both larval species with LC50 values of 13.10 and 9.02 ppm after 24 and 48 hours for anopheline and 22.74 and 16.72 ppm against culicine larvae. The acetone extract showed LC50 values of 200.87 and 127.53 ppm against anopheline and 69.03 and 51.14 ppm against culicine larvae. Mid level validity for endoparasites and lice. Low level validity for copper deficiency.	123
<i>Ulmus fulva</i>	<i>Ulmus macrocarpa</i> Hance has low to moderate anti-protozoal efficacy against <i>Toxoplasma gondii</i> and <i>Neospora caninum</i> . One-day-old broiler chicks were infected with <i>Eimeria tenella</i> and given various herbal extracts. Survival rates, lesion scores, body weight gains, bloody diarrhea, and oocysts excretions were investigated at the first and the second week after infection. All the birds treated with <i>Ulmus macrocarpa</i> survived. Lesion scores in the groups treated with <i>Ulmus macrocarpa</i> (1.40 +/- 1.14) were lower than the control. Mid level validity for endoparasites. <i>Urtica dioica</i> is reported to have anti-inflammatory, acute diuretic, natriuretic and hypotensive effects. The phenolic compounds present in <i>Urtica dioica</i> L. may contribute to its antioxidant activity. A water extract of <i>Urtica dioica</i> showed antimicrobial activity against 9 Gram-positive and Gram-negative bacteria and one yeast. A water extract of <i>Urtica dioica</i> also showed antiulcer activity against ethanol-induced ulcerogenesis and an analgesic effect. <i>Urtica dioica</i> agglutinin, a plant lectin, consists of seven individual isolectins. Isolectin I binds Zn(2+) ions. Mid level validity for zinc deficiency. Mid level validity for immune system protection. High level validity as a tonic and for diarrhea. Low level validity for endoparasites.	124, 125
<i>Urtica dioica</i>	A multicenter, prospective clinical trial was performed on 257 patients to study the efficacy and tolerance of a compound drug PRO 160/120 (<i>Sabal palmetto</i> and nettle) in elderly men with lower urinary tract symptoms due to benign prostatic hyperplasia. Group I of 129 patients received PRO 160/120 which was found to be superior to the placebo. High level validity as a tonic and for diarrhea.	128
<i>Usnea longissima</i> , <i>Usnea barbata</i>	<i>Usnea barbata</i> (L.) Mott and <i>Usnea hirta</i> (L.) Wigg hydroalcoholic extracts have antiinflammatory activity comparable to phenylbutazone and hydrocortisone hemisuccinate; the analgesic activity was close to that of noraminophenazole; the antipyretic activity was equivalent or better than aminophenazole. <i>Usnea hirta</i> has usnic, thamnolic and usnamic acids with antibiotic effects. <i>Usnea longissima</i> contains usnic and evernic acids which act as expectorants. Usnic acid has 2 enantiomeric forms with different activities including antimicrobial activity against Gram-positive and anaerobic bacteria including antibiotic-resistant pathogenic strains. It also has antiviral, antiprotozoal, antiproliferative, anti-inflammatory (equivalent to ibuprofen) and analgesic activity. High level validity for wounds and foot rot.	129-131



Vaccinium sp.	The compounds absorbed into the rat blood after oral administration of ethanol extract of the stems and leaves of <i>Vaccinium vitis-idaea</i> were analyzed. Two compounds found in the plasma were arbutin and fraxin. Both arbutin and fraxin have anti-inflammatory, anti-coughing and phlegm-removing effects. Fraxin at the higher dosage tested had similar activity to dexamethasone; arbutin was less active. Docosane, quercetin, daucosterol, hyperoside, have also been isolated from the stem and leaf of the plant. Two huckleberry species, <i>Vaccinium membranaceum</i> and <i>Vaccinium ovatum</i> were evaluated for their total, and individual, anthocyanin and polyphenolic compositions. <i>Vaccinium ovatum</i> had greater total anthocyanin, total phenolics, oxygen radical absorbing capacity, and ferric reducing antioxidant potential than <i>Vaccinium membranaceum</i> . The pH and degrees Brix were also higher in <i>Vaccinium ovatum</i> . Each species contained 15 anthocyanins (galactoside, glucoside, and arabinoside of delphinidin, cyanidin, petunidin, peonidin, and malvidin) but in different quantities. They also had a different polyphenolic profile. The polyphenolics of both species had a high proportion of cinnamic acid derivatives and flavonol glycosides. The major polyphenolic compound in <i>V. membranaceum</i> was neochlorogenic acid, and in <i>Vaccinium ovatum</i> , chlorogenic acid. Mid level validity for ketosis and as a feed supplement.	132, 133
<i>Valeriana officinalis</i>	Valerian was used in World Wars I and II to treat shell shock. A review of <i>Valeriana officinalis</i> states that the compounds in the volatile oil vary due to genetics and environmental causes. Main constituents include the monoterpene bornyl acetate and the sesquiterpene valerenic acid. Some sesquiterpenes act on the amygdaloid body of the brain and valerenic acid inhibits enzyme-induced breakdown of GABA in the brain producing sedation. The valepotriates are changed into homobaldralin which reduces the spontaneous motility of mice. The aqueous extracts of the roots contain GABA which could cause sedation depending on its bioavailability. A lignan, hydroxypinoresinol, can bind to benzodiazepine receptors.	12, 134
<i>Verbascum thapsus</i>	The use of mullein for respiratory problems is derived from traditional folk medicine. Extracts of <i>Verbascum thapsus</i> exhibited antiviral activity against herpesvirus type I and influenza viruses. High level validity as a respiratory tonic.	12, 135
<i>Vitis</i> sp.	The components of the pure plant-based extract AS 195 (Folia vitis viniferae) are flavon(ol)-glycosides and glucuronides with quercetin-3-O-beta-D-glucuronide (main flavonoid) and isoquercitrin (quercetin-3-O-beta-glycoside; a secondary flavonoid). Low level validity for unknown illnesses.	136
<i>Zea mays</i>	The use of the stigma and styles of <i>Zea mays</i> as a diuretic is found only in those parts of Italy where the Spanish influence was strong. This ethnomedicinal use is also found in the Caribbean and in Latin America and is still found in Spain. Corn silk aqueous extract is diuretic in rats at large dosages. Mid level validity for udder edema.	137, 138
<i>Zingiber officinale</i>	<i>Zingiber officinale</i> is active against <i>Helicobacter pylori</i> strains, and also has antiinflammatory, antioxidant and antitumoral activity. An extract from the root of <i>Zingiber officinale</i> reduced the minimum inhibitory concentrations of aminoglycosides in vancomycin-resistant enterococci. The effective compound [10]-gingerol with its detergent-like effect potentiated the antimicrobial activity of the aminoglycosides. High level validity for diarrhea and scours.	139, 140

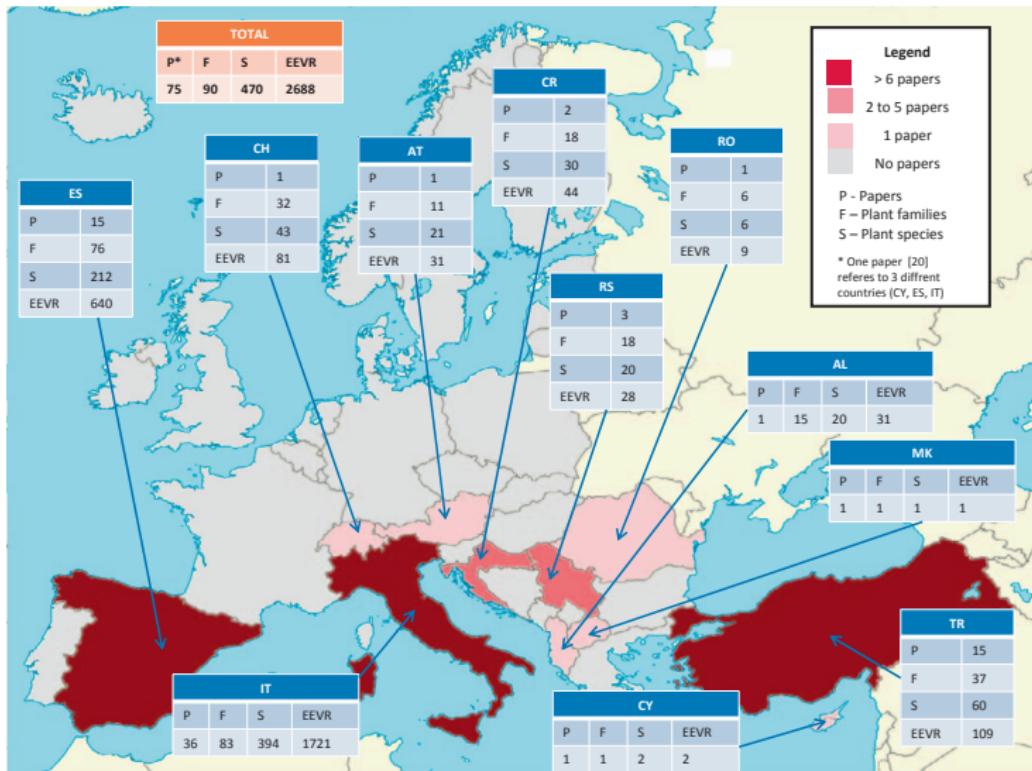
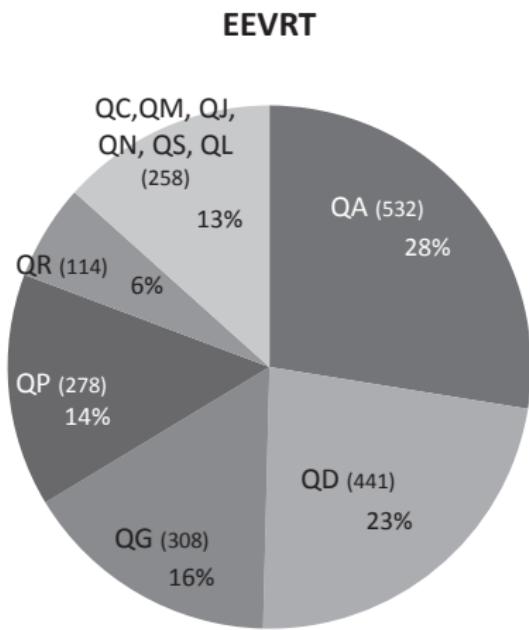


Fig. 2. European map of ethnoveterinary research. AL = Albania; AT = Austria; CH = Switzerland; CR = Croatia; CY = Cyprus; RO = Romania; IT = Italy; MK = Macedonia; RS = Serbia; TR = Turkey.

Fig. 3. Distribution of European Ethnoveterinary use Reports (EEVR) according to veterinary therapeutic indications of the Anatomical Therapeutic Chemical Classification system for veterinary medicinal products (EEVRT). ATC-vet codes: QA = Alimentary tract and metabolism; QC = Cardiovascular system; QD = Dermatologicals; QG = Genito urinary system and sex hormones; QJ = Anti-infectives for systemic use; QL = Antineoplastic and immunomodulating agents; QM = Musculoskeletal system; QN = Nervous system; QP = Antiparasitic products, insecticides, and repellents; QR = Respiratory system; QS = Sensory organs. In brackets = Number of EEVRT per ATC-vet code; percentage referred to a total of 1,931 EEVRT.



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