

Plant resources used for traditional ethnoveterinary phytotherapy in Sardinia (Italy)

S. Bullitta · G. Piluzza · L. Viegi

Received: 22 February 2006 / Accepted: 28 September 2006 / Published online: 18 April 2007
© Springer Science+Business Media B.V. 2007

Abstract The diffusion of herbal remedies for therapies on domestic animals in Sardinia (Italy) was investigated by means of expeditions in the regional territory. The monitoring of knowledge related to plant species utilised in the past for traditional veterinary practices, favoured the recovery of ancient local traditions related to veterinary ethnobotany. Forty two species with several properties have been recorded and compared to uses on domestic animals in other Italian regions. Therapeutic uses of the same plant species for humans and animals in Sardinia have also been compared. The identification of plant species traditionally used for veterinary practices from the local flora could be also potentially useful for the isolation of natural extracts of phytotherapeutic interest to increase animal welfare and quality of animal productions in organic farming.

Keywords Ethnobotany · Ethnoveterinary · Phytotherapy · Sardinia

S. Bullitta (✉) · G. Piluzza
ISPAAM-CNR sez. Sassari, Via E. de Nicola 1,
07100 Sassari, Italy
e-mail: bullitta@cspm.ss.cnr.it

L. Viegi
Dipartimento di Biologia, Unità di Botanica,
Università di Pisa, Via L. Ghini 5, 56126 Pisa, Italy

Introduction

The importance of ethnoveterinary studies is to be correlated to the renewed interest on phytotherapy in the feeding and health care of domestic animals (EC Regulation n. 1804/99).

The inventory of traditional ethnobotanic knowledge is a fundamental preliminary step for the isolation of natural extracts from species of Mediterranean pasturelands in view of the utilisation for the production of new phytotherapeutic substances for domestic animals.

We investigated about the diffusion of herbal remedies on domestic animals in Sardinia (Italy) by means of expeditions in the regional territory for monitoring knowledge related to plant species utilised in the past for traditional veterinary practices.

Main objective of the study was the recovery of ancient local traditions related to veterinary ethnobotany and also the identification of potential plant resources useful for phytotherapy treatments on domestic animals.

Another objective was to hinder the continuous erosion of knowledge related to the local ethnoveterinary traditions.

This study is also a mean of diffusion of knowledge on local genetic resources, potentially useful to develop new natural products for animal phytotherapy and feed additives, to improve animal performances and productions for organic animal farming.

A comparison between Sardinian and other Italian ethnoveterinary practices was also performed in order to integrate knowledge related to the extremely different environments, animal production systems and traditions in Italy. Plants therapeutic properties indicated for domestic animals during the interviews were compared with properties obtained by searching recent literature about phytotherapeutic practices on humans in Sardinia, particularly the studies by Ballero et al. (2001), Palmese et al. (2001), Atzei (2003), Loi et al. (2004).

Materials and methods

The inventory of traditional veterinary practices was made through the set up of a questionnaire and its diffusion in animal breeding farms in some different districts of rural areas. For the purposes of our research, it was necessary to interview aged people often retired from work, differently from other kind of investigations requiring random sampling or probability sampling with quotas (Sudman 1966) in order to reduce the selection bias. The “standard” questionnaire, according to Viegi et al. (1999), included information such as the taxonomy and vernacular names of plant species, the plant parts utilised, the periods and techniques of collection, the plant preparation and utilisation methods, the type of animals and illnesses treated, the present and past frequency of utilisation of the remedies, the evaluation of the efficacy, the other uses of the plants, the geographical areas of diffusion of the remedies.

Considered the type of investigation, aimed at recovering traditional ethnoveterinary practices, farms devoted to extensive animal breeding systems have been visited and some criteria have been defined in order to select farms (farmers age, percentage of animals fed from pasturelands, sanitary scheme).

Apart from the filling of questionnaires, herbarium specimen were collected and stored at the CNR-ISPAAM (Institute for animal production systems in Mediterranean environments) in Sassari.

The filled forms were ordered on the basis of species and phytotherapeutic uses, the correct taxo-

nomic identification of specimen was checked, according to Pignatti (1982) and Conti et al. (2005), and a database was created.

All the obtained information was compared to the available Italian ethnobotanic literature through the detailed inventory made by Viegi et al. (2003) in order to check new uses of the species.

Uses of the herbal remedies for therapies on humans and domestic animals in Sardinia were also compared.

Results

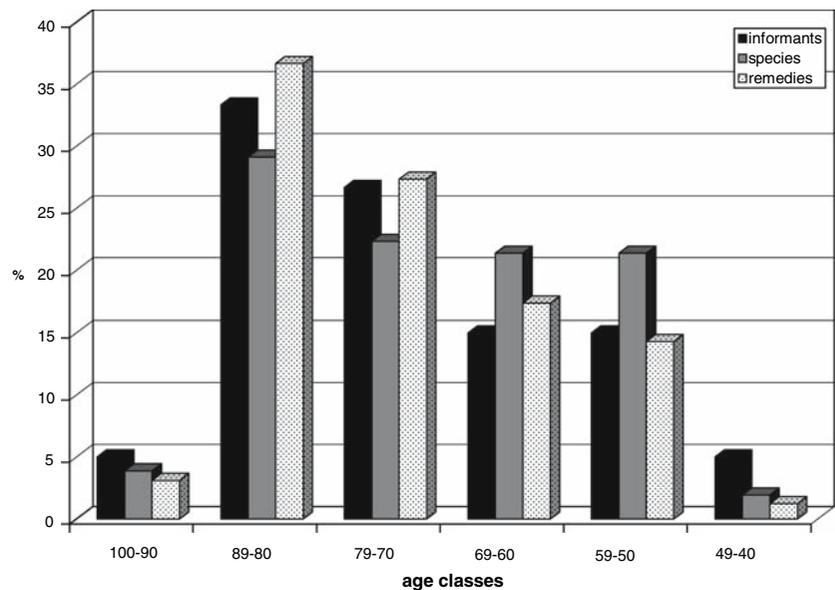
The distribution according to the age of the livestock breeders giving answer to the questionnaire and the related knowledge is shown on Fig. 1. About 60% of people giving answer to the questionnaires were within the age classes 70–79 and 80–89. The latter being the most represented class, reaching 33.3%. Among the interviewed livestock breeders younger than 50, only very few had knowledge useful to answer the questionnaires. Figure 1 shows the continuous loss of knowledge about traditions related to veterinary ethnobotany practices among generations determining the erosion of knowledge about such topic in Sardinia. All informers were men and only a few women (16%) gave answers in the interviews, confirming or adding new information to their husbands’ reminiscences. This can be explained by the fact that women were almost always not directly involved in the collection, preparation and administration of remedies to animals.

Based on the collected information 85 remedies of plant origin were identified (Table 1). Often the same remedy was used for different animal species.

The list of plant species utilised to treat domestic animals in Sardinia is reported in Table 2 with specifications about the illnesses treated for each animal species.

The diffusion and filling of questionnaires allowed us to record 41 plant species utilised to cure domestic animals in Sardinia, 9 of which were cultivated, the other 32 were from the wild flora, another species, *Carybdis maritima* (L.) Speta (= *Urginea maritima* (L.) Baker), was indicated

Fig. 1 Percentage distribution into age classes of the informants and their knowledge about species and remedies



as rats repellent. In most cases, only one remedy was obtained from each plant species and it was utilised for different animal species, while in some cases, several remedies were obtained from the same plant species, as indicated in Table 3.

Several plant organs were utilised for the preparation of herbal remedies. As listed in Table 3, the most used plant organs were in decreasing order, leaves, fruits, seeds, bulbs, stems, thorns, roots. Very often, the entire plant was used, as evident for almost a third of the species listed in Table 3.

Table 1 Number of traditional herbal remedies and “other” remedies referred to the different domestic animals

Domestic animals	Herbal remedies n.	“Other” remedies n.	Total n.
Horses	11	12	23
Pigs	4	13	17
Sheep	16	63	79
Goats	3	4	7
Oxen	14	7	21
Cows	10	8	18
Calves	4	–	4
All cattle ^a	22	16	38
Hens	2	1	3
Dogs	2	1	3
Cats	1	1	2
All species	8	3	11

^aRemedies for cows, calves and oxen

Cattle, ovine and horses were mostly treated with herbal remedies, while less remedies were used for caprine and swine species; a limited number of remedies was also used to treat poultry, dogs and cats.

Fourteen herbal remedies were exclusively intended for oxen, a remarkable amount, compared to the 22 remedies used to cure either cows, calves and oxen. In the past, oxen and horses were work animals and more attention was paid to their health.

As shown on Table 2, among the illnesses treated by herbal remedies were bloat and diarrhoea, cured respectively by means of eight and seven different herbal preparations, scabies and stomatitis treated respectively with five and four different herbal remedies. While mastitis and foot rot were the illnesses mostly treated with the “other” remedies of non herbal origin. Ashes and copper sulphate combined with other constituents were the mostly used among the “other” remedies.

According to the questionnaire answers, the period of time in which the remedies were utilised covers approximately 60 years, from the mid 20s to the mid 80s of the last century. All informers state to have learnt the use of remedies by their parents or elderly relatives. So it is quite evident that all remedies date back much longer ago than the dates reported on questionnaires. Only three

Table 2 Plant species used as herbal remedies for domestic animals in Sardinia and related pathologies

Species	Animals treated	Pathology
<i>Allium cepa</i> L.	Cattle ^a	Bloat
<i>Allium sativum</i> L.	Cattle, ^a horses, ovines ^b	Intestinal worms, hoof infection
<i>Anagyris foetida</i> L.	Dogs	Cold
<i>Apium nodiflorum</i> (L.) Lag. subsp. <i>nodiflorum</i>	Oxen, cows	Stomatitis, inappetence
<i>Arundo donax</i> L.	Horses	Intestinal worms
<i>Calamintha nepeta</i> (L.) Savi s. l.	All domestic animals	Wounds infected by worms
<i>Cicer arietinum</i> L.	Sheep	Swollen throat
<i>Cistus creticus</i> L. subsp. <i>eriocephalus</i> (Viv.) Greuter et Burdet (= <i>Cistus incanus</i> L.)	Sheep, oxen	Wounds by yoke, foot rot
<i>Crataegus monogyna</i> Jacq.	Sheep	Swollen ears, swollen head
<i>Cynoglossum officinale</i> L.	Sheep	Wounds, furuncles
<i>Daphne gnidium</i> L.	All domestic animals	Gastrointestinal infections
<i>Daucus carota</i> L. s. l.	Oxen	Diarrhoea
<i>Dipsacus fullonum</i> L.	Cattle ^a	Eyes infections
<i>Euphorbia characias</i> L.	Sheep, cows	Scabies
<i>Ficus carica</i> L.	Oxen	Pneumonia
<i>Hedera helix</i> L. s. l.	Cows	Post-partum disorders
<i>Hordeum vulgare</i> L.	Horses, pigs, cattle, ^a ovines ^b	Stomatitis, diarrhoea, intoxications
<i>Lavatera olbia</i> L.	Oxen	Diarrhoea
<i>Linum strictum</i> L. s. l.	Cows, oxen, horses	Abdominal pains, indigestion
<i>Malva sylvestris</i> L. subsp. <i>sylvestris</i>	All domestic animals	Wounds, abdominal pains, bloat, pneumonia, sprains, swelling legs, intoxications, fever.
<i>Matricaria chamomilla</i> L.	Cattle, ^a sheep, horses	Abdominal pains, bloat, bronchitis, colics
<i>Nasturtium officinale</i> R.Br. subsp. <i>officinale</i>	Oxen	Stomatitis
<i>Nicotiana tabacum</i> L.	Goats, ovines ^b	Scabies, hoof infections, ocular infections
<i>Olea europaea</i> L. (= <i>Olea europaea</i> L. var. <i>sylvestris</i>)	Lambs	Weaning
<i>Opuntia ficus-indica</i> (L.) Mill.	Cattle ^a	Diarrhoea
<i>Parietaria officinalis</i> L.	Oxen, horses, sheep	Diarrhoea, coughs, contusions, wounds, sprains
<i>Petroselinum crispum</i> (Mill.) Nym.	Cattle ^a	Bloat
<i>Pistacia lentiscus</i> L.	All domestic animals	Wound, scabies, bloat, constipation
<i>Plantago major</i> L. s. l.	Cows	Dug rhagades
<i>Prunus spinosa</i> L. subsp. <i>spinosa</i>	All domestic animals	Wound infected by worms
<i>Pteridium aquilinum</i> (L.) Kuhn	Sheep, horses	Worms, bloat, gastritis
<i>Pyrus spinosa</i> Forssk. (= <i>Pyrus amygdaliformis</i> Vill.)	Ovines ^b	Swollen head and legs
<i>Quercus suber</i> L.	Horses, cattle, ^a sheep, dogs	Wounds, sprains, scabies, mastitis, weaning lambs
<i>Sambucus nigra</i> L.	All domestic animals	Wounds, nails infections
<i>Smilax aspera</i> L.	Calves	Purulent vesicles
<i>Smyrniolum olusatrum</i> L.	Horses	Weakness, inappetence
<i>Umbilicus rupestris</i> (Salisb.) Dandy	All domestic animals	Wounds, diarrhoea, fever, intoxications
<i>Urtica dioica</i> L. subsp. <i>dioica</i>	Cattle, ^a sheep, horses, pigs	Contusions
<i>Vicia faba</i> L.	Cattle, ^a ovines ^b	Diarrhoea
<i>Vitis vinifera</i> L. s. l.	Ovines, ^b cattle, ^a hens	Stomatitis, mastitis, constipation, blue tongue, throat infection, intestinal worms, postpartum collapse, bloat

^a Cure for cows, calves and oxen^b Cure for sheep, rams and lambs

among the interviewed people referred to have personally set up some herbal remedies after several adjustments.

A high proportion (96%) said to have personally prepared and administered to animals the traditional herbal remedies they referred about in the questionnaire, while only 4% said to have learnt about, but had never utilised the remedies that they described.

Only 22% of interviewed people stated to utilise some of the herbal remedies still today while 27% of them are currently using the “other” remedies.

The list of species that are still occasionally used to prepare herbal remedies is reported in Table 4 while details on their properties and about the animals treated were given in Table 2.

Table 3 Number of remedies and plant organs utilized from each species

Plant species	Plant organs used	Number of remedies (or other uses)
<i>Allium cepa</i> L.	Bulbs	3
<i>Allium sativum</i> L.	Bulbs	2
<i>Anagyris foetida</i> L.	Whole plant	1
<i>Apium nodiflorum</i> (L.) Lag. subsp. <i>nodiflorum</i>	Whole plant	2
<i>Arundo donax</i> L.	Leaves	1
<i>Calamintha nepeta</i> (L.) Savi s. l.	Whole plant	1
<i>Carybdis maritima</i> (L.) Speta	Bulbs	1 ^a
<i>Cicer arietinum</i> L.	Whole plant	1
<i>Cistus creticus</i> L. subsp. <i>eriocephalus</i> (Viv.) Greuter et Burdet	Leaves, fruits	2
<i>Crataegus monogyna</i> Jacq.	Thorns	1
<i>Cynoglossum officinale</i> L.	Leaves	1
<i>Daphne gnidium</i> L.	Fruits	1
<i>Daucus carota</i> L. s. l.	Leaves	1
<i>Dipsacus fullonum</i> L.	Whole plant	1
<i>Euphorbia characias</i> L.	Stems	1
<i>Ficus carica</i> L.	Leaves	1
<i>Hedera helix</i> L. s. l.	Leaves	1
<i>Hordeum vulgare</i> L.	Seeds	3
<i>Lavatera olbia</i> L.	Whole plant	1
<i>Linum strictum</i> L. s. l.	Seeds	2
<i>Malva sylvestris</i> L.	Leaves	5
<i>Matricaria chamomilla</i> L.	Whole plant	2
<i>Nasturtium officinale</i> R. Br. subsp. <i>officinale</i>	Whole plant	1
<i>Nicotiana tabacum</i> L.	Leaves	2
<i>Olea europaea</i> L. (= <i>Olea europaea</i> L. var. <i>europaea</i>)	Drupes	8
<i>Olea europea</i> L. (= <i>Olea europea</i> L. var. <i>sylvestris</i> (Mill.) Rouy)	Leaves	1
<i>Opuntia ficus-indica</i> (L.) Mill.	Cladophylls	1
<i>Parietaria officinalis</i> L.	Whole plant	4
<i>Petroselinum crispum</i> (Mill.) Nym.	Whole plant	1
<i>Pistacia lentiscus</i> L.	Stems, fruits	5
<i>Plantago major</i> L. s. l.	Leaves	1
<i>Prunus spinosa</i> L. subsp. <i>spinosa</i>	Leaves	1
<i>Pteridium aquilinum</i> (L.) Kuhn	Roots	2
<i>Pyrus spinosa</i> Forssk.	Thorns	1
<i>Quercus suber</i> L.	Bark	5
<i>Sambucus nigra</i> L.	Leaves	1
<i>Smilax aspera</i> L.	Whole plant	1
<i>Smyrniolum olusatrum</i> L.	Whole plants	1
<i>Umbilicus rupestris</i> (Salisb.) Dandy	Leaves	2
<i>Urtica dioica</i> L. subsp. <i>dioica</i>	Whole plant	1
<i>Vicia faba</i> L.	Seeds	1
<i>Vitis vinifera</i> L. s. l.	Fruits	10

^a Used as rat repellent

Table 4 Plant species for herbal remedies

<i>Anagyris foetida</i> L.
<i>Arundo donax</i> L.
<i>Calamintha nepeta</i> (L.) Savi s. l.
<i>Cicer arietinum</i> L.
<i>Crataegus monogyna</i> Jacq.
<i>Daphne gnidium</i> L.
<i>Euphorbia characias</i> L.
<i>Hedera helix</i> L. s. l.
<i>Hordeum vulgare</i> L.
<i>Linum strictum</i> L. s. l.
<i>Matricaria chamomilla</i> L.
<i>Olea europaea</i> L. (= <i>Olea europaea</i> L. var. <i>europaea</i>)
<i>Olea europaea</i> L. (= <i>Olea europaea</i> L. var. <i>sylvestris</i> (Mill.) Rouy)
<i>Parietaria officinalis</i> L.
<i>Pistacia lentiscus</i> L.
<i>Plantago maior</i> L. s. l.
<i>Prunus spinosa</i> L. subsp. <i>spinosa</i>
<i>Pyrus spinosa</i> Forssk.
<i>Quercus suber</i> L.

Animal breeders were also asked about the effectiveness of remedies. A list of plant species always referred by all animal breeders as effective to treat certain illnesses is reported on Table 5, together with the kind of preparation and way of administration to animals. Remedies were usually given to animals as feed (F), by oral administration (OA), external administration (EA) or inhalation (I).

Another aspect investigated during the interviews was the eventual use of herbal remedies adopted either for domestic animals and for humans. Often the remedies were the same but sometimes variants were made in preparations. The 31% of species used to cure animals were also used for humans as shown on Table 6, where uses and pathologies related to humans are specified.

On Annexe I, plants therapeutic properties on animals referred during the interviews are compared to the properties on humans reported by

Table 5 Plant species for herbal remedies considered effective by the interviewed animal breeders with related pathologies treated, preparation and administration of the remedies

Plant species	Pathologies and animals treated	Preparation and administration
<i>Allium cepa</i> L.	Bloat (c)	(F) Bulbs with lard
<i>Allium sativum</i> L.	Intestinal worms, hoof infection (c, h, ov)	(F) Bulbs with vinegar; (EA) mashed bulbs
<i>Apium nodiflorum</i> (L.) Lag. subsp. <i>nodiflorum</i>	Stomatitis, inappetence (o, cw)	(EA) Fresh leaves on tongue; (F) whole plant
<i>Calamintha nepeta</i> (L.) Savi s. l.	Wounds infected by worms (a)	(EA) Juice of the crushed plant
<i>Crataegus monogyna</i> Jacq.	Swollen head and ears (ov)	(EA) Thorns to cut into swollen parts
<i>Ficus carica</i> L.	Pneumonia (o)	(I) Leaves fumigations
<i>Cistus creticus</i> L. subsp. <i>eriocephalus</i> (Viv.) Greuter et Burdet	Foot rot (s)	(EA) Fresh leaves; fruits decoction
<i>Lavatera olbia</i> L.	Diarrhoea (o)	(OA) Plant decoction
<i>Malva sylvestris</i> L.	Abdominal pains, poisoning, pneumonia, fever, bloat, diarrhoea/wounds, swollen legs, sprains (a)	(OA) Plant decoction/(EA)
<i>Matricaria chamomilla</i> L.	Abdominal pains, bronchitis, colics (c, h, s)/ bloat (c)	(OA) Plant decoction/(OA) plant decoction plus oil and mallow
<i>Olea europaea</i> L. (= <i>Olea europaea</i> L. var. <i>europaea</i>)	Abdominal pains, constipation, bloat, throat infection, indigestion/scabies, wounds (a)	(OA) Oil /EA oil
<i>Nasturtium officinale</i> R. Br. subsp. <i>officinale</i>	Stomatitis (o)	(EA) Fresh plant in the tongue
<i>Opuntia ficus-indica</i> (L.) Mill.	Diarrhoea (c)	(F) Cladophylls
<i>Parietaria officinalis</i> L.	Coughs, diarrhoea/contusions/wounds (c,s), sprains (h)	(OA) Plant decoction /(EA) crushed leaves/(EA) leaves decoction
<i>Pistacia lentiscus</i> L.	Constipation/wounds/scabies (a)/bloat (c)	(OA) Fruit and leaves decoction/(EA) powdered stems/fruit oils/(EA) stem on incisions of veins
<i>Prunus spinosa</i> L. subsp. <i>spinosa</i>	Wounds infected by worms (a)	(EA) crushed leaves

Table 5 continued

Plant species	Pathologies and animals treated	Preparation and administration
<i>Pteridium aquilinum</i> (L.) Kuhn	Intestinal worms, gastritis (s, h), bloat (s)	(OA) Root decoction, (I) roots fumigations
<i>Pyrus spinosa</i> Forssk.	Swollen head and legs (ov)	(EA) Thorns to cut into swollen parts
<i>Quercus suber</i> L.	Wounds, sprains/scabies (a)	(EA) Bark decoction/burnt cork
<i>Sambucus nigra</i> L.	Wounds (a)	(EA) Crushed leaves
<i>Smilax aspera</i> L.	Purulent vesicles (cv)	(EA) Plant decoction
<i>Umbilicus rupestris</i> (Salisb.) Dandy	Wounds/diarrhoea, fever, poisoning (a)	(EA) Crushed leaves/(OA) leaves decoction

(a) All domestic animals; (c) cattle; (cv) calves; (cw) cows; (h) horses; (o) oxen; (ov) ovines; (s) sheep; (EA) external application, (F) feed, (I) inhalation, (OA) oral administration

Ballero et al. (2001), Palmese et al. (2001), Atzei (2003), Loi et al. (2004) in their recent studies done in Sardinia. For each species, some therapeutic properties are coincident for humans and domestic animals, while often, peculiar properties are evident only for humans or only for domestic animals.

On the basis of the investigation results, it seems that species mostly utilised on domestic animals were in decreasing order: *Malva sylvestris*, *Matricaria chamomilla*, *Olea europaea*, *Parietaria officinalis*, *Umbilicus rupestris*, *Vitis vinifera* s. l.

Table 6 Plant species that according to the animal breeders interviewed were used either for humans and domestic animals with the referred indications about the human pathologies

Plant species	Pathologies treated and different uses for humans
<i>Allium sativum</i> L.	Intestinal worms
<i>Daphne gnidium</i> L.	Gastroenteric infections
<i>Hordeum vulgare</i> L.	Diarrhoea
<i>Malva sylvestris</i> L.	Abdominal pains, arthrosis, varicose veins, swelling
<i>Matricaria chamomilla</i> L.	Abdominal pains, bronchitis, refreshing
<i>Olea europaea</i> L. (= <i>Olea europaea</i> L. var. <i>europaea</i>)	High blood pressure, corn-plaster
<i>Olea europaea</i> L. (= <i>Olea europaea</i> L. var. <i>sylvestris</i>)	High blood pressure
<i>Parietaria officinalis</i> L.	Diarrhoea, bronchitis, hair treatment
<i>Pistacia lentiscus</i> L.	Wound disinfectant
<i>Sambucus nigra</i> L.	Wounds
<i>Smilax aspera</i> L.	Fever, toothache
<i>Umbilicus rupestris</i> (Salisb.) Dandy	Wound, diarrhoea, fever, poisoning
<i>Vicia faba</i> L.	Diarrhoea, wound disinfectant

The bioactive compounds officially recognised in human pharmacopoeia related to each of the species singled out during the present investigation are listed in Table 7, according to Borio (1981) and Gastaldo (1987) indications.

Discussion

Comparing our data to those available in Italy about the use of herbal remedies in ethnoveterinary practices, it is evident that among the 42 plant species singled out from the interviews to Sardinian animal breeders, eight were never reported before in the other Italian regions: (*Anagyris foetida*, *Arundo donax*, *Cicer arietinum*, *Daucus carota* s. l., *Dipsacus fullonum*, *Pyrus amygdaliformis*, *Smyrniolum olusatrum*, *Umbilicus rupestris*).

The following species (*Apium nodiflorum* subsp. *nodiflorum*, *Cynoglossum officinale*, *Daucus carota* s. l., *Dipsacus fullonum*, *Linum strictum* s. l., *Nasturtium officinale* subsp. *officinale*, *Petroselinum crispum*, *Prunus spinosa* subsp. *spinosa*) are not mentioned as herbal remedies for domestic animals in the recently published search about Sardinian ethnobotanic traditions made by Atzei (2003).

Most of the species are the same used in other Italian regions, while some are different species belonging to the same genera. A series of comparisons of our data to those reported by Viegi et al. (2003) in their review of plants used in folk veterinary medicine in Italy is listed below.

Cistus monspeliensis L. instead of *Cistus creticus* L. subsp. *eriocephalus* (Viv.) Greuter et Burdet (= *Cistus incanus* L.) is known for the same use (vulnerary).

Table 7 Bioactive compounds known for each species

Plant species	Bioactive compounds
<i>Allium cepa</i> L.	Etheric oil
<i>Allium sativum</i> L.	Essential oils, allyl sulphide
<i>Arundo donax</i> L.	Glucoside, alkaloid, resins, potassium salt
<i>Calamintha nepeta</i> (L.) Savi s. l.	Essential oils, tannins
<i>Crataegus monogyna</i> Jacq.	Essential oils, flavonoids
<i>Daucus carota</i> L. s. l.	Essential oils, vitamins, sugars
<i>Dipsacus fullonum</i> L.	Salicylic acid, glucoside, tannins
<i>Hedera helix</i> L. s. l.	Alkaloid, flavonoid, glucoside, organic acids
<i>Hordeum vulgare</i> L.	Starchs, sugars, mineral salts
<i>Malva sylvestris</i> L.	Organic acids, resins, tannins
<i>Matricaria chamomilla</i> L.	Alcohol, essential oils
<i>Nasturtium officinale</i> R. Br. subsp. <i>officinale</i>	Mineral substances, vitamins
<i>Nicotiana tabacum</i> L.	Organic acids, alkaloids, tannins
<i>Olea europaea</i> L.	Glucosides, phytosterols, vitamins
<i>Opuntia ficus-indica</i> (L.) Mill.	Mucilages, flavonoids, sugars
<i>Parietaria officinalis</i> L.	Flavonoids, tannins, mineral salts, mucilages
<i>Petroselinum crispum</i> (Mill.) Nym.	Essential oils, vitamins, glucosides, sugars, mineral substances
<i>Plantago major</i> L. s. l.	Saponins, tannins
<i>Prunus spinosa</i> L. subsp. <i>spinosa</i>	Organic acids, glucosides, essential oils, tannins
<i>Quercus suber</i> L.	Gallic acid, pectins, resins, tannins
<i>Sambucus nigra</i> L.	Ascorbic acid, alkaloids, glucosides, mucilages, etheric oils, tannins
<i>Smilax aspera</i> L.	Sugars, mineral salts
<i>Urtica dioica</i> L. subsp. <i>dioica</i>	Formic acid, mucilages, tannins, vitamins
<i>Vicia faba</i> L.	Glycoalkaloid, vitamins
<i>Vitis vinifera</i> L. s. l.	Alcohol, organic acids, flavonoids, tannins, ascorbic acid, sugars

Instead of *Crataegus monogyna* Jacq. it is known *C. laevigata* (Poiret) DC. (not present in Sardinia) with different use.

Besides *Daphne gnidium* L. (as poison for fraud fishing), also *D. mezereum* L. (antiparasitic) (not present in Sardinia) (Cappelletti et al. 1981; Renzetti and Taiani 1988).

Besides *Euphorbia characias* L. also *E. ceratocarpa* Ten. (not present in Sardinia) (Barbagallo et al. 1979b), *E. dendroides* L. (Chiovenda-Bensi 1960; Lentini et al. 1988), *E. helioscopia* L. subsp. *helioscopia* (Barbagallo and Furnari 1967; Barbagallo et al. 1979a), *E. lathyris* L. (Corsi et al. 1981; De Bellis 1988; Pieroni 2000; Guarrera 2002), *E. rigida* M. Bieb. (Barbagallo et al. 1979b), *E. spinosa* L. s. l. (Gastaldo et al. 1978) are used for various infections.

Ficus carica L. has a similar use in Abruzzo (respiratory diseases) (Manzi 1989), various uses

in other regions (De Bellis 1988; Guarrera 1981, 1994; De Feo et al. 1992; Ciccodicola 1995).

Hedera helix L. s. l. has a similar use in most regions (post-partum troubles) (Tammaro 1984).

Hordeum vulgare L. has similar uses in Tuscany and Umbria (gastrointestinal diseases) (Ferri 1961; De Capite and Menghini 1973).

Instead of *Lavatera olbia* L. are used *L. arborea* L. and *L. cretica* L. (gastrointestinal diseases) (Guarrera 1990; De Feo et al. 1992; De Feo and Senatore 1993).

Linum strictum L. s. l. has a similar use as *L. usitatissimum* L. in all Italian regions (gastrointestinal diseases) (Bandini 1961; Bellomaria 1982; Guarrera 1987; Nardelli 1987; Renzetti and Taiani 1988; Amici 1992; Uncini Manganeli and Tomei 1995; Viegi et al. 1999).

Malva sylvestris L. subsp. *sylvestris* has similar uses in all Italian regions, where *M. neglecta* Wallr. (Chimenti Signorini and Fumagalli 1983)

and *M. parviflora* L. (Atzei et al. 1991) are also utilised.

Nasturtium officinale R. Br. subsp. *officinale* used in Sardinia for stomatitis, has various utilisations in other three Italian regions (Gastaldo et al. 1978; Renzetti and Taiani 1988; Guarrera 1994).

Nicotiana tabacum L. besides the scabies treatment as in Latium (Guarrera 1995), is used in Sardinia as a remedy for eyes affections and antivulnerary.

Olea europaea L. is also used in Italy for gastrointestinal troubles and as insect repellent (Corrain 1977; Guarrera 1994), while it is not reported the use to treat scabies and for lambs weaning.

Opuntia ficus-indica (L.) Mill. used in other regions as laxative, anti-inflammatory, or against bloats (Catanzaro 1968; Guarrera 1981), in Sardinia is used against diarrhoea.

Parietaria officinalis L. has similar use in all Italy.

The use of *Petroselinum crispum* (Mill.) Nym. against bloat is not known in other regions.

The use of *Pistacia lentiscus* L. is known only for fraud fishing (Mearelli and Tardelli 1995), while in Sardinia it is used as a remedy for gastrointestinal diseases and scabies.

Plantago major L. s. l. has similar use in Italy where *P. lanceolata* L. (Corrain 1977; Maccioni and Marchini 1999) is also used.

Prunus spinosa L. subsp. *spinosa* is not used in other regions, where *P. avium* L. subsp. *avium* (Corsi et al. 1981; Guarrera 1987) and *P. cerasus* L. (De Capite and Menghini 1973) are more frequent.

Pteridium aquilinum (L.) Kuhn is used for gastro-intestinal diseases, while in other regions it is known to favour placenta rejection (Guarrera 1987, 1994; Manzi 1989).

The species of *Quercus* genera have mostly external use, *Quercus suber* L. is used also in Tuscany (Mearelli and Tardelli 1995); *Q. cerris* L. (not present in Sardinia) (Guarrera 1994), *Q. pubescens* Willd. subsp. *pubescens* (Tammaro 1976, 1984) and *Q. robur* L. (Fossati et al. 1999) are also utilised in other regions.

Sambucus nigra L. has the same use (antivulnerary) in Tuscany (Corsi et al. 1981; Guarrera

1987, 1994, 2002; Viegi et al. 1999), while it has various uses in other regions.

Smilax aspera L. is used as wounding also in Latium (Guarrera 1994).

Carybdis maritima (L.) Speta used as rat-repellent, is known as anti-parasitic in Calabria (Lentini et al. 1988; Lentini and Aleo 1991).

Urtica dioica L. subsp. *dioica* has not similar uses in other Italian regions, where *U. membranacea* Poir. ex Savigny (Lentini et al. 1988; Viegi et al. 1999) and *U. urens* L. (Tammaro and Pietrocola 1975; Nardelli 1987; De Bellis 1988; Fossati et al. 1999) are also used.

Vicia faba L. has similar uses in Abruzzo (Manzi 1989), also *V. ervilia* (L.) Willd. (Guarrera 1990) is used.

Vitis vinifera L. s. l. has similar uses either external and internal.

More recently, Guarrera (2005), made a traditional phytotherapy review in Abruzzo, Latium, and Marche including veterinary and human uses. He reports veterinary uses different from our data such as *Allium sativum* L. as antiseptic for chickens; *Allium cepa* L. as digestive for sheep/livestock and for intestinal infections in chickens; *Ficus carica* L. buds applications in the mouth as digestive for bloated cows and sheep; *Hedera helix* L. s. l. in the inflammations of cattle caused by yokes; *Malva sylvestris* (L.) Mill. as digestive for livestock; *Matricaria chamomilla* L. as digestive for livestock; *Urtica dioica* L. subsp. *dioica* as recostituent for chicks, turkey cocks, pigs.

Conclusions

It is worth remembering the importance of the investigation in order to hinder the continuous process of loss of knowledge about local traditional ethnoveterinary practices also in view of the development of new herbal remedies for organic animal husbandry. It was clear during the interviews, that most of the knowledge about traditional herbal remedies used for domestic animals was lost, as many of the interviewed people could not clearly identify nor provide a plant sample of the species used for certain remedies. As a consequence, the herbal remedies we excluded from this paper because animal breeders could not

provide the corresponding plant samples, outnumber the remedies mentioned in the paper. The 42 species belonging to 28 families singled out during the investigation, anyway represent an important part of the Sardinian traditional knowledge about veterinary ethnobotany. The most represented families with four species are Liliaceae and Leguminosae, Rosaceae and Umbelliferae with three species each.

Acknowledgements Grateful thanks are due to the Fondazione Banco di Sardegna-Sassari, for financial support. The collaboration of the interviewed animal

breeders is acknowledged, particularly among them: Mr. Addis, Baule, Bitti, Brizzi, Bullitta, Cadau, Campus, Capula, Carta, Cau, Chessa-Luzzu, Daga, Delogu, Deserra, Devaddis, Fenu-Tolu, Fresu, Liperi, Lorenzoni, Mameli, Manca, Martinelli, Mula, Mulas, Mundula, Muntoni, Murgia, Ninniri, Nonna-Chessa, Palmas, Piluzza, Posadino, Re, Sanna, Satta, Sechi, Sechi-Saba, Sini, Sotgia-Pintus, Spano, Spezzigu, Suelzu, Usai, Vasamanni. Thanks are also due to Prof. G. Palmieri from the Faculty of Veterinary Science of Sassari for supporting our work, to the colleagues (G. Re, D. Dettori, S. Nieddu, P. Saba, A.P. Stangoni) from ISPAAM-CNR sez. Sassari, (G. Piras, G. Lei and G. Sini) from DISAGVA Department-Sassari and Dr. R. Vangelisti from Dept. of Biology-Pisa, for their technical support.

Annexe I

Therapeutical properties of plant species referred by animal breeders during the interviews and obtained from recent literature about phytotherapeutic practices on humans in Sardinian territories

Plant species	Therapeutical properties	
	For domestic animals referred during the present Sardinian investigation	For humans from recent ethnobotanic literature about Sardinian territories
<i>Allium cepa</i> L.	Carminative	Antidermatotic, haemostatic, antiseptic, bechic, antiasthmatic, laxative, emetic, vasodilator, antidiabetic, anthelmintic, emollient, diuretic, anti-inflammatory, analgesic (Atzei 2003) Antidermatotic (Ballerio et al. 2001) Analgesic, anti-inflammatory, antialgic, hepatic, antiseptic, antiasthmatic, anti-herpetic (Palmese et al. 2001) Anthelmintic, digestive, expectorant, antidontalgic (Loi et al. 2004)
<i>Allium sativum</i> L.	Anthelmintic, antiseptic	Antiseptic, analgesic, anti-inflammatory, antidermatotic, disinfectant, carminative, bechic, anthelmintic, digestive, carminative, hemostatic, hypotensive, hypoglycemic, astringent, anti-haemorrhoids, febrifuge, diuretic (Atzei 2003) Bechic, anthelmintic, stomatic, antidermatotic, anti-haemorrhoids, antirheumatic (Ballerio et al. 2001) Antidontalgic, Anti-inflammatory, lenitive, antirheumatic, antiseptic, antineuralgic, vermifuge, antipyretic, antihypertensive, depurative (Palmese et al. 2001) Antiphlogistic, spasmolytic (Loi et al. 2004)
<i>Anagyris foetida</i> L.	Anti-inflammatory	Emetic, laxative, emmenagogue, abortive, antiasthmatic, analgesic, antidermatotic, parasiticide (Atzei 2003)
<i>Apium nodiflorum</i> (L.) Lag. subsp. <i>nodiflorum</i>	Stomatic, appetizing	Depurative, antiphlogistic, diuretic, laxative, tonic, hypertensive (Atzei 2003) Diuretic, laxative, appetizing, antiphlogistic (Loi et al. 2004)

Annex I continued

Plant species	Therapeutical properties	
	For domestic animals referred during the present Sardinian investigation	For humans from recent ethnobotanic literature about Sardinian territories?
<i>Arundo donax</i> L.	Anthelmintic	Disinfectant, emostatic, vulnerary, anti-inflammatory, astringent, diuretic, appetizing, emmenagogue, diaphoretic, galattogogue, haemostatic, plaster (Atzei 2003) Vulnerary, antiotalgic (Ballero et al. 2001) Haemostatic, vulnerary, antiseptic, emmenagogue, diuretic, diaphoretic, galactagogue (Palmese et al. 2001)
<i>Calamintha nepeta</i> (L.) Savi s. l.	Vermifuge	Nervine, antispasmodic, balsamic, antitussive, anticatarrhal, antielmintic, decongestant, tonic, stomachic, anti-diarrhoeic, digestive, vulnerary, poultice for burns, analgesic, antidontalgic (Atzei 2003)
<i>Cicer arietinum</i> L.	Anti-inflammatory	Diuretic, emmenagogue, galactagogue, antiaphonic, refreshing, vulnerary, antidermatosis (Atzei 2003)
<i>Cistus creticus</i> L. subsp. <i>eriocephalus</i> (Viv.) Greuter et Burdet	Antiseptic	Revulsive, antidermatosis, tonic
<i>Crataegus monogyna</i> Jacq.	Anti-inflammatory	Cardiotonic, vasodilator, nervine, antispasmodic, febrifuge, diuretic, antirheumatic, anticoagulant, anticholesterolemic, tonic, anti-diarrhoeic, antineuralgic, antidontalgic, antidermatosis, abortive (Atzei 2003) Sedative, analgesic (Loi et al. 2004)
<i>Cynoglossum officinale</i> L.	Antiseptic	
<i>Daphne gnidium</i> L.	Anti-dysenteric	Purgative, analgesic, antidermatosis, rubefacient, antirheumatic, antidontalgic (Atzei 2003) Antidontalgic antichilblains (Ballero et al. 2001)
<i>Daucus carota</i> L. s. l.	Astringent	Digestive, carminative, anti-diarrhoeic, vermifuge, antiaphonic, expectorant, depurative, hypoglycaemic, anti-anaemic, diuretic, emmenagogue, galactagogue (Atzei 2003) Resolvent, carminative, vulnerary, emmenagogue, diuretic, galactagogue, hypoglycaemic, anti-diarrhoeic (Palmese et al. 2001)
<i>Dipsacus fullonum</i> L.	Antiseptic	Stimulant, diuretic, astringent (Loi et al. 2004) Digestive, antidermatosis, ophthalmic (Atzei 2003)
<i>Euphorbia characias</i> L.	Revulsive	Rubefacient, vesicatory, antichilblains, antiwarts, antidermatosis, purgative, emetic, antiasthmatic (Atzei 2003)
<i>Ficus carica</i> L.	Antiseptic, balsamic	Antiwarts, antidermatosis, analgesic (Atzei 2003)

Annex I continued

Plant species	Therapeutical properties	
	For domestic animals referred during the present Sardinian investigation	For humans from recent ethnobotanic literature about Sardinian territories?
<i>Hedera helix</i> L. s. l.	Analeptic	Emetic, purgative, odontalgic, resolvent, antidermatologic, disinfectant, antitussive, analgesic, cardiogenic, antidontalgic, ophthalmic, vasoconstrictor, antiechymotic, nervine, antirheumatic, diuretic, anti-inflammatory (Atzei 2003) Antidermatologic (Ballero et al. 2001), Decongestant (Loi et al. 2004)
<i>Hordeum vulgare</i> L.	Anti-diarrhoeic, refreshing, stomatic	Antidermatologic, ophthalmic, anthelmintic, antiemetic, anti-diarrhoeic, aperient, bechic, balsamic (Atzei 2003) Stomatic, ophthalmic (Ballero et al. 2001) Anti-inflammatory, mucolytic, decongestant, emollient, bechic, laxative, depurative (Palmese et al. 2001) Laxative (Loi et al. 2004)
<i>Lavatera olbia</i> L.	Anti-diarrhoeic	Decongestant, antirheumatic, hepatic, digestive, antitussive, laxative, antidermatologic, emollient, antiflogistic (Atzei 2003) Antidermatologic, laxative, antitussive, hepatic, anti-inflammatory (Ballero et al., 2001)
<i>Linum strictum</i> L. s. l.	Anti-spasmodic, depurative	
<i>Malva sylvestris</i> L.	Anti-diarrhoeic, anti-inflammatory, antiseptic, anti-spasmodic, carminative, depurative, emollient, sedative	Emollient, anti-inflammatory, bechic, expectorant, decongestant, antiasthmatic, stomatic, digestive, stomachic, analeptic, carminative, hepatic, refreshing, laxative, analgesic, anti-diarrhoeic, antispasmodic, cholagogue, antidote, antidermatologic, depurative, hypotensive, antipyretic, nervine, emmenagogue, disinfectant, vulnerary, lenitive, resolvent, ophthalmic, odontalgic, antipruritic, foot care, antiechymotic, antirheumatic (Atzei 2003) Anti-inflammatory, bechic, laxative, antidermatologic, stomatic, anti-chilblain, vulnerary, antihemorrhoidal (Ballero et al. 2001) Laxative, depurative, diuretic, anti-inflammatory, analgesic, anti-oedematous, resolvent, lenitive, antiseptic (Palmese et al. 2001) Anti-inflammatory, odontalgic, stomatic, aperient, diuretic, laxative, odontalgic, antidermatologic, hypotensive, analeptic, emollient (Loi et al. 2004)

Annex I continued

Plant species	Therapeutical properties	
	For domestic animals referred during the present Sardinian investigation	For humans from recent ethnobotanic literature about Sardinian territories?
<i>Matricaria chamomilla</i> L.	Anti-spasmodic, carminative, bronchial spasmolytic	Analgesic, antispasmodic, digestive, nerveine, tonic, stomachic, analeptic, anti-diarrhoeic, hepatic, depurative, hypotensive, expectorant, decongestant, antipyretic, emmenagogue, anthelmintic, ophthalmic, odontalgic, stomatic, antidermatomic (Atzei 2003) Sedative, astringent, antiemetic, ophthalmic (Ballero et al. 2001) Sedative, antispasmodic, ophthalmic, anti-inflammatory, anti-diarrhoeic, antipyretic, emmenagogue, anti-oedematous (Palmese et al. 2001) Sedative, anti-inflammatory, ophthalmic, laxative, decongestant, hypnotic (Loi et al. 2004)
<i>Nasturtium officinale</i> R. Br subsp. <i>officinale</i>	Stomatic	Digestive, appetizing, laxative, hepatic, anthelmintic, diuretic, lithontripic, depurative, hypertensive, antianaemic, anti-inflammatory, anticoagulant, emmenagogue, analgesic, odontalgic, antidermatomic, analeptic, refreshing, febrifuge, expectorant, bechic (Atzei 2003) Digestive, anticatarrhal, cleansing agent (Loi et al. 2004)
<i>Nicotiana tabacum</i> L. <i>Olea europaea</i> L. (= <i>Olea europaea</i> L. var. <i>europaea</i>)	Antiseptic, vermifuge Antiseptic, anti-spasmodic, anti-inflammatory, carminative, laxative	Febrifuge, antimalarial, hypotensive, hypoglycaemic, stomatic, odontalgic, antihaemorrhoidal, diuretic, laxative, analgesic, hepatic, anthelmintic, emollient, antidermatomic, anti-inflammatory, colagogue, emetic, vulnerary, antirheumatic, parasiticide, spasmolytic, lenitive (Atzei 2003) Antidermatomic, vulnerary, laxative, hypotensive, antihaemorrhoidal (Ballero et al. 2001) Anti-oedematous, anti-inflammatory, analgesic, spasmolytic, lenitive, vulnerary, antidermatomic, anti-hypertensive, laxative, hepatic, emollient, hypoglycaemic, antihaemorrhoidal (Palmese et al. 2001) Hypotensive, febrifuge (Loi et al. 2004)
<i>Olea europaea</i> L. (= <i>Olea europaea</i> L. var. <i>sylvestris</i>)	Reconstituent	Antipyretic, antimalarial, hypotensive, anti-diarrhoeic, hepatic, astringent, lenitive, antiseptic, colagogue, laxative, stomatic, antidermatomic, anti-chilblains (Atzei 2003)

Annex I continued

Plant species	Therapeutical properties	
	For domestic animals referred during the present Sardinian investigation	For humans from recent ethnobotanic literature about Sardinian territories?
<i>Opuntia ficus-indica</i> (L.) Mill.	Anti-diarrhoeic	Antacid, astringent, antidermatotoxic, anti-inflammatory, emollient, antiseptic, odontalgic, antichilblains, antirheumatic, lenitive, nervine, antihemorrhoidal, vulnerary, antiphlogistic, analgesic, antirheumatic, antichilblains, emetic, expectorant, vulnerary (Atzei 2003) Antidermatotoxic, antiviral, anti-inflammatory, expectorant (Ballero et al. 2001) Lenitive, anti-oedematous, sedative, antiseptic, odontalgic, vulnerary, antidermatotoxic (Palmese et al. 2001) Antidermatotoxic, lenitive (Loi et al. 2004)
<i>Parietaria officinalis</i> L.	Anti-diarrhoeic, anti-inflammatory, antiseptic, expectorant	Digestive, emollient, antiphlogistic, refreshing, hepatic, laxative, anti-diarrhoeic, carminative, analgesic, antiseptic, diuretic, antispasmodic, decongestant, demulcent, expectorant, hypotensive, depurative, anticholesterolemic, hypoglycaemic, antihemorrhoidal, emollient, anti-inflammatory, sedative, nervine, emmenagogue, diaphoretic, antipyretic, refreshing, antimalarial, vulnerary, resolvent, antidermatotoxic, stomatic, ophtalmic (Atzei 2003) Febrifuge, antitussive, antihemorrhoidal (Ballero et al. 2001) Spasmolytic, anti-inflammatory, lenitive, antidermatotoxic, emollient, antihemorrhoidal, lithontriptic, analgesic, diuretic, sedative, hypoglycemic (Palmese et al. 2001) Anti-inflammatory, odontalgic, stomatic, digestive, hepatic, antispastic, diuretic (Loi et al. 2004)
<i>Petroselinum crispum</i> (Mill.) Nym.	Carminative	Diuretic, lithontriptic, stomatic, digestive, carminative, laxative, hepatic, analgesic, antacid, emmenagogue, galactofuge, abortive, depurative, tonic, sedative, antianaemic, febrifuge, hypotensive, expectorant, anthelmintic, spasmolytic, resolvent, antidote, ophtalmic, odontalgic (Atzei 2003) Hypotensive, antacid (Loi et al. 2004)
<i>Pistacia lentiscus</i> L.	Antiseptic, carminative, laxative	Stomatic, antidermatotoxic, astringent, analgesic, odontalgic, vulnerary, antirheumatic, antichilblains, antitumor, antipruritic, haemostatic, expectorant, diaphoretic, anti-inflammatory, anthelmintic, astringent, tonic, antiseptic, styptic, antiphlogistic (Atzei 2003) Antidermatotoxic, antichilblains, hepatic, antirheumatic, antitussive, stomatic (Ballero et al. 2001)

Annex I continued

Plant species	Therapeutical properties	
	For domestic animals referred during the present Sardinian investigation	For humans from recent ethnobotanic literature about Sardinian territories?
<i>Plantago major</i> L. s. l.	Anti-inflammatory, vulnerary	Antiseptic, vulnerary, lenitive, antirheumatic, antiarthritic, vesicatory, expectorant, analgesic, vulnerary, stomachic, spasmolytic, antiseptic, odontalgic, antiviral, astringent (Palmese et al. 2001) Antacid (Loi et al. 2004) Astringent, antidiarrhoeic, febrifuge, emollient, bechic, expectorant, anti-inflammatory, diuretic, antianaemic, emmenagogue, abortifacient, depurative, analgesic, emostatic, vulnerary, stomatic, antidermatosic, antipruritic, odontalgic, antineuralgic, ophthalmic (Atzei 2003)
<i>Prunus spinosa</i> L. subsp. <i>spinosa</i>	Antiseptic, vermifuge	Astringent, antidiarrhoeic, antiphlogistic, antidermatosic, antipyretic, antimalaric, expectorant, antitussive, antiasthmatic (Atzei 2003)
<i>Pteridium aquilinum</i> (L.) Kuhn	Anti-spasmodic, carminative, vermifuge	Antirheumatic, analgesic, hypotensive, anthelmintic, purgative, depurative, anti-inflammatory, antiarthrosis (Atzei 2003)
<i>Pyrus spinosa</i> Forssk.	Anti-inflammatory	Antidermatosic, antidiarrhoeic (Atzei 2003)
<i>Quercus suber</i> L.	Anti-inflammatory, antiseptic, vulnerary	Astringent, anti-diarrhoeic, antidermatosic, expectorant, hypnotic, anticoagulant, emostatic, vulnerary, anti-oedematous, analgesic, antirheumatic (Atzei 2003)
<i>Sambucus nigra</i> L.	Antiseptic	Decongestant, antiasthmatic, analgesic, stomatic, antidermatosic, laxative, antirheumatic, diuretic, hydrogogue, emetic, depurative, resolvent, antipyretic, diaphoretic, anti-inflammatory, astringent, lenitive, purgative, antihaemorrhoidal, ophthalmic, emollient, antiphlogistic, anti-oedematous, sedative, nervine, odontalgic, resolvent, anti-rheumatic, antiseptic, galactofuge, antiviral, bechic, expectorant, antitussive, digestive, carminative, stomatic, hepatic, antineuralgic, antispasmodic (Atzei. 2003) Odontalgic, ophthalmic, analgesic (Ballero et al. 2001) Anti-rheumatic, analgesic, spasmolytic, ophthalmic, antidermatosic, bechic, anti-inflammatory, diuretic, carminative, laxative, antiviral, resolvent, anti-neuralgic, decongestant, antiseptic, astringent, demulcent (Palmese et al. 2001) Anti-inflammatory, ophthalmic, cardiac (Loi et al. 2004)

Annex I continued

Plant species	Therapeutical properties	
	For domestic animals referred during the present Sardinian investigation	For humans from recent ethnobotanic literature about Sardinian territories?
<i>Smilax aspera</i> L.	Antiseptic	Antimalaric, diaphoretic, depurative, antiasthmatic, lenitive, antirheumatic, antidermatologic, hypotensive, diuretic, anti-diarrhoeic, anti-inflammatory, antipyretic, antitussive, antiseptic, rubefaciens, revulsive, antihaemorrhoidal, odontalgic, bechic, hepatic, anthelmintic, colagogue, antacid, antispasmodic, astringent, lithontripic, analgesic, antirheumatic, antichilblains, emmenagogue, antiarthritis, rubefacient (Atzei 2003) Antirheumatic, antidermatologic (Ballero et al. 2001) Antirheumatic, anti-arthritic, anti-inflammatory, diuretic, lithontripic, anti-asthmatic, depurative, spasmolytic, odontalgic, antidermatologic, hypotensive (Palmese et al. 2001) Laxative, depurative, cholagogue, diuretic, diaphoretic, anti-inflammatory, stomachic, bechic, antispasmodic, febrifuge, anti-rheumatic (Loi et al. 2004)
<i>Smyrniolum olusatrum</i> L.	Eupeptic, tonic	Carminative, appetizer, antichilblains (Atzei 2003)
<i>Umbilicus rupestris</i> (Salisb.) Dandy	Anti-diarrhoeic, antiseptic, depurative, febrifuge	Diuretic, hepatic, emollient, anti-inflammatory, vulnerary, antidermatologic, anti-oedematous, resolvent, analgesic, antihaemorrhoidal, ophthalmic, emostatic, lenitive, resolvent (Atzei 2003) Odontalgic, antidermatologic (Ballero et al. 2001) Antiseptic, antidermatologic, antihaemorrhoidal (Palmese et al. 2001)
<i>Urtica dioica</i> L. subsp. <i>dioica</i>	Anti-inflammatory	Purgative, astringent, anti-diarrhoeic, carminative, decongestant, anti-inflammatory, analgesic, stomachic, hepatic, colagogue, digestive, diuretic, depurative, antidermatologic, hypoglycaemic, antidiabetic, hypotensive, antianaemic, antihaemorrhoidal, antirheumatic, galactagogue, analeptic, antiphlogistic, stomachic, emostatic, antioedematous, vulnerary, antichilblains, astringent, revulsive, anti-inflammatory, rubefaciens stimulant (Atzei 2003) Digestive, diuretic, antitussive, anti-inflammatory, febrifuge, antidermatologic, antichilblains, anti-haemorrhoidal (Ballero et al. 2001) Anti-haemorrhoidal, antirheumatic, hepatic, laxative, neuralgic, depurative (Loi et al. 2004)

Annex I continued

Plant species	Therapeutical properties	
	For domestic animals referred during the present Sardinian investigation	For humans from recent ethnobotanic literature about Sardinian territories?
<i>Vicia faba</i> L.	Anti-diarrhoeic	Resolvent, lenitive, antidermatosis, antacid, analgesic, anti-diarrhoeic, antipyretic, vulnerary, anti-oedematous (Atzei 2003) Analgesic, antidermatosis, vulnerary (Ballero et al. 2001) Analgesic (Palmese et al. 2001)
<i>Vitis vinifera</i> L. s. l.	Anti-inflammatory, carminative, purgative, stomatic, stimulanting, anthelmintic	Vulnerary, antidermatosis, antihæmorrhoidal, emostatic, antiphlogistic, anti-diarrhoeic, galactofuge, ophthalmic, febrifuge, analgesic, antiasthmatic, odontalgic, anti-inflammatory, febrifuge, antihypotensive, disinfectant, emopoietic, antidontalgic, antipyretic, antichilblains, kidney, antiherpetic (Atzei 2003) Antidermatosis, bechic, antiphlogistic, diuretic, insecticide, odontalgic, emmenagogue (Ballero et al. 2001). Anti-parasitic, febrifuge, anti-inflammatory, antioedematous, analgesic (Palmese et al. 2001)

References

- Amici L (1992) Medicina popolare della Teverina. Regione Lazio (Assessorato alla Cultura) e Associazione Intercomunale della Teverina per la cultura
- Atzei AD, Orioni S, Sotgiu R (1991) Contributo alla conoscenza degli usi etnobotanici nella Gallura (Sardegna). *Bollettino della Società Sarda di Scienze Naturali* 28:137–177
- Atzei AD, OFM (2003) Le piante nella tradizione popolare della Sardegna. Delfino Editore, Sassari
- Ballero M, Poli F, Sacchetti G, Loi MC (2001) Ethnobotanical research in the territory of Fluminimaggiore (south-western Sardinia). *Fitoterapia* 72:788–801
- Bandini A (1961) Le piante della medicina tradizionale nell'alta Val di Vara (Liguria orientale). *Webbia* 16:143–163
- Barbagallo C, Furnari F (1967) Flora officinale del territorio di Caltagirone (Catania). Ed. Succ. Fusi, Pavia
- Barbagallo C, Grillo M, Meli R (1979a) Nota sulle piante officinali spontanee e coltivate del territorio di Cesarò (Messina). *Fitoterapia* L, 57–66
- Barbagallo C, Longhitano N, Meli R (1979b) Contributo alla flora del versante ovest dell'Etna con osservazioni sulle piante officinali. Cooperativa Universitaria Libreria Catanese, Catania, Italy
- Bellomaria B (1982) Le piante di uso popolare nel territorio di Camerino (Marche). *Arch Bot e Biogeogr Ital* 58:1–27
- Borio E (1981) Curarsi con erbe, radici, foglie e fiori, vol I–IV. Editrice Velar, Bergamo
- Cappelletti EM, Trevisan R, Foletto A, Cattolica PM (1981) Le piante utilizzate in medicina popolare in due vallate trentine: Val di Ledro e Val dei Mocheni. *Studi Trentini di Scienze Naturali* 58:119–140
- Catanzaro F (1968) Piante officinali dell'Isola di Pantelleria. *Webbia* 23:135–148
- Chimenti Signorini R, Fumagalli M (1983) Indagine etnofarmacobotanica nella Valtournanche (Val d'Aosta). *Webbia* 37:69–94
- Chiovenda-Bensi C (1960) *Florula Medicinale delle Cinque Terre*. *Webbia* 15:631–641
- Ciccodicola F (1995) Pratiche di guarigione e memoria collettiva-Considerazioni relative ad una ricerca sul campo. In: Giusti S (ed) *Le piante magiche-Una ricerca storico-antropologica*. Domograf, Roma, pp 241–301
- Conti F, Abbate G, Alessandrini A, Blasi C (2005) An annotated checklist of the Italian vascular flora. Palombi Editori, Roma
- Corrain C (1977) Ricordi di Folklore Polesano. Minelliana, Rovigo, pp 47–53
- Corsi G, Gaspari G, Pagni AM (1981) L'uso delle piante nell'economia domestica della Versilia collinare e montana. *Atti Soc Tosc Sci Nat, Mem Ser B* 87:309–386
- De Bellis A (1988) *Erbe di Val d'Orcia*. Editori del Grifo, Montepulciano, Siena
- De Capite L, Menghini A (1973) Le piante medicinali in Umbria nell'uso della veterinaria popolare. *Annali*

- Facoltà di Agraria Università di Perugia XXVIII:589–599
- De Feo V, Aquino R, Menghini A, Ramundo E, Senatore F (1992) Traditional phytoterapy in the Peninsula Sorrentina, Campania, Southern Italy. *J Ethnopharmacol* 36:113–125
- De Feo V, Senatore F (1993) Medicinal plants and phytoterapy in the Amalfitan Coast, Salerno province, Campania, Southern Italy. *J Ethnopharmacol* 39:39–51
- Ferri S (1961) Le piante della provincia di Siena attualmente usate nella medicina popolare. In: *Atti 21° Congresso Internaz. Scienze Farmaceutiche*, Pisa, September 4–8, 1961, pp 485–521
- Fossati F, Bianchi A, Favalli MA (1999) *Farmacopea popolare del parmense: passato e presente*. *Informatore Botanico Italiano* 31:171–176
- Gastaldo P, Barberis G, Fossati F (1978) Le piante della medicina tradizionale nei dintorni di Praglia (Appennino ligure-piemontese). *Atti Accademia Ligure di Scienze e Lettere* 35:125–128
- Gastaldo P (1987) *Compendio della Flora officinale italiana*. Piccin Ed
- Guarrera PM (1981) Ricerche etnobotaniche nelle Province di Macerata e di Ancona. *EPPOS* 2:99–108. *Rivista Italiana EPPOS* 4:220–228
- Guarrera PM (1987) Usi tradizionali delle piante nel territorio della Majella. In: *Fasc. Monograf, “Erbe e piante medicinali nella storia e nelle tradizioni popolari abruzzesi”*. Reg. Abruzzo, Chieti, Tip. Anxanum, Lanciano, 17–45
- Guarrera PM (1990) Usi tradizionali delle piante in alcune aree marchigiane. *Informatore Botanico Italiano* 22:155–167
- Guarrera PM (1994) *Il patrimonio etnobotanico del Lazio*. Regione Lazio e Dipartimento di Biologia Vegetale, Roma, 301
- Guarrera PM (1995) *Fitoterapia e uso tradizionale delle piante nel territorio della Valle di Comino (Frosinone)*. In: Giusti S (a cura di), *Le piante magiche. Una ricerca storico-antropologica*, Domograf Roma, pp 121–144
- Guarrera PM (2002) Primo contributo allo studio del patrimonio etnobotanico del Molise. In: *Università degli Studi del Molise, Di.ST.e.BA, 97° Congresso della Società Botanica Italiana, Lecce, settembre 24–27, 2002*, p 209
- Guarrera PM (2005) Traditional phytoterapy in Central Italy (Marche, Abruzzo, and Latium). *Fitoterapia* 76:1–25
- Lentini F, Catanzaro F, Aleo M (1988) Indagini etnobotaniche in Sicilia, III. L'uso tradizionale delle piante nel territorio di Mazara del Vallo (Trapani). *Atti Accademia di Scienze, Lettere e Arti di Palermo*, pp 1–29
- Lentini F, Aleo M (1991) Indagini etnobotaniche in Sicilia. V. L'uso tradizionale delle piante nel territorio di Erice (Trapani). *Atti Accademia di Scienze, Lettere e Arti di Palermo*, pp 1–30
- Loi MC, Poli F, Sacchetti G, Selenu MB, Ballero M (2004) Ethnopharmacology of Ogliastra (Villagrande Strisaili, Sardinia, Italy). *Fitoterapia* 75:277–295
- Maccioni S, Marchini G (1999) *La Val di Vara*. Collana “Liguria in parole povere”. Sagep Ed., Genova
- Manzi A (1989) *Piante utilizzate nella veterinaria popolare a Gessopalena (CH)*. *Rivista Abruzzese* 3:253–260
- Mearelli F, Tardelli C (1995) *Maremma Mediterranea*. *Erboristeria Domani* 7/8:45–57
- Nardelli GM (1987) *Cultura e tradizione. Demomedicina nell'alta Umbria*. Provincia di Perugia
- Palmese MT, Uncini Manganelli RE, Tomei PE (2001) An ethno-pharmacobotanical survey in the Sarrabus district (South-East Sardinia). *Fitoterapia* 72:619–637
- Pieroni A (2000) Medicinal plants and food medicines in the folk traditions of the upper Lucca Province, Italy. *J Ethnopharmacol* 70:235–273
- Pignatti S (1982) *Flora d'Italia*, Voll 1–3. Edagricole, Bologna
- Renzetti E, Taiani R (1988) *Sulla pelle del villano*. Museo Usi e Costumi della Gente Trentina, S. Michele all'Adige, pp 147–164
- Sudman S (1966) Probability sampling with quotas. *J Am Stat Assoc* LXI:749–771
- Tammaro F, Pietrocola L (1975) *Piante nella medicina popolare d'Abruzzo*. *Annali di Botanica* XXXIV:269–290
- Tammaro F (1976) *Piante officinali e pratica della fitoterapia nel territorio del Gran Sasso d'Italia*. *Rivista Italiana EPPOS* 58:593–605
- Tammaro F (1984) *Flora Officinale d'Abruzzo*. Giunta Reg. d'Abruzzo, Chieti
- Uncini Manganelli RE, Tomei PE (1995) Indagini farmaco-botaniche in Garfagnana (Lucca): il versante appenninico. *Atti della Società Toscana di Scienze Naturali, Memorie, Serie B* 102:3–18
- Viegi L, Bioli A, Vangelisti R, Cela Renzoni G (1999) Prima indagine sulle piante utilizzate in medicina veterinaria popolare in alcune località dell'alta Val di Cecina. *Atti della Società Toscana di Scienze Naturali, Memorie, Serie B* 106:1–10
- Viegi L, Pieroni A, Guarrera PM, Vangelisti R (2003) A review of plants used in folk veterinary medicine in Italy as basis for a databank. *J Ethnopharmacol* 89:221–244