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# Uses of plants, animal and mineral substances in Mediterranean ethno-veterinary practices for the care of small ruminants



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## ABSTRACT

**Ethno-pharmacological relevance:** The cultural heritage of Sardinian shepherds is rapidly vanishing and survives in the memory of elderly people. The objective of our study was not only to report the usage of plants and their preparation for administration but also the use of other remedies of different origin arising from traditional ethno-veterinary knowledge, as Sardinian shepherds were used to employ plants, animals, minerals and combinations of several substances to prepare remedies for prophylaxis or therapy on their animals.

**Materials and methods:** The work was carried out in rural areas of the island of Sardinia (Italy) by interviewing shepherds and filling questionnaires in order to record ethno-veterinary practices traditionally used for animal health care.

**Results:** Ethno-veterinary remedies traditionally utilised for treatments of small ruminants against ecto- and endo-parasites, gastrointestinal diseases, viral and bacterial diseases, wounds, sprains and bruises were identified. Non herbal remedies outnumbered the herbal ones, as usually plant species were mainly used for the care of cattle and equines. A total of 150 ethno-veterinary uses were documented for the treatment of 33 animal conditions, a detailed account of the formulations and their administration to sheep and goats was provided. Herbal remedies involved the use of twenty two spontaneous species and seven cultivated species.

**Conclusions:** This study identifies remedies used in ethno-veterinary practices for small ruminants care in Sardinia, the second major Mediterranean island which has agro-pastoral activities dating back to Neolithic. Moreover, the danger of losing oral traditions, and the increasing attention towards traditional remedies as potential sources of natural products for improving animal health and welfare, support the interest of our survey.

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## 1. Introduction

Ethno-botanical research is focused on the usage of plants in the folk tradition of various regions and countries, including also those for ethno-veterinary practices.

Ethno-veterinary research deals with the systematic investigation and application of folk veterinary knowledge, theory, and practice (Mc Corkle, 1986). According to Mc Corkle and Mathias-Mundy (1992), looking ahead to the future, integrating ethno- and Western veterinary medicine, could well help saving money, energy and natural resources; the same authors claimed that local knowledge was receiving attention and respect by the conventional science and international development community and point out the need to study and underpin the valuable but endangered knowledge related

to ethno-veterinary practices. Mc Corkle (1989) also underlines the importance of a “knowledge of local knowledge”. According to Quave and Pieroni (2013) animals and animal products were important in the Mediterranean pharmacopeia for millennia and many of those ancient therapies still persist nowadays in the traditional medical practice, and its use is documented in both ancient medical texts and recent ethno-biological studies. Lev (2003) reviews the animal healing by means of animal parts and products in the Middle East throughout history, he claims that investigations about the medicinal use of animal parts and products, as well as the use of inorganic materials, should not be neglected. The author also indicates that about 10% of the substances listed in Dioscoride's “Materia Medica” were parts of the body and products from animals. Nevertheless, few studies exist about remedies different from plants in traditional animal healthcare, as ethno-veterinary studies mainly report herbal remedies. Many plants traditionally used in ethno-veterinary practices are indicated in several studies, among which those of Pieroni et al., 2006; Bonet and Vallès, 2007; Bullitta et al., 2007; Schmid et al., 2012; Kalayou et al., 2012; Shang et al. 2012. Studies about

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ethno-veterinary remedies involving medications of mineral or animal origin are even less (Mootoosamy and Mahomoodally, 2014; Quave et al., 2008).

Our main interest was to identify Sardinian ethno-veterinary practices and to account for these traditional usage prior to their disappearance, since like any other form of traditional knowledge, traditions transmitted orally from one generation to another are at risk of extinction, mainly due to their decreased use and the older age of shepherds that still keep these memories. The study of such traditional ethno-veterinary knowledge in Sardinia, is justified by its geographical isolation and high floristic diversity, as well as by its rich cultural traditions, because sheep farming in the Sardinian society has ancient origins with cultural, environmental and economic implications. Barbieri (1958) describes the economic importance of sheep rearing activities in Sardinia in the fifties of the last century, when permanent pastures were 44.6% of the Sardinian productive surfaces, transhumance was common, the number of sheep and goats were 2,378,000 and 417,000 respectively, the yearly milk production from sheep and goat was 1,079,000 hectolitres, and 134,016 quintals of cheese were exported. According to the 2010 Census (VI Censimento, 2010), sheep breeding farms are 12,669 units with 3,028,373 sheep. These data compared to the 2000 Census (V Censimento, 2000), show a 12.1% decrease in sheep breeding farms and an increase of 7.8% in the number of sheep. Within the Sardinian farms breeding animals, the sheep breeding farms are 61.6% while the cattle breeding farms are 38.3%, the swine breeding 23.6%, the horse breeding 18%, and the goat breeding 12.8% ([http://www.sardegna-statistiche.it/documenti/12\\_103\\_20130710170153.pdf](http://www.sardegna-statistiche.it/documenti/12_103_20130710170153.pdf)). In 2013, according to a statement of the Sardinian Agency for Agricultural Extension Services (Laore, 2013), only 20.8% of shepherds are between 20 and 40 years old.

Sardinia is the second largest island (24,089 km<sup>2</sup> including minor isles) in the Mediterranean sea (after Sicily and before Cyprus) (Fig. 1) and according to Pungetti et al. (2008) its landscape mosaic confirms its transient position between Africa and Europe, being Sardinia almost equally distant from the coastline of both continents. Such centrality in the Mediterranean area and the history marked by several foreign dominations contribute to the Sardinian traditions and culture. The cultural heritage of Sardinian shepherds has been passed on orally for generations, but nowadays, it is rapidly disappearing because many practices are no longer in use and only survive in the memory of elderly people. Traditional pharmacopoeia and the use of wild and cultivated plant species in different areas of Sardinia have been investigated

by some authors, (Palmese et al., 2001; Ballero et al., 2001; Loi et al., 2004; Atzei, 2003; Atzei et al., 2004; Lancioni et al., 2007; Signorini et al., 2009), but these data are limited to specific areas. Further studies of ethnopharmacology, ethnobotanical uses, ethnoveterinary have been done in Italy (Viegi et al., 2003), and in specific regions such as Campania-Italy (Menale and Muoio, 2014; Di Novella et al., 2013), Calabria-Italy (Passalacqua et al., 2006), Sicily-Italy (Tuttolomondo et al., 2014), Liguria-Italy (Cornara et al., 2014); province of Granada, Andalusia, Spain (Benítez et al., 2012); Central Serbia (Jarić et al., 2007); Turkey (Polat et al., 2015; Hayta et al., 2014; Bulut and Tuzlaci, 2013), Tunisia and Italy (Viegi and Ghedira 2014); in eight Mediterranean areas (Pieroni et al., 2006).

The aim of our study was not only to testify the use of plants and their formulation for administration but also to highlight the use of remedies of different nature arising from the popular ethno-veterinary knowledge, as Sardinian shepherds utilised plants, animals, minerals and other substances to prepare medicaments for prophylaxis or therapy for their animals.

## 2. Materials and methods

The field work was carried out in rural areas of Sardinia (Italy) and precisely Anglona, Barbagia, Campidano, Meilogu, Monte Acuto, Gallura, Goceano, Nurra and Sassarese, where shepherds were interviewed about the animal health care and questionnaires were filled. Among all the recorded remedies, only those adopted for small ruminants are presented. For the purpose of the study, it was paid particular attention to the elderly and to those farms having an extensive animal breeding. Methodology was according to Viegi et al. (1999), with some modifications as the questionnaire was developed to recover also those ancient remedies utilised for ethno-veterinary practices that did not imply plant usage. The questions concerned the type of illnesses and the animal species treated, the formulation and administration of the remedy, the eventual use of the remedy at present, the efficacy of the remedy, further eventual uses of the remedy in respect to livestock raising. The original filled forms are stored at CNR-ISPAAAM. According to the people interviewed, the remedies mentioned were used from 1925 to 1985, however almost all them declared to have learnt them from their parents or elderly relatives. Some small surgical interventions made on sheep and generally avoided on other animal species were also mentioned by shepherds. When plants were indicated as remedies, specimens were collected in order to



Fig. 1. Map with location of Sardinia.

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