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Ethiopian Medicinal Plants in Veterinary Healthcare
A Mini-Review

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Abstract

Ethiopia has the largest livestock population in Africa. There are a myriad of diseases that affect this livestock population. Considering the inadequate modern veterinary health services in the country commensurate with tackling the problems, traditional ways of treatment appear to be a viable alternative approach. Traditional medicines and methods have been woven into the culture of local communities for a long time. There are many medicinal plants scattered all over the country, and a sizable number of them have been used for animal diseases. Rationalizing and validating the use of each medicinal plant requires thorough research. As a first step, it is important and necessary to collate in a review some of the available information on traditional use of such plants. A review of the literature shows that plants are used in various parts of Ethiopia in the general healthcare of livestock. Several studies have reported such use, although a thorough and complete inventory of plant species used for animal diseases is still unavailable. In this mini-review, the current literature on veterinary medicinal plants is summarized, along with a listing of the medicinal plants used for common livestock ailments. The paper concludes by providing recommendations regarding the prospects of research in this area.

Key words: Veterinary healthcare; ethnoveterinary: livestock diseases; medicinal plants.

Introduction

The application of traditional medicine to veterinary medicine has been termed as ethnoveterinary medicine. It is mainly concerned with folk beliefs, knowledge, skills, methods and practices which are used in the healthcare of animals. The knowledge varies from region to region, and from community to community.[1] In general, ethnoveterinary practices have been developed by trial and error and by actual experimentation.[2] Ethnoveterinary medicine comprises of traditional surgical techniques, traditional immunization, magico-religious practices, and the use of herbal medicines to treat livestock diseases.[3]

The relationship between the use of medicinal plants in animals and humans is rather complex. However, an overlap in use of plant remedies for the same indications in animals and human beings may occur, pointing to a theory that humans may have tried these remedies in animals before they used them for their own medical problems. Alternatively, humans may have used their overall arsenal of medicinal plants to treat animals, irrespective of whether or not they used the remedies themselves. Some evidence indicates that some animals may develop a natural attraction towards certain healing chemicals in plants.[4]

In many developing countries, several field studies on the use plants in veterinary medicine have been conducted. On the other hand, although interest in evidence-based veterinary phytotherapy is allegedly growing in general, only a few studies have been published in European countries.[5] In developed countries, such as the Unites States, medicinal plants are used for animal healthcare to a lesser extent than in developing countries.[4]

The 32nd Session of UNESCO has identified ethnoveterniray folk medicine as one of the important components of indigenous cultures that need to be protected, sustained and studied. Funded by the European Union, a survey was conducted in selected sites in the Mediterranean region to gather data on the herbal remedies used in animal healthcare. The survey, which identified about 136 plant-derived veterinary medicinal preparations, included sites in Albania, Italy, Morocco, Spain, Egypt, Greece, Cyprus and Algeria. About six phytomedicnes were found to be most commonly used in each of the selected areas. The survey found that cattle, sheep, goats, equines, swine, camels, rabbits, poultry, birds, cats, dogs and bees were treated with plant

products for various ailments, such as digestive disorders, internal parasites, skin diseases, wounds, urinary problems and mastitis [5]

In developing counties, people rely on medicinal plants for the healthcare of animals. For example, researchers have reported that about 506 herbal remedies are used for animal healthcare in 18 areas of southern Africa.[4]Although details are not given, Kokwaro[6] lists 57 plants that are used in East Africa for livestock and poultry diseases. The problems treated include anthrax, general fever, swollen glands, lung diseases, constipation, indigestion, cancer, snake bite, cancer and lactation.

Ethiopia has the largest livestock population in Africa.[7] According to an estimate, about 31 million heads of cattle, 27 million sheep, 24 million goats, 7.02 million equine (horses, donkeys, and mules), one million camels and 56 million poultry are found in the country.[5] Correspondingly, there are also a myriad of diseases that affect this livestock population. According to a recent survey, about 36 traditionally characterized animal diseases occur in the country. Some of them do not have equivalent English names. A few examples of vernacular names of these diseases are *aba megal*, *chefin*, *mendf*, *amenmn*[*kumegna*](emaciation), *dereba* and *kurtimis* in the highlands, *aba senga* (anthrax), *azurit* (epilepsy), *adrik* and *gendi* (trypanosomiasis) in the medium highlands (*weyna dega*),[1] and rinderpest (*desta*).[8]

The majority of livestock raisers in Ethiopia are geographically removed from the sites of veterinary stations, and those that are closer to the sites may not afford the fees for services. The inadequate funding at the national level for the prevention and control of animal diseases adds to the burden, especially among pastoralists who live in the remote arid and semi-arid lowland parts of the country. Therefore, a reasonable solution would be to complement modern veterinary health care with traditional care.[7]

Modern veterinary medicine is not well developed in the country, nor are modern drugs available adequately to fight animal diseases.[8] It is estimated that about 90% of the livestock population are treated with traditional medicines.[9] In some parts of the country, livestock diseases such as anthrax (*quruba*), black leg (*aba gurba*), anaplasmosis (*afrera*), ascariasis (*wosfat*), abscess (*ebach*), leeches (*alqt*), trypanosomiais, lymphangitis (*gub gub*), stomatitis (*yaf qusil*), and coccidosis (*fengel*) have been treated using various natural plant product combinations.[10]

Background literature

A survey in the central highlands of Ethiopia indicated that 40% of livestock raisers use traditional veterinary practices, while 85% of livestock owners use both modern and traditional veterinary practices.[3] A study carried out in southern Tigray, northern Ethiopia revealed that 83 medicinal plant species are used in the treatment of 37 types of livestock ailments ranging from wound infections to other complicated diseases. A high proportion of the plants are used for wound infections, and most of them are administered orally. The majority of the plants (90%) are used to treat about 23 cattle diseases, while 48% are employed to treat seven types of equine diseases. Several of the plants are used for ailments in other types of livestock, such as sheep, goats, camels and chicken.[8] Another study conducted in northern Ethiopia in Zegie peninsula reported that eight plants were used for various animal diseases.[11] Seventy-seven plant species have been used by Borana pastoralists for a number of livestock diseases. About 62% of the surveyed pastoralists used herbal medicines, while about 37% preferred a combination of herbal and modern drugs to treat their livestock. The plants were used mainly as infusion, decoction or as poultice application. A total of 24 traditional healers and 97 livestock owners participated in the survey.[7] A recent report indicated that in the Bale Mountains National Park, 74 veterinary medicinal herbs were used to treat 25 animal ailments. The most frequent route of administration was oral (65 species, 42.8%), while 55 species were applied topically. Fresh plant materials were used to prepare the remedies.[12] In Chiro District, western Harerghe 18 plants which are used for common animal ailments were collected and recorded. As in other similar studies, the plants were found to be used frequently by mouth in the form of juice, sap and other forms. About 74% of the livestock owners interviewed claimed they used herbal medicines, and about 26% preferred a combination of herbal preparations and modern drugs.[2] A survey conducted in Dabat District, Northwestern Ethiopia showed that 18 plants were used for various animal diseases. In the district, the total livestock is estimated at 64,450 cattle, 41,937 sheep, 24,912 goats, 260 horses, 11,963 donkeys, 449 camels, 36,647 poultry, 2,071 dogs, 3,176 cats and 5,3663 beehives. The types of medical conditions treated included trypanosomiasis, anthrax, rabies, abdominal bloat, leech infestation and sun-stroke fever. The traditional healers who administered the

remedies were all followers of the Ethiopian Orthodox Church.[13] In Fentalle District, East Shewa Zone, a total of 25 plant species were used for animal healthcare. The most common method of preparation of the remedies used by Kerreyu pastoralists who live in this area was by homogenizing the plant material with water.[14] Haile and co-investigators have reported on 29 medicinal plant species that were used for 16 livestock diseases in the Gilgel Ghibe Area in southwestern Ethiopia. In this area, traditional medicine practitioners collected the fresh plant parts to prepare the needed veterinary remedies.[15]

Some medicinal plants and their veterinary uses

Ethiopian farmers and pastoralists rely on traditional knowledge, practices and locally available materials, plants in particular, to control and manage domestic animal diseases.[8] As mentioned earlier, a comprehensive compilation of medicinal plants used in animal healthcare in Ethiopia is lacking; however, a number of plants have been widely reported as having utility for treating animals. In Table 1, selected plant remedies used in traditional healthcare of domestic animals are presented. They are culled from reports that have been forthcoming in the literature from surveys in various parts of the country. These remedies are used for commonly encountered diseases such as anthrax, trypanosomiasis, black leg, leech infestation, and mastitis. Most of the plants were collected and identified. A bulk of the information regarding the use of the plants was gathered from local informants (farmers), or from traditional healers.

Table 1.* Common veterinary diseases, botanical names of medicinal plants used to treat them, and the vernacular names of the plants (in parentheses)

Anthrax	Black leg	Leech infestation	Mastitis	Trypanosomiais
Aloe trichosantha-- Ver name (hargisu)[17] *Balanites aegyptica* (jemo)[8] *Besama abyssinica* (qorsoma; azmar)[8] *Chinopodium schraderomon*[8] *Cissus quadrangularis* (Chewie)[5] *Commiphora hodai* (Qumbi)[7] *Cyphosetma adenocaule* (ye' mariam meqenet)[8] *Dodonea augustifolia* (tahses)[16] *Euphorrbia abyssinica* (qulqual)[8]	*Agave sisalana* (qacha)[16] *Ampelocissus abyssinica* (teru)[18] *Calopteris procera* (gelaeto; tobiaw)[8,16] *Euphorbia abyssinica* (qulqual)[8] *Justica schimperiana* (simeja; sensel)[8] *P. dodecandra*[8] *Senecio handensis* (jiniras) *Solanum incanun* (engule–nishtoy)[2,7,8] *Ziziphus spina-christie*[8] *Momordica foestida*[2]	*Agave sisalana* [8] *Allium cepa* (netch shnkurt)[8] *Brassica nigra* (senafitch) [8] *Cadia purpurea* (shilen) [8] *Capsicum annuum* (berbere) [8] *Citrus aurantiflora* (lomi)[11] *Clutia abyssinica* (hirtimtim) [8] *Linum usitatissimum* (entatie; telba) [8] *Nicotiana tobacum* (tinbaho) [8] *Pittosporum viridiflorum* (maileho) [8]	*Accacia busei* (hallo)[7] *Carissa edulis* (agam)[7] *C. quadrangularis*[8] *M. angolensis*[8] *P. capensis*[8] Senna occidentalis[8] *Sesbania sesban* (daysa; alqm)[2,7] *Ziziphu10s spina-christi*[8]	*Allium cepa* (qey shnikurt)[13] *P. dodecandra*[13] *Clutea abyssinica* (f'yel fej)[19] *Clausena anisata* (l'mich)[29] *Rumex nepalensis* (ye wusha lat)[13] *Verbascum sinaticum* (kutina)[13] *Salvadora persica* (hudha)[7]

Table 1.* (Continued)

Anthrax	Black leg	Leech infestation	Mastitis	Trypanosomiais
Maerua angolensis (tetem-agazen)[8] *Pappea capensis* (qentaso)[8] *Phytolacca dodecandra* (endod)[8,13] *Salvadora persica* (Hudha)[7] Senna occidentalis (airogit)[16] *Stephania abyssinica*(achebchabit)[13]		*Rhamnus prinoides* (gesho)[13] *Solanum incanun* (engule–nishtoy) [8] *Solanum giganteun* (engule-abiy) [8] *Verbascum sinaiticum* (kutina) [8] *Withania sominifera*[2]		

* For details of plant parts, preparation methods and modes of administration, see the references

Current research

According to some researchers, about 30% of botanical preparations that are used to treat livestock diseases in Africa are probably effective. For example, one research has indicated that

among 31 medicinal plants used by the Fulani of Mauritania, 10 have been found to be useful for the treatment of eight types of animal diseases.[3] In Ethiopia, modern veterinary medicine has played a major role in the past several decades in the control and prevention of livestock diseases. However, inadequate manpower, lack of required equipment and insufficient supply of drugs have put constraints on the healthcare of livestock.[3]As can be gathered from the "background literature" section, several attempts have been made to document important veterinary medicinal plants from different parts of the country.

The Faculty of Veterinary Medicine (FVM), Addis Ababa University, Institute of Agricultural Research (IAR), National Animal Health Research Center (NAHRC), and several field veterinary stations have been involved at various levels in research on traditional veterinary practices. Some of the research activities that have been carried out by these institutions have included a study of ethnoveterinary medicine in East Shewa Zone, a study on anthelminthic effects of some traditionally used herbal remedies, a trial on the efficacy of traditional herbal remedies in the treatment of mastitis, and a study on selected herbal remedies for livestock ectoparasites.[3]

Traditional veterinary healthcare has enormous potential; however, this potential has not yet been exploited at the national level.[13] So far, most of the research on Ethiopian veterinary medicinal plants has focused on ethnobotany, which is essentially documenting the traditional medicinal uses of plants by livestock raisers in local communities. Recently, serious attempts have been made by the Institute of Biodiversity Conservation and Research (IBCR) on scientific research to develop medicinal plants for three major livestock diseases. The major diseases identified by the Institute were tapeworm infestation, mastitis and dematophilosis. A component of a larger project heavily funded by the World Bank, the study has focused on medicinal plants that are found in the Bale Mountains National Park.[17] However, the final outcome of the study of the selected veterinary medicinal plants is yet to be seen.

Recommendations

In Ethiopia, modern investigation on herbal remedies for human ailments has been going on for a while. On the other hand, similar efforts in the area of research on plant remedies for livestock diseases seem to be lagging behind.

Traditional veterinary medicine, especially the use of medicinal plants in the treatment of livestock diseases, needs to be scientifically explored. Considering the fact that the country has a huge resource of medicinal plants, research attention should be directed to this potential. The shortage of veterinary drugs and the poor accessibility of modern veterinary healthcare services by rural farmers and pastoralists make the case for the use of medicinal plants stronger. In addition to being cheaper and more accessible, traditionally used medicinal plants can indeed prove to be viable therapeutic options or substitutes, if they are properly investigated and standardized. For such effort to materialize, a multi-disciplinary research approach involving veterinary doctors, chemists, botanists and traditional medicine practitioners appears to be the best route to pursue. In addition, strong policy support is required to promote and integrate research, training and application. While some regulations are in place to monitor the practice of traditional medicine in humans, especially in urban areas, similar regulations for traditional veterinary care need to be drafted. Enhanced efforts are required to integrate modern veterinary healthcare with traditional animal care. A complementary and co-evolution of traditional and modern veterinary medicine must be promoted at the policy, research, training and application levels.

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