SINET: Ethiop. J. Sci., 26(2):123–136, 2003
 ISSN: 0379–2897

AN ETHNOBOTANICAL SURVEY ON PLANTS OF VETERINARY IMPORTANCE IN TWO *WOREDA*S OF SOUTHERN TIGRAY, NORTHERN ETHIOPIA

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ABSTRACT: The purpose of the survey was to document and analyze information on the traditional use of medicinal plants by farmers in Ofla and Raya-Azebo *woreda*s of South Tigray Zone for the treatment and prevention of livestock ailments. Data were collected mainly through interviews carried out with randomly selected farmers of the two *woreda*s. During the survey, 83 medicinal plant species were reported as being used for the treatment of 37 types of livestock ailments. A high proportion of the species (17%) were claimed to have been used as remedies for wound infections. The highest informant consensus was recorded for the plant *Achyranthes aspera* L. where 18 out of the total informants (9%) reported the use of the species as remedy against inflammation of the eye in cattle. Leaves are the most commonly sought plant parts in remedy preparations. Most of the remedies (96%) are prepared from freshly collected plant parts and a higher proportion being administered orally. The majority of the plants were found to be harvested from the wild. A significant difference ($p<0.05$) was observed between the average numbers of medicinal plants that were reported by farmers of the two *woreda*s; on average two plant species were reported by the farmers from Raya-Azebo, whereas, only one plant species was reported by the farmers from Ofla. Further studies are needed to evaluate the efficacies and possible side effects of the traditional medicinal plants before they are recommend for their wider use both in the study area and elsewhere in the country.

Key words/phrases: Ethiopia, ethnobotany, ethnoveterinary, medicinal plants, Southern Tigray

INTRODUCTION

Ethiopia is one of the leading countries of Africa in livestock population. According to the Ethiopian Agricultural Research Organization (EARO) (1999), the country has about 31 million heads of cattle, 27 million sheep, 24 million goats, 7.02 million equine, 1 million camels and 56 million poultry. Livestock production is an integral part of the Ethiopian agriculture and shares about 40% of the total agricultural output (EARO, 1999).

Although Ethiopia is rich in its livestock population, it is one of the countries in the world with the lowest unit output. The poor health condition of its livestock has partially been responsible for the low productivity. Tsetse borne trypanosomiasis, contagious bovine pleuropneumonia, rinderpest and foot-and-mouth disease are among the major health problems of livestock (EARO, 1999). Modern livestock health care is still at its lowest stage in the country due to lack of adequate clinics, veterinarians and supply of drugs. Besides, most modern drugs are expensive and, as a result, not affordable by the majority of Ethiopian farmers and pastoralists. Most of the Ethiopian farmers and pastoralists, therefore, rely on their traditional knowledge, practices and locally available materials (mainly plants) in the control of diseases of their domestic animals.

However, such rich ethnoveterinary knowledge, which has been transferred verbally from one generation to the next from time immemorial, is currently in danger of being lost. Medicinal plants, which have been used in ethnoveterinary practices, are being depleted at an alarming rate because of the continued environmental degradation in Ethiopia as a result of deforestation, overgrazing and recurrent drought as well as overexploitation and destructive harvesting of the medicinal plants themselves. Unless such medicinal plants are locally available in a reasonable amount, it becomes difficult to continue the practice. This in turn could pave a way to the deterioration or complete loss of the knowledge. Loss of knowledge has been aggravated by the expansion of modern education, which has made the younger generation underestimate its traditional values.

To our dismay, very little effort has so far been made to reverse or stop the trend. Few ethnoveterinary surveys (Lidetu Alemu, 1993; Yihenew Mekonnen, 1994; Ayalew Tolosa, 1997; Gemechu Wirtu *et al.*, 1999; Mirutse Giday, 1999) have been conducted in the country to document the medicinal plants used and the associated ethno-

veterinary knowledge. Enormous knowledge is still being lost before it is recognized and properly documented, and medicinal plants go extinct before appropriate conservation measures are taken. Thus, there is an urgent need for a documentation of the knowledge in the country and conservation of the medicinal plants, which have been used in the practice, but are currently on the verge of extinction. By reducing the loss of the medicinal plants used and the associated knowledge through conservation measures and documentation, respectively, the continuation of the ethnoveterinary practice could be guaranteed. Besides, such ethnoveterinary knowledge could serve as a lead in the development of modern herbal drugs.

Like the farmers/pastoralists, elsewhere, in the country, most of the farmers in Southern Tigray are to a large extent dependent on their ethnoveterinary knowledge and practices, which mainly involve the use of locally available medicinal plants. Such knowledge and practices are, however, currently under threat mainly because of the depletion of the locally available medicinal plants as a result of the large-scale environmental degradation and recurrent drought that have been taking place in their worst form, in this part of the country. Very little effort has so far been made to record and document the medicinal plants used and the associated knowledge. Immediate measures should, therefore, be taken to rescue the plants and the associated knowledge from further loss. But before such measures are taken, the extent of the knowledge of the ethnoveterinary practice involving medicinal plants should be investigated properly through ethnobotanical surveys.

The aim of this survey was, therefore, to document and analyze the existing ethnoveterinary knowledge and practices of farmers associated with the use of medicinal plants in two *woreda*s (districts) of South Tigray Zone.

THE STUDY AREA

South Tigray is one of the four administrative zones of the Tigray Regional Administration. It is divided into eight administrative *woreda*s. The area is well known for its high livestock population. Cattle, sheep, chicken, goats, equine and camels are the domestic animals commonly raised in the area. A survey conducted in 2001/02 showed that South Tigray Zone has 631,186 heads of cattle (Central Agricultural Census Commission, 2003).

For the ethnoveterinary survey, two *woreda*s of the South Tigray Administrative Zone were selected, namely the Ofla and Raya-Azebo *woreda*s (Fig. 1). These *woreda*s are found at close distances from the historic town of Maichew. Maichew is located at 662 kms north of Addis Ababa. In terms of the ethnoveterinary and other farming practices of the people, as well as livestock composition, the two *woreda*s are believed to represent most areas of Southern Tigray: Ofla *Woreda* representing the western highland areas, and Raya-Azebo *Woreda* representing the eastern lowland areas.

Ofla

The altitudes of the areas surveyed in the *woreda* range between 2400 to 2450 meters a.s.l. *Euphorbia abysssinica* and *Becium grandiflorum* are among the dominant plant species naturally growing in the area. Tef, barley and maize are the commonly cultivated field crops.

Of all the domestic animals raised in the *woreda*, cattle population takes the lead, claimed to be 72,924 heads, followed by chicken (97,248) and sheep (49,772) (Central Agricultural Census Commission, 2003). Blackleg, pasteurellosis, anthrax, fascioliasis and trypanosomiasis are among the diseases occurring in the area (unpublished data, Ofla *Woreda* Agricultural Office). Three veterinary clinics are available in the *woreda*.

Raya-Azebo

The altitudes of the surveyed area in the *woreda* ranges between 1600 and 1830 meters a.s.l. *Euphorbia abysssinica* and *Opuntia ficus-indica* are among the frequently occurring species in the specific sites of the *woreda* covered by the ethnobotanical survey. Sorghum and maize are the widely cultivated field crops.

Similar to Ofla *woreda*, cattle (139,127), chicken (100,079) and goats (16,969) take the highest number of the livestock population in Raya-Azebo (Central Agricultural Census Commission, 2003). Sheep pox, contagious caprine pleuropneumonia (CCPP), lumpy skin disease, babesiosis, trypanosomiasis and streptotrichosis are among the prevalent diseases in the area (unpublished data, Raya-Azebo *Woreda* Agricultural Office). Five veterinary clinics are operational in the *woreda*.

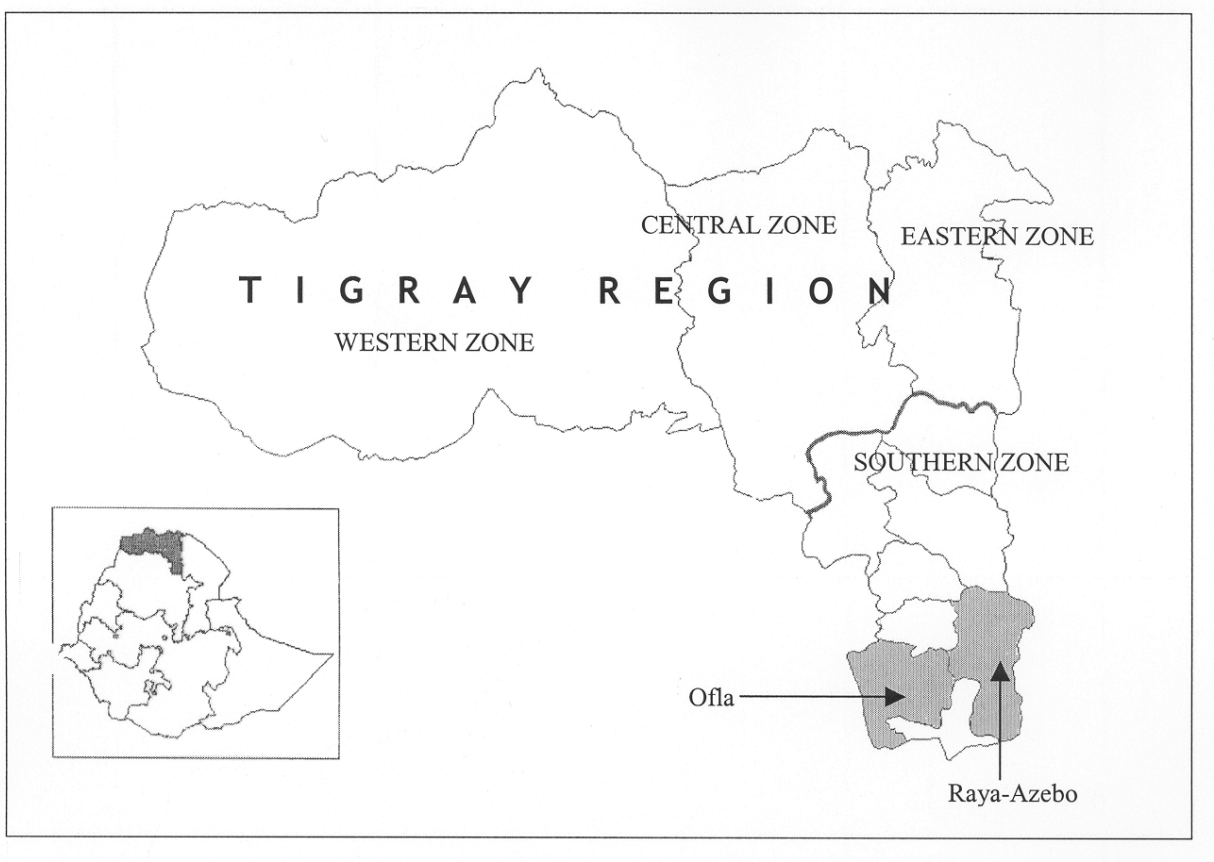

Fig. 1. Map of the study area; arrows show the surveyed *woreda*s. [Modified from UNDP-EUE (1996).]

MATERIALS AND METHODS

Survey sites

For the ethnoveterinary survey, three villages were chosen from each of the selected *woreda*s. They are Adi-Golo, Menkere and Hashenge from Ofla *Woreda*, and Tsegea, Ebo and Mechara from Raya-Azebo *Woreda*. The villages were chosen because of their easy accessibility.

Informants

For the survey, 202 farmers (194 males and 8 females), 146 from Ofla and 56 from Raya-Azebo, volunteered to serve as informants. The age of the informants ranged from 18 to 92. They were picked up during transect walks made to the selected villages of the two *woreda*s. Initially, there was a plan to interview a comparable number of informants from Raya-Azebo *woreda*. This was, however, not achieved as farmers were busy in different farming activities during the time where most of the interviews were conducted. Although more females than the number stated above were encountered during the visits, only few of them were willing to sit for the interview. It was learned that there were no specialized livestock healers in the study area.

Methods of data collection and analysis

Ethnoveterinary data were collected during two trips made to the survey areas in October 2001 and April 2002. These are the months where most of the seasonal herbs are found blooming. The data were collected mainly through separate interviews and discussions held with the selected informants. For this purpose, a semi-structured questionnaire was prepared before hand. The interviews were conducted in Tigrigna, a widely spoken language in the area. During the interview, data regarding

the kinds of ailments treated and the types of medicinal plants used (including their local names) in the day-to-day ethnoveterinary practices of the people in the area, the plant parts used, remedy preparations, route of administration and dosage were collected. Besides, information on market-ability and cultivation practices of the medicinal plants was gathered. Veterinarians serving in the study area played a major role in translating the local disease names into their English equivalents. Herbarium specimens for most of the reported medicinal plants were gathered, properly identified and vouchers were deposited at the National Herbarium of the Addis Ababa University.

The data were summarized in a way to show the most commonly sought plant part/s (root, stem, leaf, *etc.*), the widely used solvents or diluents in remedy preparation and the frequently employed mode of administration. Data were also analyzed in order to understand the degree of local trade and habit of cultivation of medicinal plants by the farmers in the area. Knowledge of medicinal plants between farmers residing in the two *woreda*s was also compared using Stata Version 6 software, and statistical significance was determined by employing the Student t-test at 95% confidence intervals.

The relative importance of each reported medicinal plant was assessed based on the proportion of informants who independently reported its use as a remedy against a particular disease/disease category following an approach used by Trotter and Logan (1986). Such agreement of informants is usually referred to as informants consensus.

RESULTS

The medicinal plants and their applications

During the survey, a total of 83 plant species (44 from Ofla and 60 from Raya-Azebo) that belong to 50 families and 75 genera were reported to have been used as treatments against 37 types of livestock ailments in the study area (Annex 1). Of the total, 21 species were found to have simultaneously been used in both *woreda*s for the same or different veterinary purposes. The family Fabaceae took a bigger proportion of the reported medicinal plants accounting for 12%, followed by Solanaceae (7%) and Lamiaceae (6%). Of the total reported species, 45.8% are herbs, 27.7% are shrubs and 26.5% are trees.

Most of the claimed medicinal plants (90%) were found to have been used as remedies against 23 types of cattle ailments, nearly two-third of the total livestock diseases reported by the informants (Table 1). A high proportion of species were claimed to have been used as remedies for the treatments of wound infections accounting for 17% of the total medicinal plants reported, followed by leech infestation (16%), strangles (15%), inflammation of the eye (14%) and anthrax (11%). Some of the claimed medicinal plants are used as treatments against several types of livestock ailments. The plants, *Solanum incanum* and *Euphorbia abyssinica*, for example, are used for the treatment of seven and five kinds of livestock ailment, respectively.

Table 1. Proportions of medicinal plants used in the treatments of the ailments of the different livestock types.

Type of livestock	No. of species reported (%)	No. of ailments treated
Cattle	75 (90%)	23
Equine	40 (48%)	7
Sheep	24 (29%)	6
Goat	24 (29%)	6
Camel	17 (20%)	3
Chicken	3 (4%)	2

Some of the reported medicinal plants in the study area were found to be popular among the farmers with relatively higher informants consensus for being used as remedies against particular type of diseases (Table 2). A highest agreement of informants was recorded for *Achyranthes aspera* L. Eighteen out of the total 202 informants (9%) reported the use of *A. aspera* as a remedy against inflammation of the eye in cattle. The species, *Nicotiana tabacum* L., *Impatiens rothii* and *Aloe* sp. also scored higher informant consensus for being used as treatments against leech infestation (6.4%), lungworm pneumonia (5.4%) and bloat (4.5%), respectively.

Table 2. List of medicinal plants reported as remedies against particular types of disease by five or more informants.

Scientific name	Local name	Type of ailment treated	No. of informant
Achyranthes Aspera	mechelo, gurbe	inflammation of the eye (cattle)	18 (9%)
Nicotiana tabacum	timbaho	leech infestation (cattle)	13 (6.4%)
Impatiens rothii	gurshit	lungworm pneumonia (cattle)	11 (5.4%)
Aloe sp.	ire	bloat (cattle)	9 (4.5%)
Calpurnia aurea	hitsawts, cherecnchah	mange mites (cattle, sheep, goat and equine)	7 (3.5%)
		lice infestation (chickens)	6 (3%)
Ricinus communis	gulee	external wound infection (cattle)	6 (3%)
Meriandra bengalensis	mesaguh	lung worm pneumonia (cattle, goat, sheep)	5 (2.5%)
Rumex nervosus	digele	strangles	5 (2.5%)
Silene macrosolen	saero-saero, wogert	strangles	5 (2.5%)
Senecio myriocephalus	tsaeda-qotsli	limping, physical damage (cattle)	5 (2.5%)

Plant parts used, preparation and route of administration

Leaves and roots are the most commonly used plant parts in the preparation of remedies accounting for 70% and 35% of the total medicinal plants, respectively, followed by seeds and fruits (16%).

The majority of the remedies (96%) are prepared from freshly collected plants in the form of juice or paste. It was revealed that about 79% of the remedies are prepared without the use of solvents or diluents. When solvents are needed, however, it is water that is frequently used. Human saliva and urine as well as milk and butter are also used as solvents or additives, to some degree, in the preparation of remedies.

Preparations of nearly half (45%) of the total reported plant remedies are given orally. Remedies of a big number of plants are also frequently applied topically on the skin and given nasally accounting for 36% and 32 % of the total reported species, respectively. For most of the diseases reported, remedies are continuously given on daily basis until a significant improvement in health conditions are noticed. Lack of consistency among the informants on the levels of daily doses for many of the remedies was frequently noted.

Comparison of the medicinal plants knowledge between farmers of the two woredas

About 70% of the farmers interviewed from the two *woreda*s reported the knowledge of at least one medicinal plant; and the average number of reported medicinal plants by the same informants was between one and two.

A significant difference ($p<0.05$) was observed between the average numbers of medicinal plants that were reported by farmers of the two *woreda*s; on average, two plant species were reported by the farmers from Raya-Azebo, whereas, only one species was reported by the farmers from Ofla (Table 3).

Table 3. Number (%) of informants in the two *woreda*s in relation to the number of medicinal plants reported by each of the interviewees.

No of plants reported	Ofla *Woreda* n= 146	Raya-Azebo *Woreda* n= 56
0	54 (36.99)	7 (12.50)
1	42 (28.77)	26 (46.43)
2	26 (17.81)	12 (21.43)
3	13 (8.90)	2 (3.57)
4	5 (3.42)	3 (5.36)
5	5 (3.42)	3 (5.36)
6+	1 (0.68)	3 (5.36)
Mean of the reported plants: Ofla = 1; Raya-Azebo = 2		

Local status of the reported medicinal plants

Of the total claimed medicinal plants, more than half (60%) were found to be growing wild, and about 15% were reported to be weeds. Around 25% of the medicinal plants were reported to have been grown in and around home gardens or in cultivation fields although most of them are primarily cultivated for other purposes. Except for the cultivated and weedy species, long distance walks are required to collect medicinal plants because of their limited occurrence. According to the informants, the wild plants *Grewia villosa*, *Berberis holistii*, *Pittosporum viridiflorum*, *Maerua angolensis* and ADEMOMIN (local name) are the most scarce medicinal plants in the area.

There was no much treat to the reported medicinal plants as a result of local trade. Some of the reported medicinal plants (*eg*., fruits of *Opuntia ficus-indica* and *Ziziphus spina-christi*) were sold in markets within and around the study area. They were, however, sold primarily for other purposes.

DISCUSSION

It is encouraging to find such a good number of medicinal plants (83 species) that are still in use for the treatment of several livestock diseases in the area despite the large-scale environmental degradation and recurrent droughts that have been taking place in that part of the country in their worst forms. The fact that more than half of the claimed medicinal plants are herbs could indicate their relatively better abundance in the area as compared to trees and shrubs.

Proportionally, a high number of plants were claimed to have been used for the treatments of wound infections, leech infestation, strangles, inflammation of the eye and anthrax. This might indicate the economic importance of such ailments in the area. Infection by internal parasites and anthrax were reported as two of the most economically important livestock diseases in Southern Tigray (unpublished data, Southern Tigray Zone Agricultural Office).

As compared to results of a similar study that was carried out elsewhere in the country (Mirutse Giday, 1999), informants consensus values obtained for the medicinal plants that were reported during this survey were found to be low. One of this could probably be due to the little practice by farmers in the study area to share traditional medicinal knowledge among themselves. But results of the consensus could still be useful in proritizing plants for further studies. According to Trotter and Logan (1986), pharmacologically effective remedies are expected to have relatively greater informant consensus. Accordingly, the plants *Achyranthes aspera*, *Nicotiana tabacum*, *Impatiens rothii* and *Aloe* sp. that were found as having relatively higher informants consensus for being used as remedies against inflammation of the eye, leech infestation, lungworm pneumonia and bloat, respectively are the ones that deserve further investigation. Previous phytochemical studies showed that the leaves of *A. aspera* contain active substances such as saponin, alkaloid and sterol (Dawit Abebe and Estifanos Hagos, 1991).

Thirty-three percent of the plant remedies that were cited during this survey were also reported by different authors to have been used medicinally elsewhere in the country (Ayalew Tolosa, 1997; Gemechu Wirtu *et al*., 1999; Mirutse Giday, 1999) and/or in other parts of the world (Karehed and Odhult, 1997; Dwivedi, 1999; Rangnekar, 1999; Rathore *et al*., 1999; Sikarwar, 1999). Even some of the plants that were reported by the farmers in the study area (*e.g., Aloe* sp., *Calotropis procera, Cucurbita pepo, Eucalyptus globulus, Impatiens rothii*, *Linum usitatissimum* and *Nicotiana tabacum*) are used exactly for the same purpose elsewhere (Ayalew Tolosa, 1997; Gemechu Wirtu *et al*., 1999; Mirutse Giday, 1999; Rangnekar, 1999). The fact that some of the reported plants are having similar uses elsewhere might also reveal their pharmacological effectiveness.

Analysis of the data showed that leaf is the most sought plant part in the preparation of the remedies in the area. As compared to other plant parts, *e.g*., underground part, stem, bark, or whole plant, harvesting leaves poses relatively less danger to the existence of an individual plant. Studies indicated that removal of up to 50% of tree leaves does not significantly affect the growth of the species studied (Poffenberger *et al*., 1992). The popularity of underground parts, barks and stems, however, could bring grave consequences to the survival of the medicinal plants (Dawit Abebe and Ahadu Ayehu, 1993).

Most preparations of the reported plants in the area were found to be drawn from a single plant. In other parts of the country, however, the use of mixtures of plants in treating a particular livestock ailment is fairly common (Ayalew Tolosa, 1997; Gemechu Wirtu *et al*., 1999) because of the wide belief of the synergic effect of one plant on the other during the use of concoctions (Dawit Abebe and Ahadu Ayehu, 1993).

It was revealed that the farmers residing in Raya-Azebo *woreda*, part of the lowland area of Southern Tigray, have relatively better knowledge of medicinal plants as compared to the farmers in Ofla *woreda*, the highland part of the study area. The better knowledge of medicinal plants of the farmers in Raya-Azebo could be attributed to the relatively better interaction they have with the neighbouring Afar people who are basically pastoralists. Pastoral people in Ethiopia who are still having very limited access to modern veterinary services are thought to have very rich ethnoveterinary knowledge (Taffese Mesfin, 2000).

The habit of cultivating plants in or around home gardens in the area for their medicinal purpose is very limited. There is also a similar trend in other parts of the country. A survey conducted by Zemede Asfaw (1997), which covered a large part of Ethiopia, showed that plants primarily cultivated in home gardens for their medicinal uses are few, accounting for only about 6% of the total species grown. There is, therefore, a high threat to the medicinal flora of the area as long as the majority of the medicinal plants are only obtained from the wild, a habitat where severe environmental degradation is still going on.

The threat from the local trade of medicinal plants in the area is very minimal. Most of the plants are harvested for local use and are only collected when the need arises. Other studies (Kloos, 1976; Kloos *et al*., 1978) carried out elsewhere in the country, however, indicated a wide domestic trade of medicinal plants.

Although the reported medicinal plants were claimed effective by the informants against various types of livestock diseases, this information should not be taken for granted when recommending such plants for their wider use both in the study area and elsewhere in the country. Further investigations (field and laboratory evaluations) are, therefore, needed to be done on the reported plants so as to confirm their efficacies and check possible side effects. Screening priorities should be given to those plants that scored relatively higher informants consensus in the study area and/or reported elsewhere for similar uses as such results might indicate their better efficacies. Attention should also be given to individual plants that were reported as having a wide range of ethnoveterinary uses.

In situ and *ex situ* conservation measures are needed to be taken for those medicinal plants, which are only found growing wild, and priorities should be given to those ones, which were reported to be found rare in the area.

ACKNOWLEDGEMENTS

First of all we would like to thank the Aklilu Lemma Foundation for its financial support to carry out this study. We are highly indebted to the Institute of Pathobiology for providing us with vechicle for our field trips. Our thanks also go to veterinarians in Southern Tigray, Dr. Gebru Legesse, Dr. Selamawit Tesfay and Mr. Yishak Hailu for their professional and administrative assistance during our visits to the study area; Mr. Girmay Medhin for his assistance in data analysis and field assistants Aselef Meresa, Babi Zekarias, Hiluf Abay and Meselle Gebre-Medhin for their help in data collection.

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Annex 1. List of plants of ethnoveterinary importance in Southern Tigray, alphabetically arranged by their scientific names

Scientific name	Family name	Local name	Growth form	Ailment treated	Animal treated	Part used	Administration route	Voucher no.*
Acacia abyssinica Hochst ex Beth.	Fabaceae	chea	tree	external wound infection	cattle, equine, camel	leaf	topical	
Acacia etbaica Schweinf.	Fabaceae	ajo, seraw	tree	broken/dislocated bones	cattle	bark	topical	M-081-2002
				external wound infection	cattle, equine, camel	leaf	topical	
				pneumonia	camel	leaf	oral	
Acacia laeta R. ex Benth.	Fabaceae	sawansa	Tree	inflammation of the eye	cattle	leaf	local (eye)	M-053-2002
Achyranthes aspera L.♠	Amaranthaceae	mechelo	scrambling herb	inflammation of the eye	cattle	root, leaf	local (eye)	M-021-2001
				lungworm pneumonia	cattle, sheep, goat	root	oral	
Agave sisalana Perrine ex Engel.♠	Agavaceae	shihqo, gorengor	herb	leech infestation	cattle	leaf	nasal	M-035-2001
				retained fetal membrane	cattle	leaf	oral	
Allium cepa L.	Alliaceae	keih-shigurti	herb	leech infestation	cattle	bulb	nasal	
Aloe sp.♠	Aloaceae	ire	herb	bloat	cattle, sheep, goat	leaf	oral	M-066-2002
						root	nasal	
				broken/dislocated bone	cattle	root	topical	
				rinderpest	cattle	root	topical	
Artemisia abyssinica Sch. Bip. ex A. Rich.	Asteraceae	chena-baria	herb	coenorosis	sheep	leaf	nasal	M-044-2002
Asparagus africanus Lam.	Asparagaceae	qastanesto	herb	broken/dislocated bones	cattle	root	topical	M-071-2002
Balanites aegyptiaca (L.) Del.	Balanitaceae	badeno	tree	bovine pasteurellosis	cattle	leaf	nasal	M-003-2001
				anthrax	equine, cattle, goat	bark/leaf	nasal	
				bloat	cattle, sheep, goat	leaf	oral	
						bark	nasal	
				external wound infection	cattle, equine, camel	bark	oral	
Barleria eranthemoides C.B. Clarke	Acanthaceae	melhas-anshti	herb	external wound infection	cattle, equine, camel	leaf	topical	M-060-2002 M-002-2001
Becium grandiflorum (Benth.) Pichi-Serm.♠	Lamiaceae	tebeb	shrub	broken/dislocated bone	cattle	leaf	topical	M-036-2002
				Inflammation of the eye	cattle	leaf	local (eye)	
				limping due to mechanical damage	equine	leaf	topical	
Berberis holstii Engl.	Berberidaceae	michu-uff	herb	inflammation of the eye	cattle	root	local (eye)	M-022-2001

* Voucher specimens were collected by Mirutse Giday

♠ These are species that were reported from both *woredas*

Annex 1 (Contd).

Scientific name	Family name	Local name	Growth form	Ailment treated	Animal treated	Part used	Administration route	Voucher no.*
Bersama abyssinica Fresen.	Melianthaceae	mircuz-zibee, qorosma	tree	anthrax anthrax mange mites	equine, cattle, goat cattle, equine, goat cattle, sheep, goat	root leaf stem	topical nasal nasal	M-011-2001
Brassica nigra (L.) Koch	Brassicaceae	senafich	herb	leech infestation	cattle	seed	nasal	
Cadia purpurea (Picc.) Ait.	Fabacaeae	shilen	shrub	leech infestation	cattle	leaf	nasal	M-063-2002
Calotropis procera (Ait.) Ait. f.	Asclepiadaceae	gelaeto	shrub	blackleg	cattle	root, leaf milky sap	nasal topical	M-015-2001
				warts	cattle, equine	milky sap	topical	
Calpurnia aurea (Ait.) Benth.♠	Fabaceae	hitsawts, cherenchah	tree	infestation by fleas and lice mange mites lice infestation	cattle cattle, sheep, goat chicken	leaf leaf leaf	topical topical topical	M-006-2001
Capsicum annuum L.	Solanaceae	berbere	herb	bloat leech infestation	cattle, sheep, goat cattle	fruit fruit	oral nasal	
Carissa edulis (Forssk.) Vahl	Apocynaceae	egam	shrub	strangles	equine	root	oral	
Chenopodium murale L.	Chenopodiacae	amedmado		bovine pasteurellosis external wound infection	cattle cattle, equine, camel	leaf leaf, root	topical topical	M-064-2002
Chenopodium schraderianum Schult.	Chenopodiacae	sinhneh	herb	lice infestation	chicken	leaf	topical	M-012-2001
Cissus quadrangularis L.	Vitaceae	chewie	climbing herb	anthrax infestation by fleas and lice mastitis	cattle, goat, equine cattle cattle	stem leaf stem	oral topical oral	M-008-2001
Citrus aurantifolia (Christm.) Swingle	Rutaceae	lomin	tree	leech infestation mange mites	cattle cattle, sheep, goat	fruit fruit	nasal oral	
Clematis simensis Fresen.	Rununculaceae	hazo	climbing herb	actinomycosis	cattle	leaf	topical	M-024-2001
Clutea abyssinica Jaub. & Spach.	Euphorbiaceae	hirtimtim	herb	infection with internal parasites leech infestation strangles	cattle, equine cattle equine	leaf leaf leaf	oral nasal nasal	M-076-2002
Cordia africana Lam.	Boraginaceae	awhi	tree	external wound infection	cattle, equine, camel	lead	topical	

Annex 1 (Contd).

Scientific name	Family name	Local name	Growth form	Ailment treated	Animal treated	Part used	Administration route	Voucher no.*
Cucumis ficifolius A. Rich.♦	Cucurbitaceae	ramborambo	trailing herb	broken/dislocated bone	cattle	leaf	topical	M-050-2002
				retained fetal membrane	cattle	leaf	oral	
Cucurbita pepo L.♦	Cucurbitaceae	duba	trailing herb	lungworm pneumonia	cattle	root	oral	
				strangles	equine	fruit	nasal	
Cyphostemma adenocaule (Steud. ex A. Rich.) Descoings ex Wild & Drummond	Vitaceae	aserkuka	climbing herb	anthrax	equine, cattle, goat	root	nasal	M-058-2002 M-084-2002
				snake poison	cattle	root	oral	
Datura stramonium L.	Solanaceae	mestenagir	herb	bloat	cattle, sheep, goat	leaf	oral	
Dichrostachys cinerea (L.) Wight & Arn.	Fabaceae	karshamarsha	tree	foot-and-mouth disease	cattle	bark	topical	M-072-2002
Discopodium penninervium Hochst.	Solanaceae	alhem	shrub	diarrhoea	cattle, sheep, goat	leaf	oral	
				external wound infection	cattle, equine, camel	leaf	nasal	
				strangles	equine	leaf	nasal	
Dodonea angustifolia L. f.♦	Sapindaceae	tahses	tree	anthrax	cattle, equine, goat	leaf	oral	M-065-2002
				broken/dislocated bone	cattle	leaf	topical	
				limping due to mechanical damage	equine	leaf	topical	
Eucalyptus globulus Labill.	Myrtaceae	tsaed-bahirzaf	tree	bloat	cattle, sheep, goat	seed	oral	
Euclea shimperi (A. DC) Dandy	Ebenaceae	kuleaw	shrub	inflammation of the eye	cattle	root	local (eye)	
Euphorbia abyssinica Gmel.♦	Euphorbiaceae	qolqual	tree	bovine pasteurellosis	cattle	milky sap	topical	M-028-2001
				actinomycosis	cattle	milky sap	topical	
				blackleg	cattle	milky sap	topical	
				skin infection	camel, equine	milky sap	topical	
				strangles	equine	root stem, fruit	oral/nasal	
Ficus palmata Forssk.	Moraceae	beles	tree	external wound infection	cattle, equine, camel	leaf	topical	M-083-2002
				warts	cattle, equine	milky sap	topical	
Grewia villosa Willd.	Tiliaceae	agewdie	shrub	foot-and-mouth disease	cattle	stem	topical	M-088-2002
Heliotropium cinerascens Steud. ex DC.	Boraginaceae	amam-gimel	herb	bloat	cattle, sheep, goat	leaf, root	oral	M-069-2002
Hordeum vulgare L.	Poaceae	Buqlee-sigem	herb	bloat	cattle, sheep. goat	grain	oral	

Annex 1 (Contd).

Scientific name	Family name	Local name	Growth form	Ailment treated	Animal treated	Part used	Administration route	Voucher no.*
Impatiens rothii Hook. f.♠	Balsaminaceae	gurshit	herb	infestation with internal parasites	cattle, equine	root	oral	
				lungworm pneumonia	cattle	root	oral	
				lungworm pneumonia	cattle, sheep, goat	root	oral	
Juniperus procera Hochst. ex Endl.	Cupressaceae	tsihdi	tree	strangles	equine	leaf	nasal	
Justicia schimperiana T. Anders.♠	Acanthaceae	simeja	shrub	blackleg	cattle	root	oral	M-010-2001
				strangles	equine	leaf	oral	
Kalanchoe marmorata Bak.	Crassulaceae	arearo	herb	bovine pasteurellosis	cattle	root	topical	M-089-2002
Laggera tomentosa (Sch. Bip. ex A. Rich.) Oliv. & Hiern	Asteraceae	hansehanse	shrub	broken/dislocated bone	cattle	leaf	topical	M-045-2002
Leucas abyssinca (Benth.) Briq.	Lamiaceae	sewa-qerni	shrub	inflammation of the eye	cattle	leaf	Local (eye)	M-033-2002
Linum usitatissimum L.♠	Linaceae	entatie	herb	lungworm pneumonia	cattle	seed	oral	
				leech infestation	cattle	seed	nasal	
				retained fetal membrane	cattle	seed	oral	
Maerua angolensis DC.	Capparidaceae	tetem-agazen	tree	anthrax	equine, cattle, goat	leaf	oral, nasal	M-007-2001
				mastitis	cattle	leaf	oral	
Maytenus senegalensis (Lam.) Excell	Celastraceae	qebqeb	tree	inflammation of the eye	cattle	leaf	local (eye)	
Meriandra bengalensis Benth.♠	Lamiaceae	mesaguh	shrub	diarrhoea	cattle, sheep, goat	leaf	oral	M-052-2002 M-077-2002
				infestation with internal parasites	cattle, equine	leaf, root	oral	
				lungworm pneumonia	cattle, sheep, goat	leaf	oral	
						leaf, stem	nasal	
				Newcastle disease	chicken	leaf	nasal, by smoking	
Nicotiana tabacum L.♠	Solanaceae	timbaho	herb	leech infestation	cattle	leaf	nasal	
Olea africana subsp. *cuspidata* (Wall. ex DC) Cifferri♠	Oleaceae	aulie, woira	tree	external wound infection	cattle, equine, camel	leaf	topical	
				inflammation of the eye	cattle	leaf	local (eye)	
Opuntia ficus-indica (L.) Miller	Cactaceae	qolqual-bahri	shrub	external wound infection	cattle, equine, camel	stem	topical	
Osyris quadripartita Decn.	Santalaceae	qerets	shrub	diarrhoea	cattle, sheep, goat	leaf	oral	
Otostegia integrifolia Benth.	Lamiaceae	chiendog	shrub	infestation by fleas and lice	cattle	leaf	nasal	M-095-2002
Pappea capensis Eckl. & Zeyh.	Sapindaceae	qentaso	tree	anthrax	cattle, equine, goat	leaf	oral	M-013-2001 M-062-2002
				mastitis	cattle	leaf	oral	
Phytolacca dodecandra L'Hérit.♠	Phytolaccaceae	endod	shrub	anthrax	cattle, equine, goat	root	nasal	
				blackleg	cattle	fruit	nasal	

Annex 1 (Contd).

Scientific name	Family name	Local name	Growth form	Ailment treated	Animal treated	Part used	Administration route	Voucher no.*
				bloat	cattle, sheep, goat	leaf	oral	
				strangles	equine	root	nasal	
Pisum sativum L.	Fabaceae	ater	herb	strangles	equine	seed	oral	
Pittosporum viridiflorum Sims	Pittosporaceae	maileho	tree	leech infestation	cattle	leaf	nasal	M-092-2002
				strangles	equine	leaf	nasal	
Pterolobium stellatum (Forssk.) Brenan	Fabaceae	qentafe	climbing shrub	bovine pasteurellosis	cattle	leaf	nasal	M-014-2001
Rhamnus prinoides L' Hérit.♠	Rhamnaceae	giesho	tree	leech infestation	cattle	leaf	nasal	M-093-2002
Rhamnus staddo A. Rich.	Rhamnaceae	tsedo	shrub	foot-and-mouth disease	cattle	leaf	oral	M-077-2002
Rhus natalensis Krauss	Anacardiaceae	atami	shrub	infection with internal parasites	cattle, equine	leaf	oral	
Ricinus communis L.♠	Euphorbiaceae	gulee	tree-like herb	bovine pasteurellosis	cattle	leaf	topical	
				actinomycosis	cattle	leaf	topical	
				bloat	cattle, sheep, goat	leaf	oral	
				external wound infection	cattle, equine, camel	leaf	topical	
Rumex nepalensis Spreng.	Polygonaceae	digele	herb	bloat	cattle, sheep, goat	root, leaf	oral	M-078-2002
				external bleeding	cattle	root	topical	
				external wound infection	cattle, equine, camel	leaf	topical	
Rumex nervosus Vahl♠	Polygonaceae	hohot, embacho	shrub	mange mites	cattle, sheep, goat	leaf	topical	M-039-2002
				strangles	equine	leaf	nasal	
Senecio hadiensis Forssk.	Asteraceae	sihum-teli	climbing herb	inflammation of the eye	cattle	root	local (eye)	M-082-2002
Senecio myriocephalus Sch. Bip. ex A. Rich.	Sapindaceae	tsaeda-qotsli	shrub	broken/dislocated bone	cattle	leaf, root	topical	M-079-2002
				limping due to mechanical damage	equine	leaf	topical	
Senna occidentalis (L.) Link	Fabacaeae	airogit	woody herb	mastitis	cattle	leaf	oral	M-005-2001
Silene macrosolen A. Rich.	Caryophyllaceae	saero-saero, wogert	herb	strangles	equine	root	oral, nasal	
Solanum giganteum Jacq.♠	Solanaceae	engule-abiy	shrub	leech infestation	cattle	fruit	oral	M-038-2002
				lungworm pneumonia	cattle, sheep, goat	fruit	nasal	
Solanum incanum L.♠	Solanaceae	engule-nishtoy	shrubby herb	actinomycosis	cattle	leaf	topical	M-023-2002 M-032-2002
				blackleg	cattle	leaf	oral	
				external wound infection	cattle, equine, camel	leaf	topical	

Annex 1 (Contd).

Scientific name	Family name	Local name	Growth form	Ailment treated	Animal treated	Part used	Administration route	Voucher no.*
				infestation with internal parasites	cattle, equine	root	oral	
				leech infestation	cattle	leaf, root fruit	oral nasal	
				mange mites	cattle, sheep, goat	fruit	topical	
				strangles	equine	fruit	nasal	
Sorghum bicolor (L.) Moench	Poaceae	mishela	herb	external wound infection	cattle, equine, camel	seed	topical	
Trigonella foenum-graecum L.	Fabaceae	abaeke	herb	infestation with internal parasites	cattle, equine	seed	oral	
				pneumonia	camel	seed	oral	
Verbascum sinaiticum Benth.	Scrophulariaceae	ternaka	woody herb	leech infestation	cattle	root	nasal	M-086-2002
Verbena officinalis L.	Verbenaceae	atuch	herb	bloat	cattle, sheep, goat	leaf	oral	M-055-2002
				mange mites	cattle, sheep, goat	root	oral	
						root, leaf	topical	
Zaleya pentandra (L.) Jeffrey	Aizoaceae	areda-adgi	trailing herb	limping due to mechanical damage	equine	root	topical	M-001-2001
				strangles	equine	root	nasal	
Zehneria scabra (Linn. f.) Sond.	Cucurbitaceae	hareg-resa	climbing herb	Contagious bovine pleuropneumonia (CBPP)	cattle	leaf	oral	M-085-2002
Zingiber officinale Roscoe	Zingiberaceae	zingibil	herb	inflammation of the eye	cattle	rhizome	local (eye)	
Ziziphus spina-christi (L.) Desf.	Rhamnaceae	qunqur	shrub	inflammation of the eye	cattle	fruit	local (eye)	M-025-2001
				retained fetal membrane	cattle	leaf	oral	
-	-	ademomin	tree	anthrax	equine, cattle, goat	leaf	oral, nasal	M-073-2002 M-009-2001
				blackleg	cattle	leaf	oral	
				mastitis	cattle	leaf	oral	
				external wound infection	cattle, equine, camel	milky sap	topical	
-	Lamiaceae	omhalia	shrub	lungworm pneumonia	cattle, sheep, goat	leaf	oral	M-090-2002