Traditional medicinal plants for ethnoveterinary medicine used in Kilte Awulaelo District, Tigray Region, Northern Ethiopia

Abraha Teklay

Department of Biomedical Sciences, Physiology Team, Adigrat University, Adigrat, Ethiopia.

Accepted 29 September, 2015

ABSTRACT

Ethnoveterinary is the scientific study of the relationships between livestock and plants. Traditional medicine is still remaining the main resource for livestock treating health problems. Hence, the purpose of the study was to conduct ethnoveterinary study on medicinal plant species used to treat diseases of livestock in Kilte Awulaelo District, Tigray, Ethiopia. An ethnoveterinary study of medicinal plants was conducted in the District. The study employed common ethnoveterinary methods including semi-structured interviews, field observations, preference ranking exercises and paired comparisons. A total of 72 informants were purposefully selected, with the help of local administrators, elders and other members of the local community. A total of 50 species belonging to 44 genera and 27 families in which family Solanaceae is represented by 8 species (16%), followed by family Euphorbiaceae with 5 species (10%) were used as medicine. Present survey reveals that some plants have multiple medicinal uses, while some were being used to cure only one disease. Likewise some of the diseases are being treated by many plants while some diseases are treated by one plants species. The males above 40 years were found to be more knowledgeable regarding uses of medicinal plants than women and youngsters. Mostly, leaves of the plants are used as medicine. The major threats were found to be drought followed by over grazing. In conclusion, Kilte Awulaelo District is relatively rich in medicinal plant knowledge and practice. It is concluded that the plant resources in this area are used to treat different diseases of livestock. The medicinal plants were exposing to various anthropogenic and natural factors. The participation of the local people, awareness rising through training or education on sustainable utilization and management of plant resources, establishment of forest protected areas should be encouraged. Conservation of medicinal plants, conservation and promotion of indigenous knowledge by promotion of research activities are required.

Keywords: Traditional medicine, livestock, medicinal plants, diseases, species.

E-mail: abrahateklay@yahoo.com. Tel: +251917979616.

INTRODUCTION

The use of plant by man is dated back to the human existence on earth. In most developing countries, particularly in Sub-Saharan Africa, disease remains one of the principal causes of poor livestock performance leading to an ever-increasing gap between supply and demand for livestock products (Sori et al., 2004). Ethnoveterinary medicine which refers to traditional animal health care knowledge and practices comprising of traditional immunization, beliefs and the use of herbal remedies to prevent and treat disease problems of livestock (Swaleh, 1999; Amenu, 2007). Ethnoveterinary medicine provides traditional medicines, which are locally available and usually cheaper than standard treatments (Mesfin and Obsa, 1994).

In Ethiopia as elsewhere in most developing countries, animal disease remains one of the principal causes of poor livestock performance (Sori et al., 2004). Ethiopia is one of the leading countries of Africa in livestock population (Giday and Ameni, 2003). Although, Ethiopia is rich in its livestock population, it is one of the countries...
in the world with the lowest unit output (Mesfin and Obsa, 1994). The poor health condition and of its livestock has partially been responsible for the low productivity (Giday and Ameni, 2003).

Besides, most modern drugs are expensive and not affordable by the majority of Ethiopian farmers and pastoralists, most of them rely on their traditional knowledge practices and locally available materials (mainly plants) in the control of diseases of their domestic animals (Mesfin and Obsa, 1994; Giday and Ameni, 2003; Sori et al., 2004). Therefore, proper documentation and understanding of farmers’ knowledge and practices about the treatment, prevention and control of various ailments is important in designing and implementing successful livestock production.

MATERIALS AND METHODS

Kilte Awulaelo District is located in Eastern Zone of Tigray Regional State, Northern Ethiopia, with a total of 18 Kebeles. The District is geographically located between 39° 30’ to 39° 45’ E and 13° 45’ to 14° 00’ N at a distance of 825 km north of Addis Ababa. It borders with Howzien and Sease Tsadamba in the north, Atsbi Womberta in the east, Douga Tembien in the west and Mekelle (Enderta) in the South (Unpublished data, Kilte Awulaelo plan and finance, 2010) (Figure 1).

Altitude of the District ranges from 1900 to 2460 m above sea level. The District covers an area of 101,758 hectares, of which 21,620 hectares used for farmland, 7,930.85 hectares used for grazing, 44,134 hectares are enclosure area and 28,073.15 hectares are hills and homes (MoARD, 2007).

Methods

Following Martin (1995) and Cotton (1996), semi-structured interviews were employed and observation was made to collect ethnoveterinary data in the field. Information regarding local names of plants used, wild or cultivated, part(s) used, condition of plant part used (fresh/dried), methods of preparations, routes of administration, methods of application, diseases treated, noticeable adverse effects of remedies (vomiting, pain or others), indigenous knowledge transfer, uses of the medicinal plant species other than medicine, existing threats to these species and traditional conservation practices were gathered during the interviews. The necessary information about the plants such as habit, habitat, and altitude were observed. Each collection was given a collection code.
The collected specimens were then pressed and dried, and identified in the National Herbarium (ETH), Addis Ababa University. The identification work was performed by using the volumes of the Flora of Ethiopia and Eritrea and by comparing with authentic specimens deposited in the National Herbarium (ETH), Addis Ababa University and by getting assistance from taxonomists. The results were then noted and tabulated.

RESULTS

During the study, sixty one (84.72%) male and eleven (15.28%) female informants were part of the study. Of 72 informants, nineteen 26.39% were found between the ages 20 to 39, twenty five 34.72% were between the ages 40 to 59 and the remaining eight 38.89% were above sixty. Of the collected medicinal plants most of them were mentioned by males whereas, females explained the use of few medicinal plants. The knowledge of traditional medicinal plants of the study area was in the hand of male elders. This was evident that informant ages above 40 were 53 (73.61%) and of which about 45 informants (62.5%) were males (Table 1).

The people of the District classify the vegetation of the study area are different (Table 2). The vegetation of the study area is dominated by *Acacia etbaica* as one move away from houses and *Opuntia ficus-indica* is common around houses. A total of 50 species were collected during the study used to treat 19 livestock ailments (Appendix 1). These species belong to 44 genera and 27 families. Family Solanaceae is represented by 8 species (16%), followed by family Euphorbiaceae with 5 species (10%), Fabaceae and Lamiaceae with 4 species (8%) each, Asclepiadaceae with 3 species (6%), Acanthaceae, Asteraceae, Malvaceae and Vitaceae with 2 species (4%) each and the rest 18 families have one species (2%) each. The results depict plant parts for veterinary uses are herbs (22 species, 44%), followed by shrubs (19 species, 38%), trees (6 species, 12%) and climbers (3 species, 6%) (Table 3).

The majority of these plants were wild (37 species, 74%), some were harvested from cultivated area (6 species, 12%) and few were collected from both cultivated and wild habitats (7 species, 14%). Leaves are widely used plant parts for a range of preparations than the other parts accounting for 25 preparations (40.98%), followed by roots 21 preparations (34.43%) for livestock ailment treatment (Figure 2). According to the results, crushing 42 (65.63%) and unprocessed preparation 8 (12.5%) were the main methods of remedy preparations for livestock ailment treatment (Table 4). Similarly, the frequent applied modes of administration of ethnoveterinary medicine include creaming, rubbing and smearing were the widely used modes of administration accounting for 19 (29.69%), followed by drinking 16 (25%) of the reports (Figure 3).

<table>
<thead>
<tr>
<th>Informants age group</th>
<th>Sex</th>
<th>Total</th>
<th>Percent of total</th>
</tr>
</thead>
<tbody>
<tr>
<td>40-59</td>
<td>M: 19</td>
<td>F: 6</td>
<td>25</td>
</tr>
<tr>
<td>Above 60</td>
<td>M: 26</td>
<td>F: 2</td>
<td>28</td>
</tr>
</tbody>
</table>

Major livestock diseases and plant species used by the people of the study area

Nineteen livestock diseases were found to be treated with 50 plant species. Anthrax ranked first since it is treated with 15 species of plants. Dislocated bone is treated with 7 plant species. Snake bite and lice (fleas) also treated with 6 species of plants. Swelling, eye infection and urine retention are also treated with 5 plant species (Appendix 2). Informants ranked drought as the most serious threat to medicinal plants followed by over grazing and fire wood (Table 5). Over grazing and fire wood are the other factors, following drought, that pose threats to medicinal plants.

Conservation status and management measures on medicinal plants

The local communities did not give much attention for management of traditional medicinal plants. Deforestation, overgrazing and recurrent drought resulted in the reduction in number and diversity of trees and shrubs used for medication. The principal threatening factors of medicinal plants were drought, overgrazing and fire wood collection. According to the informants, nowadays search for
Figure 2. Plant parts of medicinal plants preparation for livestock ailment treatment.

Table 4. Methods of preparation of medicinal plants for livestock.

<table>
<thead>
<tr>
<th>Forms of preparation</th>
<th>Total responses</th>
<th>Percent of total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crushing</td>
<td>42</td>
<td>65.63</td>
</tr>
<tr>
<td>Unprocessed</td>
<td>8</td>
<td>12.5</td>
</tr>
<tr>
<td>Collecting juice</td>
<td>4</td>
<td>6.25</td>
</tr>
<tr>
<td>Chewing</td>
<td>3</td>
<td>4.69</td>
</tr>
<tr>
<td>Grinding</td>
<td>3</td>
<td>4.69</td>
</tr>
<tr>
<td>Fumigant (smoke and vapour)</td>
<td>2</td>
<td>3.13</td>
</tr>
<tr>
<td>Decoction</td>
<td>1</td>
<td>1.56</td>
</tr>
<tr>
<td>Firin</td>
<td>1</td>
<td>1.56</td>
</tr>
<tr>
<td>Total</td>
<td>64</td>
<td>100</td>
</tr>
</tbody>
</table>
some medicinal plants especially trees and some shrubs required a lot of time and travelling long distances. Fifty five (48.25%) species of trees, shrubs and climbers were rarely encountered in the study area, 49 (42.98%) plant species were commonly found and the rest 10 (8.77%) plant species were moderate or occasionally found. Means that they were not found as frequently as the common one but they were relatively better than the rare species in abundance.

DISCUSSION

A remarkable traditional medicinal plant knowledge and practice was documented from the study area. Elders had greater knowledge and use of medicinal plant species than younger people and most are males. Similar results were observed in different part of Ethiopia (Teklehaymanot and Giday, 2007; Giday et al., 2009). This may indicate that the indigenous medicinal plant use knowledge was declining among the younger generation. This may due to the influence of modernizations. But this result disagrees with the observation by Bekalo et al. (2009) with majority of informants interviewed were in the age class of less than 50.

Ethnoveterinary plant species used by people of the study area

It is encouraging to find out that 50 medicinal plants are still in use in the study area for the treatment of several livestock diseases. Even though the area is in a large scale environmental degradation and recurrent droughts taking place. Comparative studies were undertaken in two districts (Ofla and Raya-Azebo) and other study in Ofla District, Southern Tigray came up with 83 and 113 plant species of medicinal importance (Giday and Ameni, 2003; Abdurhman, 2010). On the other hand, the study in five districts of the region came up with a large number of medicinal plants, about 259 species (Birhane et al., 2011). In addition to this, most plant species that were identified during this study were also mentioned by different authors to have been used medicinally elsewhere in the region. The existence and utilization of such a common large number of medicinal plants by people in the study area indicates that the majority of the people use indigenous medicinal practices to take care of medication problems.

During the survey, the majority of medicinal plants were been obtained from wild vegetation. Except few herbs, trees and some cultivated crops. This result also agrees with the study by Giday (2001). In another study, Giday and Ameni (2003), found that (60%) of the cited medicinal plant species were collected from wild areas. Similar results were obtained stile in other studies (Yineger et al., 2008; Bekalo et al., 2009; Abdurhman, 2010; Yirga, 2010b). Wild habitats are subjected to the loss of a number of plant species due to different anthropogenic factors.

In this study, nearly half of the medicinal plants are herbs; this may indicate their relatively better abundance in the area as compared to others. They might be owing to the easily occurrence of these species in the study area and high level of abundance. In the same way high number of herbs and shrubs for medicinal purpose were also previously reported by Teklehaymanot and Giday (2007) indicated the dominance of herbs (52%) in the list of the identified medicinal plants, and Amenu (2007) noted that, herbs constitute the largest category (31.5%) followed by shrubs (30.3%). Comparable results were also observed in Bekalo et al. (2009) and Birhane et al. (2011). Nevertheless, the study observed by Lulekal et al. (2008), disagrees with this result. They argued that, of the medicinal plants of Mana Angetu District shrubs made up the highest proportion (47.83%), followed by herbs (23.91%). However, it is a fact in the country that woody plants (forest and wood land species) are declining and most of the easily available plants become the herbs and the trend of using more of herbaceous plants could be advantageous as it is easier to cultivate them when they are in short supply. Naturally, there are more herbaceous plant species as compared to trees and shrubs.

Table 5. Priority ranking factors perceived as threats to medicinal plants based on their level of destructive effects (values 1 to 6 were given: 1 is the least destructive threat and 6 is the most destructive threat).

<table>
<thead>
<tr>
<th>Threats</th>
<th>R1</th>
<th>R2</th>
<th>R3</th>
<th>R4</th>
<th>R5</th>
<th>R6</th>
<th>R7</th>
<th>R8</th>
<th>R9</th>
<th>Total</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drought</td>
<td>1</td>
<td>3</td>
<td>2</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>42</td>
<td>1st</td>
</tr>
<tr>
<td>Agricultural expansion</td>
<td>2</td>
<td>4</td>
<td>4</td>
<td>5</td>
<td>3</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>5</td>
<td>35</td>
<td>4th</td>
</tr>
<tr>
<td>Fire wood</td>
<td>5</td>
<td>5</td>
<td>6</td>
<td>3</td>
<td>2</td>
<td>4</td>
<td>5</td>
<td>5</td>
<td>3</td>
<td>38</td>
<td>3rd</td>
</tr>
<tr>
<td>Over grazing</td>
<td>6</td>
<td>6</td>
<td>5</td>
<td>4</td>
<td>5</td>
<td>3</td>
<td>4</td>
<td>4</td>
<td>2</td>
<td>40</td>
<td>2nd</td>
</tr>
<tr>
<td>Soil erosion</td>
<td>3</td>
<td>2</td>
<td>3</td>
<td>2</td>
<td>4</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>22</td>
<td>5th</td>
</tr>
<tr>
<td>Others</td>
<td>4</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>12</td>
<td>6th</td>
</tr>
</tbody>
</table>

*Key: Where R represented respondents.
The result of this study showed that leaf is the most used plant part in the preparation of the remedies than the other plant parts in the study area. Many studies conducted in different parts of Ethiopia also showed that leaves are used more than the other parts of a plant (Giday, 2001; Giday and Ameni, 2003; Yineger and Yewhalaw, 2007; Yineger et al., 2008; Bekalo et al., 2009; Yirga, 2010c). In contrast to this, the results observed by Birhane et al. (2011) indicated that, root followed by leaf and stem were the most commonly harvested plant parts in five districts of Tigray Region. In addition, this result disagrees with the result observed by Lulekal et al. (2008) in which, the most commonly used plant parts for herbal preparations in the Mana Angetu District were roots (33.91%) and leaves (25.65%). So it may be argued that this result is very important for the existence of the plant, because this practice helps to reduce the rate of threat on plant species or helps for sustainable harvesting of plants since removal of an appreciable amount of leaf is tolerated by the plant. Medicinal plant harvest that involves root, rhizomes, bulbs, barks and stem have serious effect on the survival of mother plant. An estimate of the threat to medicinal plants can be made from the type of plant and the part used. Harvesting the root of a tree poses more of a threat than collecting the fruits, seeds, and leaves (Ragunathan and Abay, 2009).

According to the results, the herbal remedies are prepared using fresh material; some species are also used in the case of dried plant material. There were species in which the local people use either dried or fresh materials, which is a common observation of different studies on various health problems in different parts of Ethiopia (Giday and Ameni, 2003; Amenu, 2007; Yineger and Yewhalaw, 2007; Yineger et al., 2008; Bekalo et al., 2009; Yirga, 2010b). As these plants are used in both forms, the chance of using the medicinal plants under different seasons of the year is increased. In this result, most of the medicinal plants were used in the fresh form; so using of them under different seasons of the year might be decreased. They are used only when they are available.

Proportionally, a high number of the medicinal plants preparation was crushing, chewing, decoction and unprocessed part. The local people employ several methods of preparation of traditional medicines. A similar study showed that different preparations and application methods of medicinal plants were mentioned (Yineger and Yewhalaw, 2007; Yineger et al., 2008; Yirga, 2010b; Birhane et al., 2011). However, the results observed in Lulekal et al. (2008) indicated that, concoction (60 species, 26.1%) constituted the highest type of preparation form. The results also disagreed with finding by Abera (2003) in which (33.3%) plants are prepared as decoction and (30.8%) as vegetable drug.

In this study, most of the remedy prescriptions involved the use of single plant species or a single plant part. But some of the preparations were also made from mixture of different plant species with addition of water and different additives. The study also revealed that a single plant species could be used to treat more than one disease. In agreement with this result it was reported by Giday et al. (2009) that 50% of the Bench people remedies were prepared without the use of diluents, while 40% were prepared with the addition of water. According to the authors Giday et al. (2009), water was the most frequently used diluent in the preparation of remedies.

The results indicated that creaming; rubbing and smearing were the highest reported followed by drinking and fumigating (smoke and vapour). Comparative findings were conducted by Abdurhan (2010), at Ofla District, Northern Ethiopia, indicated that drinking was the highest with 24.50%, followed by 21.90% creaming, rubbing and smearing.

There are various routes of administration of traditional medicinal plants in the study area. The greater proportions of medicinal plants were applied externally. Internally (oral, local, nasal and oracular) applications were slightly lower. In agreement with this study it was reported by Giday et al. (2009) that 39% of the remedies prepared by Bench People were applied on the skin while 33% were taken orally and 16% administered through the eyes. However, it disagrees with the investigation by Bekalo et al. (2009) in Konta Special Wereda, Southern Nations, Nationalities and Peoples Regional State, Ethiopia, in which most medicinal plant preparations were taken internally (79.7%) out of which drinking takes the leading proportion (67.8%). Not only that but also this results disagrees with the results by Sori et al. (2004) in which it reported that the most widely practiced administration of medicinal plant preparations was oral administration.

With regard to the administration for treatment, there is no agreement in measurement or unit used among the informants. Getahun (1976) indicated that lack of precision and standardization as one of the drawbacks for the recognition of traditional health care system. Birhane et al. (2011) noted that, there were variation in quantity of remedies, unit of measurement of remedies, duration and time of use of preparations prescribed by healers for the same kind of health problems. Giday (2001) also indicated that, the preparation of most of the remedies are rough and therefore lack precision.

**Major livestock diseases and the plant species used**

The diseases of livestock being treated by a number of species are coupled with the frequent occurrence of the diseases and limited accessibility of plant species for treatment. This indicates that the popularity of these species among the informants and the widespread nature of the indigenous knowledge for treating the diseases. Similar findings were identified by Amenu (2007) and
Seid and Tsegay (2011).

The findings of the current study showed that medicinal plant species were under serious threat mainly due to drought, overgrazing and fire wood collection. Since most of the cited medicinal plant species were wild, they were exposed to various anthropogenic and natural factors. However, a comparative study by Yineger and Yewhalaw (2007) at Sekoru District, Southwestern Ethiopia observed that, deforestation (40%), drought (17.5%), agricultural expansion (12.5%) and fire (12.5%), were the principal threats to medicinal plant species. Another study by Abdurhman (2010) at Ofla District, Northern Ethiopia, indicated that fire wood collection, agricultural expansion and drought were the most common threats to medicinal plant species.

In the study area, almost all vegetation types especially those of the trees and shrubs are highly depleted. Most of the ethnoveterinary plant species were reported to be rarely encountered. This might be due to impact of anthropogenic pressure and natural conditions. The local communities did not give much attention for management of traditional medicinal plants. This could be explained by the lack of knowledge as important medicinal plants are known by few local healers, and the habitat of the plants (most of the plants were found too far from home gardens) which makes their management difficult. There is little practice of cultivating medicinal plants in the area. Similar findings were conducted by Giday (2001), Yineger et al. (2008) and Abdurhman (2010). Deforestation, overgrazing and recurrent drought resulted in the reduction in number and diversity of trees and shrubs used for medication. According to the informants, nowadays search for some medicinal plants especially trees and some shrubs, required a lot of time and travelling long distances; fore stance, Hagenia abyssinica.

Ecosystem conservation should be implemented through ex-situ and in-situ conservation of medicinal plants for sustainable harvesting methods in the collection of medicinal plants.

Conclusion

Kilte Awulaelo District is relatively rich in medicinal plant knowledge and practice. Even though, the area was highly degraded and sparse in plant species coverage. The majority of the reported medicinal plant species were from the wild habitat. This indicates that giving of less attention of the medicinal plants by the community, mean that not cultivating plant for medicinal purpose. As a reason of this they are subjected to the loss of a number of plant species due to different anthropogenic factors. Herbs were reported by more species used for preparation of traditional remedies followed by shrubs. Leaves were also found to be the most frequently used plant parts followed by roots for preparation of livestock remedies. Herbal remedies are prepared using fresh material, while some species are used in the case of dried plant material. Crushing, chewing, decoction and unprocessed part are the four main methods of preparation. Creaming, rubbing and smearing were the highest reported case followed by drinking of the modes of administration. The greater proportion of application of medicinal plant preparations was external, internal application being slightly lower. With regard to the dosage of traditional medicinal plants, there is no agreement on measurement. This will have negative consequence on the health of the society. Droughts, over grazing and fire wood collection are the major threat to medicinal plants in the area. As the vegetation of the area was exposed to many factors ex-situ and in-situ conservation strategies are crucial for conservation. Further biological studies should also be conducted on the reported medicinal plant species of the study area so as to utilize them in drug development.

ACKNOWLEDGEMENTS

My appreciation goes to the people of Kilte Awulaelo District for their positive response, sharing their valuable knowledge and time as well as for their tremendous generosity and hospitality. We also thank the Kilte Awulaelo District offices of Rural Agricultural Development, Health, Administration and Plan and Finance for their provision of information and support letter during data collection. I thank Addis Ababa University for the provision of some facilities required for identification of plants. I am also indebted to my families as general for encouraging and supporting during the study.

REFERENCES


### Appendix 1: List of Medicinal plants used to treat livestock ailments (Ha = habit, H = herb, T = tree, Sh = shrub, Cl = climber, PU = partes used, Sb = stem bark, L = leaves, R = root, RB = root bark, W.pa = whole plant part, CP = condition of preparation, F = fresh, D = dry, F/D = fresh or dried)

<table>
<thead>
<tr>
<th>Scientific name</th>
<th>Family name</th>
<th>Local name (Tigrigna)</th>
<th>Ha</th>
<th>PU</th>
<th>CP</th>
<th>Ailment type</th>
<th>Method of preparation</th>
<th>Administration route</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acacia etbaica</td>
<td>Fabaceae</td>
<td>Seraw</td>
<td>T</td>
<td>L</td>
<td>F</td>
<td>Swelling</td>
<td>Crushed mixing with latex of <em>Euphorbia abyssinica</em> and creaming the infected part</td>
<td>External</td>
</tr>
<tr>
<td>Achyranthes aspera</td>
<td>Amaranthaceae</td>
<td>Muchele</td>
<td>H</td>
<td>R</td>
<td>F/D</td>
<td>Eye infection Anthrax</td>
<td>Chewing and spit drop of it to the eye Burning (firing) and attaching to the infected parts</td>
<td>Local External</td>
</tr>
<tr>
<td>Galium boreo-aethiopicum</td>
<td>Rubiaceae</td>
<td>Mendefadgi</td>
<td>H</td>
<td>R</td>
<td>F/D</td>
<td>Donkey’s malaria</td>
<td>Crushed and dropping through nose</td>
<td>Nasal</td>
</tr>
<tr>
<td>Aloe megalacantha</td>
<td>Aloaceae</td>
<td>Ere</td>
<td>Sh</td>
<td>R</td>
<td>F/D</td>
<td>Dislocated bone</td>
<td>Tied in their ear Cutting a leaf and cream the latex to the wound until treated</td>
<td>External Oral</td>
</tr>
<tr>
<td>Anethum graveolens</td>
<td>Apiaceae</td>
<td>Shilan</td>
<td>H</td>
<td>W.Pa</td>
<td>F/D</td>
<td>Urine retention</td>
<td>Crushed, Filtering the fluid and drunk Boiling and then drunk the water</td>
<td>Oral Oral</td>
</tr>
<tr>
<td>Calotropis procera</td>
<td>Asclepiadaceae</td>
<td>Ginda</td>
<td>Sh</td>
<td>L</td>
<td>&amp;</td>
<td>External wound</td>
<td>Crushed with leaves of <em>Ficus palmata</em> and creaming the infected until treated</td>
<td>External</td>
</tr>
<tr>
<td>Buddleja polystachya</td>
<td>Budlejaceae</td>
<td>Metere</td>
<td>Sh</td>
<td>L</td>
<td>F</td>
<td>Leeches</td>
<td>Crushed and adding through the nose</td>
<td>Nasal</td>
</tr>
</tbody>
</table>
### Appendix 1: Continues.

<table>
<thead>
<tr>
<th><strong>Plant Name</strong></th>
<th><strong>Family</strong></th>
<th><strong>Part Used</strong></th>
<th><strong>Part of Plant</strong></th>
<th><strong>Condition</strong></th>
<th><strong>Treatment</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Calpurnia aurea</em></td>
<td>Fabaceae</td>
<td>Hitsawts</td>
<td>T</td>
<td>L and F</td>
<td>Lice and ticks&lt;br&gt;Crushed and dressing or washing for few seconds</td>
</tr>
<tr>
<td><em>Chenopodium murale</em></td>
<td>Chenopodiaceae</td>
<td>Hamli qiweo</td>
<td>H</td>
<td>L and F</td>
<td>Swelling&lt;br&gt;Crushed and tie in the infected parts</td>
</tr>
<tr>
<td><em>Clematis hirsuta</em></td>
<td>Ranunculaceae</td>
<td>Hareg qiweo</td>
<td>R</td>
<td>F</td>
<td>Swelling&lt;br&gt;Crushed and placing or creaming in the damaged parts</td>
</tr>
<tr>
<td><em>Clerodendrum myricoides</em></td>
<td>Lamiaceae</td>
<td>Shiwha Sh</td>
<td>R</td>
<td>F</td>
<td>Swelling&lt;br&gt;Crushed and placing or creaming in the damaged parts</td>
</tr>
<tr>
<td><em>Clutia abyssinica</em></td>
<td>Euphorbiaceae</td>
<td>Tewshealali Sh</td>
<td>L</td>
<td>F</td>
<td>Swelling&lt;br&gt;Crushed and creaming with butter</td>
</tr>
<tr>
<td><em>Cucumis ficifolius</em></td>
<td>Cucurbitaceae</td>
<td>Ramborambo</td>
<td>H</td>
<td>L</td>
<td>Swelling&lt;br&gt;Crushed, add water Filter and drunk using glass&lt;br&gt;Placing of its one tip part in fire then burning to the bite side</td>
</tr>
<tr>
<td><em>Cyphostema adenocaule</em></td>
<td>Vitaceae</td>
<td>Aserkuca asergundi</td>
<td>R</td>
<td>F/D</td>
<td>Snake bite&lt;br&gt;Crushed, filtering and drunk the fluid</td>
</tr>
<tr>
<td><em>Cyphostemma junceum</em></td>
<td>Vitaceae</td>
<td>Etse zewye</td>
<td>H</td>
<td>F</td>
<td>Snake bite&lt;br&gt;Crushed and eating with honey</td>
</tr>
<tr>
<td><em>Datura stramonium</em></td>
<td>Solanaceae</td>
<td>Mestenagr</td>
<td>H</td>
<td>L</td>
<td>Anthrax (livestock)&lt;br&gt;Crushed with leaves of <em>Solanum marignatum</em> and leaves of <em>Malva verticillata</em> and then creaming the affected parts</td>
</tr>
<tr>
<td><em>Dodonia angustifolia</em></td>
<td>Sapindaceae</td>
<td>Tahses</td>
<td>T</td>
<td>L</td>
<td>Dislocated bone&lt;br&gt;Crushed and placed or tied in the damaged part</td>
</tr>
<tr>
<td><em>Dregea schimperi</em></td>
<td>Asclepiadaceae</td>
<td>Shanqoq</td>
<td>Cl</td>
<td>L</td>
<td>Rabbis&lt;br&gt;Crushed And to be drunk</td>
</tr>
<tr>
<td><em>Echinops Kebericho</em></td>
<td>Asteraceae</td>
<td>Dander</td>
<td>H</td>
<td>R</td>
<td>Dislocated bone&lt;br&gt;Tied around the damaged parts</td>
</tr>
</tbody>
</table>
### Appendix 1: Continues.

<table>
<thead>
<tr>
<th>Plant Name</th>
<th>Family</th>
<th>Part Used</th>
<th>Mode of Administration</th>
<th>Use</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Euclea racemosa</strong> subsp. <strong>schimperi</strong></td>
<td>Ebenaceae</td>
<td>Keleaw</td>
<td>RB F/D Snake bite</td>
<td>Crushed, add water and drunk the fluids by glass Oral</td>
</tr>
<tr>
<td><strong>Euphorbia abyssinica</strong></td>
<td>Euphorbiaceae</td>
<td>Kulqual</td>
<td>T Latex Swelling</td>
<td>Smearing by the latex on affected part. External</td>
</tr>
<tr>
<td><strong>Euphorbia petitiana</strong></td>
<td>Euphorbiaceae</td>
<td>Hindukduk</td>
<td>H R F/D Dislocated bone</td>
<td>Tied around the damaged parts External</td>
</tr>
<tr>
<td><strong>Euphorbia tirucali</strong></td>
<td>Euphorbiaceae</td>
<td>Kinchib</td>
<td>Sh Latex Swelling</td>
<td>Smearing the swallowed part by the latex. External</td>
</tr>
<tr>
<td><strong>Gomphocarpus purpurascens</strong></td>
<td>Asclepiadaceae</td>
<td>Tseba dimu</td>
<td>H R F/D Wound (livestock)</td>
<td>Crushed and creaming External</td>
</tr>
<tr>
<td><strong>Hypoestes forskoalii</strong></td>
<td>Acanthaceae</td>
<td>Girbia</td>
<td>H W.pa F Anthrax</td>
<td>Crushed alone or mixed with seeds of <em>Lepidium sativum</em>, roots of <em>Solanum incanum</em>, roots of <em>Achyranthes aspera</em> and roots of <em>Verbascum sinaiticum</em>, filtering the fluid and drunk Oral</td>
</tr>
<tr>
<td><strong>Hypericum annulatum</strong></td>
<td>Hypericaceae</td>
<td>Akti</td>
<td>H L F Eye infection</td>
<td>Dried, Grinding and creaming with butter Local</td>
</tr>
<tr>
<td><strong>Justicia schimperiana</strong></td>
<td>Acanthaceae</td>
<td>Shimieya</td>
<td>Sh L F Dysentery</td>
<td>Crushed, add water and drunk Oral</td>
</tr>
<tr>
<td><strong>Laggera tomentosa</strong></td>
<td>Asteraceae</td>
<td>Kash koshe</td>
<td>Sh L F Leeches</td>
<td>Crushed and adding the fluids through their nose Nasal</td>
</tr>
<tr>
<td><strong>Premna oligotriche</strong></td>
<td>Lamiaceae</td>
<td>Sasa</td>
<td>Sh W.pa F/D Synerosis celebralis</td>
<td>Placing on fire and fumigating the smoke External</td>
</tr>
<tr>
<td><strong>Lepidium sativum</strong></td>
<td>Brassicaceae</td>
<td>Shimfa</td>
<td>H Seed D Swelling (both)</td>
<td>Crushed and creaming on the affected part External</td>
</tr>
<tr>
<td><strong>Leucas abyssinica</strong></td>
<td>Lamiaceae</td>
<td>Siwa karni</td>
<td>Sh L F Eye infection</td>
<td>Chewing and spit drop of it to the eye Local</td>
</tr>
<tr>
<td><strong>Lycopersicum esculantum</strong></td>
<td>Solanaceae</td>
<td>Komodere</td>
<td>H L F Leeches</td>
<td>Crushed and adding through their nose Nasal</td>
</tr>
<tr>
<td><strong>Malva verticillata</strong></td>
<td>Malvaceae</td>
<td>Enkiaftha</td>
<td>H L F Anthrax</td>
<td>Crushed with leaves of <em>Datura stramonium</em> and leaves of <em>Solanum mariginatum</em> and creaming the parts External</td>
</tr>
</tbody>
</table>
### Appendix 1: Continues.

<table>
<thead>
<tr>
<th>Plant Name</th>
<th>Family</th>
<th>Common Name</th>
<th>Sex</th>
<th>Application</th>
<th>Treatment</th>
<th>Part Used</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Melia azadrachta</strong></td>
<td>Meliaceae</td>
<td>Limo (nim)</td>
<td>T</td>
<td>L</td>
<td>F</td>
<td>External wound</td>
</tr>
<tr>
<td><strong>Nicotiana glauca</strong></td>
<td>Solanaceae</td>
<td>Chenawi (tegegwe)</td>
<td>Sh</td>
<td>L</td>
<td>F</td>
<td>Lice and ticks (livestock)</td>
</tr>
<tr>
<td><strong>Nicotiana tabacum</strong></td>
<td>Solanaceae</td>
<td>Timbako</td>
<td>H</td>
<td>L</td>
<td>F</td>
<td>Leeches (livestock)</td>
</tr>
<tr>
<td><strong>Opuntia ficus-indica</strong></td>
<td>Cactaceae</td>
<td>Beles (kulqual bahri)</td>
<td>Sh</td>
<td>L</td>
<td>F</td>
<td>Anthrax</td>
</tr>
<tr>
<td><strong>Otostegia integrifolia</strong></td>
<td>Lamiaceae</td>
<td>Chiendog</td>
<td>Sh</td>
<td>L</td>
<td>F/D</td>
<td>Lice or Fleas</td>
</tr>
<tr>
<td><strong>Plumbago zeylanica</strong></td>
<td>Plumbaginaceae</td>
<td>Atthi</td>
<td>H</td>
<td>R</td>
<td>F/D</td>
<td>Wound (livestock)</td>
</tr>
<tr>
<td><strong>Ricinus communis</strong></td>
<td>Euphorbiaceae</td>
<td>Guile</td>
<td>H</td>
<td>L</td>
<td>F</td>
<td>External wound</td>
</tr>
<tr>
<td><strong>Rumex nepalensis</strong></td>
<td>Polygonaceae</td>
<td>Dengele (shembobat a)</td>
<td>H</td>
<td>R</td>
<td>F</td>
<td>Fire burn</td>
</tr>
<tr>
<td><strong>Schinus molle</strong></td>
<td>Anacardiaceae</td>
<td>Tikur berbere</td>
<td>T</td>
<td>L</td>
<td>F</td>
<td>Bloating</td>
</tr>
<tr>
<td><strong>Sida schimperiana</strong></td>
<td>Malvaceae</td>
<td>Tifraria</td>
<td>Sh</td>
<td>R</td>
<td>F/D</td>
<td>Dislocated bone</td>
</tr>
<tr>
<td><strong>Solanum hartfollium</strong></td>
<td>Solanaceae</td>
<td>Alamo kalbi</td>
<td>Sh</td>
<td>R</td>
<td>D</td>
<td>Abortion (livestock)</td>
</tr>
<tr>
<td><strong>Solanum incanum</strong></td>
<td>Solanaceae</td>
<td>Niesheton Engule</td>
<td>Sh</td>
<td>R</td>
<td>F</td>
<td>Abdominal pain</td>
</tr>
</tbody>
</table>

- **T**: Top
- **L**: Lower
- **F**: Female
- **D**: Dried
- **F/D**: Fresh and dried
- **Sh**: Shaved
- **H**: Healthy
# Appendix 1: Continues.

<table>
<thead>
<tr>
<th>Plant Name</th>
<th>Family</th>
<th>Species</th>
<th>Part Used</th>
<th>Problem</th>
<th>Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Solanum mariginatum</strong></td>
<td>Solanaceae</td>
<td>Aby Ungul</td>
<td>Sh</td>
<td>External wound infection</td>
<td>Dried, grinding and creaming to the infected parts. Crushed with seeds of <em>Lepidium sativum</em>, whole parts of <em>Hypoestes forskaolii</em>, roots of <em>Achyranthes aspera</em> and roots of <em>Verbascum sinaticum</em>, filtering the fluid and drunk.</td>
</tr>
<tr>
<td><strong>Trigonella foenum-graecwm</strong></td>
<td>Fabaceae</td>
<td>Abeake</td>
<td>H</td>
<td>Abdominal pain</td>
<td>Grinding, adding water and drunk.</td>
</tr>
<tr>
<td><strong>Verbascum sinaticum</strong></td>
<td>Scrophulariaceae</td>
<td>Tirmake (handega)</td>
<td>H</td>
<td>Swelling</td>
<td>Grinding with ('Ater') and creaming the effected parts.</td>
</tr>
<tr>
<td><strong>Withania somnifera</strong></td>
<td>Solanaceae</td>
<td>Agol</td>
<td>H</td>
<td>Eye infection</td>
<td>Boiled in water with leaves of <em>Eucalyptus globulus</em>, roots of <em>Achyranthes aspera</em>, roots of <em>Cynoglossum lanceolatum</em> and leaves of <em>Zehneria scabra</em> and fumigated by its vapor.</td>
</tr>
</tbody>
</table>
Appendix 2. List of livestock ailments, number of informants cited and percentage.

<table>
<thead>
<tr>
<th>No.</th>
<th>Ailments</th>
<th>Local name of the ailment</th>
<th>No. of medicinal plants</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Anthrax</td>
<td>Megerem</td>
<td>15</td>
<td>13.16</td>
</tr>
<tr>
<td>2</td>
<td>Snake bite</td>
<td>Teben Zinekeso</td>
<td>6</td>
<td>5.26</td>
</tr>
<tr>
<td>3</td>
<td>Ticks</td>
<td>Qurid</td>
<td>3</td>
<td>2.63</td>
</tr>
<tr>
<td>4</td>
<td>Lice and fleas</td>
<td>Qunchae (Kumale)</td>
<td>6</td>
<td>5.26</td>
</tr>
<tr>
<td>5</td>
<td>Problem (difficulty) in breathing</td>
<td>Mitnfas miebay</td>
<td>1</td>
<td>0.88</td>
</tr>
<tr>
<td>6</td>
<td>Swelling</td>
<td>Hibet (zigag)</td>
<td>5</td>
<td>4.39</td>
</tr>
<tr>
<td>7</td>
<td>Eye infection</td>
<td>Atsmi ayni (Ayni Himam)</td>
<td>5</td>
<td>4.39</td>
</tr>
<tr>
<td>8</td>
<td>Urine retention</td>
<td>Atsere Shinti</td>
<td>5</td>
<td>4.39</td>
</tr>
<tr>
<td>9</td>
<td>Dysentery</td>
<td>Tsihtsah (Dem Hiwas)</td>
<td>1</td>
<td>0.88</td>
</tr>
<tr>
<td>10</td>
<td>Synerosis cerebrals</td>
<td>Zarti</td>
<td>1</td>
<td>0.88</td>
</tr>
<tr>
<td>11</td>
<td>Leeches</td>
<td>Aleqti</td>
<td>5</td>
<td>4.39</td>
</tr>
<tr>
<td>12</td>
<td>Malaria of donkey</td>
<td>Aso Adgi</td>
<td>3</td>
<td>2.63</td>
</tr>
<tr>
<td>13</td>
<td>Rabies</td>
<td>Ebud kelbi Nikas</td>
<td>1</td>
<td>0.88</td>
</tr>
<tr>
<td>14</td>
<td>Bloating</td>
<td>Kebdi Minfah</td>
<td>1</td>
<td>0.88</td>
</tr>
<tr>
<td>15</td>
<td>Scabies (skin diseases)</td>
<td>Shehor</td>
<td>1</td>
<td>0.88</td>
</tr>
<tr>
<td>16</td>
<td>Abortion</td>
<td>Mibreay</td>
<td>2</td>
<td>1.75</td>
</tr>
<tr>
<td>17</td>
<td>Dislocated bone</td>
<td>Filuay (likak)</td>
<td>7</td>
<td>6.14</td>
</tr>
<tr>
<td>18</td>
<td>Wound</td>
<td>Gudae (kusli)</td>
<td>4</td>
<td>3.51</td>
</tr>
<tr>
<td>19</td>
<td>Internal parasite</td>
<td>Efel</td>
<td>1</td>
<td>0.88</td>
</tr>
</tbody>
</table>