

Ethnobotanical study of medicinal plants around 'Dheeraa' town, Arsi Zone, Ethiopia

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Abstract

A study aimed at identifying plant species used and manipulated by the community for medicine was carried out around 'Dheeraa' town, Arsi Zone, Oromia Region, Southeast Ethiopia. The data were collected through a series of fieldworks conducted from October to December 2002. Random and systematic sampling methods were employed to select the study sites as well as the informants. Ethnobotanical methods using semi-structured interviews were employed and a total of 83 species of medicinal plants were recorded. The natural environment yielded larger proportion (76 species, 92%) of the total records followed by home gardens of the area. The studied medicinal plants were those used in traditional health care of humans and livestock. However, only very few individuals of each species were found in the area and this might be attributed to the ongoing habitat modification and loss of natural vegetation. Therefore, it is important to create awareness on sustainable use of the natural vegetation. Paying special attention to the medicinal plants found in the area may help to amplify the role that these plants play in healthcare, poverty alleviation as well as environmental protection.

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1. Introduction

Many research works have been doing on plants, which provide humans with extensive and fundamental uses. The authentic product or by-product of plants serves human beings in so many ways, one of which is medicine. The use of plants for health purpose started long time ago, probably at the first moment when a human being got sick. Some 3000 years B.P, humankind was well aware of the medicinal properties of some plants growing around him (Sofowora, 1982). In Lal and Yadav (1983), it is reported that expeditions, undertaken primarily by investigators interested in the cultural attributes of primitive societies, have also yielded valuable information regarding the uses of plants for medicine. The use of plants to cure diseases and relieve physical sufferings has started from the earliest times of mankind's history (Hill, 1989).

Balick and Cox (1996) observed that in so many cases, the sources of important pharmaceuticals are plants being used by indigenous people. In Cotton (1996), it is more explained that the use of plants as medicine by traditional people has laid basis for the discovery of modern medicine and 'The American Shaman Inc.' is mentioned as an example of company that has focused on traditional medical systems in drug discovery programs.

Today, medicinal plants play a great role in human health services worldwide. Many people in the modern world are turning to herbal medicine. For example, in USA about 25% of all prescriptions dispensed in public pharmacies in 1973 contained drugs extracted from higher plants and about 64% of the total global populations remain dependent on traditional medicine for their healthcare needs (Farnsworth and Morris, 1976; cited in Sofowora, 1982; Farnsworth, 1994 and Sindiga, 1994; cited in Cotton, 1996). It is shown in many literature sources that India, Korea, Japan, China, and Malaysia are the leading countries in the world using traditional medicines. For example, in Indian tribes, approximately 7500 medicinal plant species are traditionally used (Rao, 1996). It is reported in Singh et al. (1979) that among about 2000 drugs that have been used in India and Nepal, about 1500 drugs are of plant origin. The Miskitu (in

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Nicaragua) people also obtain most of their medicines (more than 77%) from the forest (Coe and Anderson, 1997).

In the African region, traditional medicine has become a part of the people's culture even though this form of medicine is not as well organized as, for example, in India and China (Sofowora, 1982). Ethiopia is a home of diversity, having diverse flora as well as ethnic groups, each having different ways of utilization and manipulation of medicinal plants. More than 80% of the people are also dependent on plants for their health service (Gebremariam and Asress, 1998). They are using large numbers of medicinal plants efficiently even though the plants used and the methods of preparation are often closely guarded secrets. Due to lack of interest by the modern society and the way elders transfer their knowledge, there were many misconceptions on the efficacy of medicinal plants (Wilson and Woldo, 1979). Traditional medication has been ignored in the past by educated and modern societies. Recently, a number of ethnomedicinal and ethnobotanical studies are being carried out realizing the benefit of traditional medication to promote the health care services. The outcomes of these researches are greatly playing roles in attitudinal changes. However, these studies are very few in light of the country's biodiversity.

This study has been conducted in semi-arid area of Arsi Zone with more focus on medicinal plants. The people in the study area depend on agricultural products for their food source and the natural vegetation as source of fuel, medicine, construction materials and other cultural needs. Such higher use rate might be the cause for the environmental degradation observed in the area. This obviously, has impact on the loss of indigenous knowledge. Hence, collecting and documenting indigenous knowledge

on medicinal plants may add information to the valuation of biodiversity and to forward suggestions for its sustainable use and conservation.

2. Materials and methods

2.1. The study area

The study was conducted in a lowland area of Arsi Zone, in the Regional States of Oromia, southeast Ethiopia where the Great Rift Valley crosses the area. It is bounded by Sodere Resort in the east and Lakes Koka and Ziway in the west (Fig. 1). 'Dheeraa' town, 125 km away from Addis Ababa towards South-eastern direction, is located at 8°16'N and 39°20'E with the elevation of the study area ranges from 1400 to 1800 m a.s.l. (EMA, 1998).

Based on the current agroecological classification made by MOA (1998), the study area lies in three major agroecological zones: SA1 (hot to warm semi-arid lowlands), SA2 (tepid to cool semi-arid mid-highlands, and SM2 (tepid to cool semi-moist highlands). Specifically in the sub-agroecological zones: SA1-2 (hot to warm semi-arid lakes and rift valleys), SA2-2 (tepid to cool semi-arid lakes and rift valleys), and SM2-2 (tepid to cool semi-moist lakes and rift valleys). In MOA (1998), it is indicated that the mean annual evapo-transpiration in the study area is 1400–1700 mm, which is greater than the mean annual precipitation (700–1200 mm). This clearly shows that there is moisture deficiency in the area. It is also mentioned in Arsi Zone Food Security Program (2002), that the area usually experiences very erratic rainfall and drought. This together with

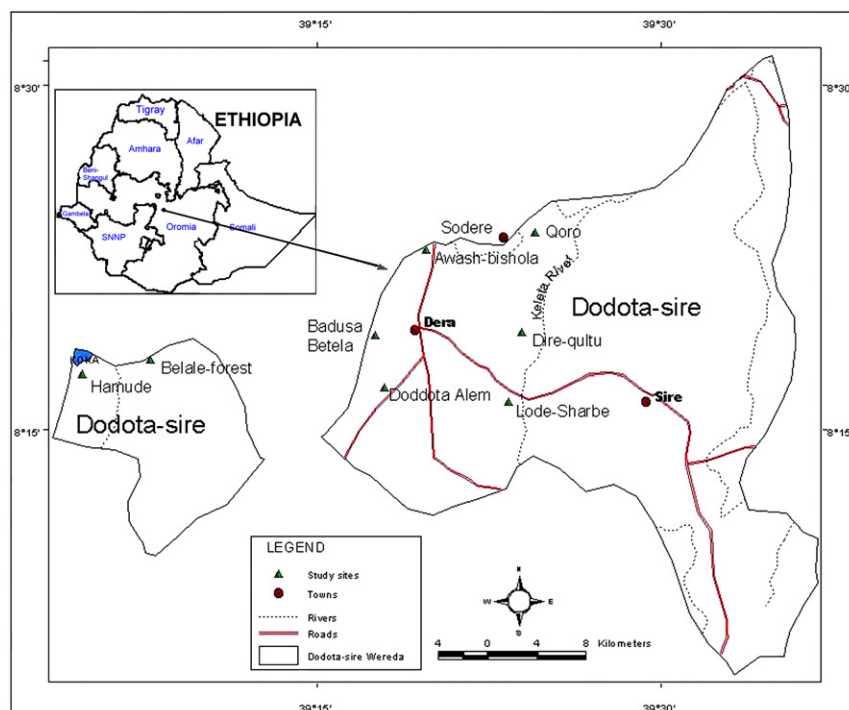


Fig. 1. Map of the study area.

the high population growth might hasten the natural resource degradation.

The vegetation of the study area belongs to the Somalia-Masai Regional Center of Endemism (White, 1983). It is characterized by having a flora dominated by *Acacia* woodland and usually categorized as *Acacia-Commiphora* vegetation type. Cambisol (45%), Lithosol (35%) and Adosol (20%) are the major soil types of the area (MOA, 1998; Arsi Zone Food Security Program, 2002).

2.2. Sampling techniques, data collection and data analysis

The sites were selected preferentially based on the information obtained from the Wereda (District) Agricultural Development Office. The main criterion for the selection of sites was the vegetation cover of the area. A total of 75 informants were involved in the study. These informants were selected applying both the systematic and random sampling techniques. The informants were in three age categories (15–25, 26–45, and above 45). Fifteen informants whose ages were more than 40 were considered as key informants and the selection was based on the information obtained from the village leaders.

Ethnobotanical methods like semi-structured interview were employed to obtain information mainly on medicinal plants. According to Martin (1995) and Maundu (1995), observation while interviewing the informants is useful in describing the actual plant. This method is termed as guided field walk. Preference ranking is asking people to think of some five to seven items in a category, which the focus of the items, according to personal preference, perceived importance in the community or another criterion (Martin, 1995). In this study informants were made to give the priority ranking on five medicinal plants based on the efficacy of the plants against the same disease. The interview was done in Afaan-Oromoo, the language spoken by the local inhabitants. Hence, the vernacular names of the plants were recorded in Afaan-Oromoo, except for those indicated otherwise. Key informants were also asked to rank and give scores to some medicinal plants according to their personal preference.

Plant specimens were collected, pressed and dried in the field. Plant identification was done in the field and confirmed at the National Herbarium, Addis Ababa University, where voucher specimens were deposited.

The ethnobotanical data has been analyzed using quantitative methods of data analyses. Descriptive statistics like percentage and frequency distribution have been used to analyze the data collected through semi-structured interview. The scores given to the species according to the preference of the informants were added and ranked. The result obtained was cross-checked by cluster analyses using computer software, SPSS version 10.0.

3. Results

3.1. The plants and their medicinal application

The result of the present study shows that 83 species of medicinal plants are used by the community. These medicinal

plants belong to 67 genera and 41 families (Appendix 1). Most of the medicinal plants are collected from different habitats of the natural vegetation (about 92%) and few of them from the home gardens (8%). Sixty-five species were used only against human ailments while 10 species are used only against diseases of livestock. Eight of the total species: *Aloe pubescens* (Aloaceae), *Calotropis procera* (Ait.) Ait. f. (Asclepiadiaceae), *Croton macrostachyus* Del. (Euphorbiaceae), *Heliotropium cinerascens* Steud. ex. DC. (Boraginaceae), *Leucas abyssinicus* L. (Lamiaceae), *Senna italica* Mill. (Fabaceae), *Verbascum sinaiticum* Benth (Scrophulariaceae) and *Vernonia amygdalina* Del. (Asteraceae) are commonly used to treat both human and livestock ailments. Among the collected medicinal plant species, 16 species provide some edible parts to human beings. *Sesbania sesban* (L.) Merr. (Fabaceae), is reported for its veterinary use as well as feed for livestock.

Further analysis on the families has shown that family Fabaceae is represented by highest number of species (13 species). Solanaceae and Euphorbiaceae are represented by six and five species, respectively. These are followed by Asclepiadiaceae, Boraginaceae and Lamiaceae, each represented by four species. Asteraceae, Capparidaceae and Tiliaceae are represented by three species each. The rest are represented by two species each (six families) and one species each (26 families).

The utilization and administration of the medicinal plants vary depending on the type of diseases. Some are concocted and drunk, coated or tied on the surface of the affected body part. Others are homogenized in water and drunk. Chewing, steam bath and smoking are the other ways of utilizing the medicines. The most frequently used way (65%) of applying the drugs for both humans and livestock is crushing or pounding the usable part, homogenizing in water and making it a drink.

3.2. Remedies for humans

Concerning medicinal plants for human use, many plants are directly used from the wild. Seventy-three medicinal plant species, which are distributed among 68 genera and 39 families, are reported to be used against more than 20 kinds of health problems. The ethnobotanical information for human use obtained included local names, habit, plant parts used, disease treated, and methods of preparation and mode of application. Table 1 displays the result of the analysis made on the habits of the plants. The analysis gave the highest score for trees (40%) followed by herbs (29%) and shrubs (19%).

Table 1
Habit of medicinal plants used to treat human ailments

Habit	Number	Percentage (%)
Herb	21	28.8
Shrub	14	19.2
Tree	29	39.7
Liana	6	8.3
Hemi-parasitic	2	2.8
Bulbous	1	1.4
Total	73	100

Table 4
Number of medicinal plant species used for livestock in respect to their Habit and Parts used

Habit	Parts used						Total	Percentage
	Root	Leaf	Fruit	Flower and bud	Twig	Latex		
Herb	5	4	0	1	1	0	11	61.1
Shrub	0	0	1	0	0	1	2	11.1
Tree	2	3	0	0	0	0	5	27.8
Total	7	7	1	1	1	1	18	100
Percentage	38.9	38.9	5.55	5.55	5.55	5.55	100	

1). Among these categories, herbs claim the largest number contributing to 61% of the species categorized as medicine for livestock. Trees took the second place, 28% followed by shrubs (11%). Analysis on the parts used indicated that roots and leaves are the most frequently used parts to treat the livestock ailments (39% each) (Table 4).

A number of medicinal plant species are employed to treat cattle disease known as anthrax. *Hypoestes forskali* (Vahl.) Soland. ex. Roem Schultz (Acanthaceae), *Achyranthes aspera*, *Solanum glabratum* Dunal. (Solanaceae), *Croton macrostachyus*, *Aloe pubescens*, *Verbascum sinaiticum* and *Gomphocarpus fruticosus* (L.) R. Br. (Asclepiadaceae) are the most frequently mentioned plants species to treat the disease. Among the key informants two elder men have good knowledge on this and asserted that *Gomphocarpus fruticosus* is the most effective one against anthrax.

4. Discussion

4.1. Distribution and diversity of medicinal plants in the study area

The fact that most of the medicinal plants (92%) are from the natural vegetation indicates that there is very little practice of keeping medicinal plants in cultivated areas or home gardens. This is in agreement with former studies by [Awat and Asfaw \(1999\)](#) where 71% of the medicinal plants collected from their study area belong to the category of non-cultivated plants. [Giday et al. \(2003\)](#) also recorded only six medicinal plants species from the cultivation areas.

The practice of cultivating medicinal plants is not well developed may be because settlement is a very short history in the area. The people in the study area became settled farmers very recently. Hence, the practice of home gardening is not well developed in the area, which is in contrast to the highlanders who have a well developed practice of keeping medicinal plants either in their home gardens or cultivated lands. However, a study of various home gardens of Ethiopia by [Asfaw and Nigatu \(1995\)](#) indicated that medicinal plants constitute only 8% of the recorded 162 species. A report by [Asfaw \(1997\)](#) also indicates that it is indicated that in some other parts of the country, medicinal plants contribute only six percent of the plants growing in the home gardens. Therefore, the wild biodiversity is rich all over the country in providing medicinal plants.

However, the ongoing mass destruction of wild vegetation for different purposes may hasten the disappearance of medicinal plants. This in turn may become a threat for the traditional knowledge on medicinal plants and discourages the practice of traditional health care in the study area.

Besides collecting medicinal plants directly from the natural environment, the people living around “Dheera” town obtain some of the important components of the health practice, from the local markets. For example, the traditional people in the study area are very good users of *Hagenia abyssinica* buying it from the local market, a well-known anti-helminthes medicinal plant used all over the country. The same is true for the “Zay” people ([Giday et al., 2003](#))

Despite the fact that the area is environmentally degraded, large number of medicinal plants species categorized in diverse genera and families were recorded. This demonstrates the presence of high taxonomic diversity of medicinal plants grown in the study area as well as the immense knowledge associated with the plants.

4.2. Habit of the medicinal plants and parts used

According to the analysis on habits of the medicinal plants and useful parts as medicine for human beings, trees provide the highest service. Similar studies in the islands of Lake Ziway by [Giday et al. \(2003\)](#) and in Fentale District by [Bailemie et al. \(2004\)](#) reported that half of the Zay people utilize herbaceous plants and the highest proportion for shrubs (45%) in Fentale District. The differences observed can be attributed to the variation in vegetation composition of the two areas and to the cultural assets of the people.

Leaves and roots of various species are frequently used to prepare the traditional medicine. This result is in agreement with [Giday et al. \(2003\)](#), where leaves are found to be the most frequently used parts. The information about livestock medication revealed out that herbaceous plants provide more remedies for cattle and equines than the other categories. Besides, leaves and roots play the role equally, in preparing livestock drugs. Utilizing roots as source of drugs may be a risk for the survival of medicinal plants as it is stated in [Abebe and Ayehu \(1993\)](#).

If the plant is a climber or small herbaceous plant, people may dig up the whole plant in order to obtain the root. For example, it is observed that traditional health practitioners in the study area digging up the whole plant from the ground to take the

root of *Achyranthes aspera* L. (Amaranthaceae) and *Enicostema axillare* (Lam.) A. Rich. (Gentianaceae). In this case, it will be destructive. For shrubs and trees, it is reported that the traditional healers dig up only small portion of the lateral root, e.g. root from *Ehretia cymosa* Thom. (Boraginaceae).

4.3. Medicinal plants and the common diseases

Almost 25 and 16% of the recorded medicinal plants are used against gastro-intestinal problems and **Mich**, respectively. On top of this, many medicinal plant species are involved to treat the serious disease of livestock in the area. Therefore, gastro-intestinal disorder and **Mich** for humans and anthrax for the livestock are most likely prevalent disease in the area. This relation was alluded to by Abebe and Ayehu (1993) based on finding that some species were used for treating a particular ailment.

Six percent of the medicinal plants are popular, widely known by many of the informants and most of them were mentioned to treat one of the prevalent diseases, **Mich** and the common flu. Other studies of medicinal plants in other parts of the country have reported that these plants are remedies for similar diseases (Giday et al., 2003; Balemie et al., 2004). Consensus gathered on the use of these species to treat the diseases testifies their efficacy.

More than 50% of the informants have mentioned the root of *Withania somnifera* used as remedy for **Mich** and evil eye for both humans and livestock. However, in some other parts of the country it is found to have diverse medicinal uses (Giday et al., 2003; Balemie et al., 2004).

4.4. Preparation and mode of application

In most cases, remedies of a single ailment are prepared from mixtures of different plant species involving either similar part or different parts. According to Abebe and Ayehu (1993), this is also a common practice in other parts of the country. However, the study by Giday et al. (2003) is reported in the reverse way, most of the preparations reported by the “Zay” people are drawn from a single plant. As reported from Indonesia by Erdelen et al. (1999), different plant species may be used for the treatment of the same disease or a specific ailment might be treated by a particular species.

Remedies that are prescribed for the purpose of curing skin disease and traumas are applied externally, whereas medication of internal problems involves exclusively oral administration of the drugs. However, some of skin related diseases and certain traumas also involve oral administration of the remedies. Therefore, most of the drugs prescribed by traditional healers are applied orally. This is in agreement with similar studies in other parts of the country (Abebe and Ayehu, 1993; Giday et al., 2003; Balemie et al., 2004).

4.5. Medicinal plants and the associated knowledge

Analysis of the result on age versus knowledge relationship reveals out that there is a wide gap between generations. More information has been obtained from the elderly informants than the young ones. This obviously indicates that modernization and change of life style due to education and others are increasing the rate of knowledge loss and the biodiversity. This interrupts the transfer of knowledge from elders to the new generation. This has been observed in many parts of the world (Balick and Cox, 1996). Wilson and Woldo (1979) had also observed that the knowledge is disappearing because most of the time knowledgeable persons die without proper handling of the knowledge system to the descendants. Nevertheless, this shouldn't be interpreted as if no need of modern life. But rather, it is recommended that youngsters should be up brought in a balanced life style that can allow them to know the important knowledge of their ancestors.

5. Conclusion

The indigenous Oromoo people of the study area are knowledgeable about the plants that provide remedies to humans and livestock health problems. This is a substantial input to the livelihood of the people. However, the area is losing its natural vegetation cover together with the medicinally valuable species rapidly. Most of the medicinal plants are getting very rare as confirmed by elders and observed during the field work too. If the present trend continues unchecked, it will not be too long before some of them head to local extermination. It is therefore, very crucial that awareness creation be undertaken so that the community is actively involved in conservation and sustainable utilization of the traditional medicinal plants; as part of the entire plant biodiversity of the area, special attention needs to be accorded to the medicinal plants in order to amplify the role that they play in health care delivery, poverty alleviation and environmental protection. Further, in depth studies to document and substantiate the indigenous knowledge on medicinal and other useful plants would help to draw serious attention to the valuation of the biological diversity of the study area.

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Appendix A. List of medicinal plants

Species name	Family name	Vernacular name	Habit	Parts used	Application	Ways of preparation	Route of administration
<i>Acacia albida</i> Del.	Fabaceae	Garbii	T	B	Diarrhea	Chd	Oral
<i>Acacia etbaica</i> Schweinf	Fabaceae	Doddotii	T	L B	Tonsillitis, gonorrhoea	Ch Cbd	Oral Oral
<i>Acacia nilotica</i> (L.) Willd ex. Del.	Fabaceae	Qordimo	T	S B	Mich Tonsillitis	S Ch	External Oral
<i>Acacia oerfota</i> (Forssk.) Schweinf	Fabaceae	Ajo	S	TW	Tooth ache	Ch	Oral
<i>Acacia tortilis</i> (Forssk.) Hayne	Fabaceae	Xadechaa	T	L	Tonsillitis	Ch	Oral
<i>Achyranthes aspera</i> L. ^a	Amaranthaceae	Dargu-arbaa	H	R	Anthrax	Chd	Oral
<i>Allium sativum</i> L. ^c	Alliaceae	Qulubi-aadii	B	Bl	Cough and lung abscess	Chd, Ih, Ef	Oral
<i>Aloe pubescens</i> ^b	Aloaceae	Haamaaresaa	H	Fl and Bu	Wounds, stomach ache, muscle cramps and anthrax ^a	C Chd	Derman Oral
<i>Asparagus setaceus</i> Lam.	Asparagaceae	Saririi	L	L, R	Problems of urination	Chd	Oral
<i>Balanites aegyptiaca</i> (L.) Del. ^c	Balanitaceae	Badanaa	S	G	Mich	S	External
<i>Calotropis procera</i> (Ait.) Ait. ^f	Asclepiadaceae	Bunagadhee	S	Ms, L, R	Wounds, Furee ^a Skin rash (allergies on skin)	C CD	External Oral
<i>Calpurnia aurea</i> (Ait.) Benth.	Fabaceae	Ceekataa	S	L	Excessive menstruation Fungal disease on skin Diarrhea	Cbd Ru Ru Cbd	Oral External External Oral
<i>Capparis fascicularis</i> DC. ^c	Capparidaceae	Haarangamaa-aadii	S	R	Tooth ache	Ch	Oral
<i>Capparis tomentosa</i> Lam.	Capparidaceae	Haarangamaa-guraach	S	R	Wounds Tooth ache	Cc Ch	External Oral
<i>Carica papaya</i> L. ^c	Caricaceae	Paapaayee	T	S F	Wounds Diarrhea	Cc Cs Er	External Oral Oral
<i>Carissa spinarum</i> L. ^c	Apocynaceae	Agaamsaa	S	R S	Stomach ache Muscle cramps Evil eye	Chd S S	Oral External External
<i>Cissus quadrangularis</i> L.	Vitaceae	Gaalee-aabdii	L	R	Tooth ache Gonorrhoea	Ch Chd	Oral Oral
<i>Cissus rotundifolia</i> (Forssk.) Vahl	Vitaceae	Gale	L	L	Gonorrhoea	Chd	Oral
<i>Citrus aurantifolia</i> (Christm.) Swingle ^c	Rutaceae	Loomii	T	F	Flu, wounds, stomach ache, Skin rash	Er or Ih Ru	Oral External
<i>Clematis simensis</i> Fresen.	Ranunculaceae	Fiitii	L	L	Swelling leg	Ct	External
<i>Clerodendrum myricoides</i> (Hoschst.) Vatke	Lamiaceae	Maraasisaa		R L	Malaria Mental illness	Chd Hb	Oral External
<i>Comiphora rostrata</i> Engl.	Burseraceae	Haamessaa	T	B	Problems in throat	Ch	Oral
<i>Cordia ovalis</i> R. Br. ex. G. Don ^c	Boraginaceae	Mandheeraa	T	L and S	Mich	S	External
<i>Crotalaria laburnifolia</i> L.	Fabaceae	Ataraa-haantutaa	S	L	Fungal disease on skin Wounds	Ru	External
<i>Croton macrostachyus</i> Del. ^b	Euphorbiaceae	Bakanissaa	T	B R L Ms	Gonorrhoea Stomach ache and anthrax ^a Gum ailment Haemorrhage	Cbd Cbd Ru C	Oral Oral External External

Appendix A (Continued)

Species name	Family name	Vernacular name	Habit	Parts used	Application	Ways of preparation	Route of administration
<i>Cucumis prophetarum</i> L.	Cucurbitaceae	Arado/Holatoo	L	R	Gonorrhea	Chd	Oral
<i>Cucurbita pepo</i> L. ^c	Cucurbitaceae	Dabaaqulaa	L	S	Stomach ache (worm expulsion)	Re	Oral
<i>Datura stramonium</i> Mill.	Solanaceae	Banjii	H	L	Gum ailment Rabies Ear ailment Fungal disease on skin	Ru Chd We Ru	External Oral External External
<i>Dichrostachys cinerea</i> (L.) Wight and Arn.	Fabaceae	Jirimee	T	B	Snake bite	Ch	Oral
<i>Echinops kebericho</i> Mesfin	Asteraceae	Kabarichoo	H	R	Mich , evil eye	S	External
<i>Ehretia cymosa</i> Thonn. ^a	Boraginaceae	Ulaagaa	T	R	Stomach ailments	Chd	Oral
<i>Entada leptostachya</i> Harms	Fabaceae	Kambaltaa	T	Tw	Mich	Sb	External
<i>Encostema axillare</i> (Lam.) A. Rich. ^a	Gentianaceae	Doddoto	H	R	Anthrax	Chd	Oral
<i>Eucalyptus globulus</i> Labill.	Myrtaceae	Barzaafii-aadii	T	L	Flu, Mich	Sb	External
<i>Euclaea racemosa</i> subsp. <i>schimperii</i> (A. DC.) White	Ebenaceae	Me'esaa	S	R	Kidney problems	Cs	Oral
<i>Euphorbia candelabrum</i> Kotschy	Euphorbiaceae	Haadaamii	T	Ms	Gonorrhea	Ef	Oral
<i>Euphorbia tirucalli</i> L.	Euphorbiaceae	Qincibii	S	S Ms	Delivery problems Gonorrhea Haemorrhage	Chd Ef C	Oral Oral External
<i>Ficus thonningi</i> Blume ^a	Moraceae	Dambii	T	R	Ma'az	CS	External
<i>Fluggea virosa</i> (Willd.) Voigt.	Euphorbiaceae	Qacaaculee	S	R	Goiter	Chd	Oral
<i>Foeniculum vulgare</i> Mill.	Apiaceae	Insilaalee	H	S	Abdominal pain in babies	Cbd	Oral
<i>Gomphocarpus fruticosus</i> (L.) Ait. f. ^a	Asclepiadaceae	Haazmalaa	H	L	Anthrax	Chd	Oral
<i>Gomphocarpus integer</i> (N. E. Br.) Bullock	Asclepiadaceae	Asaalee-daltii	H	R	Evil eye	Cs	Oral
<i>Gossypium arboreum</i> L. ^a	Malvaceae	Jirbaa	S	F	Retention of placenta	Chd	Oral
<i>Grewia bicolor</i> Juss. ^c	Tiliaceae	Haaroreesaa	T	L	Stomach ache (worm expulsion)	Chd	Oral
<i>Grewia ferruginea</i> Hochst. ex. A. Rich. ^c	Tiliaceae	Doqono	T	L	Stomach ache	Chd	Oral
<i>Grewia villosa</i> Willd. ^c	Tiliaceae	Ogobdii	T	B L	Body swelling Stomach ache	Chd	Oral
<i>Heliotropium cinerascens</i> Steud. ex. DC. ^b	Boraginaceae	Baalcaabii	H	L	Mich , Stomach ache ^a	We Chd	Oral and nasal Oral
<i>Heliotropium longifolium</i> (A. DC.) Bunge	Boraginaceae	Qorichaa-michii	H	L	Mich	We	Oral and nasal
<i>Hypoestes forskoolii</i> (Vahl) Soland. ex. Roem and Schult	Acanthaceae	Darguu	H	R	Stomach ache	Chd	Oral
<i>Indigofera amorphoides</i> Jaub. and Spach	Fabaceae	Abeceeraa	H	R	Goiter	Chd	Oral
<i>Jasminum grandiflorum</i> subsp. <i>floribundum</i> (R. Br. ex. Fresen.) P.S. Green	Oleaceae		S	L	Wounds	Cc	External
<i>Justicia schimperiana</i> Hochst. ex. DC.	Acanthaceae	Dhumugaa	S	Tw	Tooth ache	Ch	Oral
<i>Leucas abyssinica</i> L. ^b	Lamiaceae	Asaalee	H	R Tw	Tonsillitis Eye disease ^a	Chd Cc	Oral External
<i>Maerua angolensis</i> DC.	Capparidaceae	Qanqalchaa	T	R	Gonorrhea	Chd	Oral
<i>Melia azedarach</i> L.	Meliaceae	Kininii	T	B	Diarrhea	Chd	Oral
<i>Maytenus senegalensis</i> (Lam.) Exell	Celastraceae	Kombolchaa	T	S	Mich	S	External
<i>Nicotiana tabacum</i> L. ^a	Solanaceae	Tambo	H	L	Leech expulsion from mouth	CS	External
<i>Ocimum lamifolium</i> Hoschst. ex. Benth.	Lamiaceae	Daamaakasee	H	L	Mich	We	Oral and nasal
<i>Ocimum urticifolium</i> Roth	Lamiaceae	Qorichaa-michii	H	L	Mich	We	Oral and nasal

Appendix A (Continued)

Species name	Family name	Vernacular name	Habit	Parts used	Application	Ways of preparation	Route of administration
<i>Oncocalyx kellri</i> (Engl.) M. Gilbert	Loranthaceae	Haarmo-bandaa	Hp	L	Wounds	Cc	External
<i>Oncocalyx schimperii</i> (A. Rich.) M. Gillbert	Loranthaceae	Haarmo-goraa	Hp	L	Wounds	Cc	External
<i>Opuntia ficus-indica</i> (L.) Miller ^c	Cactaceae	Qulqual-aabashaa	S	F	Gastritis	Er	Oral
<i>Papea capensis</i> Eckl. and Zeyh. ^c	Sapindaceae	Biqaa	T	B	Problems in throat	Ch	Oral
<i>Punica granatum</i> L. ^c	Lythraceae	Roman	T	L	Diarrhea	Bd	Oral
<i>Ricinus communis</i> L.	Euphorbiaceae	Qoboo	T	F	Gonorrhoea	Ef	Oral
<i>Rumex nervosus</i> Vahl. ^c	Polygonaceae	Dhangagoo	S	L	Diarrhea	Chd	Oral
				R	Wound	Cc	External
					Hepatitis	Chd	Oral
<i>Ruta chalepensis</i> L.	Rutaceae	Xenaadaamii	H	F, L	Abdominal pain	Chd and Ih	Oral
<i>Sarcostemma viminale</i> (L.) R. Br.	Asclepiadaceae	Annano	T	Ms	Haemorrhage	C	External
<i>Schinus molle</i> L.	Anacardiaceae	Turumantree	T	L	Problems in throat	Ch	Oral
<i>Senna italica</i> Mill. ^b	Fabaceae	Sabanakii	H	L	Stomach ache (worm expulsion)	Cbd	Oral
<i>Sena obtusifolia</i> (L.) Irwin and Barneby	Fabaceae		S	S	Diarrhea	Chd	Oral
				R	Snake bite	Ct	External
<i>Sesbania sesban</i> (L.) Merr. ^a	Fabaceae		T	L	Poultry flu	Chd	Oral
<i>Sida ovata</i> Forssk.	Malvaceae		H	L	Ear ailment	We	External
<i>Solanum glabratum</i> Dunal ^a	Solanaceae	Darguu-waraabesaa	H	R	Anthrax ^a	Chd	Oral
<i>Solanum incanum</i> L.	Solanaceae	Hidii	H	R and L	Mich	Chd	Oral
<i>Solanum somalensis</i> Franch.	Solanaceae	Hidii-bido	H	R	Stomach ache	Chd	Oral
<i>Terminalia brownii</i> Fresen	Combretaceae	Bir'essaa	T	B and S	Body swelling	Cd	Oral
<i>Verbascum sinaiticum</i> Benth. ^b	Scrophulariaceae	Guraa-haaree	H	L	Diarrhea and haemorrhage	Chd	Oral
					Anthrax ^a		
<i>Vernonia amygdalina</i> Del. ^b	Asteraceae	Ibichaa	T	L and R	Stomach ache (worm expulsion) ^b	Cd	Oral
<i>Withania somnifera</i> (L.) Dunal	Solanaceae	Daadoo/wahaalee	H	R	Mich , evil eye	S	External
<i>Xanthium strumarium</i> L.	Asteraceae	Baandaa	H	F and L	Fungal disease on skin	Ru	External
<i>Ximena americana</i> L. ^c	Olacaceae	Hudaa	T	R and B	Lung abscess, muscle cramp, wounds	Chd	Oral
<i>Zaleya pentandra</i> (L.) Jeffrey ^a	Aizoaceae	Raaphuu-dhimaa	H	R	Evil eye		

Habit: T – tree, S – shrub, H – herb, L – liana, B – bulbous, and HP – hemi-parasitic; parts used: R – root, S – stem, L – leaf, F – fruit, Fl – flower, Se – seed, TW – twigs, G – gum, Ms – milky sap, B – bark, Bl – bulb, and Bu – bud; ways of preparation: Chd – crushed, homogenized in water and drunk, Ch – chewed, Cbd – crushed, boiled and drunk, S – smoked, C – coated, CD – concocted together and drunk, Ru – rubbed, Cc – crushed and coated, Er – eating raw, Cs – crushed and swallowed, Ih – infusion with hot drinks, Ct – crushed and tied on, Hb – hot bath, Re – roasted and eaten, We – water extract, Sb – smoke bath, Ef – eaten together with other foods, CS – crushed and smoked, Bd – boiled and drunk.

^a Medicine and disease of livestock.

^b Medicine for both humans and livestock.

^c Nutraceutical plants.

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