

# An Ethnobotanical Survey of Wild Edible Plants Commercialized in Kefira Market, Dire Dawa City, Eastern Ethiopia

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**Abstract:** Food insecurity and malnutrition affect much of the world's population. Wild edible plants are known to make important contributions to the livelihoods of local communities of sub-Saharan Africa countries including Ethiopia. The populations in Ethiopia have a rich knowledge of consumption of wild edible plants and wild edible plants are still an integral part of the society in the country. An Ethnobotanical Survey of Wild Edible Plants Commercialized in Kefira Market, Dire Dawa City, Eastern Ethiopia was conducted with the aim of documenting the wild edible plants used by the community. Ethnobotanical data were collected from 29 informants using semi-structured interviews. A total of 22 wild edible plants belonging to 17 families were documented. Most of the wild edible plants were trees (81.82%), Fruits were the dominant edible parts (68%) followed by seed (18%) consumed by the people. The present paper provides basic information for better conservation, possibly for further exploitation of WEPs, and to preserve the traditional knowledge associated with WEPs for the future generation.

**Keywords:** Commercialized, Ethnobotany, Kefira, Wild Edible Plants

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## 1. Introduction

In Ethiopia, there are lots of food materials that are obtained from plants. According to [1] 8% of the higher plant species in the country are edible, and 25% of these are cultivated and there are also many wild edible plants that produce quantities of food.

Wild edible plants refer to species that are neither cultivated nor domesticated, but are available from their wild natural habitat and used as source of food [2]. When compared to domesticated plant food sources, wild plant foods tend to be overlooked. However, there is substantial evidence that indicates the importance of wild edibles in terms of the global food basket. According to [2] about one billion people in the world use wild foods (mostly from plants) on a daily basis. Since wild edible plants are freely accessible within natural habitats, indigenous people have knowledge of how to gather and prepare the foods.

Dire Dawa is characterized by a semi-arid climate with low and erratic rainfall and it is a region where environmental degradation is observed and drought frequently affects the people [3]. Moreover, there is no such wild edible plants research conducted in the region before. This study aims at documenting wild edible plants used by the community in and around 'Dire Dawa' city, Eastern Ethiopia. The results of the present study will be useful to ensure food security, to generate income by the local people and to give due attention for the proper management and conservation of wild edible plants.

## 2. Materials and Methods

### 2.1. Description of the Study Area

Dire Dawa city is located in the eastern part of Ethiopia between 9°27'N and 9°49'N latitude and 41°38' E and 42°19' E longitude. Dire Dawa is about 515kms road distance to the east

of Addis Ababa and 311kms to the west of Djibouti port. According to the 2007 population and housing census of Ethiopia, the total population of the Dire Dawa Administration was estimated to be 341,834, out of which the urban population was 233,224 and that of the rural population, 108,610. The mean annual temperature lies between 17°C and 27°C and with annual rainfall that amounts to 604mm.

## 2.2. Study Site Selection

The study was conducted on kefira market (06 kebele), Dire Dawa City. It is a traditional market place where a number of fresh and dried wild edible plants are sold (Figure 1).

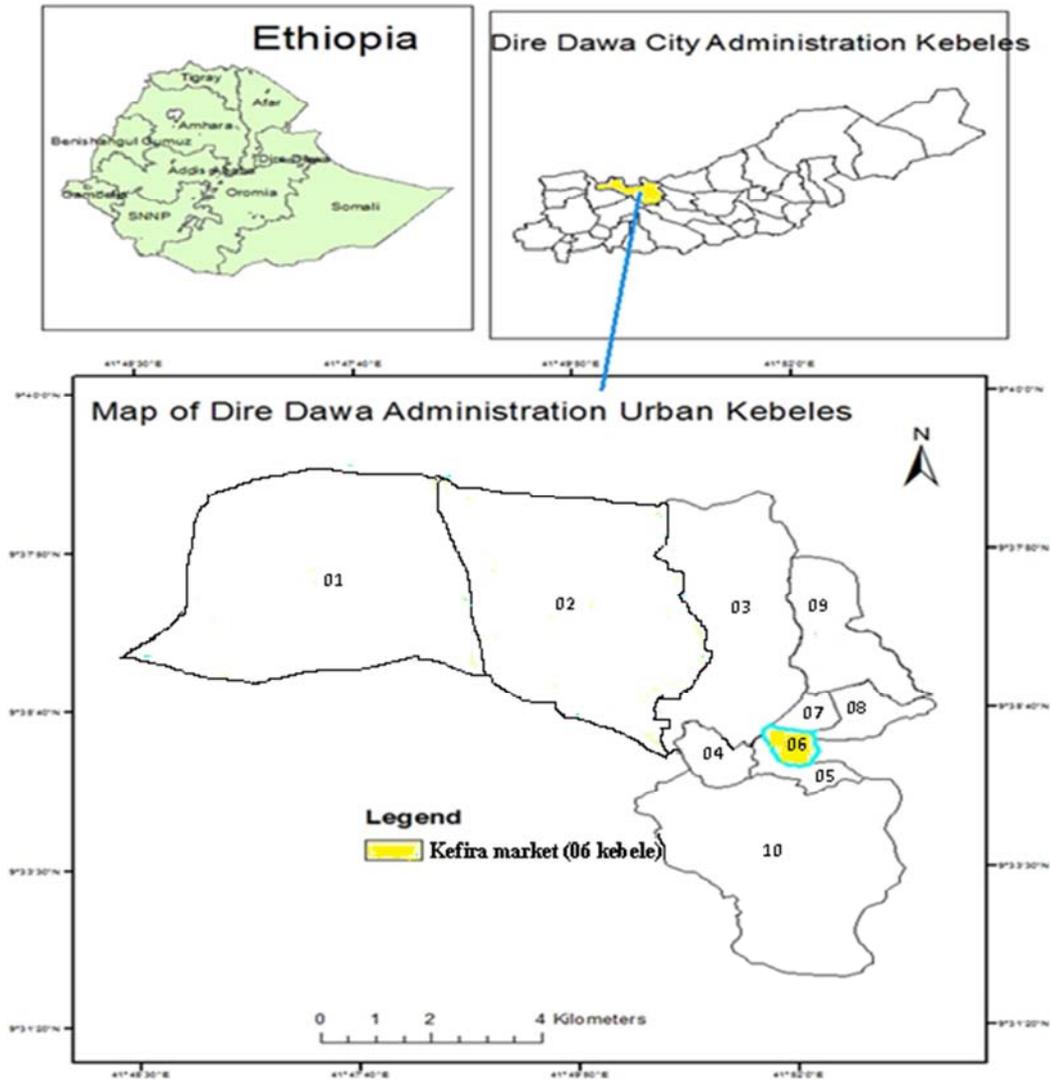


Figure 1. Location of Kefira market.

## 2.3. Informant Selection

Purposive sampling was used for selecting the informants. A total of 29 informants (10 male and 19 female) were selected for this study.

## 2.4. Data Collection Method

Data collection was done from February to June 2016 from wild edible plant sellers in Kefira market using semi-structured interviews. Prior to data collection, discussion was made with the informants to explain to them their cooperation is a valuable contribution to the documentation of their knowledge about wild edible plants and to get their verbal informed consent. Identification of specimens was

made using published literatures and with the assistance of botanists from Dire Dawa University.

## 2.5. Data Analysis

Descriptive statistics using frequencies and percentages were used to summarize data using Microsoft excel spreadsheet and it was also utilized for drawing graphs and pie charts.

## 3. Results and Discussion

### 3.1. Characteristics of the Respondents

The 29 informants were grouped into three age groups,

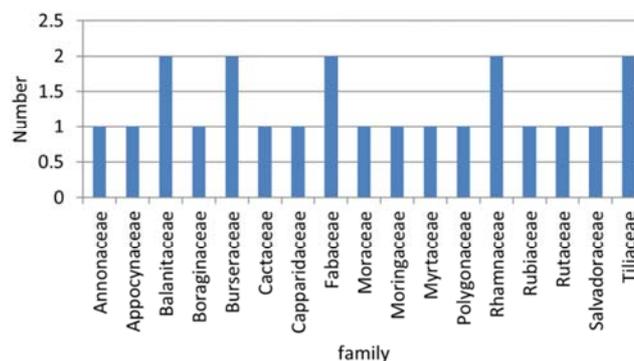
young (20–35), adult (36–50) and elderly (above 50). Generally, 34.5% of the respondents were between 20 and 35 years and 41.4% were between 36 and 50 while 24.1% were above 50. Fifty two percent of the respondents were married and 27.6% of the informants were never married while 20.7% of them were divorced (Table 1).

**Table 1.** Socio-demographic characteristics of the informants.

Characters	Male	Female	Total number	Percentage
<b>Age</b>				
25-35	3	7	10	34.5%
36-50	3	9	12	41.4%
>50	4	3	7	24.1%
Total	10	19	29	100%
<b>Marital status</b>				
Married	7	8	15	51.7%
Unmarried	3	5	8	27.6%
Divorced	1	5	6	20.7%
Total	11	18	29	100%
<b>Religion</b>				
Orthodox	4	7	11	37.9%
Muslim	4	8	12	41.4%
Protestants	2	4	6	20.7%
Total	10	19	29	100%
<b>Ethnicity</b>				
Oromo	6	10	16	55.2%
Amhara	2	3	5	17.2%
Somali	1	4	5	17.2%
Others	1	2	3	10.3%
Total	10	19	29	100%

### 3.2. Wild Edible Plants Reported

A total of 22 plant species belonging to 17 families were documented. The plant families that encompass more number of wild edible plant species were Balanitaceae, Burseraceae, Fabaceae, Rhamnaceae and Tiliaceae (two species each) the rest contributed one species each (Figure 2). The total number of edible plants is comparable to the number reported by [4], who reported 20 wild edible plants, but it is low compared to those reported by [5], [6], [7], [8], [9], [10], [11] and [12], who reported 38, 41, 43, 51, 66, 68, 122 and 168 wild edible plants, respectively.



**Figure 2.** Family distribution of wild edible plants.

**Table 2.** Wild edible plants used by the people in the study area.

S no	Scientific name	Family	Local name	Habitat	Habit	Parts used	Local use (edible only)	Availability status
1	<i>Tamarindus indica</i>	Fabaceae	Roka (Af)	Wild and Home garden	Tree	fruit	Ripe fruit eaten fresh	rare
2	<i>Syzygium guineense</i>	Myrtaceae	Baddeessa (Af)	Wild	Tree	fruit	Ripe fruit eaten fresh	Intermediate
3	<i>Ziziphus spinachristi</i>	Rhamnaceae	Kurkura (Af)	Wild	Tree	seed	Ripe fruit eaten fresh	rare
4	<i>Ziziphus mucronata</i>	Rhamnaceae	Adokurkura (A)	Wild	Tree	fruit	Ripe fruit eaten fresh	Intermediate
5	<i>Balanites aegyptiaca</i>	Balanitaceae	Bedena (Af)	Wild	Tree	fruit	Ripe fruit eaten fresh	rare
6	<i>Balanites rotundifolia</i>	Balanitaceae	Bedena (Af)	Wild	Tree	fruit	Ripe fruit eaten fresh	rare
7	<i>Carissa spairanum</i>	Apocynaceae	Agamsa (Af)	Wild	Shrub	fruit	Ripe fruit eaten fresh	rare
8	<i>Rumex nervosus</i>	Polygonaceae	Dhangago (Af)	Wild	Shrub	stem	Stem eaten fresh	Intermediate
9	<i>Salvadora persica</i>	Salvadoraceae	Adey (S)	Wild	Tree	fruit	Ripe fruit eaten fresh	common
10	<i>Ehretia cymosa</i>	Boraginaceae	Ulaagaa (Af)	Wild	Tree	fruit	Ripe fruit eaten fresh	rare
11	<i>Ficus ovata</i> Vahl.	Moraceae	Wark (A)	Wild	Tree	fruit	Ripe fruit eaten fresh	rare
12	<i>Grewia bicolor</i> Juss.	Tiliaceae	Haroresa (Af)	Wild	Shrub	seed	Seeds are eaten fresh	common
13	<i>Xylopiya aethiopia</i>	Annonaceae	Uda (Af)	Wild	Tree	fruit	Ripe fruit eaten fresh	rare
14	<i>Opuntia ficus indica</i>	Cactaceae	Beles (A)	Wild	Tree	seed	Seeds are eaten fresh	Common
15	<i>Cordia africana</i>	Rubiaceae	Wedessa (Af)	Wild and Home garden	Tree	seed	Seeds are eaten fresh	rare
16	<i>Commiphora africana</i>	Burseraceae	Hamma (Af)	Wild	Tree	fruit	Ripe fruit eaten fresh	rare
17	<i>Commiphora baluensis</i>	Burseraceae	Hagarmadow (S)	Wild	Tree	fruit	Ripe fruit eaten fresh	Intermediate
18	<i>Acacia etbaica</i>	Fabaceae	Wangayo (Af)	Wild	Tree	fruit	Ripe fruit eaten fresh	Intermediate
19	<i>Grewia tenax</i>	Tiliaceae	Chemerd (Af)	Wild	Tree	fruit	Ripe fruit eaten fresh	rare
20	<i>Cleome monophylla</i>	Capparidaceae	Doran (S)	Wild	Tree	leaf	Leaves are cooked together with any food	rare
21	<i>Toddalia asiatica</i>	Rutaceae	Barbari-Burreed (S)	Wild	Shrub	fruit	Ripe fruit eaten fresh	common
22	<i>Moringa stenopetala</i>	Moringaceae	Shiferaw (A)	Home garden	Tree	leaf	Leaves are cooked together with any food	Most common

Local name: Af-Afan oromo, S-Somali, A-Amharic

### 3.3. Habit of Wild Edible Plants

Most of the wild edible plants were trees (Figure 3), and fruits were predominantly used parts as food. Tree species comprised the majority 18 (81.82%) of the wild edible plants, followed by shrubs 4 (18.18%). According to [6] trees contributed (68%), followed by shrub (24%), [5] also reported that (50%) of the reported wild edible plants were trees followed by shrubs (26%).

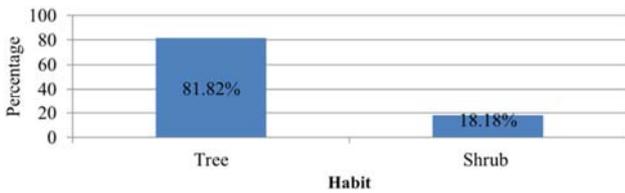


Figure 3. Habit of wild edible plants.

### 3.4. Habitat of the Wild Edible Plants

Most of the wild edible plants 19 (86%) were obtained from the wild, and (9%) of the WEPs were obtained both from the wild and home garden while (5%) of the WEPs were obtained from the home garden (Figure 4). According to [8] the majority 41 (62.1%) of the wild plant species were collected from the wild.

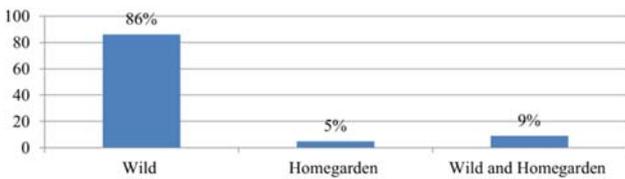


Figure 4. Habitat of the edible plants.

### 3.5. Plant Parts Used

The parts consumed include fruit, seed, stem and leaf. Fruits (68%) were the dominant edible parts followed by seed (18%) consumed by the people in the study area (Figure 5). The dominance of fruits as edible parts has also been reported in most previous studies undertaken in Ethiopia [5], [8], [13], [14], contrary to this finding, [15] reported leaves and stems as the most widely used parts of wild edible trees and shrubs in the West Bank of Palestine, this difference might be due to variation in the available species, and culture of the communities with respect to food preference and preparation.

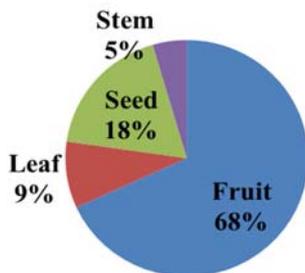


Figure 5. Plant parts used.

### 3.6. Availability Status of Wild Edible Plants

The majorities (54.5%) of wild edible plants were rare in the study area (Figure 6); this could be attributed to anthropogenic and natural factors in the study area. Their availability in the study area was also influenced by seasonal variation most of them are scarce during the dry season [8] also reported that the availability of wild edible plants varies depending on ecological and climatic conditions. [6] and [4] reported that the majority of wild edible plants are rare in their respective study areas due to continued destruction of their habitats and overharvesting.

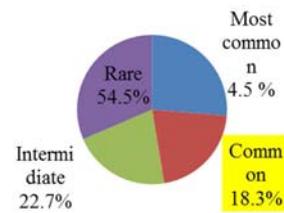


Figure 6. Availability status of wild edible plants.

### 3.7. Accessibility of the Wild Edible Plants

Most of the wild edible plants collected during the study period were accessible. They can easily be available on market. Some are rarely available on market. This could be attributed to season and increase distance to harvest areas. Some examples of commonly available WEPs in the study area were *Tamarindus indica* and *Moringa stenopetala* (Figure 7)



Figure 7. Commonly available WEPs in the study area.

### 3.8. Threats to the Wild Edible Plants

As mentioned by most of the informants six threats were selected in the study area. This information is used to determine the highest threats to wild edible plants in the study area and helps to suggest the necessary appropriate conservation measures. The results of the present study showed that deforestation and human encroachment were ranked 1<sup>st</sup> and 2<sup>nd</sup>, respectively and these were followed by drought and firewood in the 3<sup>rd</sup> and 4<sup>th</sup> places, respectively (Table 3). According to [8] drought takes the major part followed by fuel wood collection and selective cutting for construction.

Table 3. Threats to wild edible plants.

Respondents (R1-R6)								
Factors	R1	R2	R3	R4	R5	R6	Total	Rank
Deforestation	5	6	6	6	6	5	34	1 <sup>st</sup>
Firewood	2	4	3	3	2	4	18	4 <sup>th</sup>
Drought	4	3	4	5	4	3	23	3 <sup>rd</sup>
Invasive species	1	2	1	1	3	1	9	6 <sup>th</sup>
Overgrazing	3	1	2	2	1	2	11	5 <sup>th</sup>
Human encroachment	6	5	5	4	5	5	30	2 <sup>nd</sup>

## 4. Conclusions

This study is the first ethnobotanical study of wild edible plants used by local people. Our survey showed the diversity of wild edible plants and related indigenous knowledge in the study area. Different plant parts were used the most frequently used parts were fruits and seed. In the present study 22 wild edible plants were documented. These plants are belonging to different genera and family showing that the study area is rich in wild edible plant diversity. The documented information on the wild edible plants may serve as a baseline data for future studies on nutritional values and possible toxic effects and to identify plants that may improve nutrition and increase dietary diversity. Some of these wild edible plants may have the potential to be valuable food sources (if cultivated) and could be part of a strategy in tackling food insecurity in the region.

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