ETHNOBIOLOGY LETTERS

Research Communications

# Ethnobotanical Study of Wild-Edible Plants in Simada District, South Gondar Zone, Amhara Region, Ethiopia

Kindye Belaye Wassie[1*]

[1]Department of Plant Science, College of Agriculture and Environmental Sciences, Bahir Dar University, Bahir Dar, Ethiopia.
[*]belayekindye@gmail.com

**Abstract** This study was conducted in the Simada district, South Gondar Zone, Ethiopia, to investigate the ethnobotanical properties of wild edible plant species. Ethnobotanical data were collected through individual interviews, focus group discussions, guided field walks, and semi-structured questionnaires at markets. The data were analyzed using Microsoft Excel and SPSS version 29.0.2.0. Data were further verified using preference ranking, direct matrix ranking, and informant consensus with buyers, sellers, cooks, and elderly users. A total of 45 edible wild plants from various families were recorded in this investigation. Among the identified wild edible plants, fruit was the most used part (60%), followed by leaves (13%). Most (82%) of the wild edible plants in the study area were consumed raw. There was a significant difference in the number of wild edible plants reported by different informant groups ($p$<0.05). *Opuntia ficus indica* was the most frequently used wild edible plant, reported by 69.6% of respondents. Simada District has abundant wild edible plants that poor residents consume and sell to supplement their needs. Strengthening conservation, value addition, and market linking methods will improve local livelihoods and promote sustainable wild edible plant resources management.

**Received** April 30, 2024
**Accepted** October 1, 2024
**Published** December 26, 2024

**OPEN ACCESS**
**DOI** 10.14237/ebl.15.1.2024.1889

**Keywords** Food insecurity, Threats, Indigenous knowledge, Useful plants, Key informants



## Introduction

In numerous parts of the world, people frequently use wild edible plant (WEP) species as their main source of nutrition, especially during times of famine and seasonal food scarcity (Asfaw et al. 2023). WEPs play a significant role in the long history of human adaptation to natural habitats, social interactions with nature, and environmental conditions, and many people around the world depend on them for food (Tao 2020).

Ethiopia has a diverse geography and many native plant species. Approximately 6,000 plant species are endemic (Hedberg et al. 2009). There are several WEPs in the nation's marshes, grasslands, and riverine environments (Asfaw 2009). Ethiopia also possesses a wide range of Indigenous knowledge connected to its abundant biodiversity (Tizita 2016). Many communities throughout Ethiopia regularly consume edible wild plants as part of their diet (Balemie and Kibebew 2016), and wild food consumption is more prevalent in communities experiencing food insecurity (Teklehaymanot and Giday 2010).

This study seeks to compile data on WEPs that are used as food in Simada District, along with information on Indigenous knowledge and threats related to these species. Based on previous fieldwork and pilot surveys, the Simada district is a food insecurity area in the Amhara region. The Indigenous population frequently eats WEPs in periods of famine as well as during normal times. This practice not only helps with food shortages during droughts and other emergencies but also keeps many people safe in developing nations (Getu et al. 2015). Therefore, it is necessary for agronomists, planners, extension agents, aid workers, genetic resource specialists, and others to learn about the function of WEPs and document Indigenous knowledge in farming systems generally and in local economies specifically. Furthermore, the study's findings may be helpful to relevant

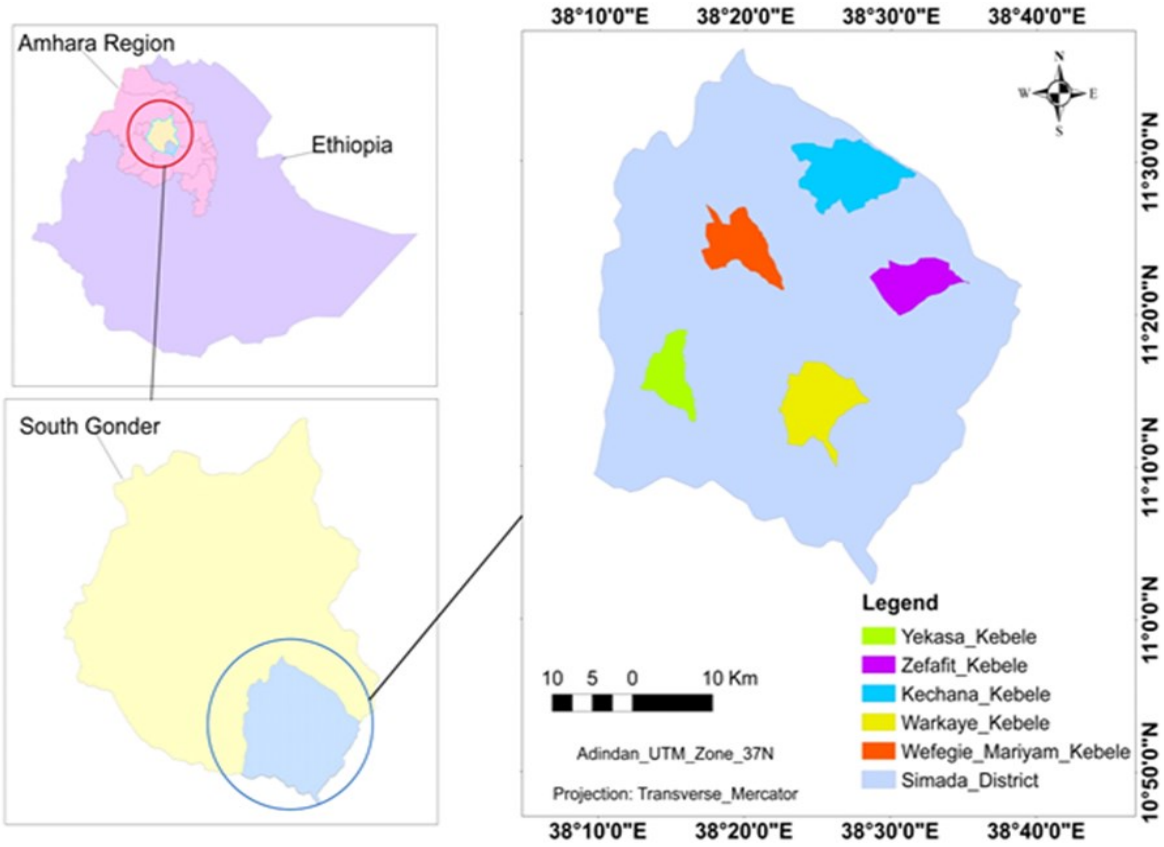


**Figure 1** Map of the study area (developed in ArcMap 10.3).

organizations in creating suitable managerial interventions.

## Methods

*Study Location*

The study was conducted in Simada District, South Gondar Zone, and Amhara Regional State, Ethiopia (Figure 1). Simada is characterized by its semiarid terrain and frequent drought conditions (Figure 2; Masresha et al. 2023). The amount and type of vegetation vary depending on the agro-ecological zone: shrubs are more prevalent in low-lying agro-ecological zones than in mid and highland agro-ecological zones (Swingland 2013). The types of vegetation in the area include scattered trees and shrubs (Tebikew 2009). However, the area covered by plant species is very small due to deforestation, and remnants of natural forests are found around churches (Tebikew 2009). The geographical framework of the Simada district is characterized by valleys (10%), hills (20%), plateaus (20%), slopes (40%), and other areas (10%). Its altitude varies from 1500 to 4000 meters above sea level.

*Design of Sampling and Study Site*

Five research sites (Yekuasa, Zefafit, Kachena, Warkaye, and Wefegie Mariam kebeles) were selected from 24 administrative kebeles based on the availability of WEPs and key informants (Martin 1995). A pilot survey was conducted from September 1 to 30, 2022, to investigate the research area, and data collection via an ethnobotanical survey of WEPs was conducted from October 1 to February 30, 2022. In accordance with earlier studies (Martin 1995), 80 general informants (16 from each kebeles) were chosen randomly using a lottery method from a list of kebele inhabitants. Thirty-five key informants (seven from each kebele) were purposively selected from the five kebeles with the recommendation of administrators and elders based on deep traditional knowledge of wild edible plants, Individuals who have extensive hands-on experience foraging or using wild plants in cooking or medicine and informants involved in community gatherings, workshops, or educational programs related to foraging and wild food are valuable.

*Ethnobotanical Data Collection*

Ethnobotanical data was collected through semi-structured interviews with all 115 general informants and knowledgeable elders using a prepared interview guide (Alexiades 1996; Cotton 1996; Cunningham 2001; Martin 1995) to collect data on human interactions with WEPs (Figure 3).

Other interviews were conducted while the participants walked around the area where the plant of interest was located. During guided field walks, specimens of WEPs were collected for identification (Figure 3).

Seven informants selected from each of the five kebeles (35 total) participated in focus group discussions. The research team convened focus groups including agriculture experts, health professionals, and farmers with detailed plant knowledge to discuss herbarium samples, pictures, and published plant descriptions. Focus group discussions were held before and during ethnobotanical data collection. These analyses were carried out at designated times at each location with WEP sellers, buyers, collectors, and other knowledgeable members. Participants were asked to list the plant species most

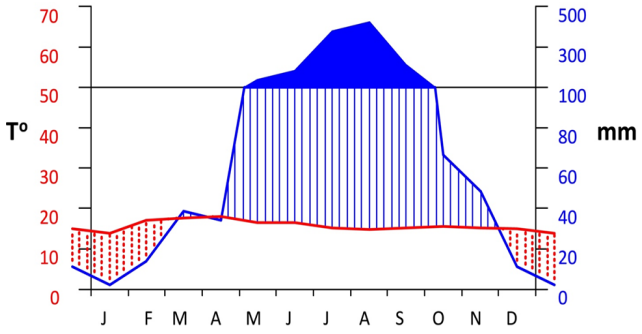


**Figure 2** Simada District (2100-meter elevation) climatogram for 2012–2022 (data source: National Meteorological Agency from 2012–2022).

**Figure 3** Wild Edible Plant Collection and Identification with Informants in the Study Area, Photograph taken by Kindye Belaye Wassie (2022).

favored and most used by the community in their Kebeles to select commonly used WEPs (Martin 1995) (Figure 3).

Market surveys were conducted in five local markets at the study sites and the Segno Gebya, Wogeda, Areda Gebya, Soscham and Tara markets were investigated. During the market survey about consumer preferences, usage, and market dynamics and brief overview of common areas covered was posed. A weekly market survey was conducted to document the wild edible plants found in these markets following Alexiades (1996) (Figure 3).

A voucher specimen collection was performed with assistance from informants and local field assistants. Fieldwork activities during this time were recorded, together with observations about the flora and the corresponding Indigenous knowledge. To record the locations, plant parts, and other pertinent details, pictures were also taken in the field. Specimen identification was performed at Bahir Dar University, Department of Biology, by a senior taxonomist (Dr. Ali Seid) using *Flora of Ethiopia and Eritrea* (Hedberg 2009).

Ethnobotanical data were analyzed using Microsoft Excel (2016) and SPSS version 29.0.2.0 to generate descriptive statistics from the semi-structured questionnaire (Cotton 1996; Martin 1995). The preference ranking, informant consensus and direct matrix ranking were then calculated (Martin 1995).

## Results

*Diversity of Wild Edible Plants*

A total of 45 WEPs were encountered in the study area, 22 (48.89%), 15 (33.33%), and 8 (17.77%) of which were trees, shrubs, and herbs, respectively (Figure 4). The dominant growth form of the WEPs was trees, which accounted for 22 (48.89%) of the total recorded plant species. A variety of sources provided the edible plants for collection. According to the current study, the majority of WEP species were found in natural forests (Table 1).

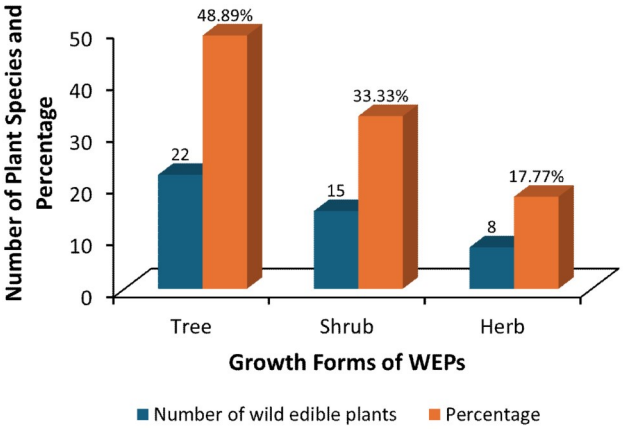


**Figure 4** Growth forms of wild edible plant species.

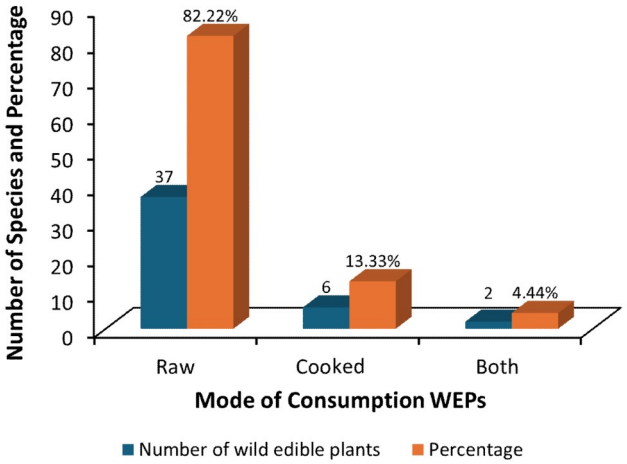


**Figure 5** Mode of consumption of wild edible plants in the Simada district.

*Mode of Consumption of Wild Edible Plants*

Most WEPs are harvested from young plants and are consumed raw (37, 82.22%), followed by cooked (6, 13.33%). In the study district, wild edible plants were available in the summer season. During this season, people collect the leaves, wash them with water, and burn them with fire (Figure 5).

*Edible Parts of the Plant*

The edible parts of wild plants are very diverse. The most widely used part of the wild edible plant was fruit (27, 60%), followed by leaves (6, 13%). The edible parts include stems (*F. communis*, *R. nervosus*, and *G. ferrugine*), gum (*A. abyssinia, A. seyal*, and *C. collinum*), and flower nectar (*A. polystachius*, *A. sennii*, and *D. stramonium*) (Figure 6).

*Contribution of Wild Edible Plants to Food Security*

Most of the area's Indigenous inhabitants consume wild edible plants as famine foods or foods in times of starvation, as well as to fill the gap created by seasonal food shortages. According to the respondents, 64.4% of the WEP species were eaten during normal times, and approximately 20% and 15.6% of the identified wild edible plants were consumed during severe and mild hunger, respectively

**Table 1** List of WEPs with their family, local name, growth form, edible part, mode of consumption, and collection number in the Simada district, Ethiopia.

| Scientific Name | Family | Local Name | Description | G | EP | CS | MDC | CP | TC | Other Uses | CN |
|---|---|---|---|---|---|---|---|---|---|---|---|
| *Acacia abyssinia* | Fabaceae | Bazra girar | Tree that reaches a height of 20 meters, distinguished by its complex, fluffy leaves and yellow blossoms. | T | G | FS | Gum is chewed | R | N | Animals frequently eat the leaves and pods | K09 |
| *Acacia seyal* | Fabaceae | Nech girar | Tree of medium size with little yellow blossoms and prickly branches. It has flat pods that extend up to 10 cm. | T | G | FS | Gum is chewed | R | N | Foliage used in animal nutrition | K10 |
| *Acanthus polystachius* | Acanthaceae | Kusheslia | Tall flower spikes and broad, lobed leaves characterize this perennial shrub. It does best in damp, shady conditions. | S | FL | RS | The juice of flowers' nectar is consumed | R | N | Utilized as a fence and leaves fed to animals | K11 |
| *Acanthus sennii* | Acanthaceae | Kusheslia | Frequently found in similar settings, this plant features large leaves and flower spikes. | S | FL | FS | The juice of flowers' nectar is consumed | R | N | Possesses historical medical applications for treating skin conditions and fence value | K12 |
| *Adansonia digitata* | Malvaceae | Diza | Known as the baobab tree, it is large with a distinctive trunk that can store water. The tree produces large fruits with a tangy pulp. | T | F | AL | Fresh ripe fruits are eaten | R | N | The fruit can be consumed raw or used to produce drinks. It is high in vitamin C | K01 |
| *Albizia schimperiana* | Fabaceae | Sessa | Medium-sized tree with a broad canopy that is adorned with clusters of white to pink blooms and delicate leaves that resemble ferns. | T | F | FS | Fresh ripe fruits are eaten | R | MH | The tree has therapeutic qualities that can be used to treat tapeworm, and the leaves are occasionally utilized as fodder | K13 |
| *Allophylus abyssinicus* | Sapindaceae | Imbis | Little tree or shrub with glossy leaves and tiny flower clusters. It frequently grows in forests. | S | F | FS | Fresh ripe fruits are eaten | R | MH | Utilized in the building of conventional farm equipment | K14 |
| *Balanitis aegyptiaca* | Balanitaceae | Lalo | Prickly tree bearing oval-shaped fruits and tiny yellow flowers. | T | F | AL | Fresh ripe fruits are eaten | R | SH | Tree is used medicinally to stop vomiting | K02 |

(continued on next page)

(continued from previous page)

| Scientific Name | Family | Local Name | Description | G | EP | CS | MDC | CP | TC | Other Uses | CN |
|---|---|---|---|---|---|---|---|---|---|---|---|
| *Boletus edulis* | Bolentaceae | Enguday | It is referred to as the porcini mushroom because of its dark top and stout stem. Usually, it thrives in wooded environments. | S | F | AL | Fresh ripe fruits are eaten | R | SH | High value culinary plant; frequently used in sauces and soups | K15 |
| *Capparis tomentosa* | Capparidaceae | Kemero | Aromatic flowers and thick, meaty leaves characterize this plant. It grows in stony, arid regions. | T | F | FS | Fresh ripe fruits are eaten | R | SH | The roots are also infused to help treat syphilis, gonorrhea, threatening abortion, sterility, and to control bleeding after | K16 |
| *Carissa spinarum* | Apocynaceae | Agam | Prickly shrub with glossy leaves and fragrant white flowers that are followed by tiny berries that are delicious. | S | F | FS | Fresh ripe fruits are eaten | R | N | Therapy for chest pain and headaches | K17 |
| *Combretum collinum* | Combretaceae | Avalo | Woody tree bearing tiny, fragrant blooms and extended leaves. | T | G | FS | Gum is chewed | R | SH | Leaves applied topically to heal wounds | K18 |
| *Commelina benghalensis* | Commenliaceae | Yebre kolte | Creeping plant that grows in disturbed places and has large leaves and blue blooms. | H | T U | GL | Fresh raw tuber are eaten | R | N | It causes burns to the throat and is used to treat infertility | K19 |
| *Corchorus olitorius* | Tiliaceae | Kudera (Amh) | Woody plant with green leaves and yellow blossoms that is well-known for its fiber. | T | L | FS | Fresh and raw Leaves were consumed | R | MH | Utilized as an analgesic and to treat malignancies, chronic cystitis, and gonorrhea in traditional medicine | K20 |
| *Cordia africana* | Boraginaceae | Wanza | Medium-sized tree with tiny white blossoms and a rough bark. It yields tiny, delicious fruits. | T | F | RB | Fresh ripe fruits are eaten | R | N | Utilized as a malaria treatment | K21 |
| *Cucumis ficifolius* | Cucurbitaceae | Yeawut arege | Creeper with tiny, cucumber-like fruits and leaves like figs. | H | F | RS | Fresh ripe fruits are eaten | R | N | Utilized to avoid dehydration | K03 |

(continued on next page)

(continued from previous page)

| Scientific Name | Family | Local Name | Description | G | EP | CS | MDC | CP | TC | Other Uses | CN |
|---|---|---|---|---|---|---|---|---|---|---|---|
| *Datura stramonium* | Solanaceae | Astenagre | Spiny seed pods and big white flowers adorn this grassy shrub. It is frequently seen as harmful. | H | FL | GL | The juice of flowers' nectar is consumed | R | N | Seeds have anthelmintic, analgesic, and anti-inflammatory properties | K22 |
| *Dioscorea prahensilis* | Dioscoreaceae | Wofegie | Plant that is well-known for its starchy roots. It produces little blooms and has heart-shaped leaves. | T | L | FS | Leaves cooked as stew | C | MH | Tuber is used to ward against fungi | K23 |
| *Diospyros abyssinica* | Ebenaceae | Serkin (Amh) | Medium-sized tree with tiny, fragrant flowers and dark green foliage. | T | L | FS | Leaves cooked as stew | C | N | A leaf decoction is used to treat malaria | K24 |
| *Discopodium penninervium* | Solanaceae | Bamlat | Small tree, often reaching heights of about 2 meters. | T | L | FS | Leaves cooked as stew | C | N | This plant's leaf is used to soothe stomachaches | K25 |
| *Dovyalis abyssinica* | Flacourtiaceae | Koshim | Prickly shrub bearing tiny, usually yellow to orange-colored fruits when ripe. | T | F | FS | Fresh ripe fruits are eaten | R | N | This plant's fruits are used as a cough remedy | K26 |
| *Ekebergia capensis* | Meliaceae | Kudekuda | Towering bush with tiny flowers. | S | F | FS | Fruit burned with fire and consumed | C | SH | This plant's root is used as a headache remedy | K04 |
| *Embelia schimperi* | Myricaceae | Enkoko | Plant bearing tiny blooms and fragrant fruit. | T | F | FS | Fresh ripe fruits are eaten | R | N | Consuming uncooked fruit as a remedy for koso illness | K27 |
| *Euclea racemosa* | Ebenaceae | Dedeho | Small berries and leathery leaves characterize this shrub or small tree. | S | F | FS | Fresh ripe fruits are eaten | R | N | Fruit that guards against anthrax illness | K28 |
| *Ferula communis* | Apiaceae | Dog | A tall herb with a robust stem and big, fluffy leaves. Well-known for its height and therapeutic qualities. | H | ST | GL | Stem burned with fire or peeled | B | N | This plant's stem is used to cure bone fractures | K29 |
| *Ficus sur* | Moraceae | Shola | Tree with little figs that are edible. It is frequently found in damp regions and has large leaves. | T | F | RB | Fresh ripe fruits are eaten | R | N | Consuming uncooked fruits as a remedy for diarrhea, worshiping | K05 |
| *Ficus vasta* | Moraceae | Warka | Large tree with a spreading canopy, producing small figs that are edible. | T | F | RB | Fresh ripe fruits are eaten | R | N | The leaves are used to prevent evil eye, worshiping | K30 |

(continued on next page)

(continued from previous page)

| Scientific Name | Family | Local Name | Description | G | EP | CS | MDC | CP | TC | Other Uses | CN |
|---|---|---|---|---|---|---|---|---|---|---|---|
| *Ficus sycomorus* | Moraceae | Bamba | Often called the sycamore fig, it bears huge, delicious figs from a broad trunk. | T | F | RB | Fresh ripe fruits are eaten | R | N | Consuming the fruits that are recommended to cure diarrhea and constipation | K31 |
| *Grewia ferrugine* | Tiliaceae | Lenqata | Tree that resembles berries and has tiny, delicious blooms and young stems. | T | ST | FS | Young stem is chewed | R | SH | The leaf that keeps constipation at bay | K32 |
| *Hibiscus cannabinus* | Malvaceae | Wayka | Tall shrub with big, eye-catching blooms and fibrous stems. For its fiber, it is frequently farmed. | S | F | FS | Fresh ripe fruits are eaten | R | MH | Used to treat cancer | K07 |
| *Hibiscus esculentus* | Malvaceae | Wayka | Usually called okra, it has edible fruits and has green, ribbed pods. | S | F | FS | The fruits are harvested when immature and eaten as vegetable and are often cooked in daily | R | MH | Used to reduce blood pressure | K06 |
| *Mimusops kummel* | Sapotaceae | Eshe | Tiny to medium-sized tree with juicy fruit and thick leaves. | T | F | RB | Fresh ripe fruits are eaten | R | N | Consuming fruits is said to stave against bad luck, rituals and ceremonies celebration | K33 |
| *Momordica foetida* | Cucurbitaceae | Yejib medihanit | Plant with yellow blossoms and unusual, prickly fruits. | T | F | FS | Fresh ripe fruits are eaten | C | SH | Eating fruits used to treat hypertension | K34 |

(continued on next page)

(continued from previous page)

| Scientific Name | Family | Local Name | Description | G | EP | CS | MDC | CP | TC | Other Uses | CN |
|---|---|---|---|---|---|---|---|---|---|---|---|
| *Opuntia ficus-indica* | Cactaceae | Qulkal | Cactus, sometimes called a "prickly pear," with flat pads and bears delicious, edible fruit. | S | F | RS | Fresh ripe fruits are eaten | R | N | Eating raw fruit used to treat skin rash in addition to the plant that is feed to animals and used as a fence. Opuntia ficus-indica has experienced substantial changes throughout time, suggesting environmental adaptation and human involvement. | K35 |
| *Oxalis obliquifolia* | Oxalidaceae | Lamcho | Plant that grows slowly, bearing tiny yellow flowers and leaves like clover. | H | L | GL | Fresh leaves consumed or burn with fire | B | N | Utilized as a feed source for animals | K36 |
| *Phoenix reclinate* | Arecaceae | Senel (Amh) | Its delicate, arching crown is covered with pinnate, fluffy leaves. | H | F | RS | Fresh ripe fruits are eaten | R | MH | Used as livestock feed and fence, as well as a skin rash | K37 |
| *Physalis peruviana* | Solanaceae | Awat | Often called the cape gooseberry, it bears little orange fruits that are encased in a husk. | H | F | GL | Fresh ripe fruits are eaten | R | N | Used as animal feed | K38 |
| *Plumbago zeylanicum* | Plumbaginaceae | Malkuya | Shrub bearing clusters of tiny fruits and complex leaves. | S | L | FS | Fresh leaves consumed | R | SH | Consuming fruit as a vomiting remedy | K08 |
| *Rhus glutinosa* | Anacardiacea | Kamo | Shrub bearing clusters of tiny fruits and complex leaves. | S | F | FS | Fresh ripe fruits are eaten | R | N | Utilized to build homes, provide firewood, and feed animals | K39 |
| *Rhus vulgaris* | Anacardiacea | Ashekamo | Bushy-looking shrub that bears tiny berries | S | F | FS | Fresh ripe fruits are eaten | R | N | Utilized to build homes, provide firewood, and feed animals | K40 |
| *Rumex nervosus* | Polygonaceae | Embacho | Perennial plant featuring tiny flowers and leaves fashioned like arrows. | S | ST | FS | Chewing young stem | C | N | Stem that is used to make firewood | K41 |

(continued on next page)

(continued from previous page)

| Scientific Name | Family | Local Name | Description | G | EP | CS | MDC | CP | TC | Other Uses | CN |
|---|---|---|---|---|---|---|---|---|---|---|---|
| *Rumex abyssinicus* | Polygonaceae | Mekemko | Like *Rumex nervosus, this plant is widely distributed in its natural habitat and possesses edible roots.* | S | RT | AL | Chewing young root | R | N | Utilized as animal feed | K42 |
| *Sporobolus pyramidalis* | Poaceae | Mure | Type of grass that grows well in a variety of settings and is frequently found in wide fields. | H | SE | GL | Seed is ground to powder and baked into injera | R | SH | Utilized as animal feed | K43 |
| *Syzygium guineense* | Myrtaceae | Dokma | Tree with tiny, delicious berries and fragrant foliage. | T | F | RB | Fresh ripe fruits are eaten | R | N | Timber is used to make building materials | K44 |
| *Ziziphus spina-christi* | Rhamnaceae | Kurkura | Tiny, spiky tree or shrub bearing tiny, tasty fruits. | T | F | AL | Fresh ripe fruits are eaten | R | N | Timber utilized to construct houses and the leaves feed to goats | K45 |

G-growth form, T-tree, S-Shrub, H-herb, EP-edible part F-fruit, L-leaves, RT-root, ST-stem, SE-Seed, G-gum, FL-flower nectar, CP-consumption part, R-raw, C-cooked, B-both, CS-FS- Forest, RS-Road side, AL-Agricultural land, GL-Agricultural land, RB-River band, TC-N-Normal time, non-famine conditions, SH-severe hunger, MH-mild hunger, MDC-Mode of consumption, CN-collection number, and K-Kindye.

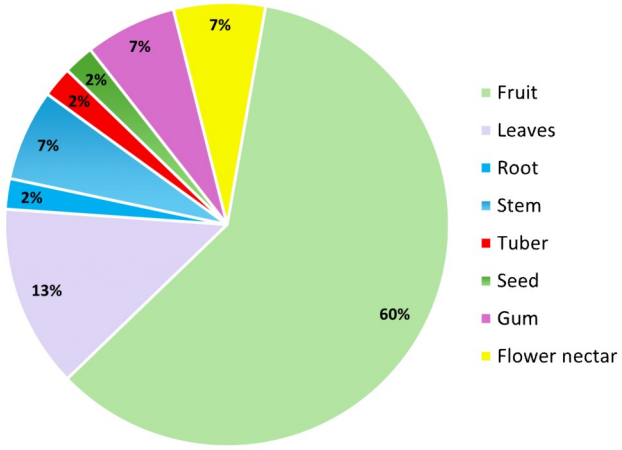


**Figure 6** Parts of wild edible plants eaten by people in the Simada district.

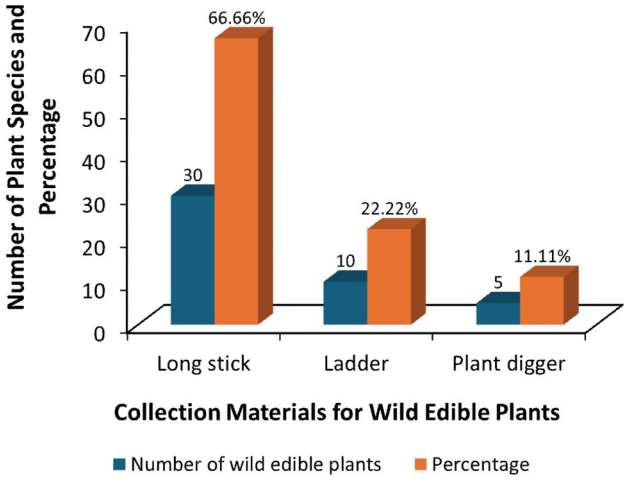


**Figure 7** Materials used for the collection of wild edible plants by people in the study area.

(Table 2). The study community reported that at present, some of the edible wild plants were comparable to cultivated crops.

*Indigenous Knowledge of Informants*

The study's informants ranged in age from 19 to 39 to 40 to 85 years old, with the majority (52.2%) being younger. There were more women than men, based on the demographic profile data that represents the population structure. Of the informants, 70 (60.9%) were literate. The knowledge of local residents about wild edible plants was greater for men than women. Older informants reported more knowledge about edible wild plants in the study area than younger informants. There were also significant differences in the number of wild edible plants reported by different informant groups, including age, literacy, and marital status. Compared with those aged ≥40 years, informants aged less than 40 years reported fewer wild edible plants. The informants age ≥40 (40–85) reported 200 wild edible plants species (Table 2). The illiterate informants knew more than the educated informants about using edible wild plants. Based on field research at the study site, they were able to identify a greater number of WEPs and were also able to determine where to find these plant species, how to gather them, and when they should ripen. Literate informants provided information about a smaller number of WEPs than illiterate ones, and they lacked knowledge about the consumption and preparation techniques of WEPs (Table 2).

In this study, various wild edible plant species were collected from participants using various tools. Approximately 30 (66.66%) of the plants were collected using long sticks, followed by a ladder (10, 22.22%) and a plant digger (5, 11.11%) (Figure 7).

**Table 2** Statistically independent t-test on the quantity of wild edible plants in Simada District that informant groups mentioned.

| Parameter | Informant Groups | N | No. of Plant Species Reported | Mean | t value** | p-value |
|---|---|---|---|---|---|---|
| Marital status | Single | 65 | 110 | 2.23 | -3.95 | 0.001* |
| | Married | 50 | 240 | 5.03 | | |
| Literacy | Literate (able to read or write) | 70 | 100 | 1.43 | -6.15 | 0.001* |
| | Illiterate (unable to read or write) | 45 | 290 | 6.4 | | |
| Age | <40(19-39) | 60 | 95 | 1.58 | -3.54 | 0.001* |
| | ≥40(40-85) | 55 | 220 | 4 | | |
| Gender | Male | 53 | 219 | 3.32 | 2.99 | 0.003* |
| | Female | 62 | 97 | 1.69 | | |

Significant difference ($p$<0.05), **t (0.05) two-tailed, df = 113, and N = number of respondents.

**Table 3** Direct matrix ranking of six wild edible plant species.

| Use Categories | *F. sycomorus* | *G. ferruginea* | *M. kummel* | *E.racemosa* | *C. spinarum* | *R. nervous* | Total | Rank |
|---|---|---|---|---|---|---|---|---|
| Firewood | 2 | 5 | 3 | 3 | 1 | 5 | 19 | 1st |
| Charcoal | 5 | 0 | 4 | 4 | 2 | 2 | 17 | 3rd |
| Medicine | 2 | 3 | 4 | 3 | 2 | 1 | 15 | 4th |
| Building | 5 | 1 | 1 | 2 | 1 | 3 | 13 | 5th |
| Forage | 1 | 2 | 2 | 2 | 1 | 2 | 10 | 6th |
| Furniture | 5 | 2 | 4 | 1 | 3 | 3 | 18 | 2nd |
| Total | 20 | 13 | 18 | 15 | 10 | 16 | | |
| Rank | 1st | 5th | 2nd | 4th | 6th | 3rd | | |

Values: 5 = excellent, 4 = very good, 3 = good, 2 = fair, 1 = poor, 0 = not used.

*Seasonal Availability of Wild Edible Plants*

In Ethiopia, there are four seasons: spring (September, October, and November), winter (December, January, and February), autumn (March, April, and May) and summer (June, July, and August). From a total of 45 wild edible plant species, 20 (44%) were available in the autumn season, followed by the summer season (13, 29%), whereas 8 species (18%) were found in the winter season, and 4 species (9%) were available in the spring season (Figure 8). Since there are a lot of plants in abundance during the autumn season, foragers gather WEPs two times per day. Similarly, wild edible plant collectors gather 2–3 kg per trip. During the spring season foraging in the study site is restricted to plants that are hardier, including roots and certain dried fruits. Gathering occurs once per week.

*Marketability of Edible Wild Plants*

The results showed that specific WEPs were identified as potential sources of income. For instance, fruits of *M. kummel* and *S. guineense* were offered for consumption in local markets. According to observations made during a market survey, the WEP species in the research area were sold in plastic cups, with one cup costing ten Ethiopian birrs ($0.17 USD) for *M. kummel* and eight Ethiopian birrs $0.14 USD) for *S. guineense*.

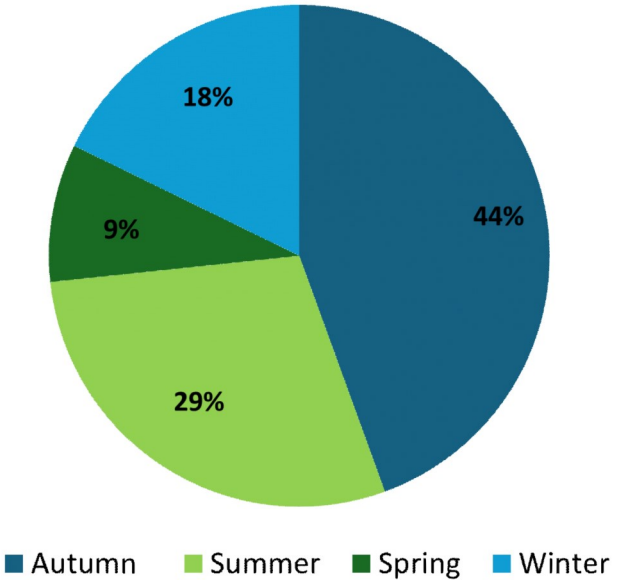


**Figure 8** Seasonal availability of wild edible plants in the study area.

*Quantitative Data Analysis*

Direct matrix ranking was conducted to assess the relative importance of each plant. Six wild edible plant species and 35 key informants were chosen for direct matrix rating. *F. sycomorus* was the most versatile wild edible plant species according to the direct matrix

**Table 4** Informant consensus on the most widely used wild edible plants in the study area.

| Scientific Name | No. of Informants | Percentage | Rank |
|---|---|---|---|
| *O. ficus-indica* | 80 | 69.6% | 1st |
| *C. africana* | 50 | 43.5% | 2nd |
| *D. abyssinica* | 45 | 39.1% | 3rd |
| *F. vasta* Forssk L. | 36 | 31.3% | 4th |
| *F. sycomorus* | 25 | 21.7% | 5th |
| *E. racemose* | 18 | 15.7% | 6th |
| *C. spinarum* | 12 | 10.4% | 7th |
| *M. kummel* | 8 | 6.96% | 8th |

**Table 5** Preference ranking of seven wild edible plants based on their taste from six key informants.

| Plant Types | R1 | R2 | R3 | R4 | R5 | R6 | Score | Rank |
|---|---|---|---|---|---|---|---|---|
| *C. spinarum* | 2 | 6 | 4 | 1 | 3 | 2 | 18 | 5th |
| *O. ficus-indica* | 4 | 3 | 7 | 5 | 3 | 4 | 26 | 1st |
| *E. schimperi* | 2 | 2 | 6 | 3 | 2 | 1 | 16 | 6th |
| *F. vasta* | 5 | 3 | 2 | 6 | 3 | 1 | 21 | 4th |
| *S. guineense* | 5 | 4 | 4 | 3 | 2 | 6 | 24 | 2nd |
| *M. kummel* | 1 | 2 | 2 | 5 | 3 | 1 | 14 | 7th |
| *F. sycomorus* | 3 | 2 | 2 | 7 | 4 | 4 | 23 | 3rd |

Values: 5 = excellent, 4 = very good, 3 = good, 2 = fair, 1 = poor, R = key respondents.

grouping results, whereas *C. spinarum* had the lowest direct matrix ranking score (Table 3).

Informants were interviewed from a variety of groups regarding food value of wild edible plants. Among the studied plants, *O. ficus indica* was the most popular, cited by 80 (69.6%) respondents for its food value, followed by 50 (43.5%) respondents from *C. africana* and 50 (43.5%) respondents in the Simada district (Table 4). Indicating the relevance of *Opuntia ficus-indica* in local populations, the informant consensus value for this plant is expected to show substantial agreement among informants regarding its many uses.

A preference score study was carried out for commonly mentioned edible wild plants. Informants were given seven of the most popular wild edible plants, which were then ranked according to sweetness. Participants ranked the wild edible plants from one to five, with the best tasting fruit receiving a five and the worst tasting fruit receiving a value of one. The total score for every species was used to calculate the preference ranking. By summing the numbers provided by each key informant, the overall rank of the preference exercise was found. The fruits of *O. ficus-indica* and *S. guineense* were the most preferred wild edible plant in the study site followed by *F. sycomorus* (Table 5).

A prioritization analysis using nine key informants was conducted to assess the degree of destruction associated with wild edible plants. Ranking analysis values ranged from one to five. Therefore, agricultural expansion and drought were ranking first and second threats that have an impact on the district's wild edible plant biodiversity and availability (Table 6). In addition to the information provided by informants, the researchers observed that farmland growth close to the forest posed a significant threat to WEP habitats (Figure 9).

## Discussion

In this project, we found that there were more WEP species recorded in the Simada district than other researchers have found in other districts across Ethiopia, including the Konso Ethnic Community (137 species); Burji District, Segan Area Zone of Southern Nations, Nationalities and Peoples Region (54 species); Awash National Park (55 species); and Berihun and Molla, Bullen District Northwest (44 species) (Addis et al. 2013; Ashagre et al. 2016; Bahru et al. 2013; Berihun and Molla 2017). We also found a lower number of WEP species recorded by other researchers in the Simada region, who recorded 41 (Wondimu et al. 2006), 30 (Assefa and Abebe 2011), 30 (Seyoum et al. 2015), 24 (Ayele 2017), and 39 (Tebkew et al. 2015) species. The variation in WEPs recorded is due to various factors, particularly climate,

**Table 6** Threats to wild edible plants reported by nine key informants.

| Threats | R1 | R2 | R3 | R4 | R5 | R6 | R7 | R8 | R9 | Total | Rank |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Over grazing | 1 | 2 | 1 | 1 | 2 | 3 | 3 | 2 | 4 | 19 | 5th |
| Agricultural expansion | 5 | 3 | 3 | 2 | 4 | 4 | 3 | 2 | 2 | 28 | 1st |
| Firewood collection | 4 | 1 | 2 | 2 | 1 | 1 | 3 | 3 | 5 | 22 | 3rd |
| Over exploitation | 2 | 2 | 1 | 3 | 1 | 1 | 3 | 3 | 1 | 21 | 4th |
| Timbering | 3 | 2 | 2 | 3 | 1 | 1 | 2 | 2 | 1 | 17 | 6th |
| Drought | 5 | 4 | 3 | 2 | 2 | 1 | 2 | 3 | 3 | 25 | 2nd |

Values: 5 = excellent, 4 = very good, 3 = good, 2 = fair, 1 = poor, R = key respondent.

**Figure 9** Agricultural expansion as primary threat wild edible plants in Simada District, Photograph taken by Kindye Belaye Wassie (2022).

land use types, and agricultural strategies, which affect the number of wild plant species present. In general, the main elements that influence the number of plant species in each area include geography, environment, cultural and environmental aspects, community structure, landscape variability, and farming practices (Mebrate et al. 2022). Most of the edible wild plants that were described in this study were in forest areas. This suggests the importance of in-situ conservation in guaranteeing the sustained utilization of these species. More kinds of wild edible plants were found in greater abundance in the research areas in the forest. This may have been caused by altitude, which in turn produced favorable soil conditions and other microclimates (Asfaw et al. 2023).

Similarly, the preference for raw eating showed that plant parts are consumed right away after being harvested from their natural habitat. Raw eating of wild edible plants in Simada district agrees with the finding of (Anbessa 2016; Masresha et al. 2023; Yiblet and Adamu 2023). The consumption of WEP parts after preparation and cooking frequently serves to both enhance flavor and decrease toxicity. Conversely, cooking food more than the maximum level could cause alterations in a variety of inorganic mineral components, colors, flavorings, vitamins, acids, enzymes, and other substances. Most of the studies on the mode of consumption of WEP species were of the raw form, which demonstrates that different cultural groups in the nation have a similar

consumption mode for WEPs. In most investigations conducted in various regions of Ethiopia, fruits are the predominant component of WEPs (Duguma 2020). However, other researchers (Amenu 2007; Mesfin et al. 2005) found that roots are mainly used for food and medicinal purposes. The fact that wild fruits are used more frequently than other plant parts during times of food scarcity and that their flavor and taste are enhanced by their chemical makeup could be the reason for their increased use.

Indigenous knowledge is the comprehension, abilities, and ideologies that have been cultivated by nearby communities with extensive histories and encounters with their natural environments (Ogunkeyede et al. 2023). Indigenous knowledge of the studied community varied with respect to the use, listing, and ways of consuming WEPs. The level of information provided by married people is greater than that provided by single people. This could be because the married people had greater responsibility to fulfill the nutritional desire of their children, and they were more intensively collecting WEPs in their surroundings. Men and women have different duties when it comes to food collecting and preparing in this region. In Simada District, further from home, men are typically in charge of hunting, foraging, and resource collection, which include gathering wild plants. Males can acquire more expertise and information about edible wild plants (Table 3). This higher level of knowledge in males could also be due to a difference in mobility: males can move freely one place to another without facing social or violent consequences, but women cannot move as freely. As a result, males had a greater chance to know more WEPs than females. However, this relationship is complex, as women were more knowledgeable than men in the Chelia district of central-western Ethiopia (Ashagre et al. 2016; Regassa et al. 2014).

In this study, wild edible plant species were not directly collected from the mother plant. The collectors used different materials in the study site, with two thirds (66.66%) of the plants collected using long sticks. This could be because the majority of the WEP species in the research area are large trees, making it challenging to pick portions of the plants directly from the mother plant. In this study, wild edible plant species were not directly collected from the mother plant. The collectors used different materials in the study site, with two thirds (66.66%) of the plants collected using long sticks. This could be because the majority of the WEP species in the research area are large trees, making it challenging to pick portions of the plants directly from the mother plant. Five percent of the fruits and seeds in this study were collected using a plant digger, 13% were collected from the ground, and 82% were collected from plucking the larger plants.

Wild edible plants are available in different seasons because their flowering and fruiting times are different. In Simada District, 20 (44%) of the 45 WEPs were available in the autumn season, 13 species (29%) in summer, and 8 species (18%) in winter. Studies of WEPs seasonality show variation. Yibelt and Adamu (2023), reported that more WEPs were found in the spring than in the winter, Tahir et al. (2023) found that most WEPs were accessible year-round, and Tebkew (2015) reported that between most WEPs were abundant during March and June). In Simada District, we found that people gather WEPs in autumn two times per day with an amount of 2–3 kg per trip. However, wild food collectors gather once a week during the spring season. These patterns are influenced greatly by ecological factors, fruiting and availability of wild edible plant species.

Among the 45 WEP species, only the fruits of Syzygium guineense and Mimusops kummel were sold at the five market sites. Market sales of WEPs vary across previous studies. Anbessa (2016) reported that of 54 wild edible plants were sold in the local marketplace, and Feyssa et al. (2011) reported that 75.7% of 37 widely recognized edible plant species were sold in East Shewa, Ethiopia. However, no wild edible plants are available for sale in the marketplace of the Berehet district, North Shewa Zone, Amhara Region, Ethiopia (Getu 2015). The commercial value of wild edible plant species varies throughout Ethiopia. Masresha et al. (2023) reported that *Balanitis aegyptiaca* was the most expensive WEP in the local market. This may depend on the region's availability of wild edible plants and the community's level of awareness.

In the study site, WEPs were also used for non-food purposes. According to the key informants, firewood was the most highly valued use category, whereas forage had the lowest value. These findings contrast with those of Tebkew et al. (2015) who reported that *D. mespiliformis* was the first multipurpose wild food plant in the Chilga district of Northern and western Ethiopia. The most widely used edible wild plants are those with the highest relative use

values. However, abuse puts these plants at risk of extinction. Due to the great variety of uses of these wild food plants, special attention to their conservation is thus needed (Chekole 2011). *Opuntia ficus indica* was the most popular, cited by 80 (69.6%) respondents for its food value. this study was not in line with previous findings (Masresha et al. 2023) in which *Diospyros abyssinica* high informant consensus of 78 had (60.94). The difference might be due to the cultural variation of people from one region to another region combined with agro-ecological distribution. Different types of Indigenous knowledge in the community may account for the heterogeneity in their frequency of citation (informant consensus) (Masresha et al. 2023). Furthermore, the variation may also be due to the number and quality of wild edible plant products (Masresha et al. 2023). Wild edible plant species with the highest informant consensus value have significant food value in the community. This indicates that WEPs are beneficial as food and medicine, as reported in similar studies (Emire et al. 2022). When people in the study region became sick, they ate wild edible herbs because a local healer had advised them to do so. These factors mean that many edible wild plants are scarce (Tebkew et al. 2015). Agricultural activity ranked as the primary threat to WEPs in the study site, as discussed by Berihun and Molla (2017).

The community has extensive Indigenous knowledge about many uses of WEPs apart from food value: they use WEPs in house construction, medicinal practices, religious worship, animal feed, fencing, and ritual and festival celebration. However, their many applications may have an impact on the local species' availability. In a similar vein, Masresha et al. (2023) claimed that plant species are exploited more in an area when they are used for numerous purposes. To preserve the versatile wild edible plant species for future generations, more care needs to be paid to them.

## Conclusion

The results of the investigation revealed that Simada District is home to several wild edible plants and the knowledge that goes along with their use. District residents fulfill their subsistence and market needs by consuming and selling these plants. Wild edible plants are affordable and accessible, allowing economically poor communities to supplement their diet. These plants are essential for food security and nutrition, especially in areas with limited access to farmed commodities. By eating and selling these plants, the residents of the district can meet their necessities. Wild edible plants have multiple purposes, including food, medicine, fodder, construction, and fuel, leading to overexploitation

The knowledge gathered from this research can help guide biodiversity studies in the future by highlighting the importance of protecting plant species and the cultural legacy that goes along with them. Proper management and preservation of these plant species are crucial for future generations to alleviate food insecurity in the study site.

## Acknowledgments

I want to express my gratitude to the Simada District, Kebele staff offices, and people who gave me both primary and secondary data and who gave up their time to participate in several official and informal interviews and group discussions to help me better understand the district's background. My acknowledgments also extended to Dr. Ali Seid for identifying the voucher specimens and to the Bahir Dar University Department of Biology for storing this reference specimen.

## Declarations

*Permissions:* The Research and Ethical Committee of the Department of Plant Sciences at Bahir Dar University provided written ethical clearance. The Department of Plant Sciences sent a formal letter to the Simada District Agriculture Office. Accordingly, approval to perform the study was secured from the district agricultural office, as well as each kebele administration. All individuals who agreed to participate in the study provided written informed consent. The participants were guaranteed the confidentiality of their responses.

*Sources of funding:* None declared.

*Conflicts of Interest:* None declared.

## References Cited

Addis, G., Z. Asfaw, and Z. Woldu. 2013. Ethnobotany of Wild and Semi Wild Edible Plants of Konso Ethnic Community, South Ethiopia. *Journal of Ethnobotany* 11:121–142.

Alexiades, M. N. 1996. Collecting Ethnobotanical Data: An Introduction to Basic Concepts and Techniques. In *Selected guidelines for Ethnobotanical Research: A Field Manual*, vol. 10, edited by M. N.

Alexiades, pp. 53–94. The New York Botanical Garden, New York.

Amenu, E. 2007. Use and Management of Medicinal Plants by Indigenous People of Ejaji Area (Chelya Woreda) West Shoa, Ethiopia: an Ethnobotanical Approach. Master's degree, Addis Ababa university school if Graduate studies. Unpublished Master's Thesis, Addis Ababa University, Addis Ababa, Ethiopia.

Anbessa, B. 2016. Ethnobotanical Study of Wild Edible Plants in Bule Hora Woreda, Southern Ethiopia. *African Journal of Basic and Applied Sciences* 8:198–207. DOI:10.5829/idosi.ajbas.2016.8.4.23529.

Asfaw, Z. 2009. The Future of Wild Food Plants in Southern Ethiopia: Ecosystem Conservation Coupled With Enhancement of the Roles of Key Social Groups. International Symposium on Underutilized Plants for Food Security in Ethiopia, Addis Ababa, Ethiopia. *Acta Horticulture* 806:701–708. DOI:10.17660/ActaHortic.2009.806.87.

Asfaw, A., E. Lulekal, T. Bekele, A. Debella, S. Tessema, A. Meresa, and E. Debebe. 2023. Ethnobotanical Study of Wild Edible Plants and Implications for Food Security. *Trees, Forests and People* 14:100453. DOI:10.1016/j.tfp.2023.100451.

Ashagre, M., Z. Asfaw, and E. Kelbessa. 2016. Ethnobotanical Study of Wild Edible Plants in Burji District, Segan Area Zone of Southern Nations, Nationalities and Peoples Region (SNNPR), Ethiopia. *Journal Ethnobiology and Ethnomedicine* 12:32. DOI:10.1186/s13002-016-0103-1.

Assefa, A., and T. Abebe. 2011. Wild Edible Trees and Shrubs in the Semiarid Lowlands of Southern Ethiopia. *Journal of Science and Development* 1:5–19.

Ayele, D. 2017. Ethnobotanical Survey of Wild Edible Plants and Their Contribution to Food Security Used by Gumuz People in Kamash Woreda; Benishangul Gumuz Regional State; Ethiopia. *Journal of Food and Nutrition Sciences* 5:217–224. DOI:10.11648/j.jfns.20170506.12.

Bahru, T., Z. Asfaw, and S. Demissew. 2013. Wild Edible Plants: Sustainable Use and Management by Indigenous Communities in and the Buffer Area of Awash National Park, Ethiopia. *SINET: Ethiopian Journal of Science* 36:93–108.

Balemie, K., and F. Kibebew. 2016. Ethnobotanical Study of Wild Edible Plants in Derashe and Kucha Districts, South Ethiopia. *Journal of Ethnobiology and Ethnomedicine* 2:53–75. DOI:10.1186/1746-4269-2-53.

Berihun, T., and E. Molla. 2017. Study on the Diversity and Use of Wild Edible Plants in Bullen District Northwest Ethiopia. *Journal of Botany* 8383468. DOI:10.1155/2017/8383468.

Chekole, G. 2011. Ethnobotanical Study of Plants Used in Traditional Medicine and as Wild Food in and Around Tara Edam and Amba Remunant Forest in Libokemkem Woreda South Gondar Zone, Amhara Region, Ethiopia. *Journal of Ethnobiology and Ethnomedicine* 11:4. DOI:10.1186/1746-4269-11-4.

Cotton, C. M. 1996. *Ethnobotany: Principles and Applications*. John Wiley and Sons, West Sussex, England.

Cunningham, A. B. 2001. *Applied Ethnobotany: People, Wild Plants Use and Conservation*. Earth Scan Publications, London.

Duguma, H. T. 2020. Wild Edible Plant Nutritional Contribution and Consumer Perception in Ethiopia. *International Journal of Food Science* 2958623. DOI:10.1155/2020/2958623.

Emire A., S. Demise, T. Giri, and W. Tadele. 2022. Ethnobotanical Study of Wild Edible Plants in Liben and Wadera Districts of Guji Zone, Southern Ethiopia. *Global Journal of Agricultural Research* 10:47–65.

Feyssa, D. H., J. T. Njoka, Z. Asfaw, and M. M. Nyangito. 2012. Nutritional Value of Grewia Flavescens: Implications for Household Food Security in Northeastern Rift Valley of Ethiopia. In *Third RUFORUM Biennial Meeting, Entebbe, Uganda*, pp. 773–778. Regional Universities Forum for Capacity Building in Agriculture, Kampala, Uganda.

Getu, A., Z. Asefaw, E. Kelbessa. 2015. Plant Diversity and Ethnobotany in Berehet District, North Shewa Zone of Amhara Region (Ethiopia) with Emphasis on Wild Edible Plants. *Journal of Medicinal Plants Studies* 3:93–105.

Hedberg, I. 2009. Flora of Ethiopia and Eritrea. Systematic Botany of the University of Uppsala and

Addis Ababa University National Herbarium, Sweden and Ethiopia.

Hedberg, I., I. Friis, and E. Persson, eds. 2009. Flora of Ethiopia and Eritrea, vol. 8. Systematic Botany of the University of Uppsala and Addis Ababa University National Herbarium, Sweden and Ethiopia.

Martin, G. J. 1995. *Ethnobotany: A Method Manual*. Chapman and Hall, London. DOI:10.1007/978-1-4615-2496-0.

Masresha, G., Y. Melkamu, and G. Chekole. 2023. Ethnobotanical Study on Wild Edible Plants in Metema District, Amhara Regional State, Ethiopia. *Hindawi International Journal of Forestry Research* 9243343. DOI:10.1155/2023/9243343.

Mesfin, F., S. Demissew, and T. Teklehaymanot. 2005. An Ethnobotanical Study of Medicinal Plants in Wonago Woreda, SNNPR, Ethiopia. *Journal of Ethnobiology and Ethnomedicine* 5:28. DOI:10.1186/1746-4269-5-28.

Ogunkeyede, A. N., N. C. Ndukwe, A. O. Akinola, and Y. F. Olaseigbe. 2023. Indigenous Knowledge and Public Library System for National Development in Nigeria. *Communicate: Journal of Library and Information Science* 25:282–291.

Regassa, T., E. Kelbessa, and Z. Asfaw, Z. 2014. Ethnobotany of Wild and Semi-Wild Edible Plants of Chelia District, West-Central Ethiopia. Science, Technology and Arts Research. *Journal Science and Technology* 3:122–134. DOI:10.4314/star.v3i4.18.

Seyoum, Y., D. Teketay, G. Shumi, and M. Wodafirash. 2015. Edible Wild Fruit Trees and Shrubs and Their Socioeconomic Significance in Central Ethiopia. *Ethnobotany Research and Applications* 14:183–197. DOI:10.17348/era.14.0.183-197.

Swingland, I. R. 2013. Biodiversity Definition. The Durrell Institute of Conservation and Ecology. *Encyclopedia of Biodiversity* 2013:399–410. DOI:10.1016/B978-0-12-384719-5.00009-5.

Tahir M., A. Abrahim, T. Beyene, G. Dinsa, T. Guluma, Y. Alemneh, P. Van Damme, U. S. Geletu, and A. Mohammed. 2023. The Traditional Use of Wild Edible Plants in Pastoral and Agro-pastoral Communities of Mieso District, Eastern Ethiopia. *Tropical Medicine Health* 51:10. DOI:10.1186/s41182-023-00505-z.

Tao, G. E. 2020. Ethnobotanical Study of Wild Edible Plants in Dabo Hana District, Buno Bedele Zone, Oromia Regional State, Southwest Ethiopia. Master's thesis, Jimma University, Jimma, Ethiopia. Available at: https://repository.ju.edu.et//handle/123456789/5358. Accessed on April 20, 2024.

Tebikew, A. 2009. Environmental History of Simada District in the Twentieth Century. Historical Publications, Addis Ababa, Ethiopia. Available at: https://ir.bdu.edu.et/bitstream/handle/123456789/9977/Alehegn%20Final%20W. Accessed on October 15, 2023.

Tebkew, M. 2015. Wild and Semi Wild Edible Plants in Chilga District, Northwester Ethiopia. Implication for Food Security and Climate Change Adaptation. *Global Journal of Wood Science, Forestry and Wildlife* 3:72–82.

Tebkew, M., A. Zebene, and Z. Solomon. 2015. Ethnobotanical Study of Medicinal Plants in Chilga District, Northwestern Ethiopia. *Journal of Natural Remedies* 15:88–112. DOI:10.18311/jnr/2015/476.

Teklehaymanot, T., and M. Giday. 2010. Ethnobotanical Study of Wild Edible Plants of Kara and Kwego Semi Pastoralist People in Lower Omo River Valley, Debub Omo Zone, SNNPR, Ethiopia. *Journal of Ethnobiology and Ethnomedicine* 4:6–23. DOI:10.1186/1746-4269-6-23.

Tizita, E. E. 2016. The Role of Indigenous People in the Biodiversity Conservation in Gamo Area of Gamo Gofa zone, Southern Ethiopia. *International Journal of Biodiversity and Conservation* 8:244–250. DOI:10.5897/IJBC2015.0893.

Wondimu, T., Z. Asfaw, and E. Kelbessa. 2006. Ethnobotanical Study of Food Plants Around Dheerar Town, Arsi, Ethiopia. *SINET: Ethiopian Journal of Science* 29:71–80. DOI:10.4314/sinet.v29i1.18261.

Yiblet, Y., and E. Adamu. 2023. Ethnobotanical Study of Wild Edible Plants in Tach Gayint District, South Gondar Zone, Amhara Region, Northwestern Ethiopia. *Evidence-Based Complementary and Alternative Medicine* 2023:7837615. DOI:10.1155/2023/7837615.