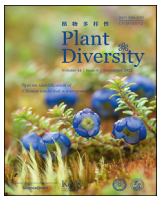
Plant Diversity 44 (2022) 577–597

Contents lists available at ScienceDirect

Plant Diversity

journal homepage: http://www.keaipublishing.com/en/journals/plant-diversity/
http://journal.kib.ac.cn



Research paper

An ethnobotanical study of medicinal plants in Güce district, north-eastern Turkey

Mustafa Karaköse

Giresun University, Espiye Vocational School, Programme of Medicinal and Aromatic Plants, Espiye, Giresun, 28600, Turkey

ARTICLE INFO

Article history:
Received 13 December 2021
Received in revised form
21 March 2022
Accepted 22 March 2022
Available online 26 April 2022

Keywords:
Colchic
Ethnobotany
Informant consensus factor
Frequency of citation
Traditional medicine
Use-record

ABSTRACT

This study aims to identify medicinal plants traditionally used to treat diseases by local people living in Güce district, north-eastern Turkey. The study was carried out between 2018 and 2021 using a two-part semi-structured, open-ended questionnaire with 165 local people. Data were analysed using use-report, frequency of citation, and informant consensus factor. Informants identified 128 vascular medicinal plant taxa belonging to 54 families and 106 genera. The most common plant taxa belong to Rosaceae (16 taxa/12.5%), Asteraceae (12 taxa/9.4%), and Lamiaceae (9 taxa/7%) families. The most frequently used preparation method reported was decoction (39.8%); the most commonly utilized plant parts were leaves (40.3%). Statistical analysis reveals that women in Güce district ($df = 163$, $p = 0.043 < 0.05$) possess the most traditional knowledge. The highest frequency of citation (61) and use report (92) were recorded for *Tilia rubra* subsp. *caucasica*, and the highest informant consensus factors were cited for respiratory system disorders (0.86), digestive system disorders (0.73), and skin disorders (0.71). This study reported nine plant taxa as medicinal plants for the first time, and documented a total of 293 new therapeutic uses. However, the study indicates that the transfer of traditional knowledge to future generations is limited ($F = 3.355$, $p = 0.020$). Action should be taken as soon as possible to preserve existing traditional knowledge and to ensure its transfer to future generations.

1. Introduction

Of the 17 sustainable development goals adopted by the Member States at the United Nations General Assembly in September 2015 at least seven are related to traditional knowledge (TK) (Kumar et al., 2021), the product and whole of the interaction of the individual and society with nature (Berkes, 1993). However, TK is being lost throughout the world (Ramirez, 2007). Thus, documentation of TK is important to safeguard the rights of local people during an era of globalization (see Article 8 of the Convention on Biological Diversity (CBD) and strategic goal E of Nagoya Protocol; Ghimire et al., 2018). TK, which has a close relationship with biodiversity (Idolo et al., 2010; Aswani et al., 2018), also has the potential to contribute to scientific knowledge for the conservation and sustainable use of biodiversity, and thus, ecosystems (Gaoue et al., 2017). Accordingly, preserving TK of natural flora has become a central focus of ethnobotany (Berkes et al., 1995, 2000; Mustafa et al., 2012; Dalar et al., 2018; Sõukand and Pieroni, 2019; Hu et al., 2020; Mattalia et al., 2021). Ethnobotanists have documented the use of plants in customs/traditions, folk nutrition, folk cuisine, and folk medicine in different parts of the world (Özdemir, 2018; Karaköse et al., 2019; Pei et al., 2020). These studies both help conserve TK and expedite the discovery of new drugs, as natural plant biodiversity in many regions provides rapid, cheap, and sufficient alternative resources for healthcare of local people (Kathambi et al., 2020). Importantly, protecting TK of plants (e.g., medicinal plant use) requires identification of both plant taxa and an understanding of which members of a community possess TK (Mathur, 2003). TK is abundant in Turkey, a region that has hosted many civilizations that have left their cultural, social, and ecological richness as a heritage (Yıldırımlı, 2004; Kendir and Güvenç, 2010). Turkey is located at the intersection of three phytogeographical regions (Circumboreal, Mediterranean, and Irano-Turanian) and three of the world's 36 biodiversity hotspots (Mediterranean Basin, Irano-Anatolian, and Caucasus biodiversity hotspots) (Myers et al., 2000; Mittermeier et al., 2004). It has complex topography, climate, and soil differences. Consequently, Turkey has approximately

E-mail address: mustafa.karakose@giresun.edu.tr.
Peer review under responsibility of Editorial Office of Plant Diversity.

https://doi.org/10.1016/j.pld.2022.03.005

12,975 plant taxa and nearly 4175 endemic plants (with an endemism rate of 32%) (Davis, 1965–1985; Davis et al., 1988; Güner et al., 2000, 2012; Özhatay et al., 2019; Karaköse, 2020). In addition to this biodiversity, Turkey has a high degree of TK related to medicinal plant use (Karaköse and Terzioğlu, 2019, 2020). However, modernization in Turkey is gradually displacing TK (Kızılarslan and Özhatay, 2012).

Although ethnobotanical studies have been conducted in Turkey since the beginning of the Republican period (Baytop, 1999), their number has increased considerably in the last two decades (Çakılcıoğlu et al., 2011; Polat and Satıl, 2012; Polat et al., 2013; Sargın et al., 2013, 2015; Tetik et al., 2013; Akbulut and Özkan, 2014; Hayta et al., 2014; Güzel et al., 2015; Gunes, 2017; Akbulut et al., 2019; Karaköse et al., 2019; Sargın and Büyükcengiz, 2019; Kawarty et al., 2020). In 2017, the Biological Diversity of Department of the General Directorate of Nature Conservation and National Parks began a project on "Registration of Traditional Knowledge Associated with Biodiversity", which will cover 81 provinces in Turkey, and create a "Traditional Knowledge Management System" available to researchers. Thus far, only a limited number of ethnobotanical studies have been carried out in the Giresun province (Polat et al., 2015; Güler et al., 2021).

Giresun is a mountainous and rugged region with habitats important for biodiversity. It harbors the Euxine-Colchic broadleaf and Caucasus mixed forests, which belong to the Caucasus biodiversity hotspot (Karaköse, 2019) and are classified as one of 200 Global Ecoregions (WWF and IUCN, 1994; Akbulut and Kurdoğlu, 2015). Districts within this region (e.g., Güce district) have been affected by the increasing global demand for natural resources, which has fragmented and reduced natural habitats. Habitat and biodiversity loss threaten the ability of local people to maintain, use and transfer TK to future generations. Thus, it is critical to record and scientifically evaluate the high biological and socio-cultural richness of the TK in places such as Güce.

This study aims to identify medicinal plants traditionally used to treat diseases by local people living in the Güce district, northeastern Turkey. In addition, I determined whether TK of these plants differs depending on the gender, age, and education level of informants. This is the first ethnobotanical study carried out in Giresun's Güce district. The comprehensive quantitative, qualitative, and statistical evaluations of this study will contribute to the TK associated with biodiversity in Turkey.

2. Material and methods

2.1. Study area

Güce, one of Giresun's eastern districts, is surrounded by the Tirebolu district to the north, south, and east, and the Espiye district to the west (Fig. 1). "Güce" is a Turkish word meaning "broken wheat, split corn, vetch". Some local studies have associated this word with the word "küçe", which means small (http://guce.gov.tr/tarihi). The settlement of the district began in 2000 BCE, before the conquest of the Muslim Turks. During the attacks before the Anatolian Seljuks, Turkish clans, including the Eymür, Halaç, Avşar, and Kipchaks, settled in the region. Turkish clans are known to have migrated to the Güce region from Asia. Güce, an intersection of important historical roads, is also one of the meeting centers of the region (Kaya, 2019). The conquest, settlement, and Islamization of the geography, including the Güce district (after the 10th century), was realized by the Chepni Turks, one of the 24 clans of the Oghuz Turks (http://www.guce.bel.tr/sayfa/tarihcemiz.html). Established on rough lands, Güce is a settlement unit connected to Tirebolu, which was the only town in the vicinity until the 20th century. The municipality organization was established in 1990 in Güce, which is a center connecting the surrounding villages (Kaya, 2019). The local language in the region is Turkish. The district is located in the south, about 15 km from the coast, and between 40°–53° northern latitudes and 38°–48° eastern longitudes; the elevation of the district varies between 50 and 2650 m. In 2021, the population of Güce was 8098. This population consists of 4131 (51.01%) men and 3967 (48.99%) women (https://data.tuik.gov.tr/).

The local people of Güce mostly earn their living from agriculture, animal husbandry, beekeeping, and forestry. In terms of agriculture, local people primarily grow small-scale agricultural products such as corn, cabbage, and bean for their own needs. The wild cherry tree *Prunus avium* (L.) L. (Syn.: *Cerasus avium* (L.) Moench) originated in Giresun. For this reason, its former name "Kerasous or Cerasus" derives from the word cherry. Additional agricultural sources of income for the people of Güce include hazelnut and tea farming, which contribute greatly to the Turkish economy (Fig. 2a). Giresun's primary source of incomes are the *Corylus* spp. The highest quality hazelnuts in the world are grown in Giresun province. Livestock and dairy products such as butter, yoghurt, and cheese are produced, and honey production is very popular in the region. Some people also earn income from forestry activities (cutting, plantation, silviculture, etc.).

2.2. Vegetation structure

The forests in Güce district are managed by the Güce Forest Enterprise, which is administratively affiliated with the Tirebolu Forestry Management Directorate within the borders of the Giresun Regional Forestry Directorate. Güce is located in the Colchic sector of the Euxine province of the Circumboreal phytogeographical region, and falls within the A7 square according to the grid system (Davis, 1965–1985). The annual mean temperature is 12.9 °C, and the annual mean precipitation is 878 mm. Moreover, the study area is under the influence of the oceanic climate below elevations of 1500 m, and semi-continental climate is felt at higher vegetation zones. Due to abundant rainfall and suitable temperature in all seasons, the lands of the district are rich in forest vegetation. The study area covers an area of about 184 km^2 (68.8 km^2 of this area is forested). Forest ecosystems belonging to the Giresun province, and also to Güce district, are of enormous importance and distributed within the Caucasus Biodiversity Hotspot. The Mediterranean climate makes itself felt at low elevations. It is possible to see species such as *Arbutus unedo* L., *A. andrachne* L., *Laurus nobilis* L., and *Erica arborea* L. in these areas. Forest vegetation consisting of deciduous species dominates at elevations up to 1000 m. Important species of this vegetation type include *Tilia rubra* DC. subsp. *caucasica* (Rupr.) V. Engl., *Ulmus glabra* Huds., *Carpinus betulus* L., *Quercus petraea* (Matt.) Liebl. subsp. *iberica* (Steven ex M. Bieb.) Krassiln., *Castanea sativa* Mill., *Alnus glutinosa* (L.) Gaertn. subsp. *barbata* (C.A. Mey.) Yalt., and *Fagus orientalis* Lipsky. At elevations of 1000–1750 (2000) m, coniferous forests consisting of *Picea orientalis* (L.) Peterm., *Abies nordmanniana* (Steven) Spach, and *Pinus sylvestris* L. var. *hamata* Steven (Fig. 2b) become dominant (Karaköse, 2019).

2.3. Data collection

Ethnobotanical knowledge was recorded by means of semi-structured interviews (Martin, 1995; Alexiades, 1996) with local people. Weckerle et al. (2018)'s recommendations were also considered within the scope of the study. Field studies were carried out in various vegetation periods between 2018 and 2021.

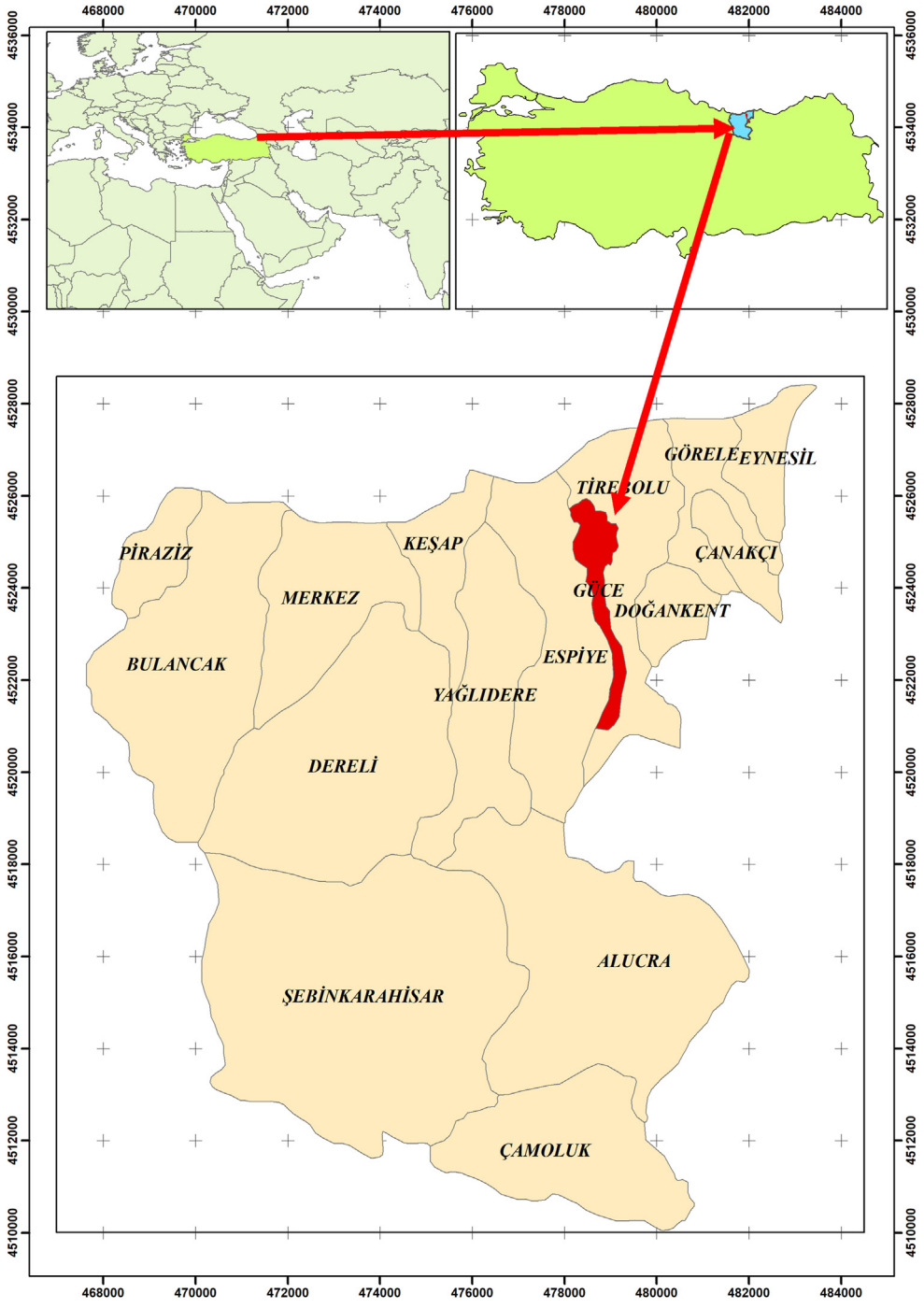


Fig. 1. Location of the study area.

Interviews were conducted with local people in person; a total of 165 informants were surveyed with a two-part questionnaire (Appendix A). The first part of the questionnaire aimed to determine demographic characteristics such as gender, age, and education level. The second part aimed to obtain information about medicinal plant taxa, including vernacular names, parts used, preparation-utilization methods, and ailments treated. In the first year of the field studies, my student Mehmet Ali (from the Fındıklı village) and I interviewed local people in the Fındıklı village to become familiar with the region (Fig. 2i). Since Mehmet is from the Fındıklı village, informants in this village were easy to find. In other villages, informants were reached through headmen (known as "muhtar" in Turkish) with the help of the Güce Forest Directorate. However, we noted that female participants were quite shy about sharing some information, especially on gynecological diseases. Fortunately, these problems were mitigated when Forest Engineer Gözde Çolak Karaköse (my wife) joined the interviews (Fig. 2c and d). Another problem was that older informants had difficulty remembering plant names during the interviews. In such cases, I used an illustrated brochure based on a floristic study carried out close to this study area (Karaköse, 2019). One final obstacle during this study was the Covid-19 pandemic. The Covid-19 pandemic, which manifested itself in Turkey in 2020, required additional precautions during village visits. As mentioned before, since Güce's

Fig. 2. Photographs from the study area. a: hazelnut and tea plantations; b: *Picea orientalis* forest and tree line; c, d: Gözde Çolak Karakose is interviewing local people; e: plant presentation with illustrated brochure; f: forest engineer Mustafa Şen (Tirebolu Forestry Management Directorate); g: Fındıklı village; h: Dayıcık village; i: interview with Mehmet Ali and his father.

forests (12 villages are known as forest-dominated villages) belong to Tirebolu, coordination was made with the Tirebolu Forestry Management Directorate. In addition, Forest Engineer Mustafa Şen, the director of the directorate who is also from the İlit village of Güce, contributed to TK (Fig. 2f). During the study, each informant was informed that the research was for academic purposes, not for commercial purposes, and their consent was obtained. This ensured that informants did not treat the study with suspicion. In addition, this study complied with the International Society of Ethnobiology Code of Ethics (with 2008 additions) (http://www.ethnobiology.net/what-we-do/core-programs/ise-ethics-program/code-of-ethics/).

2.4. Plant materials and identification

Plant materials were collected from Fındıklı, Boncukçukur, Dayıcık, Düzçukur, Fırınlı, Gürağaç, İlit, Sarıyar, Ergenekon, Tekkeköy, Yukarıboynuyoğun, Soğukpınar, Örnekköy, and Tevekli villages and from Giyimli-Kemaliye neighborhoods located in the center of Güce (Fig. 2g and h). The location of the plant specimens collected during the surveys, the characteristics of the habitat, elevations, and collection dates were recorded. Plants were identified using the "Flora of Turkey and the East Aegean Islands" (Davis, 1965–1985; Davis et al., 1988; Güner et al., 2000). Scientific names of plant taxa were checked using the Turkish Plant List (Güner et al., 2012) and updated according to World Flora Online (http://www.worldfloraonline.org/). Threat categories of plant taxa were determined according to Ekim et al. (2000) and the International Union for Conservation of Nature (IUCN) (https://www.iucnredlist.org/). The voucher specimens were kept in Giresun University Herbarium. Upper taxonomic units of plant taxa were arranged according to Christenhusz et al. (2011a) and Pteridosperm Phylogeny Group I (PPG I, 2016) for Pteridophyta, Christenhusz et al. (2011b) for the Gymnospermae sub-division, and Angiosperm Phylogeny Group (APG) IV (Chase et al., 2016) for the Angiospermae sub-division.

2.5. Data analysis

The ethnobotanical data collected in this study was presented as primary data following the recommendations of Heinrich et al. (2009), Weckerle et al. (2018), and Leonti (2022). Data were analysed quantitatively using use report (UR), frequency of citation

(FC), and the informant consensus factor (ICF). MS Excel was used for data entry and summary; quantitative indices were then calculated based on presence/absence data using the ethnobotanyR (Whitney, 2021) package (R package v.0.1.8.). UR and FC are the most commonly used calculations for determining the accuracy of ethnobotanical data. UR gives information about a plant or a plant part used by one informant. FC is the number of informants who mentioned the use of a plant species. FC calculates the notional importance of each plant taxon without considering the ailment categories, while also showing their cultural significance (Tardío and Pardo-de-Santayana, 2008).

To calculate the homogeneity of knowledge gathered from interviewed local informants, the ICF formula developed by Trotter and Logan (1986) was used. The index was calculated by the following formula:

$$ICF = (Nur - Nt) / (Nur - 1)$$

where *Nur* is the number of UR for each ailment category, and *Nt* is the number of plant taxon used. ICF value ranges from 0 to 1, where "1" indicates the highest level of informant agreement. Low values (towards zero) demonstrate disagreement among informants about the usage of the plant species for a specific ailment category (Heinrich et al., 1998). ICF values were created for 16 ailment categories arranged according to the International Classification of Primary Care (ICPC-2) (https://www.who.int/standards/classifications/other-classifications/international-classification-of-primary-care).

2.6. Statistics

The independent samples *t*-test ($\alpha = 0.05$) was computed to compare the differences in the number of medicinal plant species and their associated TK reported by male and female informants. The change in plant knowledge according to age and education level was also analysed with ANOVA and post hoc (Tukey) using SPSS software (v.22).

3. Results and discussion

3.1. Demographic characteristics of the informants

Informants included the headmen of relevant villages, farmers, foresters, shepherds, villagers, housewives, and the other local people. The majority of informants were male (99; 60%), although 40% (66) were female. The age of the informants ranged from 21 to 97, with a mean age of 56.7. More detailed demographic information on the informants is given in Table 1.

Table 1
Demographic characteristics of the informants in the study area.

Gender	Number of informants	%
Male	99	60
Female	66	40
Age		
20–40	30	18.2
41–50	27	16.3
51–60	41	24.8
>60	67	40.6
Education		
Illiterate	57	34.5
Primary	79	47.9
Secondary	21	12.7
University	8	4.9

3.2. Plant taxonomy and associated knowledge

This ethnobotanical study identified 128 vascular medicinal plant taxa belonging to 54 families and 106 genera in Pteridophyta and Magnoliophyta (Pinidae and Magnoliidae subclasses) sections. The medicinal plants used in Güce district are listed in Table 2, which also contains information on plant vernacular names, parts used, preparation and utilization methods, therapeutic effects, URs, and FCs. Some medicinal plants are given in Fig. 3. The Pteridophyta section (Equisetidae and Polypodiidae sub-classes) is represented by four (3.1%) taxa within the Polypodiopsida class. The Gymnospermae (order of Pinales within the Pinidae sub-class) sub-section is represented by two families, four genera, and four woody taxa (3.1%). The Angiospermae (Mesangiospermae) sub-section is represented by 124 (96.9%) species and sub-species. Monocot angiosperms are represented by 12 (9.4%) plant taxa, whereas dicots are represented by 112 (87.5%) taxa.

The number of medicinal plant taxa collected in Güce district was higher than that found in previous studies (except for Kazancı et al., 2020) in other parts of the north-eastern Black Sea region (Fujita et al., 1995; Türkan et al., 2006; Sağıroğlu et al., 2012; Saraç et al., 2013; Akbulut and Özkan, 2014; Polat et al., 2015; Eminağaoğlu et al., 2017; Karaköse et al., 2019; Bak and Çifçi, 2020; Gürdal and Öztürk, 2021). Only Kazancı et al. (2020), in their study of the plants of two neighboring countries, catalogued more plant taxa than this study. High medicinal plant diversity emerges as a result of local people living in touch with nature (Khajuria et al., 2021).

Among the identified taxa, herbs are represented by 73 (57%) taxa, trees by 28 (21.9%) taxa, shrubs by 16 (12.5%) taxa, climbers by ten (7.8%) (including six woody), and one vascular semi-parasite (0.8%) plant. The distribution of plant taxa according to phytogeographical regions is as follows: Circumboreal 46 (35.9%) taxa, Mediterranean 5 (4%), and Irano–Turanian 2 (1.6%). Of the recorded medicinal plants, 28 (22%) taxa were cultivated. The remaining 47 taxa (36.7%) were cosmopolitan and pluri-regional. Circumboreal plant taxa predominate the research area, as the study area is within the Euxine province of the Circumboreal phytogeographical region (Karaköse, 2019). Families with the richest medicinal plant diversity were Rosaceae (16 taxa/12.5%), Asteraceae (12 taxa/9.4%), Lamiaceae (9 taxa/7%), followed by Apiaceae and Ericaceae (each 5 taxa/4%), Amaranthaceae (4 taxa/3.1%), Amaryllidaceae, Brassicaceae, Fagaceae, Malvaceae, Moraceae, Pinaceae, Polygonaceae, and Solanaceae (each 3 taxa/2.3%). An additional 53 medicinal plant taxa belong to the remaining 40 families (Fig. 4). The ranking of families to which medicinal taxa belong in the Güce district is nearly identical to the ranking of families in the Flora of Turkey (Davis, 1965–1985). Previous studies of the eastern Black Sea region reported similar results for the first two families (Fujita et al., 1995; Türkan et al., 2006; Sağıroğlu et al., 2012; Karaköse et al., 2019; Bak and Çifçi, 2020), but ranked differently (Saraç et al., 2013; Akbulut and Özkan, 2014; Polat et al., 2015; Eminağaoğlu et al., 2017; Karcı et al., 2017; Yeşilyurt et al., 2017; Gürbüz et al., 2019; Kazancı et al., 2020; Gürdal and Öztürk, 2021).

Of the 128 medicinal plants used for ethnobotanical purposes, only three plant taxa (*Helleborus orientalis* Lam., *Veratrum album* L., and *Pteridium aquilinum* (L.) Kuhn) are used for ethnoveterinary purposes.

According to the data obtained in the study, medicinal plants are mostly used as mono-plants in Güce. Only three formulations have bi-plant uses. *Hypericum androsaemum* L. leaf and young *A. glutinosa* subsp. *barbata* leaves are combined and used as a hemostatic. A decoction of *Trifolium pratense* L. and *Alchemilla caucasica* Buser flowers is used for the common cold and influenza. A decoction of the *Urtica dioica* L. is applied in combination with flour of *Zea mays* L. to reduce swelling in sprains.

Table 2
The medicinal plant taxa from Güce district, with its related knowledge.

No.	Family	Botanical name and voucher number (new plant records in bold)	Local name	Habitus/ PG/IUCN	Part (s) used[x]	Preparation[y]	Utilization method[z]	UR	FC	Therapeutic effect (Use Report: UR) (new uses are indicated in bold)
1	Actinidiaceae	*Actinidia deliciosa* (A.Chev.) C.F.Liang & A.R.Ferguson MK-1496	Kiwi	C/Cul	Fru	Raw	Raw	4	4	Dyspepsia (UR: 3), **cough** (UR: 1)
2	Adoxaceae	*Sambucus ebulus* L. MK-1555	Yivdin, Yiğidin	H/PR/LC	Flo, Fru, Lea	Cru, Raw, Ex, Hea, Dec	Com, Swa, Raw	19	15	**Anti-fungal** (UR: 1), hemorrhoids (UR: 10), anti-allergy (UR: 3), constipation (UR: 1), intestinal worm (UR: 1), rheumatism (UR: 1), **postpartum pain** (UR: 1), dysmenorrhea (UR: 1)
3	Adoxaceae	*Sambucus nigra* L. MK-1601	Düdüklük	T/PR	Lea, Flo	Inf	Dot	3	1	Diuretic (UR: 1), expectorant (UR: 1), **galactagogue** (UR: 1)
4	Amaranthaceae	*Amaranthus retroflexus* L. MK-1592	Hoşuran	H/PR	Lea, Pet	Coo	Eat	16	13	Dyspepsia (UR: 9), stomach disorder (UR: 4), constipation (UR: 2), stomach ache (UR: 1)
5	Amaranthaceae	*Beta vulgaris* L. MK-1505	Pezük, Pezik	H/Cul	Lea	Fre, Pic	Com, Eat	11	10	Abscess (UR: 5), **burn** (UR: 1), **headache** (UR: 1), stomach disorder (UR: 1), carminative (UR: 1), **anti-inflammatory** (UR: 1), wounds (UR: 1)
6	Amaranthaceae	*Chenopodium album* L. MK-1607	İt üzümü	H/PR	Lea	Cru	Com	1	1	Rheumatism (UR: 1)
7	Amaranthaceae	*Spinacia oleracea* L. MK-1489	Ispanak	H/Cul	Lea	Coo	Eat	2	2	**Cardiovascular** (UR: 1), dyspepsia (UR: 1)
8	Amaryllidaceae	*Allium ampeloprasum* L. MK-1499	Pırasa	H/Cul	Who	Coo	Eat	1	1	**Urinary tract infection** (UR: 1)
9	Amaryllidaceae	*Allium cepa* L. MK-1502	Soğan	H/Cul	Roo	Raw, Dec, Boi, Jui, Hea	In, Dot, Com, Dot	8	8	Anti-inflammatory (UR: 2), **epilepsy** (UR: 1), lose weight (UR: 1), abscess (UR: 1), cholesterol (UR: 1), cough (UR: 1), wounds (UR: 1)
10	Amaryllidaceae	*Allium sativum* L. MK-1513	Sarımsak	H/Cul	Roo	Cru, Coo, Raw, Cru	Dam, Eat, Dbm, Dri	16	14	Abdominal pain (UR: 3), common cold (UR: 3), earache (UR: 2), hypertension (UR: 2), influenza (UR: 2), cough (UR: 1), immune system booster (UR: 1), antiseptic (UR: 1), bone fracture (UR: 1)
11	Apiaceae	*Aegopodium podagraria* L. MK-1567	Baldıran, Mendek, Mide otu	H/CB	Lea, Pet	Coo, Dec, Pic	Eat, Dot	18	15	Intestinal disorder (UR: 1), **cardiovascular** (UR: 1), **analgesic** (UR: 1), **dyspepsia** (UR: 7), **stomach disorder** (UR: 3), **kidney disorder** (UR: 1), **carminative** (UR: 1), **stomach ache** (UR: 1), **gall bladder** (UR: 1), **dyspnea** (UR: 1)
12	Apiaceae	*Heracleum platytaenium* Boiss. MK-1602	Kekire, Ezeltere	H/CB	Lea, Pet, Ste	Pic, Dec	Eat, Dot	7	5	**Dyspepsia** (UR: 4), **stomach disorder** (UR: 2), **stomach ache** (UR: 1)
13	Apiaceae	*Oenanthe pimpinelloides* L. MK-1610	Kazayağı	H/PR	Lea	Coo	Eat	1	1	Carminative (UR: 1)
14	Apiaceae	*Petroselinum crispum* (Mill.) A.W.Hill MK-1488	Maydanoz	H/Cul	Lea, Pet	Inf, Cru, Dec, Raw	Dtt, Dot, Eat	15	12	Liver steatosis (UR: 3), cholesterol (UR: 1), urinary tract infection (UR: 1), oedema (UR: 1), kidney stone (UR: 1), stomach disorder (UR: 1), **gall bladder** (UR: 1), diuretic (UR: 1), kidney disorder (UR: 1), eye diseases (UR: 1), anti-inflammatory (UR: 1), expectorant (UR: 1), dyspepsia (UR: 1)
15	Apiaceae	*Pimpinella anisum* L. MK-1485	Anason	H/Cul	Lea, See	Cru, Dec	Dbm, Dot	2	2	Inappetence (UR: 1), stomach disorder (UR: 1)
16	Araceae	*Arum maculatum* L. MK-1580	Ayı kulağı	H/PR	Roo, Lea, Fru	Dec, Fre, Ms	Dot, Com	8	5	**Herpes zoster** (UR: 2), **mumps** (UR: 2), **sore throat** (UR: 1), hemorrhoids (UR: 1), **headache** (UR: 1), **abdominal pain** (UR: 1)
17	Araliaceae	*Hedera colchica* (K. Koch) K. Koch MK-1552	Orman sarmaşığı	C/CB	Lea	Fre, Raw	Com, Che	3	3	Burn (UR: 3)

Table 2 (*continued*)

No.	Family	Botanical name and voucher number (new plant records in bold)	Local name	Habitus/ PG/IUCN	Part (s) used[x]	Preparation[y]	Utilization method[z]	UR	FC	Therapeutic effect (Use Report: UR) (new uses are indicated in bold)
18	Araliaceae	*Hedera helix* L. MK-1595	Duvar sarmaşığı	C/PR/LC	Lea	Dec	Com, Dot	7	5	**Hypertension** (UR: 1), dysmenorrhea (UR: 1), bronchitis (UR: 1), cough (UR: 1), constipation (UR: 1), hemorrhoids (UR: 1), **toothache** (UR: 1)
19	Asparagaceae	***Ornithogalum sigmoideum*** Freyn & Sint. MK-1565	Sakarca, Akyıldız	H/CB	Who, Flo, Roo, Lea	Cru, Coo	Com, Eat	12	7	**Acne** (UR: 3), **abscess** (UR: 2), **common cold** (UR: 1), **influenza** (UR: 1), **rheumatism** (UR: 1), **constipation** (UR: 1), **dyspepsia** (UR: 1), **carminative** (UR: 1), **stomach disorder** (UR: 1)
20	Asparagaceae	***Ruscus colchicus*** Yeo MK-1600	Siğle	H/CB	Cla, Roo	Dec	Dts	5	3	**Analgesic** (UR: 3), **hemorrhoids** (UR: 2)
21	Aspleniaceae	*Asplenium scolopendrium* L. MK-1599	Danadili	H/PR	Lea	Dec, Cru	Dot, Dos	3	1	Cough (UR: 1), **nausea** (UR: 1), wounds (UR: 1)
22	Asteraceae	*Achillea millefolium* L. MK-1578	Yaraotu, Civanperçemi	H/PR/LC	Lea, Flo	Cru, Dec	Com, Dot	8	7	Wounds (UR: 3), urinary tract infection (UR: 1), hypertension (UR: 1), cardiovascular (UR: 1), common cold (UR: 1), cancer (UR: 1)
23	Asteraceae	*Bellis perennis* L. MK-1531	Mayıs papatyası	H/CB	Flo	Dec, Inf	Dot, Dam	21	12	Common cold (UR: 7), influenza (UR: 5), cough (UR: 2), carminative (UR: 1), cardiovascular (UR: 1), liver steatosis (UR: 1), headache (UR: 1), bronchitis (UR: 1), dyspnea (UR: 1), expectorant (UR: 1)
24	Asteraceae	*Helianthus tuberosus* L. MK-1558	Yer elması	H/Cul	Roo	Raw	Raw	1	1	**Intestinal worm** (UR: 1)
25	Asteraceae	*Helichrysum arenarium* (L.) Moench subsp. *aucheri* (Boiss.) P.H.Davis & Kupicha MK-1549	Dudiye, Altınotu, Cennet çiçeği, Düdüye	H/IT/LC	Flo, Ste	Dec, Inf	Dot, Dbm, Sme	26	20	Common cold (UR: 3), **urinary tract infection** (UR: 3), dyspepsia (UR: 2), **immune system booster** (UR: 2), stomach disorder (UR: 2), **anti-fungal** (UR: 1), **anti-inflammatory** (UR: 1), abdominal pain (UR: 1), **menopause** (UR: 1), **oedema** (UR: 1), **lose weight** (UR: 1), **cough** (UR: 1), **cholesterol** (UR: 1), **wounds** (UR: 1), **dysmenorrhea** (UR: 1), jaundice (UR: 1), kidney stone (UR: 1), **lung disease** (UR: 1), influenza (UR: 1)
26	Asteraceae	*Lactuca sativa* L. MK-1586	Marul	H/Cul	Lea	Raw	Raw	1	1	Dyspepsia (UR: 1)
27	Asteraceae	*Carduus onopordioides* Fisch. ex M.Bieb. subsp. *turcicus* (Kazmi) P.H.Davis MK-1570	Eşek dikeni	H/IT/DD	Flo, Lea	Dec, Inf	Dot	3	2	**Blood purifier** (UR: 1), **dyspnea** (UR: 1), **intestinal disorder** (UR: 1)
28	Asteraceae	*Petasites hybridus* (L.) G.Gaertn., B.Mey. & Scherb. MK-1532	Gabalak, Gebelek	H/CB/LC	Lea, Pet, Ste	Pic, Coo	Eat	20	15	**Dyspepsia** (UR: 10), **stomach disorder** (UR: 6), **stomach ache** (UR: 2), **abdominal pain** (UR: 1), carminative (UR: 1)
29	Asteraceae	***Prenanthes petiolata*** (K.Koch) Sennikov MK-1516	Sütleğan	H/CB	Aer	Cru	Com	1	1	**Wounds** (UR: 1)
30	Asteraceae	*Tanacetum parthenium* (L.) Sch.Bip. MK-1583	Papatya	H/PR/LC	Flo, lea	Dec	Dtt, Dot	3	3	**Common cold** (UR: 2), **bronchitis** (UR: 1)
31	Asteraceae	***Taraxacum laxum*** G.E.Hagl. MK-1537	Karahindiba	H/PR	Aer, Roo, Lea	Cru, Dec	Com, Dot	5	4	**Abscess** (UR: 1), **eczema** (UR: 1), **lose weight** (UR: 1), **rheumatism** (UR: 1), **skin disease** (UR: 1)
32	Asteraceae	***Tripleurospermum elongatum*** (DC.) Bornm. MK-1517	Papatya	H/PR	Flo	Dec, Inf	Dot, Vap, Was	24	20	**Common cold** (UR: 8), **cough** (UR: 4), **bronchitis** (UR: 2), **dyspepsia** (UR: 2), **influenza** (UR: 2), **sinusitis** (UR: 1), **cancer** (UR: 1), **diabetes** (UR: 1), **insomnia** (UR: 1), **anti-dandruff** (UR: 1), **cardiovascular** (UR: 1)
33	Asteraceae	*Tussilago farfara* L. MK-1561	Öksürük otu	H/CB/LC	Lea, Flo	Dec	Dot	6	5	Cough (UR: 2), influenza (UR: 2), common cold (UR: 1), tonic (UR: 1)

(*continued on next page*)

Table 2 (*continued*)

No.	Family	Botanical name and voucher number (new plant records in bold)	Local name	Habitus/ PG/IUCN	Part (s) used[x]	Preparation[y]	Utilization method[z]	UR	FC	Therapeutic effect (Use Report: UR) (new uses are indicated in bold)
34	Athyriaceae	*Athyrium filix-femina* (L.) Roth MK-1538	Eğrelti otu, Cıbarca	H/PR	Roo	Dec	Dot	3	3	**Scabby** (UR: 1), **varicose** (UR: 1), intestinal worm (UR: 1),
35	Betulaceae	*Alnus glutinosa* (L.) Gaertn. subsp. *barbata* (C.A.Mey.) Yalt. MK-1508	Yaykın, Kızılağaç	T/CB/DD	Lea, Bar, Sho	Cru, Dec, Fre, Hea	Com, Dot	19	15	Wounds (UR: 6), **headache** (UR: 5), **burn** (UR: 2), eczema (UR: 2), **hemostatic** (UR: 2), **intestinal worm** (UR: 1), **anti-fungal** (UR: 1)
36	Betulaceae	*Corylus avellana* L. MK-1511	Fındık	S/CB/LC	See	Raw	Raw	14	12	Cholesterol (UR: 6), cardiovascular (UR: 5), tonic (UR: 2), hypertension (UR: 1)
37	Boraginaceae	*Trachystemon orientalis* (L.) D. Don MK-1518	Galdirik, Kaldirik	H/CB	Lea, Ste, Pet, Roo, Flo	Dec, Coo, Fre, Cru	Dot, Eat, Com	19	15	Dyspepsia (UR: 5), stomach disorder (UR: 2), **abscess** (UR: 2), antipyretic (UR: 2), **tonsillitis** (UR: 1), expectorant (UR: 1), **insomnia** (UR: 1), anti-inflammatory (UR: 1), diuretic (UR: 1), constipation (UR: 1), carminative (UR: 1), **dysmenorrhea** (UR: 1)
38	Brassicaceae	*Brassica oleracea* L. MK-1498	Karalahana, Pancar	H/Cul/LC	Lea, Flo	Coo, Fre, Raw, Dec	Eat, Com, Dot	21	16	Dyspepsia (UR: 8), **dysmenorrhea** (UR: 2), stomach ache (UR: 2), cancer (UR: 1), iron deficiency (UR: 1), analgesic (UR: 1), ulcer (UR: 1), tonic (UR: 1), **influenza** (UR: 1), **galactagogue** (UR: 1), **intestinal disorders** (UR: 1), **constipation** (UR: 1)
39	Brassicaceae	*Nasturtium officinale* R. Br. MK-1569	Gerdeme	H/PR/LC	Lea	Dec, Cru	Dot, Com	2	2	**Intestinal worm** (UR: 1), **joint pain** (UR: 1)
40	Brassicaceae	*Raphanus raphanistrum* L. subsp. *sativus* (L.) Domin MK-1590	Turp	H/Cul	Roo	Dec	Eat	1	1	Cough (UR: 1)
41	Buxaceae	*Buxus sempervirens* L. MK-1559	Şimşir	S/CB/LC	Lea, Nec	Dec, Hon	Com, Dot, Eat	6	4	Antipyretic (UR: 2), **burn** (UR: 1), diaphoretic (UR: 1), diuretic (UR: 1), **hypertension** (UR: 1)
42	Convolvulaceae	*Calystegia silvatica* (Kit.) Griseb. MK-1530	Yılan bürüğü	C/PR	Roo, Lea	Cru, Fre	Ex, Com	7	5	**Rheumatism** (UR: 4), **joint pain** (UR: 1), **anti-inflammatory** (UR: 1), **analgesic** (UR: 1)
43	Cornaceae	*Cornus mas* L. MK-1548	Kızılcık	S/CB/LC	Fru, Lea	Raw, Jam, Dec, Cru, Mar	Raw, Eat, Dtt, Com, Dot	9	9	Diarrheal (UR: 1), dyspepsia (UR: 1), anemia (UR: 1), wounds (UR: 1), urinary tract infection (UR: 1), stomach ache (UR: 1), **herpes zoster** (UR: 1), diabetes (UR: 1), **carminative** (UR: 1)
44	Cucurbitaceae	*Citrullus lanatus* (Thunb.) Matsum. & Nakai MK-1495	Karpuz	C/Cul	Fru	Raw	Raw	1	1	Dyspepsia (UR: 1)
45	Cucurbitaceae	*Cucurbita moschata* Duchesne MK-1492	Kabak	C/Cul	Fru	Coo	Eat	2	2	Stomach disorders (UR: 1), dyspepsia (UR: 1)
46	Dennstaedtiaceae	*Pteridium aquilinum* (L.) Kuhn MK-1554	Güllük	H/PR	Who	Bur	Fum	5	5	**Scabby** (UR: 5)
47	Dioscoreaceae	*Dioscorea communis* (L.) Caddick & Wilkin MK-1524	Acımuk, Yılancık	C/PR/LC	Roo, Lea, Fru	Cru, Hea, Fre	Com	6	5	Rheumatism (UR: 3), **osteoarthritis** (UR: 1), **eczema** (UR: 1), **anti-fungal** (UR: 1)
48	Ebenaceae	*Diospyros lotus* L. MK-1606	Trabzon hurması	T/PR/LC	Fru	Raw	Eat	2	1	Stomach ache (UR: 1), dyspepsia (UR: 1)
49	Equisetaceae	*Equisetum telmateia* Ehrh. MK-1577	At kuyruğu, Tilki kuruğu	H/PR	Aer, Lea, Ste	Dec, Inf, Fre	Dot, Com	8	6	**Wounds** (UR: 2), **herniated disc** (UR: 1), stomach disorder (UR: 1), **menstrual irregularity** (UR: 1), oedema (UR: 1), kidney stone (UR: 1), **dyspepsia** (UR: 1)
50	Ericaceae	*Arbutus unedo* L. MK-1611	Ağaç çileği	T/Med/LC	Fru	Raw, Jam	Eat	1	1	Anemia (UR: 1)
51	Ericaceae	*Rhododendron luteum* Sweet MK-1544	Sarı Avu	S/CB/LC	Flo, Nec	Dec, Cru, Hon	Dot, Ex, Eat	3	3	**Carminative** (UR: 1), **intertrigo** (UR: 1), hypertension (UR: 1)
52	Ericaceae	*Rhododendron ponticum* L. MK-1543	Mor Avu	S/CB	Flo, Lea	Dec, Inf, Hea	Dot, Com	4	3	**Abdominal pain** (UR: 1), eczema (UR: 1), **kidney disorder** (UR: 1), rheumatism (UR: 1)

Table 2 (*continued*)

No.	Family	Botanical name and voucher number (new plant records in bold)	Local name	Habitus/ PG/IUCN	Part (s) used[x]	Preparation[y]	Utilization method[z]	UR	FC	Therapeutic effect (Use Report: UR) (new uses are indicated in bold)
53	Ericaceae	*Vaccinium arctostaphylos* L. MK-1557	Çileklik	S/CB/DD	Lea, Fru, Sho	Raw, Dec	Raw, Dtt, Dot	10	7	Diabetes (UR: 4), **cancer** (UR: 2), **neurotic** (UR: 1), intestinal disorder (UR: 1), **eye diseases** (UR: 1), **hair loss** (UR: 1)
54	Ericaceae	*Vaccinium myrtillus* L. MK-1575	Çalı çileği, Dal çileği	S/CB/LC	Fru, Lea, Sho	Raw, Dec, Coo, Inf, Cru, Jam	Raw, Dot, Eat, Was	26	19	Diabetes (UR: 6), anemia (UR: 4), dyspepsia (UR: 3), abdominal pain (UR: 2), diarrheal (UR: 2), immune system booster (UR: 2), stomach disorder (UR: 2), **cholesterol** (UR: 1), hypertension (UR: 1), **anti-inflammatory** (UR: 1), cardiovascular (UR: 1), cancer (UR: 1)
55	Fabaceae	*Trifolium pratense* L. MK-1605	Kırmızı yonca, Üçgül	H/PR	Flo	Dec	Dot	5	4	Influenza (UR: 3), common cold (UR: 1), asthma (UR: 1)
56	Fabaceae	*Trifolium repens* L. MK-1608	Beyaz yonca	H/PR	Flo	Dec	Dot	5	5	Common cold (UR: 2), **influenza** (UR: 1), **cough** (UR: 1), **nausea** (UR: 1)
57	Fagaceae	*Quercus petraea* (Matt.) Liebl. subsp. *iberica* (Steven ex M.Bieb.) Krassiln. MK-1556	Pelit	T/PR	Bar, Fru	Dec	Dot, Com	9	7	Stomach disorders (UR: 3), **wounds** (UR: 2), **cancer** (UR: 1), **eczema** (UR: 1), **liver steatosis** (UR: 1), diarrheal (UR: 1),
58	Fagaceae	*Castanea sativa* Mill. MK-1576	Kestane	T/CB/LC	See, Flo, Lea, Nec	Raw, Oil, Dec, Hon	Raw, Com, Dot, Eat	13	7	**Aphrodisiac** (UR: 2), constipation (UR: 2), hypertension (UR: 2), diarrheal (UR: 1), rheumatism (UR: 1), **analgesic** (UR: 1), **asthma** (UR: 1), tonic (UR: 1), cough (UR: 1), expectorant (UR: 1)
59	Fagaceae	*Fagus orientalis* Lipsky MK-1588	Kayın	T/CB/LC	Lea	Dec	Dot	1	1	Stomach disorder (UR: 1)
60	Grossulariaceae	*Ribes petraeum* Wulfen MK-1560	Zide, Zevir	S/CB	Fru, Nec	Jam, Hon	Eat	5	4	**Diabetes** (UR: 2), antipyretic (UR: 1), **kidney stone** (UR: 1), **dyspepsia** (UR: 1)
61	Hypericaceae	*Hypericum androsaemum* L. MK-1529	Karamaz	H/PR	Lea	Cru	Com	1	1	Hemostatic (UR: 1)
62	Hypericaceae	*Hypericum perforatum* L. MK-1510	Kantaron	H/PR/LC	Lea, Flo, Pet	Cru, Dec, Oil	Com, Dot, Dri	17	11	Sedative (UR: 3), wounds (UR: 3), analgesic (UR: 2), diuretic (UR: 1), **vasodilator** (UR: 1), **dysmenorrhea** (UR: 1), **herpes zoster** (UR: 1), earache (UR: 1), bronchitis (UR: 1), **migraine** (UR: 1)
63	Juglandaceae	*Juglans regia* L. MK-1487	Ceviz	T/PR/LC	See, Lea	Raw, Inf, Dec Fre	Raw, Doe, Mou, Was, Com	14	12	Cholesterol (UR: 6), cardiovascular (UR: 2), rheumatism (UR: 2), liver steatosis (UR: 1), toothache (UR: 1), hemostatic (UR: 1), hypertension (UR: 1)
64	Juncaceae	***Luzula sylvatica*** (Huds.) Gaudin MK-1525	Gındıra	H/CB	Lea	Dec	Dot	2	1	**Diuretic** (UR: 1), **expectorant** (UR: 1)
65	Juncaceae	***Juncus alpigenus*** K.Koch MK-1541	Çöpotu, Çilotu	H/CB	Lat, Roo, Ste	Cru, Dec	Com, Dot	5	5	**Headache** (UR: 2), **wounds** (UR: 2), **intertrigo** (UR: 1)
66	Lamiaceae	*Lamium purpureum* L. MK-1539	Ballıcak	H/CB	Flo, Lea	Cru, Dec	Com, Dot	2	2	**Abscess** (UR: 1), **carminative** (UR: 1)
67	Lamiaceae	*Mentha longifolia* (L.) L. subsp. *typhoides* (Briq.) Harley MK-1571	Yarpuz	H/PR	Lea, Flo	Coo, Spi, Inf	Eat, Doe	3	2	Common cold (UR: 1), influenza (UR: 1), nausea (UR: 1)
68	Lamiaceae	*Mentha pulegium* L. MK-1534	Anuk, Ham nane	H/PR/LC	Lea, Flo	Dec, Inf	Dtt, Dam, Dot	18	13	Common cold (UR: 5), influenza (UR: 5), sore throat (UR: 1), dyspepsia (UR: 1), nausea (UR: 1), diarrheal (UR: 1), tonsillitis (UR: 1), cough (UR: 1), **dyspnea** (UR: 1), asthma (UR: 1)
69	Lamiaceae	*Mentha spicata* L. MK-1491	Bahçe nanesi	H/Cul	Lea	Dec, Inf, Spi	Dtt	11	10	Common cold (UR: 4), influenza (UR: 3), nausea (UR: 2), immune system booster (UR: 1), diarrheal (UR: 1)

(*continued on next page*)

Table 2 (*continued*)

No.	Family	Botanical name and voucher number (new plant records in bold)	Local name	Habitus/ PG/IUCN	Part (s) used[x]	Preparation[y]	Utilization method[z]	UR	FC	Therapeutic effect (Use Report: UR) (new uses are indicated in bold)
70	Lamiaceae	*Salvia forskahlei* L. MK-1604	Ağbandık	H/CB	Lea	Fre	Com	1	1	**Wounds** (UR: 1)
71	Lamiaceae	*Salvia tomentosa* Mill. MK-1506	Adaçayı	H/Med/LC	Flo, Lea, Sho	Dec	Dtt	5	4	Influenza (UR: 2), **neurotic** (UR: 2), common cold (UR: 1)
72	Lamiaceae	*Stachys sylvatica* L. MK-1609	Ham sırgan	H/CB	Lea	Coo	Eat	1	1	**Cancer** (UR: 1)
73	Lamiaceae	*Thymus nummularius* M.Bieb. MK-1520	Kekik	H/CB	Lea, Flo, Sho, Aer	Dec, Spi, Inf	Dtt, Dot	26	19	Influenza (UR: 10), common cold (UR: 8), bronchitis (UR: 2), **immune system booster** (UR: 2), **cholesterol** (UR: 2), **stomach disorder** (UR: 1), **insomnia** (UR: 1)
74	Lamiaceae	*Thymus praecox* Opiz subsp. *grossheimii* (Ronniger) Jalas MK-1533	Yayla kekiği	H/CB	Aer, Flo, Lea	Dec, Inf, Raw, Spi	Dtt, Che, Eat	40	27	**Influenza** (UR: 17), common cold (UR: 10), **cough** (UR: 4), **dyspepsia** (UR: 2), **asthma** (UR: 1), **insomnia** (UR: 1), **toothache** (UR: 1), **nausea** (UR: 1), **bronchitis** (UR: 1), stomach disorder (UR: 1), **tonic** (UR: 1)
75	Lauraceae	*Laurus nobilis* L. MK-1574	Defne	T/Med/LC	Lea	Dec	Dot	1	1	Diuretic (UR: 1)
76	Liliaceae	***Lilium ciliatum*** P.H.Davis MK-1612	Sümbül	H/CB/EN	Flo	Fre	Sme	2	1	**Headache** (UR: 1), **nasal passages** (UR: 1)
77	Malvaceae	*Alcea* rosea L. MK-1551	Hatmi	S/PR	Flo	Inf	Dot	2	2	Cough (UR: 2)
78	Malvaceae	*Malva sylvestris* L. MK-1512	Ebegömeci	H/CB	Lea, Flo	Coo, Dec, Inf, Pom	Eat, Dot, Com	27	20	Cough (UR: 5), stomach disorder (UR: 4), cancer (UR: 2), constipation (UR: 2), dyspepsia (UR: 2), stomach ache (UR: 1), sore throat (UR: 1), oedema (UR: 1), cholesterol (UR: 1), **anemia** (UR: 1), diuretic (UR: 1), abscess (UR: 1), analgesic (UR: 1), bronchitis (UR: 1), expectorant (UR: 1), hair loss (UR: 1), **wounds** (UR: 1)
79	Malvaceae	*Tilia rubra* DC. subsp. *caucasica* (Rupr.) V.Engl. MK-1493	Ihlamur	T/CB	Flo, Bra, Lea, Nec	Dec, Inf, Hon	Dbb, Dtt, Dce, Dot, Eat	92	61	Influenza (UR: 41), common cold (UR: 37), cough (UR: 4), expectorant (UR: 2), sedative (UR: 2), asthma (UR: 1), **analgesic** (UR: 1), bronchitis (UR: 1), **hair loss** (UR: 1), **blood purifier** (UR: 1), **hypertension** (UR: 1)
80	Melanthiaceae	*Veratrum album* L. MK-1582	Akunduz	H/CB	Lea	Dec	Was	1	1	Scabby (UR: 1)
81	Moraceae	*Ficus carica* L. MK-1494	İncir	T/Med	Fru, Lat	Raw, Cru	Raw, Ex	10	9	Wart (UR: 5), dyspepsia (UR: 1), scorpion sting (UR: 1), callus (UR: 1), hemorrhoids (UR: 1), intestinal disorders (UR: 1)
82	Moraceae	*Morus alba* L. MK-1490	Akdut	T/Cul	Lea, Fru	Dec, Raw, Mol	Dtt, Raw, Eat	4	4	Diabetes (UR: 2), anaemia (UR: 1), **iron deficiency** (UR: 1)
83	Moraceae	*Morus nigra* L. MK-1547	Karadut	T/Cul	Fru	Raw, Dec, Jam	Raw, Dot	13	12	Anemia (UR: 7), diabetes (UR: 3), aphthae (UR: 1), blood purifier (UR: 1), stomach ache (UR: 1)
84	Oleaceae	*Olea europaea* L. MK-1603	Zeytin	T/Med	Lea	Dec	Dot	1	1	Diabetes (UR: 1)
85	Oxalidaceae	*Oxalis acetosella* L. MK-1514	Ekşi yonca	H/PR	Aer, Lea	Coo, Dec	Eat, Dot	3	2	Inappetence (UR: 1), abdominal pain (UR: 1), **kidney disorder** (UR: 1)
86	Papaveraceae	*Chelidonium majus* L. MK-1564	Temrü otu	H/CB/LC	Lea	Cru	Ex, Com	4	4	Atopic dermatitis (UR: 2), anti-fungal (UR: 1), abscess (UR: 1)
87	Pinaceae	*Abies nordmanniana* (Steven) Spach MK-1597	Köknar	T/CB/LC	Res	Hea	Com	1	1	Anti-inflammatory (UR: 1)
88	Pinaceae	*Picea orientalis* (L.) Peterm. MK-1536	Ladin	T/CB/LC	Res, Kin, Sho, Con	Hea, Raw, Dec, Jam	Com, Che, Dtt, Dot, Eat	23	12	**Dyspnea** (UR: 4), wounds (UR: 4), anti-inflammatory (UR: 2), **common cold** (UR: 2), diabetes (UR: 2), **influenza** (UR: 2), **stomach disorder** (UR: 2), **cough** (UR: 1), **sore throat** (UR: 1), **backache** (UR: 1), **hypotension** (UR: 1), ulcer (UR: 1)
89	Pinaceae	*Pinus sylvestris* L. var. *hamata* Steven MK-1535	Alaçam, Çam	T/CB/LC	Sho, Bar, Res, Con, Mal	Mol, Hea, Dec, Fre, Jam	Eat, Com, Dtt, Dot	60	35	Bronchitis (UR: 8), dyspnea (UR: 7), wounds (UR: 6), cough (UR: 5), cancer (UR: 4), diabetes (UR: 4), anti-inflammatory (UR: 3), common cold (UR: 3), influenza

Table 2 (*continued*)

No.	Family	Botanical name and voucher number (new plant records in bold)	Local name	Habitus/ PG/IUCN	Part (s) used[x]	Preparation[y]	Utilization method[z]	UR	FC	Therapeutic effect (Use Report: UR) (new uses are indicated in bold)
										(UR: 3), asthma (UR: 2), **bone fracture** (UR: 2), lung disease (UR: 2), sore throat (UR: 2), antiseptic (UR: 1), **backache** (UR: 1), **dysmenorrhea** (UR: 1), expectorant (UR: 1), **neurotic** (UR: 1), stomach disorder (UR: 1), stomach ache (UR: 1), **tetanus** (UR: 1), ulcer (UR: 1)
90	Plantaginaceae	*Plantago lanceolata* L. MK-1504	Sivrisilik, Yaraotu, Parmakotu, Dermisilik	H/PR/LC	Lea	Fre, Dec, Cru	Com, Dot	40	31	Abscess (UR: 17), wounds (UR: 8), anti-inflammatory (UR: 3), acne (UR: 1), aphthae (UR: 1), cancer (UR: 1), rheumatism (UR: 1), analgesic (UR: 1), stomach ache (UR: 1), antiseptic (UR: 1), diabetes (UR: 1), cardiovascular (UR: 1), **kidney stone** (UR: 1), **oedema** (UR: 1), urinary tract infection (UR: 1)
91	Plantaginaceae	*Plantago major* L. MK-1501	Babadeşen, Damarotu, Sinirli ot	H/PR	Lea	Fre, Inf, Raw, Dec	Com, Dot, Eat	23	19	Abscess (UR: 10), wounds (UR: 8), stomach disorder (UR: 1), expectorant (UR: 1), cough (UR: 1), tonic (UR: 1), neurotic (UR: 1)
92	Platanaceae	*Platanus orientalis* L. MK-1568	Çınar	T/PR/DD	Lea	Dec	Dot	15	11	Rheumatism (UR: 6), joint pain (UR: 3), osteoarthritis (UR: 3), kidney disorder (UR: 1), urinary tract infection (UR: 1), **cardiovascular** (UR: 1)
93	Poaceae	*Zea mays* L. MK-1519	Mısır	H/Cul	See, Sty, Hus	Cru, Ms, Dec	Eat, Com, Dam, Dot	20	19	Bone fracture (UR: 7), lose weight (UR: 3), urinary tract infection (UR: 3), intestinal disorder (UR: 2), dyspepsia (UR: 1), kidney disorder (UR: 1), kidney stone (UR: 1), rheumatism (UR: 1), **anti-fungal** (UR: 1)
94	Polygonaceae	*Polygonum carneum* C. Koch MK-1594	Gücükdene	H/CB	Lea, Flo, Roo	Coo, Dec	Eat, Dot, Com	10	9	Carminative (UR: 1), stomach disorder (UR: 1), dyspepsia (UR: 7), hemorrhoids (UR: 1)
95	Polygonaceae	*Rumex acetosella* L. MK-1546	Kuzukulağı, Ekşi pancar	H/PR/LC	Lea	Fre, Coo, Cru, Dec	Com, Eat, Dot	8	7	**Analgesic** (UR: 1), **antipyretic** (UR: 1), **cancer** (UR: 1), **common cold** (UR: 1), Diuretic (UR: 1), **inappetence** (UR: 1), **influenza** (UR: 1), **kidney disorder** (UR: 1)
96	Polygonaceae	*Rumex obtusifolius* L. MK-1585	Labada, Evelik	H/PR	Lea	Fre, Coo, Dec	Com, Eat, Dot	10	7	**Dyspepsia** (UR: 3), **inappetence** (UR: 2), **constipation** (UR: 2), **dysmenorrhea** (UR: 1), **stomach disorder** (UR: 1), **abscess** (UR: 1)
97	Primulaceae	*Cyclamen coum* Mill. subsp. *caucasicum* (K. Koch) O. Schwarz MK-1521	Domuzaşağı	H/PR/LC	Roo	Dec, Fre	In, Com, Mou, Dot, Sme	10	10	**Sinusitis** (UR: 4), **analgesic** (UR: 1), **headache** (UR: 1), **tonsillitis** (UR: 1), **diabetes** (UR: 1), jaundice (UR: 1), **unwanted pregnancy** (UR: 1)
98	Primulaceae	*Primula vulgaris* Huds. MK-1528	Yabani marul	H/CB	Flo	Cru	Com	1	1	Wounds (UR: 1)
99	Ranunculaceae	*Helleborus orientalis* Lam. MK-1542	Çöpleme, Danakıran	H/CB	Lea, Roo	Fre, Dec	Com, Was	3	3	Scabby (UR: 2), wounds (UR: 1)
100	Ranunculaceae	*Ranunculus repens* L. MK-1579	Sarı çiçek	H/PR	Roo	Cru, Dec	Com	3	2	**Wounds** (UR: 2), **hemorrhoids** (UR: 1)
101	Rosaceae	***Alchemilla caucasica*** Buser MK-1550	Dokuztepe, Aslan pençesi	H/CB	Flo, Lea, Who	Dec, Inf, Fre	Dot, Dtt, Com	25	19	**Dysmenorrhea** (UR: 3), **kidney disorder** (UR: 3), **antipyretic** (UR: 2), **menstrual irregularity** (UR: 2), **influenza** (UR: 1), **common cold** (UR: 1), **galactagogue** (UR: 1), **hemorrhoids** (UR: 1), **cardiovascular** (UR: 1), **expectorant** (UR: 1), **neurotic** (UR: 1), **sedative** (UR: 1), **cough** (UR: 1), **stomach disorder** (UR: 1), **insomnia** (UR: 1), **hypertension** (UR: 1), **dyspnea** (UR: 1), **urinary tract infection** (UR: 1), **cancer** (UR: 1)

(*continued on next page*)

Table 2 (*continued*)

No.	Family	Botanical name and voucher number (new plant records in bold)	Local name	Habitus/ PG/IUCN	Part (s) used[x]	Preparation[y]	Utilization method[z]	UR	FC	Therapeutic effect (Use Report: UR) (new uses are indicated in bold)
102	Rosaceae	*Crataegus rhipidophylla* Gand. MK-1593	Alıç	S/PR/LC	Fru	Inf, Jam, Raw	Dtt, Doe, Eat	5	4	**Influenza** (UR: 1), **common cold** (UR: 1), **urinary tract infection** (UR: 1), cardiovascular (UR: 2)
103	Rosaceae	*Cydonia oblonga* Mill. MK-1486	Ayva	T/Cul	Fru, Lea, Flo	Raw, Dec, Inf	Raw, Dot, Dtt	15	13	Influenza (UR: 4), common cold (UR: 3), cough (UR: 2), diarrhea (UR: 2), stomach disorders (UR: 1), dyspnea (UR: 1), dyspepsia (UR: 1), **dysmenorrhea** (UR: 1)
104	Rosaceae	*Fragaria vesca* L. MK-1573	Mayıs çileği, Ham çilek	H/CB/LC	Lea, Fru	Cru, Dec, Raw, Jam	Com, Dot, Eat	6	5	**Anemia** (UR: 3), **wounds** (UR: 1), antipyretic (UR: 1), **sedative** (UR: 1)
105	Rosaceae	*Malus sylvestris* (L.) Mill. MK-1553	Elma	T/Cul/DD	Fru	Inf, Mol, Raw	Dot, Eat	3	3	**Migraine** (UR: 1), anemia (UR: 1), dyspepsia (UR: 1)
106	Rosaceae	*Mespilus germanica* L. MK-1562	Töngel	T/CB/LC	Fru, Lea, See	Mol, Dec, Raw	Eat, Dot	13	11	**Dyspepsia** (UR: 5), diarrhea (UR: 2), diabetes (UR: 1), **stomach ache** (UR: 1), **dysmenorrhea** (UR: 1), intestinal disorder (UR: 1), **dyspnea** (UR: 1), common cold (UR: 1)
107	Rosaceae	*Prunus armeniaca* L. MK-1522	Kayısı	T/Cul	Fru	Raw	Raw	1	1	Intestinal disorder (UR:1)
108	Rosaceae	*Prunus avium* (L.) L. MK-1523	Kiraz	T/Cul/LC	Roo, Ped	Dec	Dot, Dtt, Dam	16	15	**Whooping cough** (UR: 2), **stomach disorder** (UR: 2), **dyspepsia** (UR: 2), kidney stone (UR: 2), oedema (UR: 2), constipation (UR: 1), lose weight (UR: 1), **cough** (UR: 1), **hemorrhoids** (UR: 1), urinary tract infection (UR: 1), kidney sand (UR: 1)
109	Rosaceae	*Prunus domestica* L. MK-1589	Erik	T/PR	Flo, Fru	Dec, Raw	Dtt, Raw	2	2	Constipation (UR: 2)
110	Rosaceae	*Prunus laurocerasus* L. MK-1500	Taflan, Karayemiş	T/PR/LC	Lea, Fru	Dec, Raw, Mol, Boi, Hea, Jam, Pic	Dot, Raw, Eat, Com	52	46	Diabetes (UR: 22), sore throat (UR: 7), tonsillitis (UR: 5), stomach disorder (UR: 4), **anemia** (UR: 3), cough (UR: 2), burn (UR: 2), **rheumatism** (UR: 2), **intestinal disorder** (UR: 1), headache (UR: 1), **joint pain** (UR: 1), **dyspepsia** (UR: 1), bone fracture (UR: 1)
111	Rosaceae	*Pyrus caucasica* Fed. MK-1598	Armut	T/PR	Fru	Vin, Raw	Dot, Eat	2	1	Vasodilator (UR: 1), **dyspepsia** (UR: 1)
112	Rosaceae	*Rosa canina* L. MK-1497	Kuşburnu	S/PR/LC	Fru, See	Dec, Inf, Mar	Dtt, Dot, Eat	22	16	Influenza (UR: 8), common cold (UR: 4), diabetes (UR: 2), stomach ache (UR: 1), tonic (UR: 1), hypertension (UR: 1), diuretic (UR: 1), dyspepsia (UR: 1), **herpes zoster** (UR: 1), cough (UR: 1), dyspnea (UR: 1)
113	Rosaceae	*Rosa gallica* L. MK-1591	Gül	S/PR	Flo	Inf	Dtt	2	1	**Tonsillitis** (UR: 1), **sore throat** (UR: 1)
114	Rosaceae	*Rubus canescens* DC. MK-1526	Ağa böğürtlen	S/CB	Roo, Fru, Lea	Cru, Raw, Dec	Com, Che, Dot	6	5	**Aphthae** (UR: 1), **burn** (UR: 1), **cancer** (UR: 1), diarrhea (UR: 1), **gingival bleeding** (UR: 1), hypertension (UR: 1)
115	Rosaceae	*Rubus hirtus* Waldst. & Kit. MK-1581	Kara böğürtlen	S/CB	Roo, Sho, Fru	Ash, Cru, Raw	Com, Eat	10	8	**Wounds** (UR: 2), **burn** (UR: 1), **hemostatic** (UR: 1), **tonic** (UR: 1), hemorrhoids (UR: 1), **anemia** (UR: 3), **dyspnea** (UR: 1)
116	Rosaceae	*Rubus idaeus* L. MK-1572	Ahududu	S/PR/LC	Fru, Flo	Raw, Dec	Eat, Dot	5	4	Diarrhea (UR: 1), **tonsillitis** (UR: 1), tonic (UR: 1), **dyspnea** (UR: 1), anemia (UR: 1)
117	Rutaceae	*Citrus limon* (L.) Osbeck MK-1515	Limon	T/Cul	Fru	Cru, Dec, Jui	Dam, Dot	6	6	Immune system booster (UR: 2), common cold (UR: 1), influenza (UR: 1), lose weight (UR: 1), hypertension (UR: 1)
118	Santalaceae	*Viscum album* L. subsp. *austriacum* (Wiesb.) Vollm. MK-1503	Çeküm, Ökseotu, Gökçeotu	VP/PR	Fru, Lea, See	Dec, Inf, Cru, Raw	Dot, Com, Raw	25	21	Abdominal pain (UR: 4), diabetes (UR: 4), hypertension (UR: 4), cancer (UR: 3), **stomach ache** (UR: 2), **wounds** (UR: 2), **cough** (UR: 1), cholesterol (UR: 1), diarrheal (UR: 1), **dyspepsia** (UR: 1), cardiovascular (UR: 1), prostatitis (UR: 1)

Table 2 (*continued*)

No.	Family	Botanical name and voucher number (new plant records in bold)	Local name	Habitus/ PG/IUCN	Part (s) used[x]	Preparation[y]	Utilization method[z]	UR	FC	Therapeutic effect (Use Report: UR) (new uses are indicated in bold)
119	Smilacaceae	*Smilax excelsa* L. MK-1584	Tikenucu, Merolcan, Dikenucu	C/CB	Roo, Lea, Ste	Inf, Coo, Dec, Pic, Fre	Dot, Eat, Dtt, Com	16	11	**Carminative** (UR: 3), dyspepsia (UR: 3), stomach disorder (UR: 2), **kidney stone** (UR: 2), **insomnia** (UR: 1), **common cold** (UR: 1), **antipyretic** (UR: 1), **analgesic** (UR: 1), acne (UR: 1), diabetes (UR: 1),
120	Solanaecae	*Hyoscyamus niger* L. MK-1545	Banotu	H/PR	See	Raw	Che	1	1	Toothache (UR: 1)
121	Solanaecae	*Nicotiana tabacum* L. MK-1509	Tütün	H/Cul	Lea	Fre, Cru	Com	7	7	**Wounds** (UR: 4), hemostatic (UR: 3)
122	Solanaecae	*Solanum tuberosum* L. MK-1566	Patates	H/Cul	Roo	Fre	Ex, Com	8	7	Headache (UR: 6), burn (UR: 1), wounds (UR: 1)
123	Taxaceae	*Taxus baccata* L. MK-1527	Ardıç, Porsuk	T/PR/LC	Lea, Flo	Dec	Ex, Doe	3	3	**Scabby** (UR: 2), **eczema** (UR: 1)
124	Theaceae	*Camellia sinensis* (L.) Kuntze MK-1540	Çay	S/Cul	Lea	Inf	Dam	2	2	Dyspepsia (UR: 2)
125	Urticaceae	*Parietaria judaica* L. MK-1596	Çam anuğu	H/PR	Lea	Inf, Cru	Dot, Com	2	2	Sore throat (UR: 1), **constipation** (UR: 1)
126	Urticaceae	*Urtica dioica* L. MK-1507	Sırgan	H/CB/LC	Lea, Ste, Flo, See, Roo	Dec, Coo, Cru, Inf	Dam, Eat, Doe, Dbm, Com, Jui, Was	67	53	Cancer (UR: 19), abdominal pain (UR: 13), oedema (UR: 4), stomach disorder (UR: 3), wounds (UR: 3), analgesic (UR: 2), diabetes (UR: 2), hair loss (UR: 2), immune system booster (UR: 2), rheumatism (UR: 2), dyspepsia (UR: 1), **tuberculous** (UR: 1), anti-inflammatory (UR: 1), common cold (UR: 1), stomach ache (UR: 1), **gout** (UR: 1), diuretic (UR: 1), constipation (UR: 1), **menstrual irregularity** (UR: 1), kidney disorder (UR: 1), **dysmenorrhea** (UR: 1), intestinal disorder (UR: 1), **intestinal worm** (UR: 1), hypotension (UR: 1), prostatitis (UR: 1)
127	Vitaceae	*Vitis labrusca* L. MK-1563	Kokulu üzüm	C/Cul	Fru	Mol	Eat	7	7	**Anemia** (UR: 6), **iron deficiency** (UR: 1)
128	Vitaceae	*Vitis vinifera* L. MK-1587	Asma, Tevek	C/Cul	Fru, Lea	Raw, Fre	Che, Com	2	2	**Toothache** (UR: 1), **headache** (UR: 1)

Habitus: H: Herb; S: Shrub; T: Tree; C: Climber; PG: Phytogeographical region: Cul: Cultivation; CB: Circumboreal; Med: Mediterranean; IT: Irano-Turanian; PR: Pluri-Region; IUCN: International Union for Conservation of Nature; EN: Endangered; LC: Least Concern; DD: Data Deficient.

[x] Plant part (s) used: Aer: Aerial parts; Bar: Bark; Bra: Bracts; Cla: Cladode; Con: Cones; Flo: Flowers; Fru: Fruits; Hus: Husk; Kin: Kindling; Lat: Latex; Lea: Leaves; Mal: Male flowers; Nec: Nectary; Ped: Pedicel; Pet: Petiole; Res: Resin; Roo: Root; See: Seed; Sho: Shoot; Ste: Stem; Sty: Styles; Who: Whole plant.

[y] Preparations: Alc: Alcohol; Boi: Boiling; Bur: Burning; Coo: Cooking; Cru: Crushing; Dec: Decoction; Dir: Direct application; Hea: Heating; Hon: Honey; Inf: Infusion; Jui: Juice; Mar: Marmalade; Mol: Molasses; Ms: Mash; Oil: Oiled; Pic: Pickle; Pom: Pomade; Pow: Powder; Roa: Roasting; Spi: Spice; Vap: Vapor; Vin: Vinegar.

[z] Utilization method: Che: Chewing; Com: Compress; Dam: Drink after meal; Dbm: Drink before meal; Doe: Drink on an empty stomach; Dos: Drink 1 spoon, Dot: Drink one time in a one day; Dri: Driping; Dtb: Drink before bed; Dts: Drink 2 spoon; Dtt: Drink two times in a one day; Eat: Eaten as meal; Ex: Externally; Fum: Fumigant; Inh: Inhalation; Mou: Mouthwash; Sme: Smelling; Swa: Swallowing; Raw: Eaten raw; Was: Washing.

Local people collect some medicinal plants seasonally and sell them at restaurants, local bazaars, and markets to generate income. In Güce district, wild plants that generate income include *Castanea sativa*, *Fragaria vesca* L., *Helichrysum arenarium* (L.) Moench subsp. *aucheri* (Boiss.) P.H. Davis & Kupicha, *Mespilus germanica* L., *Ornithogalum sigmoideum* Freyn & Sint., *Prunus avium*, *P. laurocerasus* L., *Pyrus caucasica* Fed., *Rubus canescens* DC., *R. hirtus* Waldst. & Kit., *Thymus nummularius* M. Bieb., *T. praecox* Opiz subsp. *grossheimii* (Ronniger) Jalas, *Tilia rubra* subsp. *caucasica*, *Trachystemon orientalis* (L.) D. Don, *Urtica dioica*, and *Vaccinium myrtillus* L. In addition to these, some plants such as *Brassica oleracea* L., *Corylus avellana* L., *Zea mays*, *Vitis vinifera* L., and *V. labrusca* L. are cultivated both for personal use and as supplemental income. Turkey ranks second globally in honey production (Karaköse et al., 2018a). Unsurprisingly, honey production in Güce district is important. Both mono-floral and poly-floral honey types are produced. Mono-floral honeys, especially *Castanea sativa* and *Rhododendron* spp., are particularly popular. Furthermore, in Boncukçukur village of Güce, honey derived from *Buxus sempervirens* L., *Tilia rubra* subsp. *caucasica*, and *Hedera helix* L. is produced. Chestnut honey is used as an expectorant, tonic, and aphrodisiac in the region. Other honey types (honey obtained from *Rhododendron* spp. is known as "*mad honey*"), on the other hand, are considered dangerous due to their active ingredients, but are consumed in small amounts to reduce blood pressure.

In ethnobotanical studies, information about gynecological diseases is sometimes difficult to obtain due to the hesitation or shyness of female informants, who consider talking about the diseases taboo (as women's diseases). In this study, extensive data on gynecological diseases were obtained due to the friendly atmosphere between the study team and the informants. A total of 21 plants are used to treat five gynecological disorders. Of these, the highest UR value was for dysmenorrhea (UR: 15), followed by menstrual irregularity (UR: 4), menopause, unwanted pregnancy, and postpartum pain (UR: 1 for each).

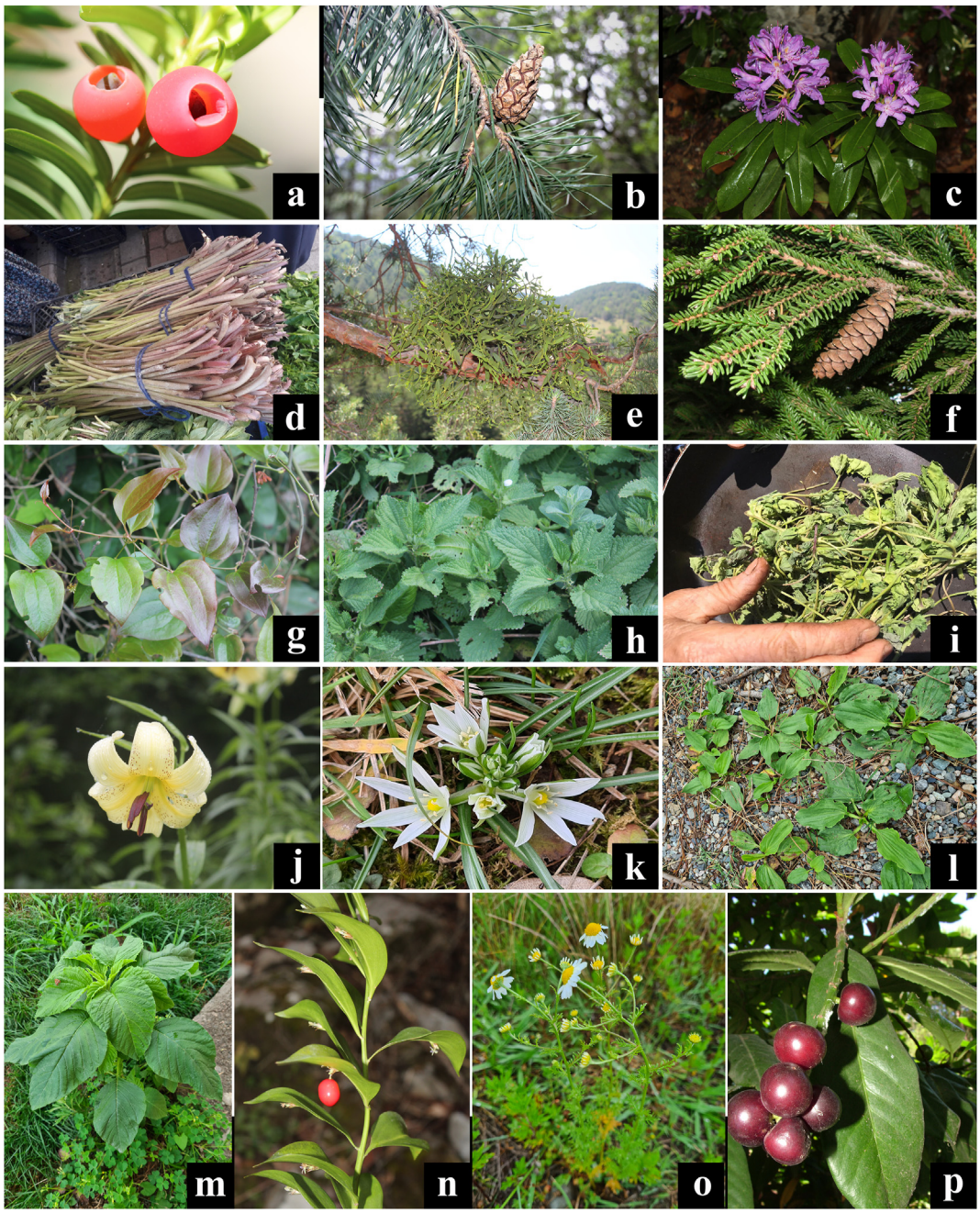


Fig. 3. Representative medicinal plant species in this study. a: *Taxus baccata* L.; b: *Pinus sylvestris* var. *hamata* Steven; c: *Rhododendron ponticum* L.; d: *Trachystemon orientalis* (L.) D. Don; e: *Viscum album* L. subsp. *austriacum* (Wiesb.) Vollm.; f: *Picea orientalis* (L.) Peterm; g: *Smilax excelsa* L.; h: *Urtica dioica* L.; i: *Malva sylvestris* L.; j: *Lilium ciliatum* P.H. Davis; k: *Ornithogalum sigmoideum* Freyn & Sint.; l: *Plantago major* L.; m: *Amaranthus retroflexus* L.; n: *Ruscus colchicus* Yeo; o: *Tripleurospermum elongatum* (DC.) Bornm.; p: *Prunus laurocerasus* L.

During the research, some interesting usages by the local people were also identified. For instance, it was learned that the meal made with the fresh leaves of *Aegopodium podagraria* L. causes swelling in the hands of kidney patients; thus, local people guess that a person with swelling in their hands has kidney disease. The leaf of *Sambucus ebulus* L. is applied directly to affected areas to relieve irritation or allergy caused by *Urtica dioica*. *Cyclamen coum* Mill. subsp. *caucasicum* (K. Koch) O. Schwarz is applied directly to the genital area in the first month of pregnancy to abort an unwanted pregnancy. However, informants noted that this practice is dangerous. The green foam that is left after boiling *Urtica dioica* is used to treat cancer.

3.3. Preparation–utilization method and plant parts used

Data obtained from Güce district indicate that local people prepare medicinal plants using simple methods. Application of medicinal remedies can be grouped into five categories: oral (79.1%), topical (19.0%), wash (0.9%), inhale (0.8%), and eye-ear drop (0.2%). Medicinal remedies are prepared and utilized by a variety of methods (see Table 2). For example, medicinal remedies are prepared by decoction, cooking, pickling, as a honey, or directly applied. Utilization methods include chewing, drinking after a meal, eating, inhaling, and washing. The most frequently preferred methods for preparing folk medicines were decoction (40.2%),

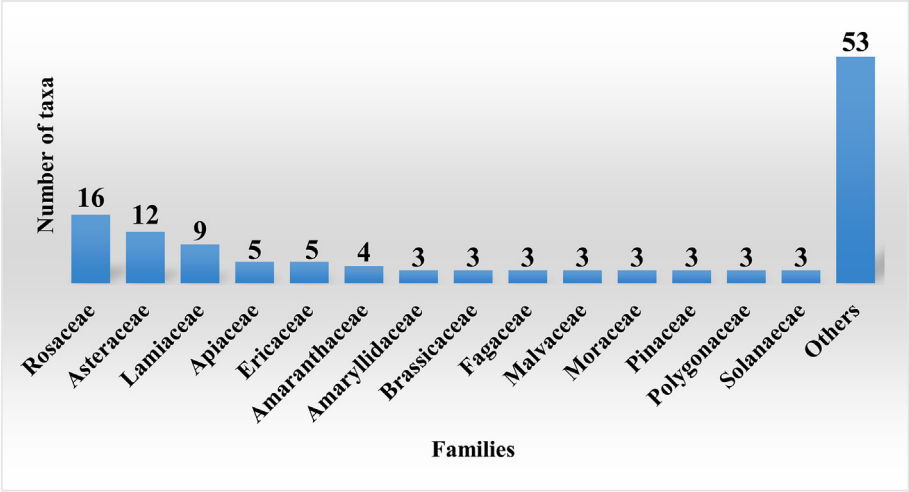


Fig. 4. Families of the most common medicinal plant species.

followed by cooking (10.4%), raw (10.1%), direct application (9.8%), and infusion (8.4%) (Fig. 5). Similar results have been observed near the study area (Polat et al., 2015; Yeşilyurt et al., 2017), at the national scale (Paksoy et al., 2016; Gunes, 2017; Güneş et al., 2017; Karcı et al., 2017), and in other countries (Gu et al., 2020; Hosseini et al., 2021).

Local people use different plant parts for medicinal purposes. A total of 1246 URs were reported on plant parts. Folk medicines in Güce district are mainly prepared from leaves (502 URs/40.3%), followed by flowers (230 URs/18.5%), fruit (178 URs/14.3%), root (73 URs/5.9%), and seed (56 URs/4.5%) (Fig. 6). Several ethnobotanical studies have indicated that the leaf is the most frequent plant part used in folk medicine (Güler et al., 2015; Polat et al., 2015; Xiong et al., 2020; Mehrnia et al., 2021; Hosseini et al., 2021; Mir et al., 2021; Khajuria et al., 2021). The high usage frequency of leaves can be explained by the fact that they are easily collected, stored, densely presented, and supplied with various secondary metabolites. Usually, medicinal plants are seasonally used. However, some additional measures are taken to ensure that they are ready at hand in extraordinary situations. Local people have the opportunity to find the majority of medicinal plants in nature during the summer season. However, to benefit from these plants in other seasons, they dry some important medicinal plants. These herbs include *Thymus nummularius*, *T. praecox* subsp. *grossheimii*, *Tilia rubra* subsp. *caucasica*, *Alchemilla caucasica*, *Mentha spicata* L., *M. pulegium* L., *Urtica dioica*, *Malva sylvestris* L., *Polygonum carneum* C. Koch, *Prunus avium*, *Bellis perennis* L., *Tanacetum parthenium* (L.) Sch. Bip., *Tripleurospermum elongatum* (DC.) Bornm., *Helichrysum arenarium* subsp. *aucheri*, *Platanus orientalis* L., *Viscum album* L. subsp. *austriacum* (Wiesb.) Vollm., *Pteridium aquilinum*, and *Cydonia oblonga* Mill. The parts of the dried plants that do not decay, such as leaves, flowers, and seeds, are preferred. During the winter months, fruits and stems are often converted into products (e.g., vinegar, molasses, jam, pickles, and marmalade) for medicinal consumption.

3.4. Frequency of citation and use reports

Overall, male participants (111 plants) reported a greater number of medicinal plants than did female participants (105 plants), suggesting that males have more knowledge about the use of medicinal plants. This can be explained by the fact that the number of male participants was higher than that of females. However, analysis of FC indicates that individual female informants reported

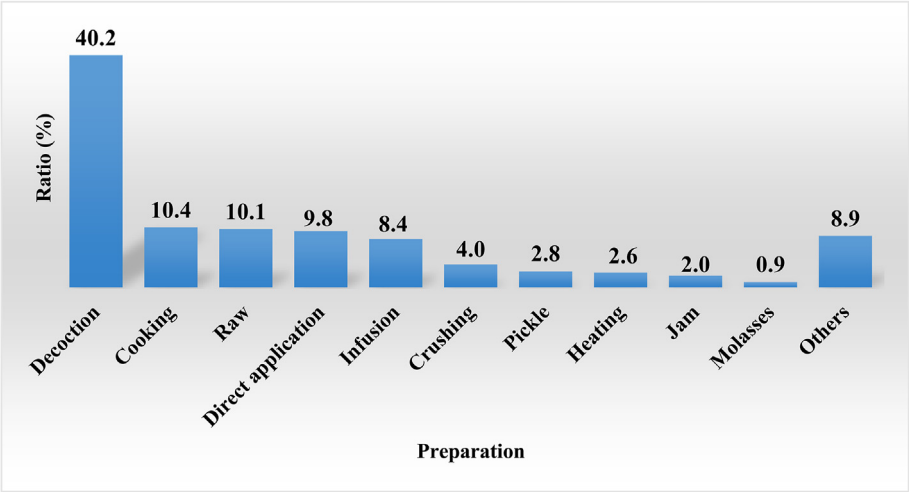


Fig. 5. Preparation methods of herbal recipes.

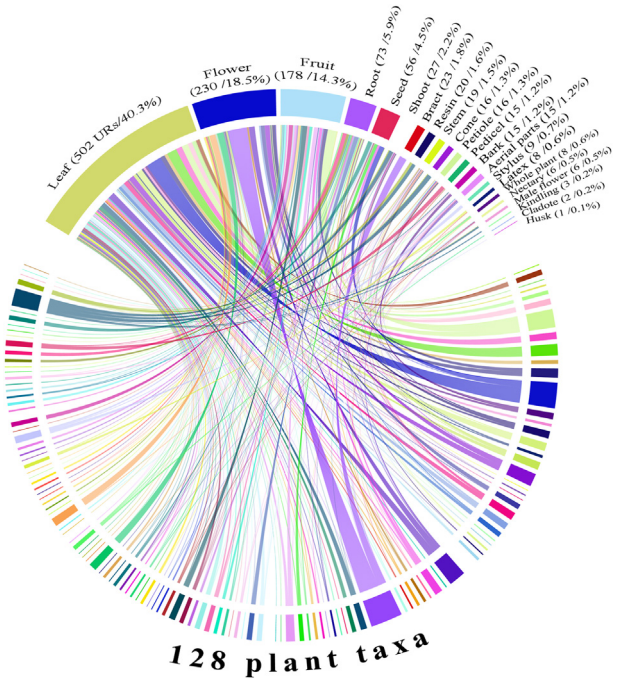


Fig. 6. Plant part usage rates.

significantly greater numbers of medicinal plants than did male informants ($df = 163$, $p = 0.037 < 0.05$). Specifically, female informants cited an average of 7.48 plant names, whereas male informants reported an average of 5.65 (the mean use-value of the entire sample is 6.38). These findings indicate that females possess greater knowledge about medicinal plant uses. Similarly, TK according to UR is similar to the number of plant species given by informants. In the current study, a total of 1352 URs belonging to 128 plant taxa were mentioned by informants. Of the 1352 URs, 52.8% (714 URs) were obtained from male and 47.2% (638 URs) from female informants. Statistical analysis indicated that when TK was considered as the number of plants cited, female informants possessed more knowledge ($df = 163$, $p = 0.043 < 0.05$). These results are consistent with previous studies (de Albuquerque et al., 2011; Gaoue et al., 2017). The FCs show the local importance of each plant taxon based on the informants who mentioned the usages of these plants (Hussain et al., 2019). The 165 informants from Güce district reported a total of 1052 FCs (Table 2). The most cited plant taxon was *Tilia rubra* subsp. *caucasica* (61). *Tilia rubra* subsp. *caucasica* is commonly used in the study area for influenza (UR: 41), common cold (UR: 37), cough (UR: 4), for expectorant purposes (UR: 2), as a sedative (UR: 2), for asthma (UR: 1), for analgesic purposes (UR: 1), for bronchitis (UR: 1), for hair loss (UR: 1), as a blood purifier (UR: 1), and for hypertension (UR: 1). The other most mentioned medicinal plant taxa in Güce district are *Urtica dioica* (53), *Prunus laurocerasus* (46), *Pinus sylvestris* var. *hamata* (35), *Plantago lanceolata* L. (31), and *Thymus praecox* subsp. *grossheimii* (27). The reason these plants have high FC values is that they are easily found in the study area and, therefore, easily collected. *Tilia rubra* subsp. *caucasica* had the highest number of UR (92 URs), followed by *Urtica dioica* and *Pinus sylvestris* var. *hamata* with 67 and 60 URs, respectively. This is the first study to calculate FC and UR values in Güce district. Therefore, these findings were compared to one ethnobotanical study conducted within the Colchic sector of the Circumboreal phytogeographical region in Turkey. UR values in the Güce district were similar to those calculated for areas close to the borders of two neighboring countries (Turkey and Georgia), where *Plantago major* L. ranked first (89 URs), *Urtica dioica* ranked second (54 URs), and *Picea orientalis* ranked third (43 URs) (Kazancı et al., 2020). For the regions bordering Georgia with Turkey, *Plantago major* (with 65 URs) is again the most frequently cited, followed by *Urtica dioica* (with 62 URs) and *Anthemis* sp. (with 43 URs).

3.5. Informant consensus factor

When ICPC-2 classification was used to investigate consensus among informants on medicinal plant species, sixteen ailment categories were identified (Table 3). A total of 101 therapeutic effects were reported from Güce district. The main ailments, based on URs, were influenza (UR: 118), common cold (UR: 114), dyspepsia (UR: 95), wounds (UR: 69), diabetes (UR: 60), stomach disorder (UR: 57), cough (UR: 47), abscess (UR: 43), cancer (UR: 40), anemia (UR: 32), abdominal pain (UR: 27), rheumatism (UR: 27), dyspnea (UR: 22), cholesterol (UR: 20), headache (UR: 20), hypertension (UR: 20), bronchitis (UR: 19), cardiovascular diseases (UR: 19), hemorrhoids (UR: 19), and constipation (UR: 18). ICF of ailment categories in this study ranged from 0 to 0.86 (Table 3).

The highest ICF (0.86) value was calculated for respiratory system disorders (e.g., influenza, common cold, cough, dyspnea, bronchitis, sore throat, expectorant, tonsillitis, asthma, sinusitis, lung disease, whooping cough, and nasal passages). This result was expected for two reasons. Firstly, local people in the villages mostly make their living from animal husbandry, forestry, and agricultural activities. They migrate to the highlands with their animals to spend the summer months. During winter they return to their villages. Thus, in almost every season, they live in cold weather conditions and frequently encounter respiratory diseases such as influenza, common cold, bronchitis, and cough. A second reason may be related to air pollution (Palabaş Uzun and Koca, 2020). A report on air pollution in Turkey states that the air pollution level is 31% higher than that in Europe (UCTEA, 2019). This raises the risk of contracting respiratory diseases. This study found that 55 plant taxa (with 375 URs) were used to treat different respiratory system disorders. The plant taxa most commonly reported for use in the treatment of respiratory system disorders are *Tilia rubra* subsp. *caucasica* (UR: 86), *Thymus praecox* subsp. *grossheimii* (UR: 33), *Pinus sylvestris* var. *hamata* (UR: 33), *Thymus nummularius* (UR: 20), *Tripleurospermum elongatum* (UR: 17), *Bellis perennis* (UR: 17), *Mentha pulegium* (UR: 15), *Prunus laurocerasus* (UR: 14), *Rosa canina* L. (UR: 14), *Picea orientalis* (UR: 10), and *Cydonia oblonga* (UR: 10). The second-highest ICF value (0.73) was calculated for digestive system disorders (e.g., dyspepsia, stomach disorder, abdominal pain, constipation, stomachache, carminative, diarrheal, intestinal disorders, nausea, intestinal worm, liver steatosis, toothache, aphthae, ulcer, mumps, hepatitis, gall bladder, and gingival bleeding). This finding is likely the result of local eating habits, which are typified by spicy, milky, and carbohydrate-heavy food (Yeşilada et al., 1993; Dalar et al., 2018). The third highest ICF value (0.71) was calculated for skin (dermatological) disorders. This study identified 58 plant taxa (200 URs) used to treat dermatological disorders. Plant taxa cited as cures for skin diseases (e.g., wounds, abscesses, inflammation) included *Plantago lanceolata* (UR: 30), *P. major* (UR: 18), *Alnus glutinosa* subsp. *barbata* (UR: 11), and *Pinus sylvestris* var. *hamata* (UR: 10). Skin diseases and/or injuries are common in Güce district, where daily life is difficult and local people earn their livelihood under stressful working conditions (e.g., livestock, forestry, agriculture). These three groups are followed by muscle-skeletal disorders (ICF: 0.65), blood, blood-forming organs and immune mechanism (ICF: 0.62), endocrine/metabolic and nutritional (ICF: 0.62), general and unspecified (ICF: 0.59), and cardiovascular diseases (ICF: 0.54).

Table 3
ICF values for ICPC-2 ailment categories.

ICPC–2 Categories	Ailments	Nur	Nt	ICF
A-General and Unspecified	Cancer (UR: 40), analgesic (UR: 17), antipyretic (UR: 11), oedema (UR: 11), tonic (UR: 10), hemostatic (UR: 8), aphrodisiac (UR: 2), tuberculous (UR: 1)	100	42	0.59
B-Blood, Blood Forming Organs and Immune Mechanism	Anemia (UR: 32), iron deficiency (UR: 3), blood purifier (UR: 3)	38	15	0.62
D-Digestive	Dyspepsia (UR: 95), stomach disorder (UR: 57), abdominal pain (UR: 27), constipation (UR: 18), stomachache (UR: 17), carminative (UR: 14), diarrheal (UR: 14), intestinal disorder (UR: 13), nausea (UR: 7), intestinal worm (UR: 6), liver steatosis (UR: 6), toothache (UR: 5), aphthae (UR: 4), ulcer (UR: 3), mumps (UR: 2), hepatitis (UR: 2), gall bladder (UR: 2), gingival bleeding (UR: 1)	293	80	0.73
F-Eye	Eye diseases (UR: 2)	2	2	0
H-Ear	Earache (UR: 3)	3	2	0.5
K-Cardiovascular	Hypertension (UR: 20), cholesterol (UR: 20), hemorrhoids (UR: 19), cardiovascular (UR: 19), hypotension (UR: 2), vasodilator (UR: 2), varicose (UR: 1)	83	39	0.54
L-Musculoskeletal	Rheumatism (UR: 27), bone fracture (UR: 12), joint pain (UR: 6), osteoarthritis (UR: 4), backache (UR: 2), herniated disc (UR: 1)	52	19	0.65
N-Neurological	Headache (UR: 20), neurosis (UR: 6), migraine (UR: 2), epilepsy (UR: 1), tetanus (UR: 1)	30	18	0.41
P-Psychological	Sedative (UR: 7), insomnia (UR: 6)	13	9	0.33
R-Respiratory	Influenza (UR: 118), common cold (UR: 114), cough (UR: 47), dyspnea (UR: 22), bronchitis (UR: 19), sore throat (UR: 15), expectorant (UR: 12), tonsillitis (UR: 10), asthma (UR: 7), sinusitis (UR: 5), lung disease (UR: 3), whooping cough (UR: 2), nasal passages (UR: 1)	375	55	0.86
S-Skin	Wounds (UR: 69), abscess (UR: 43), anti-inflammatory (UR: 18), burn (UR: 13), scabby (UR: 11), eczema (UR: 7), anti-fungal (UR: 6), hair loss (UR: 5), acne (UR: 5), wart (UR: 5), herpes zoster (UR: 4), anti-allergy (UR: 3), antiseptic (UR: 3), atopic dermatitis (UR: 2), intertrigo (UR: 2), skin disease (UR: 1), callus (UR: 1), scorpion sting (UR: 1), anti-dandruff (UR:1)	200	58	0.71
T-Endocrine/Metabolic and Nutritional	Diabetes (UR: 60), immunity (UR: 12), lose weight (UR: 8), inappetence (UR: 5), galactagogue (UR: 3), diaphoretic (UR: 1), gout (UR: 1)	90	35	0.62
U-Urological	Urinary tract infection (UR: 16), diuretic (UR: 11), kidney disorder (UR: 11), kidney stone (UR: 10), kidney sand (UR: 1)	49	27	0.46
W-Pregnancy, Childbearing, Family Planning	Unwanted pregnancy (UR: 1), postpartum pain (UR: 1)	2	2	0
X-Female Genital	Dysmenorrhea (UR: 15), menstrual irregularity (UR: 4), menopause (UR: 1)	20	13	0.37
Y-Male Genital	Prostate (UR: 2)	2	2	0

Consensus could not be achieved in some ailment categories (eye, pregnancy-childbearing-family planning, and male genital) due to the low number of informants; thus, ICF values were calculated as 0 (zero).

This is the first study to calculate ICF values in Güce. Previous studies have indicated that ICF values vary across the Black Sea region. For example, an ethnobotanical study conducted in a district neighboring Güce found the highest ICF for dermatological disorders (0.62), followed by gastrointestinal disorders (0.56) and respiratory tract problems (0.49) (Polat et al., 2015). In another neighboring district, the highest ICF value was calculated for “cold and flu”, followed by stomach disorders and gynecological diseases (Karaköse et al., 2019). In the Artvin province, located in Turkey's north-eastern Black Sea region, ICF values were not in accordance. Eminağaoğlu et al. (2017) found the highest ICF value for oncological disorders (0.55), followed by gastrointestinal (0.47) and respiratory (0.43) diseases. Bak and Çifçi (2020), however, reported that the highest ICF in the same region was “cold and flu” (0.87), followed by skin diseases (0.72) and urinary-intestinal disorders (ICF: 0.50 for each). In the north-western Black Sea region, the highest ICF value was calculated for skin diseases (0.75), followed by muscle-skeletal (0.74) and gastrointestinal disorders (0.66) (Gürbüz et al., 2019). In the central Black Sea region, the highest ICF value was determined for muscle-skeletal disorders (0.694), followed by respiratory (0.691) and dermatological system disorders (0.56) (Karcı et al., 2017). Another ethnobotanical study in the Black Sea region found that the highest ICF values were for the gynecological disorders and central nervous system disorders (1.00) (Yeşilyurt et al., 2017). In Trabzon's Sürmene district, which neighbors Giresun province, the highest ICF value was calculated for anemia (0.89), followed by gynecological disorders (0.78) and insomnia (0.75) (Gürdal and Öztürk, 2021). These findings demonstrate that respiratory, digestive, and dermatological disorders are widespread in the study area and throughout the Black Sea region. These findings are also an indication that the traditional use of medicinal plants in the Black Sea region, which includes the town of Güce, continues. High ICF values can also be used in further studies to search for secondary metabolites of these medicinal plants.

3.6. Conservation status of medicinal plants

Plants are an important element of any ecosystem, and their protection is essential for the continuity of life. According to IUCN (Allen et al., 2014), almost half of the medicinal plants used on earth are under threat, and necessary precautions are needed for the survival of threatened plant species. For this purpose, plants in the priority conservation class in Turkey are under protection by national laws and some international regulations such as The Convention on Biological Diversity, Bern Convention (The Convention on the Conservation of European Wildlife and Natural Habitats), CITES (The Convention on International Trade in Endangered Species of Wild Fauna and Flora), etc. This study identified three endemic plants used for medicinal purposes, namely *Lilium ciliatum* P.H. Davis, *Helichrysum arenarium* subsp. *aucheri*, and *Carduus onopordioides* Fisch. ex M. Bieb. subsp. *turcicus* (Kazmi) P.H. Davis (Table 2). However, some medicinal taxa have been included in the “under-threat” categories by IUCN (https://www.iucnredlist.org/) due to the negative effects on population sizes resulting from the overuse by human beings on a regional or global scale. This study identified 43 medical taxa belonging to this category. Four medicinal taxa are categorized as Data Deficient (DD) and 39 taxa as Least Concern (LC). In addition to these taxa, this study identified two medicinal taxa (*Cyclamen coum* subsp. *caucasicum* and *Vaccinium arctostaphylos* L.) protected by the Bern Convention and one medicinal taxon (*Cyclamen coum* subsp. *caucasicum*) protected by CITES. However, these protected taxa are at risk due to anthropogenic factors such as field opening, illegal cutting, fire, livestock grazing, and inappropriate land use. These

anthropogenic factors harm natural plant populations by damaging the habitats of the species, allowing alien species to settle and reproduce in the ecosystem (Karaköse et al., 2018b). In the eastern Black Sea region, where Güce is located, inappropriate land use is prevalent. For example, *Alnus glutinosa* forests are commonly clear-cut to plant hazelnut orchards. These orchards, and other artificial areas (e.g., agriculture, roadsides etc.) create new ecosystems in which alien plants flourish (Karaköse et al., 2018b). Conservation efforts should be started urgently to protect medicinal species in such transformed areas in the Güce district.

3.7. Novelty and future prospects

When I compared the ethnomedicinal knowledge of Güce with that of surrounding regions, I found that nine of the 128 medicinal plant taxa recorded here had been previously recorded in north-eastern Turkey and other countries located in the Circumboreal phytogeographical region (Table 2). These plant taxa are *Alchemillacaucasica*, *Juncus alpigenus* K. Koch, *Lilium ciliatum*, *Luzula sylvatica* (Huds.) Gaudin, *Ornithogalum sigmoideum*, *Prenanthes petiolata* (K. Koch) Sennikov, *Ruscus colchicus* Yeo, *Taraxacum laxum* G.E. Hagl., and *Tripleurospermum elongatum*. In addition to these, 293 therapeutic usages of these plants were recorded for the first time (indicated in bold font in Table 2). For example, some of the newly documented usages include *Equisetum telmateia* Ehrh. (herniated disc), *Arum maculatum* L. (herpes zoster), *Alchemilla caucasica* (menstrual irregularity, dysmenorrhea), *Crataegus rhipidophylla* Gand. (urinary tract infection), *Mespilus germanica* (dysmenorrhea), *Prunus avium* (whooping cough), *Vitis vinifera* (toothache), *Quercus petraea* subsp. *iberica* (cancer, liver steatosis). These medicinal plant taxa and their usages should be further investigated to identify their active ingredients and pharmacological properties.

This study determined that the most common and popular medicinal plant taxa throughout the Circumboreal phytogeographical region are *Achillea millefolium* L., *Allium cepa* L., *A. sativum* L., *Bellis perennis*, *Chelidonium majus* L., *Cornus mas* L., *Dioscorea communis* (L.) Caddick & Wilkin, *Ficus carica* L., *Hedera helix*, *Hypericum perforatum* L., *Juglans regia* L., *Mentha spicata*, *Morus alba* L., *M. nigra* L., *Pinus sylvestris* var. *hamata*, *Plantago lanceolata*, *P. major*, *Rosa canina*, *Sambucus ebulus*, *S. nigra* L., *Tussilago farfara* L., *Urtica dioica*, *Vaccinium myrtillus*, and *Zea mays* (Vokou et al., 1993; Ivancheva and Stantcheva, 2000; Leporatti and Ivancheva, 2003, Pieroni et al., 2003, 2014a,b, 2015; Jarić et al., 2007, 2015; Rigat et al., 2007; Leonti et al., 2009; Tita et al., 2009; Mustafa et al., 2012, 2020; Papp et al., 2013; Rexhepi et al., 2013; Bussmann et al., 2016a,b,2017a,b, 2018; Sõukand and Pieroni, 2016, 2019; Lumpert and Kreft, 2017; Pieroni, 2017; Jafarirad and Rasoulpour, 2019; Savić et al., 2019; Varga et al., 2019; Matejić et al., 2020; Mattalia et al., 2020, 2021; Sulaiman et al., 2020; Žuna Pfeiffer et al., 2020; Łuczaj et al., 2021; Mullalija et al., 2021), are also commonly used in Güce and across Turkey (Sezik et al., 1991,1997, 2001; Yeşilada et al., 1993, 1995, 1999; Tabata et al., 1994; Fujita et al., 1995; Yazıcıoğlu and Tuzlacı, 1995; Honda et al., 1996; Tuzlacı and Erol, 1999; Tuzlacı and Tolon, 2000; Tuzlacı and Aymaz, 2001; Yeşilada, 2002; Everest and Öztürk, 2005; Ezer and Arısan, 2006; Genç and Özhatay, 2006; Koçyiğit and Özhatay, 2006; Kültür, 2007; Uysal et al., 2010; Gürdal and Kültür, 2013; Bulut and Tuzlacı, 2013, 2015; Yeşilyurt et al., 2017; Aydın and Yeşil, 2018; Gürbüz et al., 2019; Palabaş Uzun and Koca, 2020; Emre et al., 2021). The reason for the widespread use of these plant taxa is that they are cosmopolitan species and can easily be found in any habitat.

The medical usages identified in the study area were consistent with those of previous studies. For example, medicinal uses were similar across the region for *Equisetum telmateia* (stomach disorders), *Asplenium scolopendrium* L. (coughs), *Arum maculatum* L. (hemorrhoids), *Dioscorea communis* (L.) Caddick & Wilkin (rheumatism), *Helleborus orientalis* (wound healing), *Buxus sempervirens* (antipyretic), *Cydonia oblonga* (influenza, the common cold), *Prunus laurocerasus* (diabetes), *Quercus petraea* subsp. *iberica* (diarrhea), *Plantago lanceolata* (abscesses, wounds, inflammations), and *Urtica dioica* (cancer).

Güce district is located in the Colchic sector of the Euxine province within the Circumboreal phytogeographical region. When I compared plant usage data from Güce with that from previous studies of the Colchic sector (including Georgia), I found that medicinal plant usage in Güce was most similar to that in Espiye (Giresun) (Polat et al., 2015) and least similar to that in north-eastern Anatolia (Sezik et al., 1991). These similarities are expected as Espiye is adjacent to Güce and shares the same ecosystems (Yeşil and İnal, 2021). One reason that Güce and north-eastern Anatolia show low similarity in plant usage may be related to the traditional data obtained from the areas belonging to the Irano-Turanian (outside the Circumboreal phytogeographical region) phytogeographical region. Medicinal plant usages are similar across the Turkish division of the Colchic sector.

Güce shares the use of 40 plant taxa with Espiye (Polat et al., 2015), 35 with Ordu (Türkan et al., 2006; Gül and Dinler, 2016; Aydın and Yeşil, 2018), 63 with Trabzon (Yazıcıoğlu and Tuzlacı, 1995; Akbulut and Bayramoğlu, 2014; Akbulut and Özkan, 2014; Gürdal and Öztürk, 2021), 53 with Rize (Sağıroğlu et al., 2012; Saraç et al., 2013; Baykal and Atamov, 2017), 12 with Torul (Karaköse et al., 2019), and 33 with Artvin (Eminağaoğlu et al., 2017; Bak and Çifçi, 2020). However, in the Turkish division of the Colchic sector, plants also have for different therapeutic usages. For example, in Hayrat, leaves of *Rumex obtusifolius* L. are used for the treatment of hemorrhoids (Sağıroğlu et al., 2012); in Güce, leaves are used for the treatment of abscess, constipation, dysmenorrhea, dyspepsia, inappetence, and stomach disorder. In Hatila-Artvin, *Cyclamen coum* subsp. *caucasicum* is used for the treatment of jaundice (Eminağaoğlu et al., 2017); in Güce, it is used for the treatment of analgesic, diabetes, headache, sinusitis, tonsillitis, and unwanted pregnancy. *Stachys sylvatica* L. usage varies in different areas. In Espiye, its leaves are used for the treatment of cardiac disorders (Polat et al., 2015); in Sürmene-Trabzon, for dysuria (Gürdal and Öztürk, 2021); and in Güce, for cancer. While leaves and flowers of the endemic *Carduus onopordioides* subsp. *turcicus* are recorded to be used as a blood purifier and for the treatment of dyspnea and intestinal disorders in Güce, in Torul-Gümüşhane it is used for the treatment of hemorrhoids (Karaköse et al., 2019).

Although Georgia is also located in the Colchic sector, its medicinal plant usages showed little similarity to those of Güce district. One factor that may explain these differences is the distance between Georgia and Güce district. Other factors may include differences in sub-flora and socio-cultural society structures between the two countries (Faruque et al., 2018). In Güce, medicinal usages were detected for characteristic plant taxa belonging to the Colchic sector, such as *Abies nordmanniana*, *Hedera colchica* (K. Koch) K. Koch, *Picea orientalis*, *Ruscus colchicus*, and *Rhododendron ponticum* L. While *Abies nordmanniana* is used in the Turkish division of the Colchic sector for anti-inflammatory, antiseptic, expectorant, wound healing purposes and for the treatment of constipation (Baytop, 1999; Akbulut and Özkan, 2014), it is also used in the Georgian division for hemostatic and vulnerary purposes, as well as for the treatment of eczema, tuberculosis, and ulcer (Bussmann et al., 2016a, 2016b; Bussmann, 2017). While *Picea orientalis* is used to treat tuberculosis, ulcer, bronchitis, and wounds in the Turkish division (Yazıcıoğlu and Tuzlacı, 1995; Akbulut and Bayramoğlu, 2014) and the Georgian division (Bussmann et al.,

2016a,b, 2017b; Bussmann, 2017), in Güce, it is used to treat additional ailments (e.g., for the treatment of dyspnea, inflammation, common cold, diabetes, influenza, stomach disorder, cough, sore throat, backache, and hypotension). *Hedera colchica* is used both in Güce and in Georgia (Bussmann et al., 2018) for the treatment of burns. Similarly, *Alnus glutinosa* subsp. *barbata* is used as a wound healer in both Turkey and Georgia (Bussmann et al., 2018). Interestingly, while there are medicinal usages of *Castanea sativa* and *Fagus orientalis* in Turkey (Baytop, 1999; Saraç et al., 2013), no such record has been found in Georgia (Bussmann et al., 2016a, b, 2017a, b, 2018; Bussmann, 2017). As stated in many studies (de Albuquerque et al., 2011; Bulut et al., 2017; Gaoue et al., 2017; Pieroni, 2017; Hu et al., 2020; Bhat et al., 2021; Hosseini et al., 2021), due to technological advances and the decrease in rural population, the transfer of TK to younger generations has become very difficult in recent years. Therefore, it is of great importance to record and protect the TK of any area or community. ANOVA showed that TK differed between four age groups ($F = 3.355$, $p = 0.020$) and four education levels ($F = 4.487$, $p = 0.005$). Although there are modern health facilities in the center of Güce, old people, unlike younger people, are reluctant to visit those facilities. In addition, knowledge and the number of medicinal plants cited increases with age, among both male and female informants (de Albuquerque et al., 2011; Gaoue et al., 2017; Nguyen et al., 2020; Yeşil and İnal, 2021). In Güce, illiterate informants have more ethnobotanical knowledge, likely because they live in harmony with nature.

4. Conclusions

This study is the first ethnobotanical study conducted in Güce and surrounding villages. Informants in Güce and its villages reported that 128 plant taxa are used to treat 101 different ailment categories. The most used plant taxa were *Tilia rubra* subsp. *caucasica*, *Urtica dioica*, *Prunus laurocerasus*, *Pinus sylvestris* var. *hamata*, *Plantago lanceolata*, and *Thymus praecox* subsp. *grossheimii*. The most common ailments treated by plant taxa were respiratory tract disorders, followed by digestive disorders and skin diseases. The therapeutic usages of nine of the identified plant taxa were recorded for the first time. One of the most important findings of the study is that local people in Güce possess great experience and knowledge of the medical usages of plant taxa, indicating that local people still benefit from nature. Nevertheless, there is the risk that future generations will not be able to benefit from this knowledge. This study identified 46 plant taxa, three of which are endemic, that are conservation priorities and two plant taxa protected by CITES and Bern conventions. Unless conservation measures are implemented soon, these taxa may be displaced by invasive plant species. This will result in the failure to provide ecosystem services from natural habitats. This study also showed TK is lost because traditions and customs are not recorded or transferred to younger generations. Ethnobotanical studies should be carried out in different areas of the world both for the conservation of TK and for the discovery of new drugs because natural plant biodiversity in any region provides rapid, cheap, and sufficient alternative resources for healthcare of local people.

Author contributions

M.K.: Visualization, Supervision, Methodology, Statistical analysis, Writing.

Declaration of competing interest

The author has no conflicts of interest to declare.

Acknowledgments

I want to express my special thanks to all the people of Güce, especially my student Mehmet Ali and his family, who participated in this ethnobotanical study and shared valuable knowledge. I would like to thank the Forest engineers Gözde Çolak Karaköse and Mustafa Şen, and also the foresters Gürsel Alemin, Yakup Yılmaz, and Mehmet Keçeci, for their logistic help supplying plant materials and contacting local people.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.pld.2022.03.005.

References

Akbulut, S., Karaköse, M., Özkan, Z.C., 2019. Traditional uses of some wild plants in kale and Acıpayam provinces in Denizli. Kastamonu Univ. J. Forest. Fac. 19, 72–81.
Akbulut, S., Kurdoğlu, O., 2015. Türkiye'de acil ve öncelikle korunması gereken bir alan: Kamilet ve Durguna Vadileri (Arhavi) ve koruma gerekçeleri. Kastamonu Univ. J. Forest. Fac. 15, 279–296.
Akbulut, S., Özkan, Z.C., 2014. Traditional usage of some wild plants in Trabzon region (Turkey). Kastamonu Univ. J. Forest. Fac. 14, 135–145.
Akbulut, S., Bayramoğlu, M.M., 2014. Reflections of socio-economic and demographic structure of urban and rural on the use of medicinal and aromatic plants: the sample of Trabzon province. Stud. Ethno-Med. 8, 89–100.
Alexiades, M.N., 1996. Collecting Ethnobotanical Data: an Introduction to Basic Concepts and Techniques, Advances in Economic Botany. New York Botanical Garden Press, pp. 53–94.
Allen, D., Bilz, M., Leaman, D.J., et al., 2014. European Red List of Medicinal Plants. Publications Office of the European Union, Luxembourg.
Aswani, S., Lemahieu, A., Sauer, W.H.H., 2018. Global trends of local ecological knowledge and future implications. PLoS One 13, e0195440.
Aydın, A., Yeşil, Y., 2018. İkizce Ordu-Türkiye ilçesinde etnobotanik bir ön çalışma. Bağbahçe Bil. Der. 5, 25–43.
Bak, F.E., Çifçi, K., 2020. Artvin'in merkez köylerinde bazı tıbbi bitkilerin yöresel kullanımları. Artvin Çoruh Univ. Orman Fak. Derg. 21, 318–329.
Baykal, H., Atamov, V., 2017. Ethnobotanical documentation of plants of Başhemşin valley, Kaçkar mountains national park, rize, Turkey. Bangladesh J. Bot. 46, 767–773.
Baytop, T., 1999. Türkiye'de Bitkilerle Tedavi. Nobel Tıp Kitapevleri, İstanbul.
Berkes, F., Colding, J., Folke, C., 2000. Rediscovery of traditional ecological knowledge as adaptive management. Ecol. Appl. 10, 1251–1262.
Berkes, F., Folke, C., Gadgil, M., 1995. Traditional ecological knowledge, biodiversity, resilience and sustainability. In: Perrings, C.A., Mäler, K.G., Folke, C., Holling, C.S., Jansson, B.O. (Eds.), Biodiversity Conservation: Problems and Policies. Springer Netherlands, Dordrecht, pp. 281–299.
Berkes, F., 1993. Traditional ecological knowledge in perspective. In: Inglis, J.T. (Ed.), Traditional Ecological Knowledge: Concepts and Cases. Canadian Museum of Nature and International Development Research Centre, Ottawa, pp. 1–9.
Bhat, M.N., Singh, B., Surmal, O., et al., 2021. Ethnobotany of the Himalayas: safeguarding medical practices and traditional uses of Kashmir regions. Biology 10, 851.
Bulut, G., Haznedaroğlu, M.Z., Doğan, A., et al., 2017. An ethnobotanical study of medicinal plants in Acipayam (Denizli-Turkey). J. Herb. Med. 10, 64–81.
Bulut, G., Tuzlacı, E., 2015. An ethnobotanical study of medicinal plants in Bayramiç (Çanakkale-Turkey). Marmara Pharm. J. 19, 269–282.
Bulut, G., Tuzlacı, E., 2013. An ethnobotanical study of medicinal plants in Turgutlu (Manisa—Turkey). J. Ethnopharmacol. 149, 633–647.
Bussmann, R., Paniagua-Zambrana, N.Y., Sikharulidze, S., et al., 2017a. Plant and fungal use in Tusheti, Khevsureti, and Pshavi, sakartvelo (republic of Georgia), Caucasus. Acta Soc. Bot. Pol. 86, 3517.
Bussmann, R., Paniagua-Zambrana, N.Y., Sikharulidze, S., et al., 2017b. Ethnobotany of samtskhe-Javakheti, sakartvelo (republic of Georgia), Caucasus. Indian J. Tradit. Knowl. 16, 7–24.
Bussmann, R., Paniagua-Zambrana, N.Y., Sikharulidze, S., et al., 2018. Unequal brothers-plant and fungal use in Guria and Racha, sakartvelo (republic of Georgia), Caucasus. Indian J. Tradit. Knowl. 17, 7–33.
Bussmann, R., 2017. Ethnobotany of the Caucasus. Springer.
Bussmann, R., Paniagua-Zambrana, N.Y., Sikharulidze, S., et al., 2016a. Medicinal and food plants of svaneti and Lechkhumi, sakartvelo (republic of Georgia), Caucasus. Med. Aromatic Plants 5, 1–18.
Bussmann, R., Paniagua-Zambrana, N.Y., Sikharulidze, S., et al., 2016b. A comparative ethnobotany of Khevsureti, samtskhe-Javakheti, Tusheti, svaneti, and Racha-Lechkhumi, republic of Georgia (sakartvelo), Caucasus. J. Ethnobiol. Ethnomed. 12, 43.

Chase, M.W., Christenhusz, M., Fay, M., et al., 2016. An update of the Angiosperm Phylogeny Group classification for the orders and families of flowering plants: APG IV. Bot. J. Linn. Soc. 181, 1–20.
Christenhusz, M., Zhang, X.-C., Schneider, H., 2011a. A linear sequence of extant families and genera of lycophytes and ferns. Phytotaxa 19, 7–54.
Christenhusz, M., Reveal, J.L., Farjon, A., et al., 2011b. A new classification and linear sequence of extant gymnosperms. Phytotaxa 19, 55–70.
Çakılcıoğlu, U., Khatun, S., Türkoglu, İ., et al., 2011. Ethnopharmacological survey of medicinal plants in Maden (Elazig-Turkey). J. Ethnopharmacol. 137, 469–486.
Dalar, A., Mukemre, M., Unal, M., et al., 2018. Traditional medicinal plants of Ağrı Province, Turkey. J. Ethnopharmacol. 226, 56–72.
Davis, P., Tan, K., Mill, R.R., 1988. Flora of Turkey and the East Aegean Islands and Supplement I. Edinburgh University Press, Edinburgh.
Davis, P., 1965–1985. Flora of Turkey and the East Aegean Islands. Edinburgh University Press, Edinburgh.
de Albuquerque, U.P., Soldati, G.T., Sieber, S.S., et al., 2011. The use of plants in the medical system of the Fulni-ô people (NE Brazil): a perspective on age and gender. J. Ethnopharmacol. 133, 866–873.
Ekim, T., Koyuncu, M., Vural, M., et al., 2000. Türkiye Bitkileri Kırmızı Kitabı (Eğrelti Ve Tohumlu Bitkiler) (Red Data Book of Turkish Plants, Pteridophyta and Spermatophyta). Barışcan Ofset, Ankara.
Eminağaoğlu, Ö., Göktürk, T., Beğen, A.H., 2017. Traditional uses of medicinal plants and animals of Hatila valley national park, Artvin. BioDiCon 10, 33–42.
Emre, G., Dogan, A., Haznedaroglu, M.Z., et al., 2021. An ethnobotanical study of medicinal plants in Mersin (Turkey). Front. Pharmacol. 12, 664500.
Everest, A., Öztürk, E., 2005. Focusing on the ethnobotanical uses of plants in Mersin and Adana provinces (Turkey). J. Ethnobiol. Ethnomed. 1, 1–6.
Ezer, N., Arısan, Ö.M., 2006. Folk medicines in Merzifon (Amasya, Turkey). Turk. J. Bot. 30, 223–230.
Faruque, M.O., Uddin, S.B., Barlow, J.W., et al., 2018. Quantitative ethnobotany of medicinal plants used by indigenous communities in the bandarban district of Bangladesh. Front. Pharmacol. 9, 40.
Fujita, T., Sezik, E., Tabata, M., et al., 1995. Traditional medicine in Turkey VII. Folk medicine in middle and west Black Sea regions. Econ. Bot. 49, 406–422.
Gaoue, O.G., Coe, M.A., Bond, M., et al., 2017. Theories and major hypotheses in ethnobotany. Econ. Bot. 71, 269–287.
Genç, G.E., Özhatay, N., 2006. An ethnobotanical study in Çatalca (European part of Istanbul) II. Turkish J. Pharm. Sci. 3, 73–89.
Ghimire, K., Adhikari, M., Uprety, Y., et al., 2018. Ethnomedicinal use of plants by the highland communities of Kailash sacred Landscape, far-west Nepal. Acad. J. Med. Plants 6, 365–378.
Gu, W., Hao, X., Wang, Z., et al., 2020. Ethnobotanical study on medicinal plants from the Dragon Boat Festival herbal markets of Qianxinan, southwestern Guizhou, China. Plant Divers. 42, 427–433.
Gunes, F., 2017. Medicinal plants used in the Uzunköprü district of Edirne, Turkey. Acta Soc. Bot. Pol. 86, 3565.
Gül, V., Dinler, B.S., 2016. Kumru (Ordu) yöresinde doğal olarak yetişen bazı tıbbi ve aromatik bitkiler. Ziraat Fak. Derg. 11, 146–156.
Güler, B., Kümüştekin, G., Uğurlu, E., 2015. Contribution to the traditional uses of medicinal plants of Turgutlu (Manisa – Turkey). J. Ethnopharmacol. 176, 102–108.
Güler, O., Polat, R., Karaköse, M., et al., 2021. An ethnoveterinary study on plants used for the treatment of livestock diseases in the province of Giresun (Turkey). South Afr. J. Bot. 142, 53–62.
Güner, A., Aslan, S., Ekim, T., et al., 2012. Turkey Plant List (Vascular Plants). ANG Foundation, İstanbul.
Güner, A., Özhatay, N., Ekim, T., et al., 2000. Flora of Turkey and the East Aegean Islands and Supplement II. Edinburgh University Press, Edinburgh.
Güneş, S., Savran, A., Paksoy, M.Y., et al., 2017. Ethnopharmacological survey of medicinal plants in Karaisalı and its surrounding (Adana-Turkey). J. Herb. Med. 8, 68–75.
Gürbüz, İ., Özkan, A.M.G., Akaydin, G., et al., 2019. Folk medicine in Düzce province (Turkey). Turk. J. Bot. 43, 769–784.
Gürdal, B., Öztürk, F., 2021. Ethnobotanical research in Sürmene district (Trabzon-Turkey, Black Sea region). Adv. Tradit. Med. https://doi.org/10.1007/s13596-021-00550-1.
Gürdal, B., Kültür, Ş., 2013. An ethnobotanical study of medicinal plants in Marmaris (Muğla, Turkey). J. Ethnopharmacol. 146, 113–126.
Güzel, Y., Güzelşemme, M., Miski, M., 2015. Ethnobotany of medicinal plants used in Antakya: a multicultural district in Hatay Province of Turkey. J. Ethnopharmacol. 174, 118–152.
Hayta, Ş., Polat, R., Selvi, S., 2014. Traditional uses of medicinal plants in Elazığ (Turkey). J. Ethnopharmacol. 154, 613–623.
Heinrich, M., Edwards, S., Moerman, D.E., et al., 2009. Ethnopharmacological field studies: a critical assessment of their conceptual basis and methods. J. Ethnopharmacol. 124, 1–17.
Heinrich, M., Ankli, A., Frei, B., et al., 1998. Medicinal plants in Mexico: Healers' consensus and cultural importance. Soc. Sci. Med. 47, 1859–1871.
Honda, G., Yeşilada, E., Tabata, M., et al., 1996. Traditional medicine in Turkey VI. Folk medicine in west Anatolia: Afyon, Kütahya, Denizli, Muğla, Aydin provinces. J. Ethnopharmacol. 53, 75–87.
Hussain, S., Hamid, A., Ahmad, K.S., et al., 2019. Quantitative ethnopharmacological profiling of medicinal shrubs used by indigenous communities of Rawalakot, District Poonch, Azad Jammu and Kashmir, Pakistan. Rev. Bras. Farmacogn. 29, 665–676.
Hosseini, S.H., Bibak, H., Ghara, A.R., et al., 2021. Ethnobotany of the medicinal plants used by the ethnic communities of Kerman province, Southeast Iran. J. Ethnobiol. Ethnomed. 17, 31.
Hu, R., Lin, C., Xu, W., et al., 2020. Ethnobotanical study on medicinal plants used by Mulam people in Guangxi, China. J. Ethnobiol. Ethnomed. 16, 40.
Idolo, M., Motti, R., Mazzoleni, S., 2010. Ethnobotanical and phytomedicinal knowledge in a long-history protected area, the Abruzzo, Lazio and Molise national park (Italian Apennines). J. Ethnopharmacol. 127, 379–395.
Ivancheva, S., Stantcheva, B., 2000. Ethnobotanical inventory of medicinal plants in Bulgaria. J. Ethnopharmacol. 69, 165–172.
Jafarirad, S., Rasoulpour, I., 2019. Pharmaceutical ethnobotany in the Mahabad (West Azerbaijan) biosphere reserve: ethno-pharmaceutical formulations, nutraceutical uses and quantitative aspects. Braz. J. Pharm. Sci. 55, 1–13.
Jarić, S., Mačukanović-Jocić, M., Djurdjević, L., et al., 2015. An ethnobotanical survey of traditionally used plants on Suva planina mountain (south-eastern Serbia). J. Ethnopharmacol. 175, 93–108.
Jarić, S., Popović, Z., Mačukanović-Jocić, M., et al., 2007. An ethnobotanical study on the usage of wild medicinal herbs from Kopaonik Mountain (Central Serbia). J. Ethnopharmacol. 111, 160–175.
Karaköse, M., 2020. Honaz (Denizli) orman planlama Birimi'nin damarlı bitkileri. Turkish J. For. 21, 43–54.
Karaköse, M., Terzioğlu, S., 2020. Finike (Antalya) orman planlama biriminin vasküler bitki florası. KSU Doğa Bilim. Derg. 23, 1144–1162.
Karaköse, M., 2019. Numerical classification and ordination of Esenli (Giresun) forest vegetation. Biologia 74, 1441–1453.
Karaköse, M., Terzioğlu, S., 2019. Flora and botanic tourism potential of Yaralıgöz (Kastamonu) education and observation forest. Kastamonu Univ. J. Forest. Fac. 19, 116–136.
Karaköse, M., Akbulut, S., Özkan, Z.C., 2019. Ethnobotanical study of medicinal plants in Torul district, Turkey. Bangladesh J. Plant Taxon. 26, 29–37.
Karaköse, M., Polat, R., Rahman, M., et al., 2018a. Traditional honey production and bee flora of Espiye, Turkey. Bangladesh J. Plant Taxon. 25, 79–91.
Karaköse, M., Akbulut, S., Bayramoğlu, M., 2018b. Espiye (Giresun) orman planlama biriminin istilacı yabancı türleri. Turkish J. For. 19, 120–129.
Karcı, E., Gürbüz, İ., Akaydın, G., et al., 2017. Folk medicines of Bafra (samsun-Turkey). Turk. J. Biochem. 42, 381–399.
Kathambi, V., Mutie, F.M., Rono, P.C., et al., 2020. Traditional knowledge, use and conservation of plants by the communities of Tharaka-Nithi County, Kenya. Plant Divers. 42, 479–487.
Kawarty, A.M.A., Behçet, L., Çakılcıoğlu, U., 2020. An ethnobotanical survey of medicinal plants in Ballakayati (Erbil, North Iraq). Turk. J. Bot. 44, 345–357.
Kaya, M., 2019. Güce adının tarihi ve kültürel kökenleri. Anemon Muş Alparslan Univ. Sos. Bilim. Derg. 7, 85–91.
Kazancı, C., Oruç, S., Mosulishvili, M., 2020. Medicinal ethnobotany of wild plants: a cross-cultural comparison around Georgia-Turkey border, the Western Lesser Caucasus. J. Ethnobiol. Ethnomed. 16, 71.
Kendir, G., Güvenç, A., 2010. Etnobotanik ve Türkiye'de yapılmış etnobotanik çalışmalara genel bir bakış. Hacet. Univ. J. Fac. Pharm. 30, 49–80.
Khajuria, A.K., Manhas, R.K., Kumar, H., et al., 2021. Ethnobotanical study of traditionally used medicinal plants of Pauri district of Uttarakhand, India. J. Ethnopharmacol. 276, 114204.
Kızılarslan, Ç., Özhatay, N., 2012. An ethnobotanical study of the useful and edible plants of İzmit. Marmara Pharm. J. 16, 194–200.
Koçyiçit, M., Özhatay, N., 2006. Wild plants used as medicinal purpose in Yalova (Northwest Turkey). Turkish J. Pharm. Sci. 3, 91–103.
Kumar, A., Kumar, S., Komal, et al., 2021. Role of traditional ethnobotanical knowledge and indigenous communities in schieving sustainable development goals. Sustainability 13, 3062.
Kültür, Ş., 2007. Medicinal plants used in Kırklareli province (Turkey). J. Ethnopharmacol. 111, 341–364.
Leonti, M., 2022. The relevance of quantitative ethnobotanical indices for ethnopharmacology and ethnobotany. J. Ethnopharmacol. 288, 115008.
Leonti, M., Casu, L., Sanna, F., et al., 2009. A comparison of medicinal plant use in Sardinia and Sicily—de Materia Medica revisited? J. Ethnopharmacol. 121, 255–267.
Leporatti, M.L., Ivancheva, S., 2003. Preliminary comparative analysis of medicinal plants used in the traditional medicine of Bulgaria and Italy. J. Ethnopharmacol. 87, 123–142.
Łuczaj, Ł., Jug-Dujaković, M., Dolina, K., et al., 2021. Insular pharmacopoeias: ethnobotanical characteristics of medicinal plants used on the Adriatic Islands. Front. Pharmacol. 12, 623070.
Lumpert, M., Kreft, S., 2017. Folk use of medicinal plants in Karst and Gorjanci, Slovenia. J. Ethnobiol. Ethnomed. 13, 16.
Martin, G.J., 1995. A Methods Manual. Springer, Boston, MA.
Matejić, J.S., Stefanović, N., Ivković, M., et al., 2020. Traditional uses of autochthonous medicinal and ritual plants and other remedies for health in Eastern and South-Eastern Serbia. J. Ethnopharmacol. 261, 113186.
Mathur, A., 2003. Who owns traditional knowledge? Econ. Polit. Wkly. 4471–4481.

Mattalia, G., Sõukand, R., Corvo, P., et al., 2021. “We became rich and we lost everything”: ethnobotany of remote mountain villages of Abruzzo and Molise, Central Italy. Hum. Ecol. 49, 217–224.
Mattalia, G., Stryamets, N., Pieroni, A., et al., 2020. Knowledge transmission patterns at the border: ethnobotany of Hutsuls living in the Carpathian Mountains of Bukovina (SW Ukraine and NE Romania). J. Ethnobiol. Ethnomed. 16, 41.
Mehrnia, M., Akaberi, M., Amiri, M.S., et al., 2021. Ethnopharmacological studies of medicinal plants in central Zagros, Lorestan Province, Iran. J. Ethnopharmacol. 280, 114080.
Mir, T.A., Jan, M., Khare, R.K., 2021. Ethnomedicinal application of plants in Doodhganga forest range of district Budgam, Jammu and Kashmir, India. Eur. J. Integr. Med. 46, 101366.
Mittermeier, R., Gil, P., Hoffmann, M., et al., 2004. Hotspots Revisited: Earth's Biologically Richest and Most Endangered Terrestrial Ecoregions: Conservation International. Sierra Madre, Cemex, p. 392.
Mullalija, B., Mustafa, B., Hajdari, A., et al., 2021. Ethnobotany of rural and urban Albanians and Serbs in the Anadrini region. Kosovo. Genet. Resour. Crop Evol. 68, 1825–1848.
Mustafa, B., Hajdari, A., Pulaj, B., et al., 2020. Medical and food ethnobotany among Albanians and Serbs living in the Shtërpcë/Štrpce area, South Kosovo. J. Herb. Med. 22, 100344.
Mustafa, B., Hajdari, A., Krasniqi, F., et al., 2012. Medical ethnobotany of the Albanian Alps in Kosovo. J. Ethnobiol. Ethnomed. 8, 6.
Myers, N., Mittermeier, R.A., Mittermeier, C.G., et al., 2000. Biodiversity hotspots for conservation priorities. Nature 403, 853–858.
Nguyen, X.-M.-A., Bun, S.-S., Ollivier, E., et al., 2020. Ethnobotanical study of medicinal plants used by K'Ho-Cil people for treatment of diarrhea in Lam Dong Province, Vietnam. J. Herb. Med. 19, 100320.
Özdemir, N., 2018. Geleneksel bilgi ve kültür ekonomisi. Türk Dünyası İnc. Derg. 18, 1–28.
Özhatay, N., Kültür, Ş., Gürdal, B., 2019. Check-list of additional taxa to the supplement flora of Turkey IX. J. Pharm. Istanbul Univ. 49, 105–120.
Paksoy, M.Y., Selvi, S., Savran, A., 2016. Ethnopharmacological survey of medicinal plants in Ulukışla (Niğde-Turkey). J. Herb. Med. 6, 42–48.
Palabaş Uzun, S., Koca, C., 2020. Ethnobotanical survey of medicinal plants traded in herbal markets of Kahramanmaraş. Plant Divers. 42, 443–454.
Papp, N., Birkás-Frendl, K., Farkas, Á., et al., 2013. An ethnobotanical study on home gardens in a Transylvanian Hungarian Csángó village (Romania). Genet. Resour. Crop Evol. 60, 1423–1432.
Pei, S., Alan, H., Wang, Y., 2020. Vital roles for ethnobotany in conservation and sustainable development. Plant Divers. 42, 399–400.
Pieroni, A., 2017. Traditional uses of wild food plants, medicinal plants, and domestic remedies in Albanian, Aromanian and Macedonian villages in South-Eastern Albania. J. Herb. Med. 9, 81–90.
Pieroni, A., Nedelcheva, A., Dogan, Y., 2015. Local knowledge of medicinal plants and wild food plants among Tatars and Romanians in Dobruja (South-East Romania). Genet. Resour. Crop Evol. 62, 605–620.
Pieroni, A., Nedelcheva, A., Hajdari, A., et al., 2014a. Local knowledge on plants and domestic remedies in the mountain villages of Peshkopia (Eastern Albania). J. Mt. Sci. 11, 180–193.
Pieroni, A., Cianfaglione, K., Nedelcheva, A., et al., 2014b. Resilience at the border: traditional botanical knowledge among Macedonians and Albanians living in Gollobordo, Eastern Albania. J. Ethnobiol. Ethnomed. 10, 31.
Pieroni, A., Elena Giusti, M., Münz, H., et al., 2003. Ethnobotanical knowledge of the Istro-Romanians of Žejane in Croatia. Fitoterapia 74, 710–719.
Polat, R., Çakılcıoğlu, U., Kaltalıoğlu, K., et al., 2015. An ethnobotanical study on medicinal plants in Espiye and its surrounding (Giresun-Turkey). J. Ethnopharmacol. 163, 1–11.
Polat, R., Çakılcıoğlu, U., Satıl, F., 2013. Traditional uses of medicinal plants in Solhan (Bingöl–Turkey). J. Ethnopharmacol. 148, 951–963.
Polat, R., Satıl, F., 2012. An ethnobotanical survey of medicinal plants in Edremit Gulf (Balıkesir–Turkey). J. Ethnopharmacol. 139, 626–641.
PPG, I., 2016. A community-derived classification for extant lycophytes and ferns. J. Syst. Evol. 54, 563–603.
Ramirez, C.R., 2007. Ethnobotany and the loss of traditional knowledge in the 21st century. Ethnobot. Res. Appl. 5, 245–247.
Rexhepi, B., Mustafa, B., Hajdari, A., et al., 2013. Traditional medicinal plant knowledge among Albanians, Macedonians and Gorani in the sharr mountains (republic of Macedonia). Genet. Resour. Crop Evol. 60, 2055–2080.
Rigat, M., Bonet, M.À., Garcia, S., et al., 2007. Studies on pharmaceutical ethnobotany in the high river ter valley (Pyrenees, Catalonia, iberian peninsula). J. Ethnopharmacol. 113, 267–277.
Sağıroğlu, M., Arslantürk, A., Akdemir, Z.K., et al., 2012. An ethnobotanical survey from Hayrat Trabzon and Kalkandere rize/Turkey. BioDiCon 5, 31–42.
Saraç, D.U., Özkan, Z.C., Akbulut, S., 2013. Ethnobotanic features of Rize/Turkey province. BioDiCon 6, 57–66.
Sargın, S.A., Büyükcengiz, M., 2019. Plants used in ethnomedicinal practices in Gulnar district of Mersin, Turkey. J. Herb. Med. 15, 100224.
Sargın, S.A., Selvi, S., Büyükcengiz, M., 2015. Ethnomedicinal plants of Aydıncık district of Mersin, Turkey. J. Ethnopharmacol. 174, 200–216.
Sargın, S.A., Akçicek, E., Selvi, S., 2013. An ethnobotanical study of medicinal plants used by the local people of Alaşehir (Manisa) in Turkey. J. Ethnopharmacol. 150, 860–874.
Savić, J., Mačukanović-Jocić, M., Jarić, S., 2019. Medical ethnobotany on the Javor mountain (Bosnia and Herzegovina). Eur. J. Integr. Med. 27, 52–64.
Sezik, E., Yeşilada, E., Honda, G., et al., 2001. Traditional medicine in Turkey X. Folk medicine in central Anatolia. J. Ethnopharmacol. 75, 95–115.
Sezik, E., Yeşilada, E., Tabata, M., et al., 1997. Traditional medicine in Turkey VIII. Folk medicine in east Anatolia; Erzurum, Erzincan, Ağrı, Kars, Iğdır provinces. Econ. Bot. 51, 195–211.
Sezik, E., Tabata, M., Yeşilada, E., et al., 1991. Traditional medicine in Turkey I. Folk medicine in Northeast Anatolia. J. Ethnopharmacol. 35, 191–196.
Sõukand, R., Pieroni, A., 2019. Resilience in the mountains: biocultural refugia of wild food in the Greater Caucasus Range, Azerbaijan. Biodivers. Conserv. 28, 3529–3545.
Sõukand, R., Pieroni, A., 2016. The importance of a border: medical, veterinary, and wild food ethnobotany of the Hutsuls living on the Romanian and Ukrainian sides of Bukovina. J. Ethnopharmacol. 185, 17–40.
Sulaiman, Shah, S., Khan, S., et al., 2020. Quantitative ethnobotanical study of indigenous knowledge on medicinal plants used by the tribal communities of Gokand Valley, district Buner, Khyber Pakhtunkhwa, Pakistan. Plants 9, 1001.
Tabata, M., Sezik, E., Honda, G., et al., 1994. Traditional medicine in Turkey III. Folk medicine in east Anatolia, van and Bitlis provinces. Int. J. Pharm. 32, 3–12.
Tardío, J., Pardo-de-Santayana, M., 2008. Cultural importance indices: a comparative analysis based on the useful wild plants of Southern Cantabria (Northern Spain) 1. Econ. Bot. 62, 24–39.
Tetik, F., Civelek, Ş., Çakılcıoğlu, U., 2013. Traditional uses of some medicinal plants in Malatya (Turkey). J. Ethnopharmacol. 146, 331–346.
Tita, I., Mogosanu, G.D., Tita, M.G., 2009. Ethnobotanical inventory of medicinal plants from the South-West of Romania. Farmacia 57, 141–156.
Trotter, R.T., Logan, M.H., 1986. Informant census: a new approach for identifying potentially effective medicinal plants. In: Etkin, L.N. (Ed.), Plants in Indigenous Medicine and Diet. Routledge, Bedford Hill, NY, pp. 91–112.
Tuzlacı, E., Aymaz, P.E., 2001. Turkish folk medicinal plants, Part IV: Gönen (Balıkesir). Fitoterapia 72, 323–343.
Tuzlacı, E., Tolon, E., 2000. Turkish folk medicinal plants, part III: Şile (Istanbul). Fitoterapia 71, 673–685.
Tuzlacı, E., Erol, M.K., 1999. Turkish folk medicinal plants. Part II: Eğirdir (Isparta). Fitoterapia 70, 593–610.
Türkan, Ş., Malyer, H., Özaydın, S., et al., 2006. Ordu ili ve çevresinde yetişen bazı bitkilerin etnobotanik özellikleri. SDÜ Fen. Bil. Enst. Der. 10, 162–166.
UCTEA, 2019. Chamber of environmental Engineers, air pollution report.
Uysal, İ., Onar, S., Karabacak, E., et al., 2010. Ethnobotanical aspects of Kapıdağ peninsula (Turkey). BioDiCon 3, 15–22.
Varga, F., Šolić, I., Dujaković, M.J., et al., 2019. The first contribution to the ethnobotany of inland Dalmatia: medicinal and wild food plants of the Knin area, Croatia. Acta Soc. Bot. Pol. 88, 3622.
Vokou, D., Katradi, K., Kokkini, S., 1993. Ethnobotanical survey of Zagori (Epirus, Greece), a renowned centre of folk medicine in the past. J. Ethnopharmacol. 39, 187–196.
Weckerle, C.S., de Boer, H.J., Puri, R.K., et al., 2018. Recommended standards for conducting and reporting ethnopharmacological field studies. J. Ethnopharmacol. 210, 125–132.
Whitney, C., 2021. EthnobotanyR: Calculate Quantitative Ethnobotany Indices. R package version 0.1.8.
WWF, IUCN, 1994. Centres of Plant Diversity. A Guide and Strategy for Their Conservation. IUCN Publications Unit, Cambridge.
Xiong, Y., Sui, X., Ahmed, S., et al., 2020. Ethnobotany and diversity of medicinal plants used by the Buyi in eastern Yunnan, China. Plant Divers. 42, 401–414.
Yazıcıoğlu, A., Tuzlacı, E., 1995. Folk medicinal plants of Trabzon (Turkey). Marmara Üniversitesi Eczacılık Dergisi 11, 333–342.
Yeşil, Y., İnal, İ., 2021. Ethnomedicinal plants of Hasankeyf (Batman-Turkey). Front. Pharmacol. 11, 624710.
Yeşilada, E., 2002. Biodiversity in Turkish folk medicine. In: Şener, B. (Ed.), Biodiversity: Biomolecular Aspects of Biodiversity and Innovative Utilization. Springer US, Boston, MA, pp. 119–135.
Yeşilada, E., Sezik, E., Honda, G., et al., 1999. Traditional medicine in Turkey IX: folk medicine in north-west Anatolia. J. Ethnopharmacol. 64, 195–210.
Yeşilada, E., Honda, G., Sezik, E., et al., 1995. Traditional medicine in Turkey. V. Folk medicine in the inner Taurus Mountains. J. Ethnopharmacol. 46, 133–152.
Yeşilada, E., Gisho, H., Ekrem, S., et al., 1993. Traditional medicine in Turkey IV. Folk medicine in the Mediterranean subdivision. J. Ethnopharmacol. 39, 31–38.
Yeşilyurt, E.B., Şimşek, I., Akaydin, G., et al., 2017. An ethnobotanical survey in selected districts of the Black Sea region (Turkey). Turk. J. Bot. 41, 47–62.
Yıldırımlı, Ş., 2004. Etnobotanik ve Türk etnobotaniği. Kebikeç 17, 175–193.
Žuna Pfeiffer, T., Krstin, L., Špoljarić Maronić, D., et al., 2020. An ethnobotanical survey of useful wild plants in the north-eastern part of Croatia (Pannonian region). Plant Biosyst. 154, 463–473.