Research Article

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Ethnopharmacological study of medicinal plants in Kastamonu province (Türkiye)

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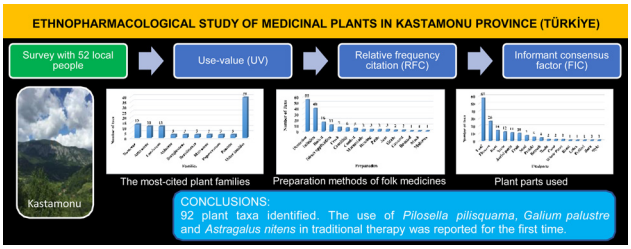
Abstract: This study is aimed at determining some of the plants traditionally used in the treatment of diseases by the local people living in Kastamonu province center and surrounding villages. A face-to-face questionnaire was applied and semi-structured interviews were conducted with 52 informants, 34 women and 18 men. Identification of 92 plants belonging to 41 families has been confirmed and their medicinal uses have been recorded. The most used families were Rosaceae (13 taxa), Asteraceae (11), and Lamiaceae (11). The most preferred folk recipes of medicinal plants was decoction (55 taxa) and in preparations and applications, the most used were the leaves (45 taxa). According to the International Classification of Primary Care categories, plants were the most used for digestive disorders (37 taxa), respiratory disorders (27 taxa), and urological disorders (24 taxa). The highest use-value was recorded for *Urtica dioica* (0.519), and highest relative frequency citation was recorded for *Tilia rubra* subsp. *caucasica* (0.231). Male genital diseases had the highest informant consensus factor value (0.83). New areas of use were also determined for *Pilosella leucopsilon* subsp. *pilisquama*, *Galium palustre*, and *Astragalus nitens*. With this study, new information for folkloric medicines is presented and the usage of herbal drugs in the study area are enhanced.

Keywords: folk remedies, traditional medicine, medicinal plants, Kastamonu



Graphical abstract

1 Introduction

Component of cultures, beliefs, and even folk remedies that make up societies are plants [1]. During their travel, European explorers and adventurers observed and documented how and for what indigenous peoples traditionally used plants. Thus, began the science of ethnobotany [2]. However, records of medicinal use of plants are found in Sumer, Assyria, Egypt, and Hittite civilizations until about 5,000 years ago, when writing was found [3]. Ethnobotany compiles all local knowledge about plants used in various ways and for various purposes [4]. The oldest source written on this subject in Anatolia is Dioscorides' "De Materia Medica," which contains information about more than 600 plants [5].

Plants play an important role for human beings from past to present. Healing with plants is one of the indispensable treatment methods since the existence of humanity. The use of plants by humans for health purposes dates back to the primeval era [6]. The majority of the world's population, especially in developing countries, obtain the necessary source for their food and health from plants [7]. This rate reaches 80% in developing countries [8]. The number of plants used only in traditional and modern medicine varies between 50,000 and 75,000 worldwide [9]. Plants are used for various purposes such as food, medicine, spices, dyes, healing, religious beliefs, clothing, shelter, and ornaments. Plants produce a wide variety of organic compounds [10]. While primary metabolites (nucleotides, amino acids, and organic acids) are directly effective in the key functions of the plant, secondary metabolites (alkaloids, terpenoids, and phenolics) are compounds

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that are not directly effective in terms of the vital function of the plant. Secondary metabolites are at least as important as primary metabolites in terms of the plant's vital function, as they form a defense mechanism against pests and diseases. People use secondary metabolites (with essential oils obtained from plants) in medicine and food industries [11,12]. Essential oils are usually colorless or light yellow, volatile, and strong smelling. These oils produced from parts of plants such as roots, stems, leaves, fruits, bark, and flowers are liquid at room temperature, sometimes freeze, and can quickly crystallize. [13]. Essential oil of plants with high economic value has gained more importance day by day. Beside these, essential oils and aromatic extracts are also used in the fragrance and flavor industry (especially the species belonging to the Lamiaceae family), in perfumes, cleaning products, cosmetics, and pharmaceutical preparations [14]. The recognition of the biological features of many secondary metabolites has influenced the search for new drugs, antibiotics, insecticides, and also herbicides.

Türkiye is very rich in terms of climate and soil characteristics. It is one of the most glorious countries, especially because it has favorable conditions for the natural growth of medicinal and aromatic plants. Today, Türkiye is one of the important biodiversity centers, with 11,707 plant taxa, 3,649 of which are endemic [15]. Anatolian territories, the cradle of civilization, have hosted various civilizations and cultures since 3000 BC [16]. These two issues are the most important references for ethnobotany.

Although ethnobotanical research has gained momentum since the 1990s in Türkiye, it still has a significant accumulation of information that needs to be recorded. One of these centers is Kastamonu province, which has a rich historical and cultural structure, geography with a maritime and continental climate, and biological diversity. It has over 1,000 plant taxa, about 20% of which are endemic, registered to the province flora, which can be the subject of botanical and ethnobotanical research. If the plant is endemic, the information about it is also endemic. Even if the plant is not endemic, its knowledge may be endemic; in other words, the specific use of that plant may be unique to a region, culture, or even an individual [3]. This study revealed and recorded this cultural accumulation in the Kastamonu region.

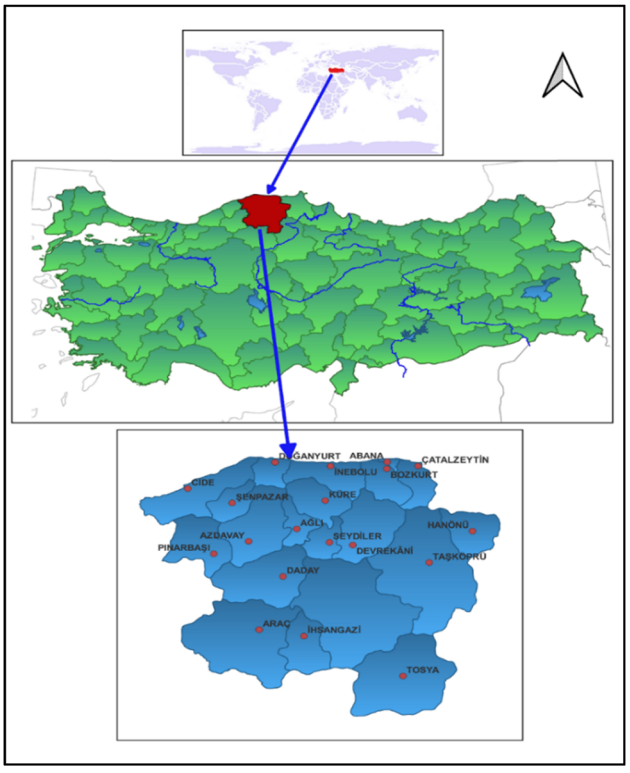

Figure 1: The geographical location of Kastamonu Province.

2 Materials and methods

2.1 Study area

Kastamonu province is in the western part of the Black Sea region between 41–42° north latitudes and 33–46° east longitudes (Figure 1). The province, which has a surface area of 13,152 km^2, constitutes approximately 1.7% of Türkiye's surface area [17]. The known history of Kastamonu begins with the Hittite Empire. After the Hittites, Phrygian and Lydian Kingdoms ruled this area. The inhabitants of this region, which was named Paphlagonia after prehistoric times, are the Gaska Turks, one of the oldest branches of the Sumerians. B.C. The Gaslar, who ruled between 2000 and 1300, constantly had political, commercial, and cultural relations with Egyptians, Syrians, and Chaldeans. Afterwards, Macedonian Kingdom, Pontus Kingdom, Romans, Byzantine Empire, Anatolian Seljuks, and Ottoman Empire ruled in this region. Due to these relations and Kastamonu being one of the commercial and administrative centers, the interaction of many peoples has taken place [18]. The local language in the region is Turkish.

Kastamonu is located in the Euxine province of the Circumboreal phytogeographical region and falls within the A4–A5 squares according to the grid system [19]. Kastamonu, between the Western Black Sea and Kızılırmak Basins, is bordered by the Isfendiyar (Küre) Mountains to the north and the Ilgaz Mountains to the south.

The Black Sea coastline of Kastamonu is 170 km long and 780 m above sea level; the mountains stretch parallel to the sea. Therefore, while the Black Sea climate is seen on the coasts, continental climate features are observed in the interior. The temperature ranges from −26.9°C to +38.7°C. Annual precipitation varies between 450 and 1,215 mm depending on the region. The annual precipitation average for Kastamonu Province is 500 mm (between 1930 and 2018). The annual number of rainy days is 128, and the annual average temperature is 9.8°C (1981–2010) [17,20,21].

There are two national parks in Kastamonu province. These are Küre Mountains National Park and Ilgaz Mountain National Park. Küre Mountains National Park has a Protected Areas Network certificate (PAN Parks) and Platinum Wilderness Certificate [17].

65% of Kastamonu, which is quite mountainous, is covered with forests and this rate is above Türkiye's average of 28.6%. 26.2% of Kastamonu forests (1,239,498 ha) are degraded forests. 79.8% of these forests are productive and 20.1% are degraded forests [20,21]. Kastamonu Province is located in a very rich area in terms of forest vegetation. The dominant species in the area are *Pinus nigra* subsp. *pallasiana* (Lamb.) Holmboe, *Pinus sylvestris* var. *hamata* Steven, *Abies nordmanniana* subsp. *equi-trojani* (Asch. & Sint. ex Boiss.) Coode & Cullen, and *Juniperus* spp. (*Juniperus communis* var. *saxatilis* Pall., *Juniperus oxycedrus* L.) from coniferous species, *Quercus* spp. (*Quercus petraea* subsp. *iberica* (Steven ex M.Bieb.) Krassiln., *Quercus pubescens* Willd., *Quercus cerris* L., *Quercus macranthera* subsp. *syspirensis* (K.Koch) Menitsky), *Fagus orientalis* Lipsky, *Carpinus betulus* L., *Castanea sativa* Mill., *Populus tremula* L., and other leafy species [22].

2.2 Data collection

This study was conducted in Kastamonu city center and surrounding villages (Yukarıbatak, Eşen, Çavundur, Ayvalı, Kuşkara, Bükköyü, Bozoğlak, Alınören, Belençal, Kızıleller, Serdar Köyü, Dereberçin, Haydarlar, Küçükkızılca, Büyükkızılca, Çukurköy, Yenidoğan, Aşağıkayı, Ermelik, Şekerköy, Kovanlı, Guzyaka, Gölköy, Yürekveren, Ahlatcı, Çevrik, Asıklı Köyü, Harmangeriş, Edeler, Aybasan, Uzunyol, Valay, Kuztekke, Dağlı, Küçükmutlu, Büyükmutlu, Bürnük, Akseki, Hacımuharrem, Hatip, Emirler, and Kurusaray) during the vegetation period between March and September 2021. Semi-structured interviews were conducted with 52 informants, 34 women and 18 men. A face-to-face questionnaire (Appendix) was applied to determine the demographic characteristics of the people, the plants they used for medicinal and therapeutic purposes, preparation methods, and the parts used (Figure 2). The guidelines of International Society of Ethnobiology were taken into account in the ethical rules. Prior informed consent was provided orally before each interview. [23]. Plant species were identified



Figure 2: Interviews with local people (a, b), samples of herbal drogs sold by locals (c–e).

and named according to the Flora of Türkiye by the botanists (Dr. Sefa Akbulut and Dr. Mustafa Karaköse) [19,24,25]. The current names of the plants have been reviewed according to the World Flora Online [26]. The voucher specimens were kept in Kastamonu University Herbarium (KÜH).

2.3 Data analysis

Three different statistical methods were used and evaluated in the analysis of the data obtained from the local population. These are use-value (UV), relative frequency citation (RFC), and informant consensus factor (FIC).

UV is a method for determining how frequently individuals in the country utilize plants in daily life. The formula used in the calculations is [27]

$$\mathrm{UV} = \frac{U}{N}, \tag{1}$$

where U = number of usage citations by informants, and N = number of informants.

The RFC was used to quantitatively evaluate the ethnobotanical data. When calculating the RFC, only the citation frequency and the total number of informants are taken into account. The categories of use of plants are not taken into account here. The formula used in the calculations is [28]

$$\mathrm{RFC} = \frac{\mathrm{FC}}{N} = \frac{\sum \mathrm{UR}}{N} \quad (0 < \mathrm{RFC} < 1), \tag{2}$$

where FC = number of informants who mentioned the species' use, and N = total number of informants participating in the survey.

FIC is a technique used to determine the homogeneity between specific ailments and the plant species used in its treatment and the potentiality of the species. The formula used in the calculations is [27,29]

$$\mathrm{FIC} = \frac{\mathrm{Nur} - \mathrm{Nt}}{\mathrm{Nur} - 1}, \tag{3}$$

where Nur = number of citations in each category, and Nt = number of species used.

Table 1: Demographic features of informants

Indicator		Number of informants	Percentage
Gender	Male	18	34.6
	Female	34	65.4
Educational level	Illiterate	16	30.8
	Primary	28	53.8
	Secondary	7	13.5
	University	1	1.9
Age groups	20–40	2	3.8
	40–50	9	17.4
	>50	41	78.8

3 Results

3.1 Demographic features

Thirty-four participants were female and 18 were male (total 52). The ages of the participants ranged from 32 to 81, with an average of 58. The education level of 84.6% of the participants was low (30.8% were illiterate, and 53.8% were primary school graduates) (Table 1).

3.2 Medicinal plants and folk remedies

Information on the use of 92 plants belonging to 41 families in folk medicine is given in Table 2. The taxonomic order was made alphabetically, first by family and then by scientific names.

The most used families were Rosaceae (13 taxa), Asteraceae (11), and Lamiaceae (11) (Figure 3). The most preferred folk recipes of medicinal plants were decoction (55 taxa) and infusion (40 taxa), followed by boiled (16 taxa) and direct application (11 taxa). Other uses of plants included fresh, crushing, cooked, marmalade, heating, paste, jam, grated, ground, roasted, mush, and molasses (Figure 4). In preparation and application, leaves were mostly used (45 taxa), followed by flowers (26 taxa) and roots (14 taxa) (Figure 5). The locals also used the stem, aerial parts, fruit, seed, petiole, branch, resin, cone, whole plant, bract, latex, pedicel, bark, and style parts for medicinal purposes.

The highest UVs were observed for *Urtica dioica* L., *Matricaria chamomilla* L. var. *recutita* (L.) Fiori, and *Tilia rubra* DC. subsp. *caucasica* (Rupr.) V.Engl. (0.519, 0.404, and 0.404, respectively). The highest RFC values belonged to *Urtica dioica* (0.308), followed by *Tilia rubra* subsp. *caucasica* (0.231), *Matricaria chamomilla* var. *recutita*, *Alchemilla mollis* (Buser) Rothm., *Elymus repens* (L.) Gould, and*Plantago major* L. (all with a value of 0.154) (Table 2). Plant taxa with high UV values used to treat different disease categories also have high RFC values.

Table 2: Traditional uses of medicinal plants

Family	Botanical name (voucher specimen)	Vernacular name	Used parts	FC	UR	RFC	UV	Purpose of usage	Mode of preparation/ application	Reported literature uses
Acoraceae	*Acorus calamus* L. (Kastamonu University Herbarium (KÜH) 21101)	Hazanbel, Eğir kökü	Root	2	4	0.038	0.077	Prostate, cancer, urinary tract infection	The dried root is ground, then drunk with the infusion or decoction method	Bronchitis, cramps, diarrhea, digestive problems, nervous disorders, rheumatism, sedative, vascular problems [30]
Adoxaceae	*Sambucus ebulus* L. (KÜH 21102)	Şahmelik	Leaf, petiole	1	2	0.019	0.038	Anti-allergy, analgesic	The leaves are directly applied to the allergic area. Leaves of *Urtica dioica*, *Elymus repens*, *Juglans regia*, *Salix* × *fragilis*, and *Sambucus ebulus* are boiled and the aching place is immersed in water	Laxative, diuretic, diaphoretic, common colds, rheumatism, intestinal disorder, hemorrhoids, skin diseases, cough, diarrhea, gastro-intestinal disorders, liver, lungs, leg pain, bruises, injuries, abscess, burns, eczema, fungal diseases, wounds, urticaria, asthma, high fever, sore throat, sunstroke, bee bite, scorpion bite, snake bite, edema, inflammation, malaria, mastitis, expelling worms, stomach ache, sterility, analgesic, tonic [5,31–48]
Adoxaceae	*Sambucus nigra* L. (KÜH 21103)	Yalangöz	Flower	2	4	0.038	0.077	Diuretics, anemia, antipyretic	Flowers are put in hot water to make infusion and drunk. The flowers are made into a paste with honey and consumed for anemia. Flowers are consumed fresh for antipyretics	Abscess, asthma, diuretic, diaphoretic, hemorrhoids, laxative, fungal itches, eczema, cough, prostatitis, heart diseases, respiratory diseases, emollient, expectorant, diarrhea, dysentery, ear inflammations, vasodilatory, anti-atherosclerotic, cholagogue, liver disorders, jaundice, skin diseases, kidney disorders, laxative, malaria, puerperal fever, rabies, influenza, flu, tonic, stimulant, rheumatism, arthritis, sore eyes [5,34,37,49–56]
Amaryllidaceae	*Allium cepa* L. (KÜH 21104)	Soğan	Root	3	4	0.058	0.077	Wound healing, bone fracture, sprains, cough	The roots are applied directly or after cooking to the wounded area. Onions are put in water to make decoction and drunk	Vulnerary, emollient, abscess, rheumatism, cicatrizing, earache, diabetes, otitis, anuria, whitlow, sprain, bruise, edema, wound healing, anti-inflammatory, constipation, weep, gynecological diseases, asthma, cancer, diuretic, fungal infection, headache, hypertension, cough, galactagogue, panacea, bone fracture,

(*Continued*)

Table 2: *Continued*

Family	Botanical name (voucher specimen)	Vernacular name	Used parts	FC	UR	RFC	UV	Purpose of usage	Mode of preparation/ application	Reported literature uses
										gastric ulcer and reflux, injuries, abdominal pain, gastrointestinal diseases, insect bite, burns, scabies, arteriosclerosis, bronchitis, common colds, dysmenorrhea, dysuria, sore throat, urinary inflammation, uterus inflammation, woman infertility, paralysis, abortifacient, analgesic, laxative, expectorant [33,35–38,42,44,45,51,54,57–68]
Apiaceae	*Anethum graveolens* L. (KÜH 21105)	Dereotu	Leaf, seed, aerial parts	4	6	0.077	0.115	Osteoarthritis, nausea, goiter, galactagogue	The infusion is prepared from leaves and seeds and drunk. The aerial parts are consumed fresh	carminative, diuretic, galactagogue, stimulant, stomachic, intestinal spasms, griping, colic, appetite, gas, digestion, urinary complaints, mental disorders [69]
Apiaceae	*Angelica sylvestris* L. (KÜH 21106)	Melekotu	Leaf	1	1	0.019	0.019	Stomach disorder	Decoction is prepared from leaves and drunk	Appetite, anorexia, anemia, migraine, vertigo, influenza, bronchitis, general dizziness, expectorant, cough, cold, sore throat, cystitis, urinary antiseptic, muscular craps, headache, rheumatic pain, asthma, digestive disorders [70–72]
Apiaceae	*Petroselinum crispum* (Mill.) A.W.Hill (KÜH 21107)	Maydanoz	Leaf, aerial parts	4	5	0.077	0.096	Urinary tract infection, anti-inflammatory, cholesterol	Decoction is prepared from leaves and drunk. The parsley is crushed with lemon. The mixture is drunk every morning on an empty stomach	Diabetes, anemia, eczema, diuretic, hemorrhoids, cholesterol, stomach diseases, kidney stones, abdominal pain, kidney ache, anti-inflammatory, halitosis, sore throat, constipation, eye health, stomach ache, infection, kidney diseases, dyspnea, sore in mouth, urethral inflammation, urinary system infections, vaginitis, bronchitis, cough, edema, urethritis, diarrhea, menstrual problem, carminative, anti-flatulence, relieves breast pain [5,32,33,35,36,39,42, 51,53,58,59,63,65,73–78]
Araceae	*Arum orientale* M.Bieb. (KÜH 21108)	Yılan yastığı	Leaf	1	1	0.019	0.019	Hemorrhoid	The leaves are roasted and eaten	Eczema, cardiovascular [79,80]
Araliaceae	*Hedera helix* L. (KÜH 21109)	Duvar sarmaşığı	Leaf	2	3	0.038	0.058	Cough, gallstone	Decoction is prepared from dried leaves and drunk	Abortion, asthma, bronchitis, burns, chills, common cold, abscess, renal

(*Continued*)

Table 2: *Continued*

Family	Botanical name (voucher specimen)	Vernacular name	Used parts	FC	UR	RFC	UV	Purpose of usage	Mode of preparation/ application	Reported literature uses
										failure, vesicant, diaphoretic, laxative, wound healing, stomach ache, stomach disorders, menstrual regulator, anthelmintic, increases bile production, expectorant, skin inflammation, exudative, skin diseases [5,34,35,41,53,54,68,73,77,81,82]
Asteraceae	*Achillea millefolium* L. (KÜH 21110)	Civanperçemi	Flower, leaf	4	4	0.077	0.077	Cough, menstrual irregularity	Infusion is prepared from leaves and flowers and drunk	Diuretic, eye inflammations, antidermatotic, hemorrhoids, wound healing, anemia, breath freshener, gynecological diseases, hemostatic, hypertension, increases sweating, antispasmodic, diarrhea, menstrual problem, abdominal pain [5,34,38,40,55,62,65,73,76,78,83–86]
Asteraceae	*Artemisia absinthium* L. (KÜH 21111)	Pelin otu	Leaf, flower, stem	2	4	0.038	0.077	Cough, diabetes, cholesterol, liver disorder	The infusion is prepared from leaves, flowers, and stems and drunk. Decoction is prepared from leaves and flowers and drunk for diabetes	Gastric, stomach disorders, ulcer, dyspepsia, intestinal parasites, liver problems, renal colic, chronic fevers, swellings, inflammation of liver, menstrual disorders, hepatocyte enlargement, hepatitis, gastritis, jaundice, wound healing, splenomegaly, dyspepsia, indigestion, flatulence, gastric pain, anemia, anorexia, esophageal bowel syndrome with irritation, weak memory tremors, depression, epilepsy, chronic fever, skin diseases, gout, rheumatism, antipyretic, abdominal pain, digestive [65,87–90]
Asteraceae	*Bellis perennis* L. (KÜH 21112)	Çayır papatyası, Döndön çiçeği	Leaf, flower, stem	3	10	0.058	0.192	Liver disorder, common cold, sinusitis, insomnia, sedative, mental disorder, stomach ache	Decoction or infusion is prepared from leaves, flowers, and stems and drunk. The flowers and stem are boiled and a vapor bath is made	Purgative, common cold, flu, diuretic, bronchitis, tonsillitis, eye inflammations, hemorrhoids, headache, respiratory, tranquilizer, gynecological diseases, stomach disorders, stomach ache, intestinal disorder, gastric complaints, insomnia, nausea, vomiting, asthma, panacea, expectorant, antipyretic, laxative, tonic, sedative, rheumatism [32–35,46,50,54,65,68,73,91–93]

(*Continued*)

Table 2: *Continued*

Family	Botanical name (voucher specimen)	Vernacular name	Used parts	FC	UR	RFC	UV	Purpose of usage	Mode of preparation/ application	Reported literature uses
Asteraceae	*Calendula arvensis* (Vaill.) L. (KÜH 21113)	Aynısefa	Flower, leaf	1	2	0.019	0.038	Diuretic, diaphoretic	Leaves and flowers are put in water to make decoction and drunk	Disinfectant, antispasmodic, diuretic, anti-inflammatory, anticancer, antipyretic, sudorific, emmenagogue, diaphoretic, sedative, wound healing, gastrointestinal ulcers, dysmenorrhea, burns, cancer, diaphoretic, mental tension, insomnia [94]
Asteraceae	*Cichorium intybus* L. (KÜH 21114)	Yabani hindiba	Root, whole plant	3	3	0.058	0.058	Liver disorder, eczema, insect sting	Decoction is prepared from roots and drunk. Decoction is prepared from whole plant and drunk for eczema. The plant is crushed and applied directly	Cancer, heart diseases, liver disorders, cough, bronchitis, rheumatism, indigestion, wound healing, jaundice, tonic, diuretic, laxative, anti-bilious, antipyretic, blood purification, strengthens the stomach [89,95,96]
Asteraceae	*Inula germanica* L. (KÜH 21115)	Andızotu	Root	1	2	0.019	0.038	Liver disorder, gall bladder	Decoction is prepared from roots and drunk	Gastrointestinal diseases [97]
Asteraceae	*Matricaria chamomilla* L. var. *recutita* (L.) Fiori (KÜH 21116)	Mayıs papatyası	Flower, stem, branch	8	21	0.154	0.404	Eye diseases, antiseptic, tonsillitis, influenza, headache, cough, sinusitis, stomach ache, common cold, insomnia, sedative, mental disorder, sore throat, anti-inflammatory	Decoction or infusion is prepared from flowers and stems and drunk. The flower, branch and stem are boiled and a vapor bath is made for sinusitis or common cold	Anti-inflammatory, antiseptic, carminative, healing, sedative, spasmolytic activity, stomach ache, irritable bowel syndrome, insomnia, bactericidal, relaxant activities, acaricidal properties, cholesterol, wound healing, diabetes, colds and flu, hair wash, common cold, cough, expectorant, flu, sedative, sore throat [65,98,99]
Asteraceae	*Pilosella leucopsilon* subsp. *pilisquama* (Nägeli & Peter) Gottschl. (KÜH 21117)	Ot kesme otu	Aerial parts	1	1	0.019	0.019	Wound healing	The aerial parts of the plant are burned, the ash is turned into mush and applied to the wound	No record
Asteraceae	*Silybum marianum* (L.) Gaertn. (KÜH 21118)	Deve dikeni	Seed	1	1	0.019	0.019	Liver disorder	The seeds are pounded in a mortar and then consumed by infusion	Liver disorders, jaundice, cholesterol, bladder, prostate, heart diseases, nervous system [100]

(*Continued*)

Table 2: *Continued*

Family	Botanical name (voucher specimen)	Vernacular name	Used parts	FC	UR	RFC	UV	Purpose of usage	Mode of preparation/ application	Reported literature uses
Asteraceae	*Taraxacum serotinum* (Waldst. & Kit.) Fisch. (KÜH 21119)	Karahindiba, Aslandişi otu	Leaf, flower	2	2	0.038	0.038	Liver disorder, intestinal disorders	The infusion is prepared from leaves and drunk. Decoction is prepared from leaves and flowers and drunk for intestinal disorder	Cardiotonic, appetizer, digestant [101]
Asteraceae	*Tussilago farfara* L. (KÜH 21120)	Öksürük otu	Flower, stem	1	1	0.019	0.019	Common cold	Decoction is prepared from flowers and stems and drunk	Cough, expectorant, dyspnea, asthma, flu, common cold, bronchitis, sedative [5,40,50,53,65,73,102–104]
Boraginaceae	*Alkanna orientalis* (L.) Boiss. (KÜH 21121)	Havacivaotu	Root	1	1	0.019	0.019	Intestinal disorder	Decoction is prepared from roots and drunk	Wound healing, ambustion, scar, festering sore, asthma, bronchitis, stomach ache, ophthalmia [105,106]
Boraginaceae	*Symphytum officinale* L. (KÜH 21122)	Karakafesotu	Leaf	1	1	0.019	0.019	Bone fracture	The infusion is prepared from dried leaved and drunk	Painkiller, wound healing [107]
Boraginaceae	*Trachystemon orientalis* (L.) D.Don (KÜH 21123)	Ispıt	Leaf, flower, petiole	1	3	0.019	0.058	Diaphoretic, diuretic, cough	Leaf, flower, and petiole are cooked and consumed	Abscess, tonsillitis, insomnia, dysmenorrhea, diaphoretic, antipyretic, diuretic, dyspepsia, intestinal diseases, anti-inflammation, constipation, expectorant, anti-depressive, breast cancer, carminative, stomach ache, wounds, rheumatism, lengthen the life [5,34–36,41,42,45,54,68,108]
Brassicaceae	*Brassica oleracea* L. (KÜH 21124)	Karalahana	Leaf	2	2	0.038	0.038	Analgesic, headache	The heated or fresh leaf is wrapped around the aching place or forehead	Dyspepsia, expectorant, rheumatism, heartburn, earache, wounds, varicose, sore throat, boil, abscess, hordeolum, cough, fever, pneumonia, headache, hoarseness, stomach ache, ulcer, tearing, watery eyes, bone pain, sooth pain, hair loss, analgesic, anemia, sedative, tonic, kidney stones, inappetence, asthma, gout, hypnotic, anthelmintics [5,35,36,42,44,45,54, 61,62,68,73,76–78,109]
Brassicaceae	*Capsella bursa-pastoris* (L.) Medik. (KÜH 21125)	Çoban çantası	Aerial parts	2	5	0.038	0.096	Kidney sand, kidney stone, hemostatic	The infusion is prepared from the aerial parts and drunk. Aerial parts are used to buffer the nose	Internal bleeding, wounds, impotence, hemostatic, diuretic, antipyretic, edema, nephritis, dysuria, chyluria, hemafecia, menorrhagia, hypertension [65,110]

(*Continued*)

Table 2: *Continued*

Family	Botanical name (voucher specimen)	Vernacular name	Used parts	FC	UR	RFC	UV	Purpose of usage	Mode of preparation/ application	Reported literature uses
Brassicaceae	*Raphanus raphanistrum* L. subsp. *sativus* (L.) Domin (KÜH 21126)	Turp	Root	3	3	0.058	0.058	Ulcer, cough	The radish is crushed to extract the juice with honey and drunk. The radish is grated, mixed with black cumin, and wrapped around the aching area	Orexigenic, diuretic, depilatory, weaken hairs, stimulant, inappetence, diuretic, antiseptic, expectorant [5,50,51,111]
Cannabaceae	*Humulus lupulus* L. (KÜH 21127)	Şerbetçi otu	Leaf	1	3	0.019	0.058	Roborant, insomnia, inappetence	The infusion is prepared from leaves and drunk	spasms, anxiety, fever, inflammation, gastric, sleeplessness, nervousness, headache, appetite, digestion, toothache, earache, neuralgia, diuretic, antispasmodic, anaphrodisiac, sedative, rheumatism, analgesic, pneumonia, intestinal pain, dyspepsia [112,113]
Caryophyllaceae	*Stellaria media* (L.) Vill. (KÜH 21128)	Kuşotu, Kedicırnığı	Aerial parts	1	2	0.019	0.038	Antipyretic, roborant	Decoction is prepared from aerial parts and drunk	Rheumatism, broken bones, anti-inflammatory, renal, astringent, headache, swelling, refrigerant, demulcent, emollient, vulnerary, antipruritic, diarrhea, itching, gastrointestinal disorders, asthma, measles, jaundice, digestive, reproductive and respiratory tracts inflammations, [36,114,115]
Cornaceae	*Cornus mas* L. (KÜH 21129)	Kiren, Kızılcık	Fruit	2	3	0.038	0.058	Diabetes, stomach ache, cancer, aphtha	The fruits are consumed as marmalade or compost	Abdominal pain, diarrhea, diabetes, common cold, bronchitis, sunstroke, insomnia, constipation, wound healing, flu, urinary inflammations, cough, cardiac diseases, hyperglycemia, nephritis, anti-fungal, antipyretic, incurable diseases, sooths pain, eases child birth, headache, toothache [5,33,35,36,43,45–47,50, 54,58,62,63,65,66,74,109,116,117]
Equisetaceae	*Equisetum hyemale* L. (KÜH 21130)	At kuyruğu, Katır kuyruğu, Kırkkilit otu	Aerial parts, leaves	5	8	0.096	0.154	Bone fracture, kidney disorder, kidney stone, kidney sand,	The infusion is prepared from the aerial parts and drunk. Leaves are made to paste and used externally. The infusion	Hypertension, inflammation, acute stroke, bleeding, cancer [118]

(*Continued*)

Table 2: *Continued*

Family	Botanical name (voucher specimen)	Vernacular name	Used parts	FC	UR	RFC	UV	Purpose of usage	Mode of preparation/ application	Reported literature uses
								diuretic, urinary tract infection	is prepared from dried leaves and drunk	
Ericaceae	*Erica arborea* L. (KÜH 21131)	Funda	Leaf	1	3	0.019	0.058	Urinary tract infection, anti-inflammatory, kidney sand	The infusion is prepared from dried leaves and drunk	Bedwetting, urinary, urolithiasis, inflammations, hypertension, prostate, blood heating, diuretic, antiseptic, laxative [5,119]
Ericaceae	*Vaccinium arctostaphylos* L. (KÜH 21132)	Kara çilek, Ayı üzümü	Fruit	1	3	0.019	0.058	Cholesterol, heart health, anti-inflammatory	Fruits are consumed as fresh	Constipation, kidney diseases, gastro-intestinal inflammations, memory, anemia, cold, diabetes, inflammation, stomach ache [5,33,35,40,78,104]
Euphorbiaceae	*Euphorbia falcata* L. (KÜH 21133)	Sütleğen	Latex	2	2	0.038	0.038	Wart	The latex is dripped onto the wart	Hypertension, warts, skin diseases [120]
Fabaceae	*Astragalus nitens* Boiss. & Heldr. (KÜH 21134)	Geven	Root	1	1	0.019	0.019	Earache	The oil obtained from the root is dripped into the ear	No record
Fabaceae	*Melilotus officinalis* (L.) Desr. (KÜH 21135)	Sarıyonca	Flower, leaf	2	2	0.038	0.038	Dyspepsia, rheumatism	Decoction is prepared from leaves and flowers and drunk	Emollient, arthritis, rheumatism demulcent, aphrodisiac, tonic, carminative, painkiller, aches, leukoderma, bronchitis, brachialgia, hemorrhoids, [121,122]
Fagaceae	*Quercus infectoria* Oliv. subsp. *veneris* (A.Kern.) Meikle (KÜH 21136)	Meşe	Leaf, fruit	2	3	0.038	0.058	Intestinal disorders, diarrhea, anti-inflammatory	Infusion is prepared from leaves and drunk. The fruits are dried, ground, and consumed as coffee. The leaves and fruit are boiled and applied directly to the infected area	Alopecia, ulcer, diarrhea, gingivitis, hemorrhage hematuria, menorrhagia, pharyngitis, ringworm, wound healing, postpartum practices, skin disease [123,124]
Hypericaceae	*Hypericum perforatum* L. (KÜH 21137)	Sarı kantaron	Flower, leaf	4	11	0.077	0.212	Intestinal worm, diuretic, sedative, inappetence, mental disorder, wound healing, diarrhea, rheumatism, blood purifier	Decoction or infusion is prepared from leaves and flowers and drunk. The flowers are crushed, boiled, and the juice is drunk	Anemia, cough, antiseptic, sedative, urogenital, anthelmintic, stomach ache, neoplastic disease, diabetes, dyspepsia, cancer, wound healing, burns, hypertension, sedative, hemorrhoids, chest emollient, diuretic, antipyretic, ulcer, abrasion, anti-inflammatory, hemostatic, bronchitis, constipation, depurative, diarrhea, enterocolitis, gastric-ulcer, genitourinary disorders, jaundice,

(*Continued*)

Table 2: *Continued*

Family	Botanical name (voucher specimen)	Vernacular name	Used parts	FC	UR	RFC	UV	Purpose of usage	Mode of preparation/ application	Reported literature uses
										neurosis, urinary tract infection, influenza, arthritis, abdominal pain, enteritis, expelling worms, stomach diseases, hypertensive, arteriosclerosis, asthma, bronchitis, chest diseases, common cold, pharyngitis, dyspnea, tuberculosis, cancer, eczema, herpes labialis, cardiac diseases, skin diseases, earache, facial paralysis, insomnia, internal hemorrhage, osteoporosis, rheumatism, toothache, anti-fungal, inappetence, diaphoretic, sedative, prostates, gynecological diseases, neurological diseases, vasodilator, dysmenorrhea, herpes zoster, migraine [5,33–35,39,43,44,46,47,50,51,57–59, 61,65,68,74–76,81,83,85,86,102,116, 117,125,126]
Iridaceae	*Crocus ancyrensis* (Herb.) Maw (KÜH 21138)	Çiğdem	Whole plant	1	1	0.019	0.019	Earache	The whole plant is boiled and dripped into the ear	Abdominal pain, diuretic [127]
Juglandaceae	*Juglans regia* L. (KÜH 21139)	Ceviz	Leaf	1	1	0.019	0.019	Analgesic	Leaves of *Urtica dioica*, *Elymus repens*, *Juglans regia*, *Salix* × *fragilis*, and *Sambucus ebulus* are boiled and the aching place is immersed in water	Diabetes, eczema, antiseptic, inappetence, goiter, cholesterol, hyperglycemia, abscess, sore throat, cancer, joint pain, kidney stone, wounds, intestinal worm, analgesic, acne, asthma, rheumatism, leg pain, hemorrhoids, bee bite, eczema, edema, cardiac disorders, vasodilator, dyspepsia, hair care, headache, vaginitis, kidney diseases, osteoporosis, respiratory tract problem, skin diseases, sunstroke, anti-fungal, hemostatic, hypoglycemic, tonic, psoriasis, cough, mnemonic, wounds, burns, myalgia

(*Continued*)

Table 2: *Continued*

Family	Botanical name (voucher specimen)	Vernacular name	Used parts	FC	UR	RFC	UV	Purpose of usage	Mode of preparation/ application	Reported literature uses
										and neurogenic pain, body skin conditioner, anthelmintics, itching, toothache, smoking cessation [5,34–36,38,39,42,44,47,51,54,57–59, 61–63,65,66,73,76,78,81–83,86,92, 117,128–130]
Lamiaceae	*Lamium maculatum* L. (KÜH 21140)	Ballıbaba	Flower, leaf	2	3	0.038	0.058	Hemorrhoid, mumps	Infusion is prepared from flowers and leaves and drunk	Trauma, fracture, hypertension [131]
Lamiaceae	*Lavandula stoechas* L. (KÜH 21141)	Karabaş otu	Flower	1	1	0.019	0.019	Heart health	It is drunk using the method of infusion with *Melissa officinalis* and *Crataegus orientalis*	Obesity, cholesterol, diabetes, hypertension, atherosclerosis, heart disease, hyperglycemia [132]
Lamiaceae	*Marrubium vulgare* L. (KÜH 21142)	Bertikotu	Aerial parts	1	1	0.019	0.019	Joint pain	Aerial parts are boiled with milk, applied to the aching place	Gallstone, hair loss, headache, measles, stomach ache, urinary tract infection, liver problems, flu, antiseptic, cholagogue, antispasmodic, stimulant, cough, hoarseness, bronchitis [133,134,135]
Lamiaceae	*Melissa officinalis* L. (KÜH 21143)	Melisa	Leaf, petiole, branch, flower	4	7	0.077	0.135	Heart health, hypertension, insomnia, mental disorder	Decoction or infusion is prepared from dried leaves and drunk	Promotes sleep, gastrointestinal disorders, hysteria, melancholia, migraine, toothache, earache, headache, cholesterol, rheumatism, nerve pains, stiff neck, neuralgia, heart problems, bronchitis, digestive, diarrhea, hemostasis, tracheobronchitis, otitis, arthritis, pharyngitis, migraine, insomnia, gynecological diseases, gout, dizziness, anemia, sedative, galactagogue, bruises, burns, furunculosis, parodontids [35,136,137]
Lamiaceae	*Mentha longifolia* (L.) L. subsp. *typhoides* (Briq.) Harley (KÜH 21144)	Yarpuz	Leaf, stem, flower	3	5	0.058	0.096	Nausea, abdominal pain	Decoction is prepared from leaves, stems, and flowers and drunk	Abdominal pain, carminative, diarrhea, hemorrhoids, digestive disorders, intestinal diseases, stomach disorders, cough, common cold, flu, tonsillitis, halitosis, headache, lumbago, sunstroke, skin diseases, rheumatism, dyspnea, menstrual disorders, infertility [38,42, 43,47,54,59,63,66,67,68,82,117]

(*Continued*)

Table 2: *Continued*

Family	Botanical name (voucher specimen)	Vernacular name	Used parts	FC	UR	RFC	UV	Purpose of usage	Mode of preparation/ application	Reported literature uses
Lamiaceae	*Mentha spicata* L. (KÜH 21145)	Nane	Leaf, petiole	2	3	0.038	0.058	Common cold, headache, sinusitis	The decoction is prepared from leaves and drunk with lemon. Leaves and petioles are boiled, and then a vapor bath is made	Hemorrhoids, nerves, tincture, common cold, nausea, respiratory disease, stomach ache, abdominal pain, cough, flu, dyspnea, gastrointestinal diseases, cardio tonic, vasodilator, eczema, gastric ulcer, reflux, stimulates lactation of nursing mothers, digestive disorders, vomiting, carminative, diuretic, diaphoretic, increases bile production, anti-infective, diarrhea, nasal bleeding, nervous headaches, migraine, intestinal disorder, hiccups [35,42,53,54,57,74,76,78,82,93,104, 109,138–140]
Lamiaceae	*Ocimum basilicum* L. (KÜH 21140)	Fesleğen	Leaf, stem, flower	3	3	0.058	0.058	Dyspepsia, dizziness	The infusion is prepared from leaves, stems, and flowers and drunk	Diabetics, cardiovascular disorders, pimples, headache, cough, kidney malfunction, insect sting, snake bite, skin infection, ache, pain, sedative, purgative, antidepressant, vulnerary, rheumatism, diarrhea, orexigenic, digestive, carminative, anti-inflammatory [35,141,142]
Lamiaceae	*Salvia tomentosa* Mill. (KÜH 21146)	Adaçayı	Leaf, flower	3	5	0.058	0.096	Asthma, common colds	Decoction is prepared from leaves and flowers and drunk	Pharyngitis, respiratory tract diseases, flu, bronchitis, diarrhea, asthma, rheumatism, tonsillitis, throat ache, toothache, gastrointestinal diseases, neurotic, abdominal pain [57,68,85,143,144]
Lamiaceae	*Teucrium chamaedrys* L. (KÜH 21147)	Mayasırotu	Leaf	1	1	0.019	0.019	Hemorrhoid	Decoction is prepared from leaves and drunk	Malaria, spasmodic, appetizing, diabetes, hemorrhoid, gastric pain, heart diseases, intestinal colic, kidney diseases, chapped, fissure [145]
Lamiaceae	*Thymus longicaulis* C.Presl (KÜH 21148)	Dağ kekiği	Aerial parts	3	6	0.058	0.115	Influenza, common cold	The infusion is prepared from the aerial parts and drunk	Antiseptic, expectorant, spasmolytic, enteralgia, stomach ache, diabetes [146,147]
Lamiaceae	*Thymus sipyleus* Boiss. (KÜH 21149)	Yumuşak kekik	Leaf, branch, flower,	4	8	0.077	0.154	Anemia, cholesterol, diabetes,	Decoction or infusion is prepared from leaves,	Abdominal pain, diabetes, expectorant, breath problems, sunstroke, laxative, pulmonary

(*Continued*)

Table 2: *Continued*

Family	Botanical name (voucher specimen)	Vernacular name	Used parts	FC	UR	RFC	UV	Purpose of usage	Mode of preparation/ application	Reported literature uses
			aerial parts					hypertension, influenza, insomnia, bronchitis, common colds	branches, flowers, or aerial parts and drunk	diseases, common colds, ulcer, stomach ache, hypotension, emollient, toothache [141,148–150]
Lauraceae	*Laurus nobilis* L. (KÜH 21150)	Defne	Leaf	2	2	0.038	0.038	Rheumatism, anti-inflammatory	Decoction is prepared from leaves and drunk	Analgesic, anthelmintic, antipyretic, antiseptic, antispasmodic, antistress, cough, bee sting, cardiovascular, common cold, chokes, diabetes, diaphoretic, diarrhea, diuretic, dyspepsia, dyspnea, eczema, enteritis, emmenagogue, expectorant, flatulence, hair care, headache, hemorrhoid, inappetence, intestinal diseases, itching, kidney diseases, prostatitis, respiratory disease, rheumatism, scorpion bite, sedative, skin diseases, snake bite, stomach ache, stomach disorders, sweaty, tonic, ulcer, wound, weakness [5,38,39,43,45,46,51,52,65,83,92,108-,130,144,148,151]
Malvaceae	*Althaea officinalis* L. (KÜH 21151)	Hatmi çiçeği	Flower	2	3	0.038	0.058	Expectorant, common cold, toothache	Decoction is prepared from flowers and drunk	Diuretic, expectorant, ulcer, antilithic, emollient, demulcent, wound, bronchitis [52,61,141]
Malvaceae	*Malva sylvestris* L. (KÜH 21152)	Ebegömeci, Kaba otu	Leaf, stem	4	5	0.077	0.096	Cough, sore throat, stomach ache, bronchitis, dyspnea	Decoction or infusion is prepared from leaves and drunk	Gargle, sore throat, skin disorders, wound, maturation, dyspepsia, internal injury, abscess, abortive, common colds, flu, cough, stomach diseases, cancer, diuretic, stomach ache, rheumatism, infertility, carminative, mouth, kidney, gut and throat inflammations, abdominal pain [33,35,41,50,51,53,73, 77,81,82,102,109]
Malvaceae	*Tilia rubra* DC. subsp. *caucasica* (Rupr.) V.Engl. (KÜH 21153)	Ihlamur	Flower, bract, seed	12	21	0.231	0.404	Abdominal pain, common cold, cough, influenza, bronchitis	Decoction or infusion is prepared from flowers, bracts, and seeds and drunk	Diuretic, diaphoretic, cough, asthma, stomach diseases, tonsillitis, gastric diseases, common cold, tachycardia, liver disease, sedative, flu, dyspepsia, sore throat [5,34,35,42,45,59,65,74, 81,84,85,86]

(*Continued*)

Table 2: *Continued*

Family	Botanical name (voucher specimen)	Vernacular name	Used parts	FC	UR	RFC	UV	Purpose of usage	Mode of preparation/ application	Reported literature uses
Moraceae	*Morus nigra* L. (KÜH 21154)	Kara dut	Leaf, fruit	2	2	0.038	0.038	Diabetes, anemia	Decoction or infusion is prepared from dried leaves and drunk. The molasses of the fruit is consumed	Worm, hematinic, anti-inflammatory, cancer, expectorant, stomach disorder, cholesterol, blood forming, gargle, oral wound, diabetes, odor, gingival disease [5,50,51,65,68,85]
Nitrariaceae	*Peganum harmala* L. (KÜH 21155)	Üzerlik otu	Leaf, stem, flower	1	3	0.019	0.058	Stomach ache, expectorant, joint pain	The infusion is prepared from leaves, stems, and flowers and drunk	Snake repellent, cardiac pains, muscle spasm, food poisoning, rabies, vermicide, rheumatic, hair-fall, aphrodisiac, headache, nervous seizure, blood purification, hepatitis, antibacterial, eczema, pruritus, gangrene, tranquilizing, sterility, epilepsy, varicose veins, allergic influenza, hay fever, joint and rheumatic pains, hemorrhage, sexual potency enhancer elephantiasis and urinal incontinence/bed wetting [152,153,154]
Oleaceae	*Olea europaea* L. (KÜH 21156)	Zeytin	Leaf	1	2	0.019	0.038	Lose weight, edema	Infusion is prepared from leaves and drunk	Diabetes, cholesterol, bronchitis, toothache, defuse, diuretic, inappetence, constipation, antipyretic, wound healing, burns, bruises, sprains, broken and dislocated bones, abscess, alopecia, oral wounds, nail/ slivers, scorpion bite, cardio tonic, tachycardia, vasodilator, carminative, cancer, hemorrhoids, common cold, cough, diabetes, earache, eye diseases, foot swelling, hypertension, nodule, rheumatism, hemostatic, febrifuge, memory improvement, hyperuricemia, sore throat [5,35,38, 39,42,45,47,51,54,57,61,62,67,73, 74,86,117]
Onagraceae	*Epilobium angustifolium* L. (KÜH 21157)	Yakı otu	Leaf	2	3	0.038	0.058	The prostate, urinary tract infection	Infusion is prepared from leaves and drunk	Ulcers, swelling, gastritis, colitis, dysentery, diarrhea, prostate, urinary problems, voiding disorders, mouth wounds, skin disorders, burns, skin irritation, swelling and boils of the skin, blood purifier, antiseptic, migraine headaches, insomnia, anemia, delirium, infections, cold [155,156]

(*Continued*)

Table 2: *Continued*

Family	Botanical name (voucher specimen)	Vernacular name	Used parts	FC	UR	RFC	UV	Purpose of usage	Mode of preparation/ application	Reported literature uses
Orobanchaceae	*Euphrasia pectinata* Ten. (KÜH 21158)	Gözotu	Seed	1	1	0.019	0.019	Eye diseases	The seed is boiled and a vapor bath is applied to the eye	Wound healing [5]
Papaveraceae	*Chelidonium majus* L. (KÜH 21159)	Temre otu	Leaf, stem	1	1	0.019	0.019	Antiseptic	Leaves and stems are crushed, then applied directly	Abscess, analgesic, bronchitis, burns, diuretic, fistulae, herpes, foot corns, laxative, cholagogue, sedative, stomach ache, stomach diseases, stimulant, eczema, skin diseases, acne, warts, jaundice, pains, wound healing, gall bladder, liver, fungal infection, moles, eye diseases, alopecia areata, sores, calluses, callosities [5,33,34,37,40,41,54,56,68,77,86,10-4,139,157]
Papaveraceae	*Fumaria officinalis* L. (KÜH 21160)	Şahtere otu, Tilki kişnişi	Leaf, flower, stem	1	3	0.019	0.058	Blood purifier, diaphoretic, diuretic	Decoction is prepared from leaves, flowers, and stems and drunk	Rheumatism, skin disorders, hypertension, asthma, blood purifier, itching, scabies treatment, liver ailments, constipation, cystitis, arteriosclerosis, rheumatoid arthritis, hypoglycemia, infections [158]
Papaveraceae	*Papaver rhoeas* L. (KÜH 21161)	Gelincik	Flower	2	2	0.038	0.038	Whooping cough	Decoction is prepared from flowers and drunk	Cough, insomnia, sedative, painkiller [159]
Pinaceae	*Pinus nigra* J.F.Arnold subsp. *pallasiana* (Lamb.) Holmboe (KÜH 21162)	Karasakız	Resin, bark, cone	4	11	0.077	0.212	Stomach disorder, bronchitis, common cold, kidney disorder, sprains, lung disease, asthma	Resin is consumed fresh. Decoction is prepared from bark and drunk. The heated resin is applied directly to the bone fracture or sprains. Cones are used in jam making and are consumed	Asthma, wound, bronchitis, common cold, cough [160]
Pinaceae	*Pinus sylvestris* L. var. *hamata* Steven (KÜH 21163)	Çam	Cone, resin	6	10	0.115	0.192	Common cold, influenza, asthma, anti-inflammatory, wound healing	Cones are used in jam making and are consumed. Decoction is prepared from cones and drunk. The resin is heated and applied directly to the infected area. The resin is cooked with butter, turned into a paste with starch, and applied to the	Abscess, anthelmintic, anti-fungal, antiseptic, cough, asthma, bronchitis, burns, calmative, cancer, common cold, colophony, diabetes, diaphoretic, diarrhea, diuretic, dyspnea, eczema, emollient, expectorant, immune system booster, internal diseases, kidney disorders,

(*Continued*)

Table 2: *Continued*

Family	Botanical name (voucher specimen)	Vernacular name	Used parts	FC	UR	RFC	UV	Purpose of usage	Mode of preparation/ application	Reported literature uses
									relevant wound or infected area	lung infections, panacea, podagra, rheumatism, scabs, sinusitis, skin diseases, snake bites, stops bleeding, stomach ache, tonic, tuberculosis, ulcer, vulnerary, whooping cough, wound healing, backache, bone fracture, dysmenorrhea, tetanus, neurotic [5,32,35–37,40,45,50, 51,68,73,86,104,157]
Plantaginaceae	*Plantago lanceolata* L. (KÜH 21164)	Sinir otu	Leaf	3	7	0.058	0.135	Lung disease, dyspepsia, diarrhea, stomach disorder, wound healing	Infusion is prepared from leaves and drunk. Leaves are applied directly to the wounds	Hemostatic, burns, sinusitis, ulcer, gynecological diseases, stomach disorder, ulcer, wound healing, antiseptic, acne, mouth sores odor, inappetence, dyspepsia, embolism, abscess, bee bites, eczema, wart, asthma, bronchitis, cough, tuberculosis, atherosclerosis, diarrhea, hemorrhoids, urinary tract inflammation, antipyretic, sedative, dyspnea, diabetes, stomach ache, intestinal disorder, sedative, osteoarthritis, constipation, urinary tract infection, goiter, heart ailments [5,33,34,39,42,43,44,46,47,51,54,59,-61,63,65,66,73,78,82,86,117,128]
Plantaginaceae	*Plantago major* L. (KÜH 21165)	Siğilotu, Eyvadana otu, Sivilce otu	Leaf	8	11	0.154	0.212	Wart, anti-inflammatory, wound healing, low back pain, abdominal pain, analgesic, abscess	Leaves are made to apply directly on the wart, abscess, inflamed area, or wound	Anti-inflammatory, erysipelas, rash, urticaria, toothache, asthma, dyspnea, diabetes, diarrhea, hemorrhoids, embolism, edema, goiter, kidney stone, vaginitis, analgesic, influenza, warts, knee pain, vulnerary, abscess, wound healing, antiseptic, acne, rheumatism, stomach ache, cough, sedative, osteoarthritis, urinary tract disorder, goiter, heart ailments, sinusitis, stomach disorder, psoriasis, hair loss, infarction, cholesterol, eczema, cancer, coronary diseases,

(*Continued*)

Table 2: *Continued*

Family	Botanical name (voucher specimen)	Vernacular name	Used parts	FC	UR	RFC	UV	Purpose of usage	Mode of preparation/ application	Reported literature uses
										bleeding, digestive disorder, gastritis, gastro-intestinal disorders, expectorant, jaundice, bronchitis, diuretic vasodilator, pricks, felons, cardiovascular diseases, panacea, kidney cancer, constipation [5,32,33–35,36,38,39,44,46,47,51,53,-54,56,58,59,62,63,65,66,67,77,78,81,-85,86,92,104,105]
Platanaceae	*Platanus orientalis* L. (KÜH 21166)	Çınar	Leaf	2	2	0.038	0.038	Bronchitis, rheumatism	Decoction is prepared from leaves and drunk	Constipation, antipyretic, arthrolith, edema, kidney disorders, kidney stones, dyspnea, diarrhea, wound healing, tonic, toothache, diuretic, mouthwash, diabetes, rheumatism, osteoarthritis, backache, joint pain, severe eye inflammation, dysentery, peeling skin, snakebite, urinary tract disorder [5,36,46,54,55,67,73,86,92,143,148,1-61,162]
Poaceae	*Avena sativa* L. (KÜH 21167)	Yulaf	Leaf	1	2	0.019	0.038	Diuretic, stomach disorder	Infusion is prepared from leaves and drunk	Nervous exhaustion, insomnia, weakness of the nerves, antispasmodic, antitumor, cyanogenetic, demulcent, diuretic, neurotronic, stimulant, tonic, vulnerary [163]
Poaceae	*Elymus repens* (L.) Gould (KÜH 21168)	Ayrık otu	Root, leaf	8	14	0.154	0.269	Kidney sand, kidney stone, edema, kidney disorder, urinary tract infection, osteoarthritis, analgesic	Decoction or infusion is prepared from fresh leaves and drunk. Infusion is prepared from roots and drunk. Leaves of *Urtica dioica*, *Elymus repens*, *Juglans regia*, *Salix* × *fragilis*, and *Sambucus ebulus* are boiled and the aching place is immersed in water	Diuretic, calming, pain in urinary tract disorders, demulcent, tonic, cystitis, urethritis, prostate [164]

(*Continued*)

Table 2: *Continued*

Family	Botanical name (voucher specimen)	Vernacular name	Used parts	FC	UR	RFC	UV	Purpose of usage	Mode of preparation/ application	Reported literature uses
Poaceae	*Zea mays* L. (KÜH 21169)	Mısır	Style	1	1	0.019	0.019	Urinary tract infection	Decoction is prepared from styles and drunk	Hemorrhoids, urinary system, kidney stones, burns, prostate cancer, pyelonephritis, diabetes, diarrhea, diuretic, gonorrhea, aphrodisiac, hypertension, ringworm, prostate, whitlow, rheumatism, abdominal pain, intestinal worms, stomach ache, cough, sore throat, dysmenorrhea, dysuria, edema, urinary tract inflammation, goiter [32,33,35,37,39,42,45,47,54,59,61,62-,63,65,66,77,78,83,86,91,92,108,139]
Polygonaceae	*Rumex acetosella* L. (KÜH 21170)	Kuzukulağı	Root	1	1	0.019	0.019	Diuretic	Decoction is prepared from roots and drunk	Anti-inflammatory, cholagogue, diuretic, diabetes, cholesterol, abscess, hypertension, stomachic, digestive disorders, tooth inflammation, abdominal pain, sinusitis, eczema, cardiovascular diseases, constipation, gastrointestinal disorders, melancholia, palpitations, infectious disease, gastric acidity, metabolic disorders, diseases of the adrenal glands, skin diseases, neck tumors, women's diseases, diarrhea, dysentery, hemorrhoids, hemostatic, liver diseases, acne [5,33,34,35,65,73,81,157,165,166]
Polygonaceae	*Rumex crispus* L. (KÜH 21171)	Develik, Labada	Seed, root	2	4	0.038	0.077	Diarrhea, itch, urinary bladder	Decoction is prepared from seeds and drunk. Decoction is prepared from roots and drunk for itching	Constipation, diarrhea, eczema laxative, diuretic, antipyretic, wound cure, anti-inflammatory [5]
Rosaceae	*Agrimonia eupatoria* L. subsp. *asiatica* (Juz.) Skalicky (KÜH 21172)	Burçotu	Leaf, stem	3	4	0.058	0.077	Sprains, liver disorder, rheumatism, dyspepsia	Leaves are applied directly to the wounds. Decoction is prepared from leaves and stems and drunk	Emollient, expectorant, varicose veins, phlebitis, liver disorder, diuretic, tuberculosis, astringent [49]
Rosaceae	*Alchemilla mollis* (Buser) Rothm. (KÜH 21173)	Aslan pençesi	Leaf, flower	8	10	0.154	0.192	Menopause, menstrual irregularity, migraine	Decoction or infusion is prepared from leaves and flowers and drunk. Decoction is prepared from leaves and drunk for migraine	Menopausal discomfort, gynecological disorders, dysmenorrhea, menorrhagia, menstrual pain, wounds, skin disorders [167]

(*Continued*)

Table 2: *Continued*

Family	Botanical name (voucher specimen)	Vernacular name	Used parts	FC	UR	RFC	UV	Purpose of usage	Mode of preparation/ application	Reported literature uses
Rosaceae	*Crataegus orientalis* Pall. ex M.Bieb. (KÜH 21174)	Alıç, Yemişen	Leaf, fruit, flower	5	8	0.09-6	0.154	Heart health, vessel stiffness, hypertension, eye diseases	Decoction is prepared from leaves and drunk. Fruits are consumed as fresh or marmalade. It is drunk using the method of infusion with *Melissa officinalis* and *Lavandula stoechas*	Hypertension, throat inflammation, diabetes, blood pressure, nerves, kidney sands, insomnia, itching, asthma, bronchitis, intestinal problems, vascular occlusion, kidney stones, shortness of breath, heart diseases, urinary tract disorder, stomach disorders, cough [76,168]
Rosaceae	*Cydonia oblonga* Mill. (KÜH 21175)	Ayva	Leaf, fruit, seed	4	6	0.077	0.115	Common cold, cough, acne, tonsillitis	Decoction is prepared from leaves and drunk. The seeds are kept in water for one night, and then they are pounded and when turned into mush, they are applied to the acne. The fruit is cut in half, cooked on embers and wrapped in the throat	Galactagogue, edema, heart, diarrhea, expectorant, common cold, cough, dyspepsia, breast feeding nipple wound, psoriasis, cancer, cardiac diseases, sore throat, respiratory tract problem, cystitis, dysuria, kidney stone, urinary disorders, sterility, gastrointestinal diseases, stomach ache, diuretic, earache, headache, hypoglycemic, antihypertensive, appetizer, tranquilizer, nausea, heartburn, pyrosis, sedative, dysmenorrhea, hemorrhoids, dyspnea [33,35,36,38,39,45–47, 54,57–59,61,62,67,68,74,76,85,93,102, 116,117,128,151,169]
Rosaceae	*Fragaria vesca* L. (KÜH 21176)	Çilek	Leaf	2	2	0.038	0.038	Hypertension	Decoction is prepared from leaves and drunk	Tonic, diabetes, constipation, inappetence, diuretic, headache, blood pressure, kidney disorder, heart disorder, diarrhea, fever, skin diseases, laxative, digestive disorders, hemorrhoids, common cold [5,34,35,55,68,102,170,171]
Rosaceae	*Mespilus germanica* L. (KÜH 21177)	Döngel	Leaf	1	2	0.019	0.038	Urinary tract infection, kidney disorder	Fir cones, barley and *Mespilus* leaves are boiled and drunk	Kidney disorder, diarrhea, gastric, abdominal pain, anthelmintic, hemorrhoids, asthma, bronchitis, common colds, cough, flu, tuberculosis, diabetes, eczema, hypertension, diuretic, kidney stone, bladder stone, hemostatic, stomach and intestinal

(*Continued*)

Table 2: *Continued*

Family	Botanical name (voucher specimen)	Vernacular name	Used parts	FC	UR	RFC	UV	Purpose of usage	Mode of preparation/ application	Reported literature uses
										disorders, urinary sand, sedative, gastroenterology diseases, dysentery, angina, laryngitis, toothache, varicose veins, scabies, inflamed digestive tracts, dyspepsia, stomach ache, dysmenorrhea, urolithiasis [36,39,45, 47,54,68,77,81,89,116,157,161]
Rosaceae	*Potentilla recta* L. (KÜH 21178)	Beşparmak otu	Leaf	1	1	0.019	0.019	Toothache	Infusion is prepared from leaves and drunk	Dental and oral healthcare, skin diseases, gastrointestinal disorders, neurological disorders, respiratory disorders [172]
Rosaceae	*Prunus avium* (L.) L. (KÜH 21179)	Kiraz	Pedicel	2	3	0.038	0.058	Lose weight, urinary tract infection	Decoction or infusion is prepared from pedicels with corn styles and drunk	Intestinal disorders, urinary tract disorder, diarrhea, diuretic, abdominal pain, carminative, dysuria, kidney stone, bronchitis, constipation, renal diseases, edema, common cold, anti-inflammatory, immune system booster, anti-coagulant, cough, hemorrhoids, whooping cough, stomach disorder, dyspepsia [33,36,42, 45,47,53,54,61,68,74,83,84,86,93]
Rosaceae	*Prunus divaricata* Ledeb. (KÜH 21180)	Erik	Fruit	2	2	0.038	0.038	Analgesic, intestinal disorder	Fruit leather, applied directly to the aching place for one night. Fruits are consumed fresh	Urinary system disorders, cardiovascular, gastrointestinal disorders, respiratory disorders [172]
Rosaceae	*Prunus mahaleb* L. (KÜH 21181)	Mahlep	Fruit, leaf	1	1	0.019	0.019	Diuretic	Decoction is prepared from leaves and fruits and drunk	Urinary system disorders, cardiovascular, gastrointestinal disorders, respiratory disorders [172]
Rosaceae	*Rosa canina* L. (KÜH 21182)	Kuşburnu	Fruit	4	9	0.077	0.173	Influenza, roborant, stomach ache, anemia, diabetes, heart health, common cold	Fruits are consumed as jam, marmalade or put in water to make decoction or infusion and drunk.	Herpes zoster, flu, hemorrhoids, common cold, diarrhea, diabetes, kidney stone, sedative, tonic, constipation, tinea pedis, prostatitis cancer, cough, hepatitis, malaria, stomach ache, dyspnea, ease inhalation, influenza, healthy living, analgesic, abdominal pain, anemia, antiemetic, antipyretic, hemostatic, atherosclerosis, bronchitis, bruises,

(*Continued*)

Table 2: *Continued*

Family	Botanical name (voucher specimen)	Vernacular name	Used parts	FC	UR	RFC	UV	Purpose of usage	Mode of preparation/ application	Reported literature uses
										carminative, dysuria, eye hemostatic, foot pain, gallstones, heartaches, inflamed gall bladder, inappetence, intestinal disorders, reduce thirst, gastric inflammation, mouthwash, snake bites, sore throat, stomach disorders, sudorific, abscess, burns, eczema, itching, rash, wart, wound healing, allergy, respiratory tract disorders, cancer, cystitis, intrauterine inflammation, kidney disorders, eye strain, heart diseases, hypertension, thyroid, rheumatism, aphrodisiac, urine retention, tuberculosis, vasodilator, panacea [5,33–35,38,39,42–47,49–51, 53–55,58,59,61,63,65,67,68,73, 76,85, 92,105,116,117,128,151,157,173,174]
Rosaceae	*Rubus canescens* DC. (KÜH 21183)	Böğürtlen	Leaf, branch	2	2	0.038	0.038	Hemostatic, kidney sand	The leaves are chewed in the mouth and applied to the bleeding area. The leaves and branches are boiled with the root of *Elymus repens* and drunk	Aphthae, burn, cancer, gingival bleeding, cardiac diseases, diuretic, diabetes, gonorrhea, hypertension, hemostatic, hemorrhoids, infertility, cough, anemia, tonsillitis, antiemetic, antipyretic, asthenopia, diarrhea, wounds, anti-aging, eye and mouth sore, hair care, anti-inflammatory, stomach disorder [35,45,50,65,68,83, 85,102,151,175,176]
Rosaceae	*Rubus hirtus* Waldst. & Kit. (KÜH 21184)	Böğürtlen	Leaf, fruit, roots	4	7	0.077	0.135	Rheumatism, stomach disorder, anemia, eye diseases, kidney sand, urinary tract infection	Fruits are consumed fresh. Decoction or infusion is prepared from leaves and drunk. Decoction is prepared from roots and drunk as kidney sand	Burn, wound healing, hemostatic, tonic, anemia, dyspnea, diabetes, eczema, hemorrhoids, nephritis, prostate [34,50,68,176]

(*Continued*)

Table 2: *Continued*

Family	Botanical name (voucher specimen)	Vernacular name	Used parts	FC	UR	RFC	UV	Purpose of usage	Mode of preparation/ application	Reported literature uses
Rubiaceae	*Galium palustre* L. (KÜH 21185)	Yapışkan otu	Leaf	2	4	0.038	0.077	Anemia, diuretic, intestinal disorder	Decoction is prepared from leaves and drunk	No record
Salicaceae	*Salix* × *fragilis* L. (KÜH 21186)	Söğüt	Leaf	1	1	0.019	0.019	Analgesics	Leaves of *Urtica dioica*, *Elymus repens*, *Juglans regia*, *Salix* × *fragilis*, and *Sambucus ebulus* were boiled and the aching place was immersed in water	Fever [177]
Scrophulariaceae	*Verbascum thapsus* L. (KÜH 21187)	Sığırkuyruğu	Aerial parts, leaves	2	2	0.038	0.038	Hemorrhoid, bronchitis	Aerial parts are boiled, then vapor bath is made. Decoction is prepared from leaves and drunk	Wounds, asthma, bronchitis, ulcers, tumors, piles, analgesic, lumbago, joints, diarrhea, dysentery, skin infections, demulcent, astringent, aphrodisiac, tuberculosis, respiratory tract disorders, cough, blood purifier, influenza, burns, ear ailments, blood diseases, cuts, diuretic, infections, sores, abscess, colds, constipation, dysentery, mental relaxation, pulmonary problems, sores, styptic, anti-inflammatory, gynecological problems [178]
Solanaecae	*Hyoscyamus niger* L. (KÜH 21188)	Ban otu	Flower, leaf	1	1	0.019	0.019	Heart health	The infusion is prepared from leaves and flowers and drunk	Analgesic, sedative, itching, stomatitis, dyspnea, toothache, earache, expel worms from eyes, headache, antitumor, febrifuge, neuralgia, rheumatism, hysteria, migraine, sinusitis [5,50,54,57,68,73,102]
Solanaceae	*Solanum tuberosum* L. (KÜH 21189)	Patates	Root	4	6	0.077	0.115	Intestinal disorders, dyspepsia, cancer, headache, stomach ache	The bark of the root is grated, the juice is squeezed and half a tea glass is drunk. The potato is cut in half and applied directly to the forehead	Headache, eye disorders, burns, eczema, edema, swelling, analgesic, diarrhea, sunburn, anti-inflammatory, fever, cough, sedative, stomach ache, stomach disorders, [33,35,36,42,47, 54,61,62,67,68,73,76,109]
Urticaceae	*Urtica dioica* L. (KÜH 21190)	Isırgan	Root, leaf,	16	27	0.308	0.519	Cancer, stomach ache,	The cleaned root is boiled for 10 min and drunk. Leaves are	Immune system booster, evil-eye, anemia, alopecia, fever, neuralgia,

(*Continued*)

Table 2: *Continued*

Family	Botanical name (voucher specimen)	Vernacular name	Used parts	FC	UR	RFC	UV	Purpose of usage	Mode of preparation/ application	Reported literature uses
			aerial parts, seed, petiole					analgesic, hypertension, urinary tract infection, prostate, rheumatism, common cold, heart health, hemorrhoids, jaundice, dyspepsia, roborant, immunity, joint pain	cut pasted and used externally on rheumatism for one night. Decoction is prepared from leaves and drunk. A meal made from leaves and seeds is consumed. Leaves of *Urtica dioica*, *Elymus repens*, *Juglans regia*, *Salix* × *fragilis*, and *Sambucus ebulus* are boiled and the aching place is immersed in water. Leaves, stems, and seeds are boiled, then applied to the aching area	cicatrizing, anthrax, scabby, kidney disorder, nose bleeding, malicious wounds, ulcer, joint pain, antiseptic, sedative, hypertension, bleeding, cholesterol, cardiovascular, acne, oily seborrhea, radiculitis, liver disease, biliary tract, uterine, pneumonic, intestinal hemorrhages, dysentery, purgative, expectorant, anastatic, anticonvulsant, antipyretic, podagra, bruises and injuries, diuretic, stomach ache, cancer, dyspepsia, hypertension, jaundice, leg pain, measles, rheumatism, dandruff, anemia, diabetes, bronchitis, depurative, anti-inflammatory, hemorrhoids, skin diseases, measles, allergic diseases, low back pain, cough, eczema, respiratory disease, tonsillitis, analgesic, anthrax, antiseptic, arthritis, common colds, flu, gynecological disorders, tuberculous, gout, menstrual irregularity, dysmenorrhea, intestinal worm, hair cleaning, whooping cough, dyspnea, prostate [5,32–36,38,39, 42,45,47,49–51,61–63,65,66,68,74, 83,93,105,117,151]
Zingiberaceae	*Zingiber officinale* Roscoe (KÜH 21191)	Zencefil	Root	1	1	0.019	0.019	Migraine	Decoction is prepared from roots and drunk	Nausea, pains, vomiting, asthma, cough, constipation, palpitation, inflammation, dyspepsia, loss of appetite, indigestion [179]

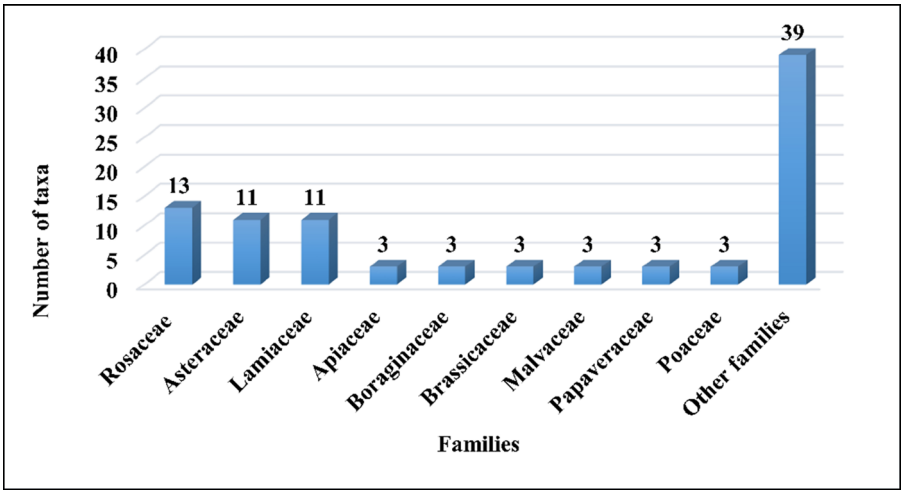

Figure 3: The most-cited plant families.

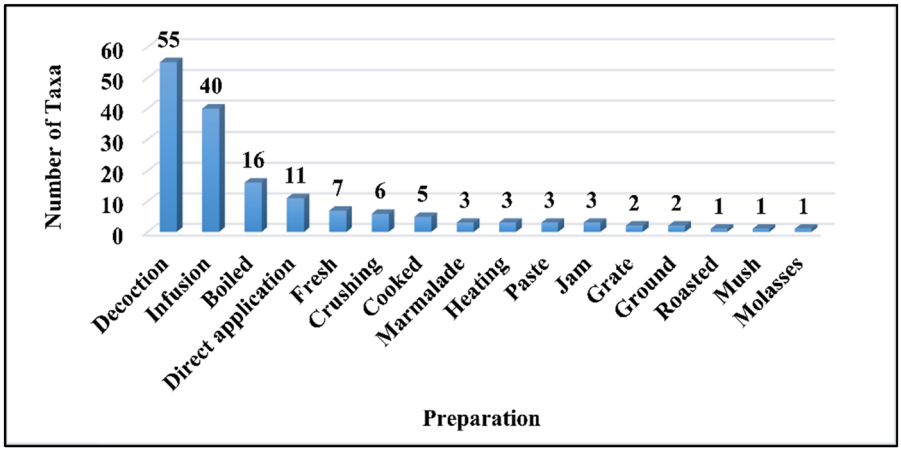

Figure 4: Preparation methods of folk medicines in the region.

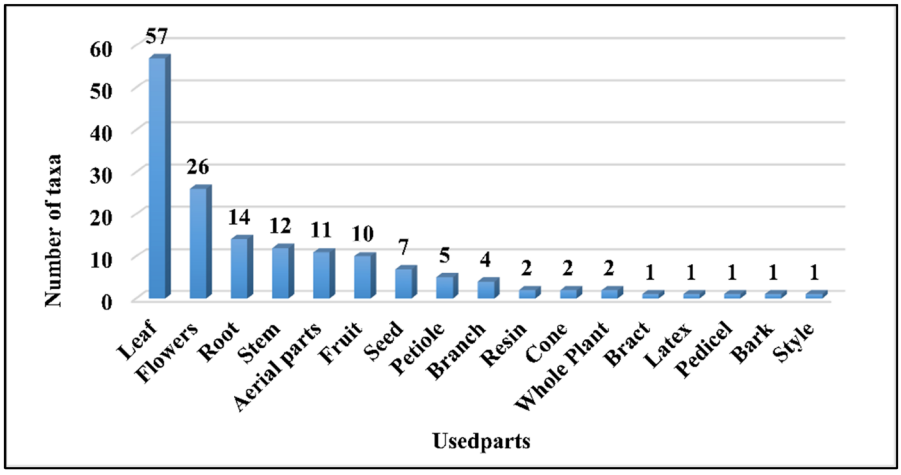

Figure 5: Plant parts used.

According to the International Classification of Primary Care/2nd edition (ICPC-2) ailment categories (WHO, 2022), plants were the most used for digestive disorders (37 taxa), respiratory disorders (27 taxa), and urological disorders (24 taxa). According to FIC values, male genital disorders were in the first place (FIC = 0.83), followed by respiratory disorders (FIC = 0.73), and heart health disorders (FIC = 0.53) (Table 3).

4 Discussion

Plants and recipes used in folk medicine in the current study were compared with ethnobotanical studies in Türkiye and around the world.

In many studies, the infusion and decoction have been the most preferred preparations for using plants for medicinal purposes [34,68,85,180–182]. In this study, decoction and infusion were the most preferred methods, respectively.

Rosaceae, Asteraceae, and Lamiaceae were the families that contain the most medicinal plants. Although the rankings differ, the families most commonly used in the literature were similar [33,78,82,86]. The most cited plants were *Urtica dioica* (27 citations), *Tilia rubra* subsp. *caucasica* (21 citations), and *Matricaria chamomilla* var. *recutita* (21 citations). *Urtica dioica* is a species that naturally spreads in wide areas in Türkiye and is frequently used medicinally [67,75,168]. Additionally, being an edible plant has caused it to become the most preferred plant.

It was recorded in this study that *Bellis perennis* L., *Trachystemon orientalis* D. Don, *Cornus mas* L., *Lamium maculatum* L., *Pinus nigra* J. F. Arnold subsp. *pallasiana* (Lamb.) Holmboe, *Rubus canescens* DC., *R. hirtus* Waldst. & Kit., and *Galium palustre* L., which were known to be used medicinally in the literature, were used to treat different diseases. Table 2 shows crosscheck of the information of medicinal plants in Kastamonu with the previously recorded literature on plant usage in Türkiye and some near countries.

It has been reported that *Bellis perennis* has been used to treat antipyretic, asthma, bronchitis, common cold, cough, diuretic, eye inflammations, expectorant, flu, gastric complaints, gynecological diseases, hemorrhoids, headache, insomnia, intestinal disorder, laxative, nausea, panacea, purgative, respiratory disorders, rheumatism, tonic, tonsillitis, tranquilizer, sedative, stomach disorders, stomach ache, and vomiting, in various sources [32–34,50,54,65,91–93,183] in Türkiye. It was recorded for the first time that local people used to treat sinusitis and nervousness. There are already many pharmacological studies on *Bellis perennis* in the literature. According to aqueous and methanol extract of *B. perennis* cis-chrysanthenyl acetate (0–2.2%), γ-himachalene (5.2–17.4%), germacrene D (0.2–6.4%), tetradecanal (0.1–8.6%), pentadecanal (tr-4.4%), hexahydrofarnesylacetone (0–2.2%), phytol (3.5–30.4%), nonacosane (0–3.2%), and hexadecenoic acid (14.0–87.6%) were determined as the major constituents [184]. Previous studies reported that *B. perennis* showed wound healing activity, anxiolytic properties, antitumor activity, antibacterial, antifungal, antioxidant, postpartum antihemorrhagic, pancreatic lipase inhibitor cytotoxic activity, and antimicrobial activity [185–191].

Trachystemon orientalis is both a medicinal and an edible plant. It was used medicinally for abscess, tonsillitis, insomnia, dysmenorrhea, diaphoretic, antipyretic, diuretic, dyspepsia, intestinal diseases, anti-inflammation, constipation, expectorant, anti-depressive, breast cancer, carminative, stomach ache, wounds, rheumatism, lengthen the life, abscess, digestive, intestinal, insomnia, dysmenorrhea, and inflammation [5,34–36,41,42,45,54,65,68,108,192]. It was recorded that the plant, which was consumed by cooking leaves, flowers, and petiole, was used as a cough suppressant in Kastamonu. Antimicrobial, antimutagenic, antioxidant, antidiabetic, and antifungal activities and total phenolic and flavonoid contents of the *Trachystemon orientalis* were evaluated [193–197]. In addition, it has been investigated whether this plant is suitable for use in the cosmetic industry and it has been determined that it can be used for photoprotective and antiaging purposes [198]. Beside these medicinal properties, *T. orientalis* is traditionally known as an important food source, and its nutritional and mineral contents have also been analyzed [199,200]. As a result of these analyzes, it was determined that this plant is a natural antioxidant source that can be used instead of synthetic antioxidants. These features of *Trachystemon orientalis* describe and show its traditional use and significance in pharmaceutical, food, and cosmetic industries.

In Kastamonu, the locals make a compote from the ripe fruit of *Cornus mas* and use it to gargle to treat oral aphtha. It was reported that the fruit and other parts of *C. mas* are used in traditional practices for abdominal pain, antifungal, antipyretic, atherosclerosis, bleeding, bronchitis, cardiac diseases, cancer, carminative, cholera, common cold, constipation, cough, degenerative diseases, diabetes, diarrhea, ease child birth, flu, gastrointestinal disorders, headache, herpes zoster, hyperglycemia, incurable diseases, insomnia, intestinal disease, kidney stones, marsh fever, nephritis, sooth pain, sunstroke, toothache, urinary diseases, urinary inflammations, and

Table 3 : FIC values by category of ailment within the present study

ICPC-2 categories	Ailments	Nur	Nt	FIC
A-General and unspecified	Analgesic (UR:9), cancer (UR:8), edema (UR:4), roborant (UR:4), antipyretic (UR:2), hemostatic (UR:2)	29	17	0.43
B-Blood, blood forming organs and immune mechanism	Anemia (UR:8), blood purifier (UR:2)	10	8	0.22
D-Digestive	Stomach ache (UR:12), dyspepsia (UR:9), liver disorder (UR:8), diarrhea (UR:6), intestinal disorder (UR:6), stomach disorder (UR:4), nausea (UR:4), abdominal pain (UR:3), toothache (UR:2), gall bladder (UR:2), mumps (UR:1), jaundice (UR:1), aphtha (UR:1), ulcer (UR:1), intestinal worm (UR:1)	61	37	0.4
F-Eye	Eye disease (UR:4)	4	4	0
H-Ear	Earache (UR:2)	2	2	0
K-Cardiovascular	Heart health (UR:14), hemorrhoids (UR:6), hypertension (UR:5), cholesterol (UR:4), hypotension (UR:1), vessel stiffness (UR:1)	31	15	0.53
L-Musculoskeletal	Rheumatism (UR:11), bone fracture (UR:6), arthralgia (UR:4), sprains (UR:1), osteoarthritis (UR:2), osteoporosis (UR:1), low back pain (UR:1)	28	17	0.41
N-Neurological	Headache (UR:6), mental disorder (UR:4), migraine (UR:2), dizziness (UR:1)	13	10	0.25
P-Psychological	Insomnia (UR:5), sedative (UR:3)	8	6	0.29
R-Respiratory	Common cold (UR:31), influenza (UR:20), cough (UR:18), bronchitis (UR:6), asthma (UR:5), sinusitis (UR:4), tonsillitis (UR:3), sore throat (UR:2), expectorant (UR:2), whooping cough (UR:2), lung disease (UR:2), dyspnea (UR:1)	96	27	0.73
S-Skin	Wound healing (UR:11), anti-inflammatory (UR:11), wart (UR:3), antiseptic (UR:2), anti-allergy (UR:1), abscess (UR:1), itching (UR:1), acne (UR:1), eczema (UR:1), scorpion sting (UR:1)	33	18	0.47
T-Endocrine/metabolic and nutritional	Diabetes (UR:6), diaphoretic (UR:3), inappetence (UR:3), lose weight (UR:3), immunity (UR:1), goiter (UR:1), galactagogue (UR:1)	18	14	0.24
U-Urological	Urinary tract infection (UR:16), diuretic (UR:11), kidney sand (UR:10), kidney disorder (UR:5), kidney stone (UR:4), urinary bladder (UR:1)	47	24	0.5
X-Female genital	Menopause (UR:4), menstrual irregularity (UR:3)	5	3	0.5
Y-Male genital	Prostate (UR:5)	7	2	0.83

wound healing [5,33,36,43,45–47,50,54,58,62,63,65,66,68,74, 109,117,201,202] in Türkiye and Iran. *C. mas* is a medicinal and food plant that has been the subject of extensive studies for its nutraceutical and pharmaceutical potential. Main components Delphinidin 3-*O*-*β*-galactopyranoside, cyanidin 3-*O*-*β*-galactopyranoside, and pelargonidin 3-*O*-*β* -galactopyranoside characterized the chemical profile of the essential oil from *C. mas* [203]. Important flavonoids, anthocyanins, and iridoids were determined from the essential oils of the fruits and leaves of *C. mas* [204]. Essential oils of *C. mas* were proved to have anticarcinogenic, antibacterial, antimicrobial, anti-obesity, anticancer, anticoagulant, antiparasitic, hypolipidemic, anti-atherosclerotic, antidiabetic, antiviral, antioxidative, cytotoxic, hepatoprotective, renal protective, neuroprotective, reproductive organ protective, antiplatelet, antiglaucoma, radioprotective, aldose reductase inhibitory, cardioprotective, and anti-inflammatory effects [202,204,205].

Lamium maculatum and some other *Lamium* species such as *L. album* L., and *L. purpureum* L. were used for rheumatism pain, constipation, arthritic ailments, and as roborant in Türkiye [5,206]. In traditional Chinese medicine, it was used for treating various diseases such as injury, fracture, palsy, and high blood pressure [207]. Kastamonu locals make infusions from flowers and leaves and drink it as tea. This tea was used for treating hemorrhoids and mumps. Lamalbide, Lamiide, 5-OH-8-*epi*-Loganin, Penstemoside, Shanzhiside methyl ester, Sesamoside, Lamiol, Liriodendrin, and Verbascoside are found in *L. maculatum* [208]. According to pharmacological studies, *Lamium* species have many biological activities such as antimicrobial, antiviral, anti-inflammatory, anti-nociceptive activity, cytotoxicity, and cytoprotective activity [209]. Thus, treating of hemorrhoid and mump, which are viral and bacterial diseases, with ethnomedicines have been validated by modern pharmacological analyzes.

Species belonging to the genus *Rubus* (*R. canescens*, *R. hirtus*, *R. idaeus* L., and *R. sanctus* Schreb.) were generally used as a folk medicine for diuretic, diabetes, hypertension, stomach disorders, cough, hemorrhoids, constipation, dyspnea, roborant, tonsillitis, gingival bleeding, colds, aphthae, burn, cancer, anemia, and liver diseases [50,65,68,162,210]. Some other *Rubus* species around the world have similar uses [211]. It was recorded that the *Rubus* taxa included in the study were used to treat abscess anemia, anti-aging, antiemetic, anti-inflammatory, antipyretic, aphthae, asthenopia, burn, cancer, cardiac diseases, cough, diabetes, diarrhea, diuretic, dyspnea, eczema, eye and mouth sore, gingival bleeding, gonorrhea, hair care, hemostatic, hemorrhoids, hypertension, infertility, kidney sand, nephritis, prostate, rheumatism, stomachic, stomach disorder, tonic, tonsillitis, and wound healing in Türkiye [34,35,38,45,50,65, 68,83,85,102,151,175]. While *Rubus hirtus* is used for rheumatism, stomach disorder, anemia, eye diseases, kidney sand, urinary tract infection purposes, *R. canescens* is used for the treatment of hemostatic and kidney sand in the study area. Some of these diseases are caused by inflammation such as rheumatism, cancer, cardiac diseases, hypertension, diabetes, and wounds. It has been reported that the use of *R. hirtus*, which has anti-inflammatory and antinociceptive activity, may be appropriate in the treatment of these inflammatory diseases [212,213]. Antimicrobial, antioxidant, and antibacterial studies have been carried out for other *Rubus* species in the study area and pharmacologically confirmed [214,215].

The resin, shoot, bark, cone, and needles of five *Pinus* species (*P. brutia* Ten., *P. sylvestris* var. *hamata* Steven, *P. nigra*, *P. halepensis* Mill., and *P. pinea* L.) grown in the flora of Türkiye [216] were used for treating mostly asthma, bronchitis, cold, cough, and wounds [160]. In Kastamonu, the locals declared that they used the resin and raw cones of *Pinus nigra* subsp. *pallasiana* for treating stomach disorder, bronchitis, common cold, kidney disorder, sprains, lung disease, and asthma. *P. sylvestris* var. *hamata* is preferred in the treatment of diseases such as common cold, influenza, asthma, inflammation, and wound healing in Kastamonu province. As can be seen, these two pine species that grow naturally in the study area are generally used in respiratory diseases, followed by inflammatory diseases. Essential oil compositions of the needles of *P. nigra* and *P. sylvestris* var. *hamata* were investigated separately [217,218]. While α-pinene, β-pinene, β-caryophyllene, and germacrene D were found as the main components in the essential oil of Black pine, α-pinene, camphene, and β-pinene were detected in scot pine. Antioxidant, anti-inflammatory, antimicrobial, antifungal, and analgesic activities of these pines have already been studied [219–222]. On the other hand, bark extracts of these two pines were also studied and phenolic compounds such as catechin, ferulic acid and taxifolin were determined. The presence of these compounds has been reported to indicate the presence of anti-inflammatory, antibacterial, antioxidant, and antiproliferative activities [222,223].

Common cold, influenza, cough, urinary tract infection, heart health, wound healing, stomach ache, anti-inflammatory, diuretic, kidney sand, and rheumatism were the most frequently mentioned ailments in Kastamonu. Although there are regional differences, the plants mentioned in folk medicine studies in Türkiye are generally used for treating these diseases [3,192]. However, it was recorded for the first time that *Pilosella leucopsilon* subsp. *pilisquama* (Nägeli & Peter) Gottschl., *Galium palustre* L., and *Astragalus nitens* Boiss. & Heldr. were used as folk medicine.

The aerial parts of *P. leucopsilon* subsp. *pilisquama* (Nägeli & Peter) Gottschl. were used for wound treatment, while the roots of *A. nitens* were used to relieve earache. While there are antifungal and antibacterial studies for *A. nitens* in the literature, no study has been found for *P. leucopsilon* subsp. *pilisquama*. In previous studies conducted in Türkiye and the world, *Galium* species were used for appetizer, diuretic, rheumatic pain, burn healing, cancer, antioxidant, antidiabetic, and calmative purposes [5,50,224,225]. In Kastamonu, it was recorded that the leaf infusion of *Galium palustre* was used for anemia and intestinal diseases. The extract of the *G. palustre* was tested with three different methods (aqueous, ethanol, and methanol) and the presence of antitumor properties was determined, and beside this, the inhibitory activity (antibacterial) was not observed [185]. Thus, it is understood that more pharmacological studies are needed for the new medicinal plants identified within the scope of the study, and the traditional use of these plants should be proven.

No previous studies have been found in the research area that includes FIC values. The FIC value ranged from 0 to 0.83. If the FIC value is close to 1, medicinal plants used to treat some diseases are considered more effective. The FIC values in this study differed from other results in Türkiye. Male genital disorder had the highest FIC value (0.83) in this study. *Acorus calamus* L., *Epilobium angustifolium* L., and *Urtica dioica* were reported to be among the plants treat pointed for this purpose. Respiratory diseases had the second-highest FIC value (0.73), and heart health disorders had the third rank (0.53). According to Emre et al. [82] for analgesics in Mersin, Gürbüz et al. [54] for dermatological in İzmir, Karaköse et al. [85] for cold and flu in Torul (Gümüşhane), Kaval et al. [226] for respiratory tract problems in Geçitli (Hakkari), Kılıç et al. [227] for gynecological diseases in Artuklu, Polat [64] for healing cut and wounds in Bingöl found the highest FIC values (Table 3).

5 Conclusion

Kastamonu is one of the significant lands of Euro-Siberian flora area. It has a geography where the transition from a temperate maritime climate to a continental climate, and forest vegetation to steppe vegetation has been observed. Therefore, it has a rich plant diversity. Biodiversity is a significant source for folk medicine studies. This study enabled us to collect information about the traditional uses of medicinal plants in Kastamonu. Because of face-to-face interviews with 52 locals living in the region, information about the uses of 92 plants in folk medicine was compiled.

The use of *Pilosella leucopsilon* subsp. *pilisquama, Galium palustre,* and *Astragalus nitens* in traditional therapy was reported for the first time in this study. In this study, it was recorded that *Bellis perennis, Trachystemon orientalis, Cornus mas, Lamium maculatum, Pinus nigra* subsp. *pallasiana, Rubus canescens,* and *R. hirtus* were also used for treating different diseases. This is significant because the newly recorded species and different uses of plants will contribute to fields such as phototherapy, chemist's shop, and chemistry.

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Conflict of interest: The authors declare no competing interest.

Ethical approval: The participants provided their written prior informed consent to participate in this study and researchers adhered to the ethical guidelines of the International Society of Ethnobiology [23].

Informed consent: Prior Informed Consent (PIC) was provided orally before each interview

Data availability statement: Data supporting the findings of this study contain personal information of subjects and are available from the corresponding author upon reasonable request. Since the data include the places where people live, they are stored in a controlled access repository.

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Appendix

1. Age and gender of the informant.
2. Marital status of the informant.
3. Educational level of the informant.
4. Place of residence of the informant.
5. What are the medical plants you know?
6. For what purposes do you use medical plants?
7. Which parts of plants are you using?
8. How do you prepare the preparation?
9. What is the vernacular name of the plant used?
10. What are the poisonous plants you know? How do you use them?
11. What are the food plants you know? How do you use them?
12. Do you use auxiliary substances when preparing the preparation? (Honey, oil, butter, etc.)