An ethnobotanical study of Elmasuyu village, Elazığ (Eastern Anatolia) in Turkey

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Abstract. This study contains the results of ethnobotanical investigations carried out to determine what plants are used by the people of Elmasuyu village in the Sivrice district of Elazığ. For this purpose, several field studies were conducted in 2018 and 2019 in Elmasuyu village. During the field studies, 76 plant specimens were collected and identified and ethnobotanical information concerning these plants was recorded. The voucher specimens were stored in the Herbarium of the Faculty of Pharmacy, Istanbul University (ISTE) and in the personal herbarium of Rümeysa GÜL (RG). Ethnobotanical uses of the plants were recorded by interviewing volunteers from the people of Elmasuyu village. The study was focused on identifying the collected species, on the diseases treated by them, parts of the used plants, methods of preparation and administration. FIC values and Use Values were calculated to identify the potentially effective medicinal plants. Data obtained in Elmasuyu village were compared with those from the earlier ethnobotanical studies in Eastern Anatolia.

Key words: Eastern Anatolia, Elazığ, Elmasuyu village, ethnobotany, Turkey

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Introduction

Since ancient times, people have used plants for their therapeutic effect and have recorded the therapeutic effect of plants throughout history. Ethnobotany studies the utilitarian relationship between human beings and vegetation in their environment, including medicinal uses (Harshberger 1896), and can also be defined as 'a study of the interaction between plants and people, with particular emphasis on the traditional tribal cultures' (Akbulut & Bayramoğlu 2013). Medicinal plants are playing an important role in the healthcare programmes worldwide, especially in the developing countries. Turkey has a rich traditional medicine and ethnobotanical culture. Eastern Anatolia, in turn, has a rich flora thanks to its varied climate and numerous ecological zones. Folk medicine is still commonly practiced in East Anatolia because of its geographical remoteness from medical facilities and difficulty of transportation during the long, cold

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winters (Özgökçe & Özçelik, 2004). Diversity of the flora provides an ample source of medicinal plants, which have long been utilized by Anatolian cultures, and hence, accounts for the accumulation of remarkable medicinal folk knowledge in the region. (Çakılcıoğlu & Türkoğlu 2010). People have preserved this medicinal folk knowledge by handing it over from generation to generation. It is important to record this medicinal folk knowledge before it disappears. Many studies have been published on the ethnomedicine of Central and Eastern Anatolia (Akan & al. 2013; Akaydin & al. 2013; Akgul & al. 2018; Çakır & 2017; Arı & al. 2015; Bağcı & al. 2006; Baytop 1999; Bulut & al. 2017a; Demirci & al. 2012; Doğan 2015; Ertuğ 2000; Güneş & Özhatay, 2011; Gürdal & Kültür, 2013; Güzel & al. 2015; Kargıoğlu & al. 2008; Korkmaz & al. 2016; Mükemre & al. 2016; Özüdoğru & al. 2011; Polat 2019; Polat & al. 2015; Sezik & al. 1997; Sığva & Seçmen 2009; Uysal & al. 2010). Some ethnobotanical studies have been carried out earlier in the Elazığ Province (Cakilcioglu 2007, 2008, 2009; Cakilcioglu & al. 2010; Hayta 2014, Kilic & Bagci 2013). However, these studies contained no records about the Elmasuyu village. Researches on the economic and human geography of the Elazığ Province have shown that most of the population has migrated from the region by the 1950s. In the years 1950-1955, especially during the construction of the Keban Dam, many people from different provinces settled in the region. Elmasuyu village, whose registered population has not changed since the 1800s, is important for its preserved ethnic culture. Ethnobotanical data recorded in this study differ from the ethnobotanical data obtained earlier in the region. This study is a further contribution to the ethnobotanical data obtained in the Elazığ region.

Material and methods

Study area

The country of Eastern Anatolia is part of the Irano-Turanian region of Turkey. That region, located in the high mountain range of the country (average 1900 m), is Quaternary in age and volcanic in character. Many rivers such as the Euphrates, Tigris, Karasu, Aras and Çoruh, flow through it. The study area has a typical continental climate. The soils are generally alluvial, colvial, chestnut-brown, regosol and basalt. It comprises over eight million hectares of meadows and pastures. The study area hosts different types of climate which intersect and mix up there, but, in general, the climate is characterised by long and harsh cold winters. From north to south and from east to west temperatures gradually increase (Öztürk & al. 2015). Elazığ is a city in Eastern Anatolia, Turkey, located in the uppermost Euphrates Valley (Fig. 1) (MCT 2011). Elmasuyu village is surrounded by Kavak village of Maden district in the east, Hazar Baba Mountain in the west, Başkaynak village in the south, and Akbuğday village in the north. (Fig. 2). The coordinates of Elmasuyu village are 38°24'45.5868" N

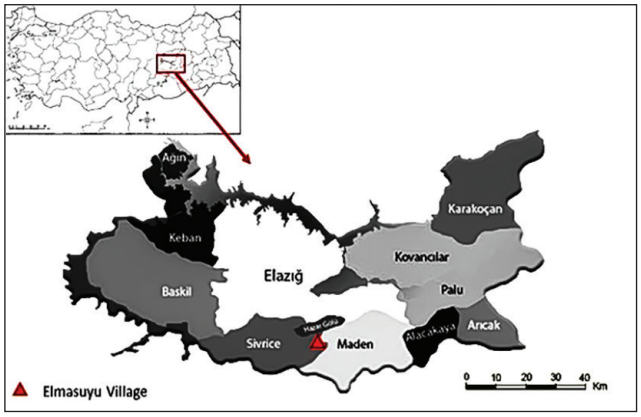

Fig. 1. Map of the Elazığ Province.

Fig.2. General view of Elmasuyu village.

and 39°23' 35.5056 '' E. Elmasuyu village lies at about 35 km from the centre of Elazığ. The vegetation of the studied area is similar to that in East Anatolia, with most Irano-Turanian elements (Yeşil & Akalın 2009, Bulut & al. 2019). The most common plants in the area belong to the genera *Astracantha*, *Achillea*, *Ferula*, *Rosa,* and *Crataegus*.

Data collection

Field studies were carried out for two years (2018-2019) in Elmasuyu village. The study was conducted in accordance with the International Society of Ethnobiology Code of Ethics (ISE 2006). The researchers observed the ethical rules of the International Society of Ethnobiology. In several field studies, 76 taxa (56 wild, 20 cultivated) have been collected and identified by reference to the *Flora of Turkey and East Aegean Islands* (Davis 1965-1985; Davis & al. 1988; Güner & al. 2000) and Turkey Plants List (Güner & al. 2012). The data (local names, purposes of use, used parts of plants and methods of preparation and administration) have been obtained by interviewing face-to-face 72 respondents (42 women and 30 men). The respondents were mostly elderly people (Fig 3). The occupational groups of the participants were mainly farming, retired, animal husbandry, and housewives. The village is inhabited ethnically by the Zaza group. The people living in the village are descendants of the locals that had been registered in the same village since the 1800s. The plant names were recorded in Turkish and Zazaki. Scientific plant names were checked in the Plant List (Plant List 2013). The collected specimens were stored in the Herbarium of the Faculty of Pharmacy, Istanbul University (ISTE).

Calculation

A. Informant consensus factor (FIC): Trotter & Logan (1986) had developed a method based on the concept of *informant consensus* to identify potentially effective medicinal plants. They compared the total number of cases for each disease (the number of informants who reported a particular disease) with the

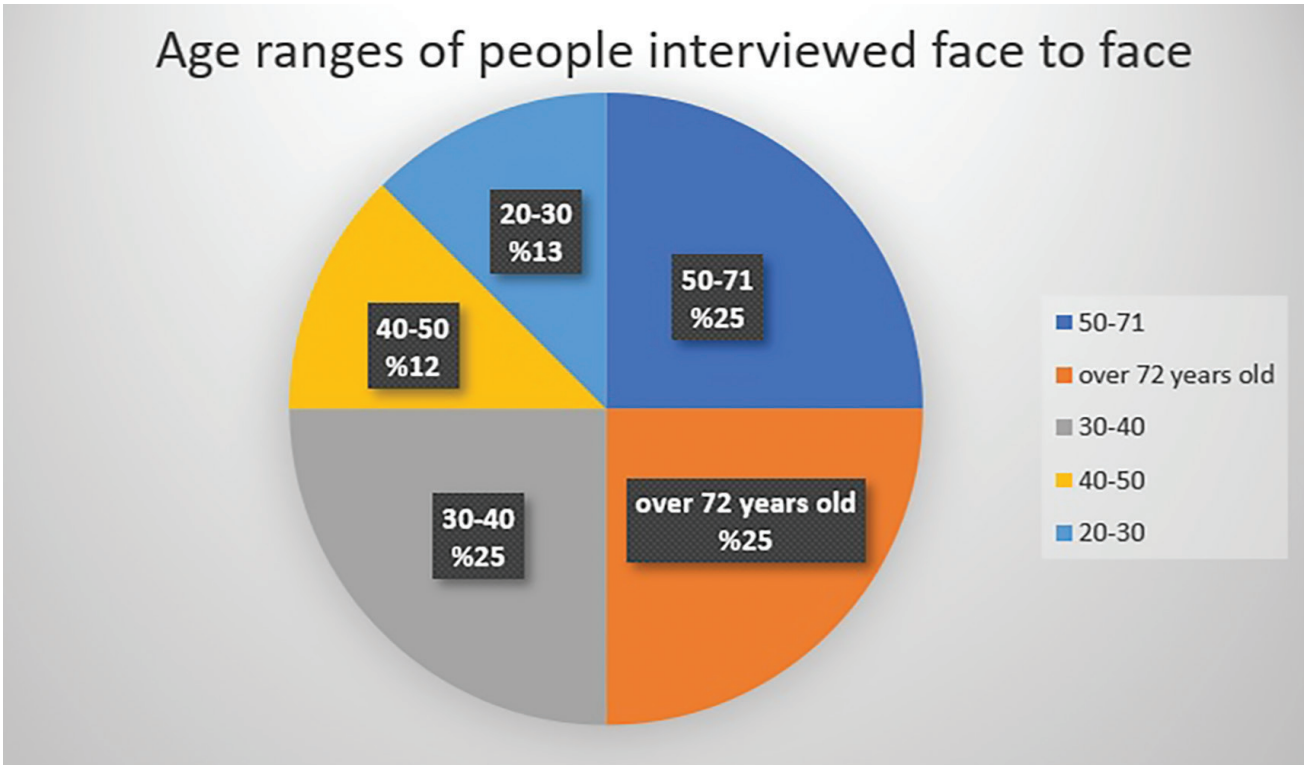

Fig. 3. Age ranges of people interviewed face-to-face

number of specific drugs for that disease. Thus, FIC gives the relationship between the 'number of use-reports in each category (Nur) minus the number of used taxa (Nt)' and the 'number of use-reports in each category minus 1'. FIC is calculated by using the following formula: FIC = Nur – Nt / (Nur – 1). The product of this factor ranges from 0 to 1. A high value (close to 1) indicates that relatively few taxa (usually species) are used by most healers, while a low value indicates that informants disagree about the taxa that should be used in treatment within a disease category (Heinrich 2000). In other words, medicinal plants that are thought to be effective in treating a particular disease have higher FIC values. (Teklehaymanot & Giday 2007)

B. Use Value (UV): The Use Value was calculated according to the number of plants used and the number of informants (Trotter & Logan, 1986) by the following formula: UV = U / N. Where U refers to the number of usage reports for any plant and N is the number of informants.

Results

Used plant species

In this study, 76 species from 31 different plant families were examined and their ethnobotanical uses were recorded (Table 1). *Astracantha condensata* (Ledeb.) Podlech is the only endemic species among them. The plants are mostly used as food, remedy, beverage, fodder, domestic goods, dyes, ornaments, and fuel. Some of them are used for spices and brooms (Fig. 4, Fig. 5). The most commonly used parts of the plants are fruits,

Table 1. Uses of plants for medicinal purposes in Elmasuyu village (Elazığ, Turkey).

Latin name / Specimen number	Family	Local name	Plant part used	Preparation/ Utilisation method	UV (Use value)	Ailments treated, therapeutic effect	Reported literature uses
**Abelmoschus esculentus* (L.) Moench (RG 011)	***Malvaceae***	Bamya	Seeds, fruits	Infusion, int cooked, eaten	0.44	Crushed seeds against dyspnea. Fruits are consumed against constipation	Gastrointestinal disorders (7), management of fertility (4)
Agrimonia eupatoria L. (ISTE 116238)	***Rosaceae***	Koyunotu	Aerial parts	Infusion, int	0.15	Infusion is consumed to lower blood sugar. Aerial parts used to dye wool yellow	Throat disease (13)
Amaranthus retroflexus L. (ISTE 116217)	***Amaranthaceae***	Leğundur	Leaves	Infusion, int cooked, eaten	0.09	Inf. leaves against stomachvache, infertility (int). Cooked, eaten as food	Cooked(4,35), against sterility (40)
**Beta vulgaris* L. (RG 001)	***Amaranthaceae***	Şeker pancarı	Whole plant	Molasses eaten	0.33	Molasses obtained from roots used against liver diseases, eczema. The leaves are used against animal intestinal diseases.	Against oxyuris (1)
Calamagrostis arundinacea (L.) Roth (ISTE 116263)	***Poaceae***	Korekvaş	Roots	Decoction, ext.	0.08	Boiled roots turned into poultice and used against thorn puncture inflammations for 1-2 hour	Anti-inflamatory (50)
Carduus nutans L. (ISTE 116247)	***Asteraceae***	Eşek dikeni	Receptacles, leaves, roots	Put on skin, ext.	0.05	Crushed fresh leaves applied in the form of a poultice to wounds, skin cancer (with roots)	Sedative (30), foodstuff (1, 45) hemorrhoids (36)
Centaurea solstitialis L. (ISTE 116252)	***Asteraceae***	Diken	Aerial parts	Decoction, int.	0.08	Capitula, against cold; aerial parts, against malaria.	Warts (6), foodstuff (20), kidney stones (40)

Latin name / Specimen number	Family	Local name	Plant part used	Preparation/ Utilisation method	UV (Use value)	Ailments treated, therapeutic effect	Reported literature uses
Chondrilla juncea L. (ISTE 116236)	***Asteraceae***	Karakavuk	Latex	Chewed	0.08	Latex obtained from roots is chewed as a chewing gum to prevent tooth decay	Chewing gum (41), painkiller, stomach disease (3, 38)
Convolvulus arvensis L. (ISTE 116221)	***Convolvulaceae***	Peçek, yer sarmaşığı	Whole plant	Decoction, int.	0.09	Latex obtained from roots is used against constipation (int). Dec. prepared from leaves is used to threat jaundice (int).	Constipation (13, 14, 29), stomachache (14), stomachic (38), diuretic (35), fodder (20)
Crataegus monogyna Jacq. (ISTE 116266)	***Rosaceae***	Alıç	Fruits, flower, leaves, branches, seeds	Infusion, decoction, int. eaten	0.12	Flowers inf., dec., cardiovascular diseases, hypertension (int.). Dec. expectorant. Leaves dec. rheumatism (int.). Fruits eaten against constipation. Dec. flowering branches, stomach ache, (int).	Sedative, antispasmodic (38), respiratory, colds (3), snake bites (35), cardiovascular disease s (12, 14, 27, 30, 38, 42, 46), vasodilatory (14, 27, 30, 46), diabetes (46), antihypertensive (6), toothache (6)
Cydonia oblonga Mill. (ISTE 116269)	***Rosaceae***	Ayva	Fruits, leaves, branches, seeds	Decoction of leaves, int. decoction of seeds, ext.	0.44	Leaves dec. antitussive, expectorant, against colds, antidiarrheal (int.). Seeds are boiled and kept in a closed jar for 5-6 days until turned to gel and used for treatment of acne(ext.). Leaves are used to obtain dye	Antihypertensive, abdominal pain (7), diarrhea (6, 37, 43, 45), diuretic, kidney stones, cough, asthma, headache (1, 34), blood glucose regulators (42), colds and flu (38, 45), diuretic (34, 45), insomnia, antianxiety agent, antipyretic (2)
Echinops orientalis Trautv. (ISTE 116237)	***Asteraceae***	Eşek kengeri	Whole plant	Eaten	0.39	Eaten raw, inflorescence is eaten raw to lower blood sugar (int.). The whole plant is used as fodder	Foodstuff (39), fuel (45)
Elaeagnus angustifolia L. (ISTE 116271)	***Eleagnaceae***	Sürgülü	Fruits	Decoction, int	0.19	Dec. fruits are used for passing kidney stones (int). Fruits are eaten raw against bowel disorders (int).	Colds (27), genital and urinary tract infections c, diabetes (46) hypercholesterolemia (27, 46), gall bladder ailments, kidney stones nephritis, (35), sickness and vomit, eczema (45)
Epilobium hirsutum L. (ISTE 116240)	***Onagraceae***	Yakıotu	Aerial parts	Crushed leaves, ext.	0.11	Crushed fresh leaves are placed on the wounds to reduce swelling and inflammation (ext.)	Animal fodder (32)
Erigeron canadensis L. (ISTE 116241)	***Asteraceae***	Şifa otu	Leaves, flowers	Crushed, ext.	0.15	Used against lice and itching (ext.)	Antihemorrhagic, diuretic, carminative, osteoarthritis, diarrhea, dysentery (38)
Euphorbia macroclada Boiss. (ISTE 116230)	***Euphorbiaceae***	Dele, Sütleğen, Yılan otu	Aerial parts	Crushed, latex, ext.	0.12	Latex of the plant is used for treatment of warts (ext.). The aerial parts are boiled in water and the water is used to dye wool dark yellow (brown)	Curing warts (12, 14, 27), arthritis (13), malaria (3), constipation (14)

Latin name / Specimen number	Family	Local name	Plant part used	Preparation/ Utilisation method	UV (Use value)	Ailments treated, therapeutic effect	Reported literature uses
Juglans regia L. (ISTE 116227)	***Juglandaceae***	Ceviz	Fruits, seeds, leaves	Chrushed bark of fresh fruits, ext. Seeds eaten	0.73	Crushed green bark of fresh fruits against inflammatory wounds (ext.), antifungal (ext). Seeds are eaten as antihyperlipidemic.	Cough (34), cancer (3,46), joint pain (40, 45), diabetes (40), hypercholesterolemia (14, 18, 27, 46), cardiotonic and vasodilatory, hair care (2, 18, 30, 46), foodstuff (29), antihelmintic (12, 38), antifungal (38), diuretic, arthritis, orexigenic (2), arteriosclerosis (18), toothache, shortness of breath (6), eczema, hemostatic (38, 46),
Lactuca serriola L. (ISTE 116264)	***Asteraceae***	Keklik otu	Aerial parts	Decoction, int.	0.09	Dec. from the young shoots used for passing kidney stones (int).	Dietetic and attenuating (3), increasing milk secretion (6), foodstuff (46), demulcent (4)
Matricaria chamomilla L. (RG 004)	***Asteraceae***	Beyaz papatya	Aerial parts, capitulum	Infusion, int.	0.16	Inf. capitula against stomach ache (int)	Gastrointestinal diseases, headache, respiratory tract diesases and flu, cancer, stomach ache, enteralgia, kidney stones anti-inflammatory, carminative (36, 46, 57), menstrual pains and disorders, insomnia (46)
Medicago sativa L. (ISTE 116267)	***Fabaceae***	Yonca	Whole plant, flower	Eaten	0.77	In veterinary medicine, the whole plant given to animals to increase secretion of milk and as digestive	Fodder (21)
Melissa officinalis L. (ISTE 116251)	***Lamiaceae***	Melisa otu	Leaves	Infusion, int.	0.11	Inf. sedative (int.), against stomach ache(int.)	Cancer, asthma, cardiovascular diseases, stomach diseases, nephritis, cardiovascular diseases, forgetfulness, diabetes , cold (35, 42, 46), insomnia sedative (14, 27, 39, 42, 46), antiseptic, carminative (2), Soothes insect bite, headache, indigestion, nausea (39), stomachache, diuretic (21)
Mentha longifolia subsp. *typhoides* (Briq.) Harley (ISTE 116258)	***Lamiaceae***	Yarpuz	Leaves	Infusion, int.	0.33	Inf. respiratory diseases(int), against stomach ache(int), against cold(int.)	Stomach disorders (21, 46), stomachache (42), diuretic (21), cold and flu (27, 39, 41, 46), throat diseases (12), respiratory diseases (3), antispasmodic (14), abdominal pain (36, 39), pulmonic disorders, diarrhea, asthma, antihemorrhoidal, sunstroke, aphta (39), antispasmodic, constipation (13)
Morus alba L. (ISTE 116223)	***Moraceae***	Dut	Fruits	Eaten	0.83	Molasses obtained from fruits used against cold, as demulcent (int).	Anemia (27, 46), hypoglycaemic, constipation (14, 30), foodstuff (30), to reduce blood sugar (1, 27), urinary inflammations (1), cancer (1, 3), abscess, stomach disorders, gastric ulcer (39), herpes (21)
Ocimum basilicum L. (RG 010)	***Lamiaceae***	Fesleğen, Reyhan	Leaves, aerial parts,	Eaten	0.57	Leaves eaten raw against heartburn (int.)	Cold, flu (42), calmative, carminative, diuretic, constipation, stomach and intestine ache (2, 27), bee stings (21)

Latin name / Specimen number	Family	Local name	Plant part used	Preparation/ Utilisation method	UV (Use value)	Ailments treated, therapeutic effect	Reported literature uses
**Persica vulgaris* Mill. (ISTE 116212)	***Rosaceae***	Şeftali	Fruits, seeds	Eaten	0.71	Fruits are eaten. Seeds agaist diabetes and stomachache (int.)	Cough and intestinal worms (46), diarrhea(36)
**Petroselinum crispum* (Mill.) Fuss (RG 003)	***Apiaceae***	Maydanoz	Leaves, branches	Decoction, int.	0.58	Dec. leaves and branches against urinary tract infections, diabetes, hypertension and as digestive (int); eaten raw, leaves and branches antiinflammatory, galactagogue(int.).	Halitosis, diuretic (3) diuretic (1, 2), kidney ache, abdominal ache (42), stomachache (1), kidney stones, mouth sores (20), urinary tract infection, anti-inflammatory (59)
Plantago lanceolata L. (ISTE 116243)	***Plantaginaceae***	Yaraotu, damarotu	Leaves	Crushed, ext. infusion int.	0.33	Crushed fresh leaves are placed on wounds (ext.). Inf. against stomach ache (int.).	Infection (3), haemorrhoids (6), inflamed wounds, cuts, wounds (27, 36, 41, 42), abscess (39, 42), anti-parasitic, vulnerary, astringent, anti- inflammatory; gynecologic diseaes, stomachic, ulcers (39)
Portulaca oleracea* L.** (ISTE 116214)	***Portulacaceae***	Semiz otu, Pirpirin	Leaves	Decoction, int.	0.57	Dec. for passing kidney stones (int.). Eaten raw to treat constipation	Foodstuff (2, 7, 37, 55, 65), stomach ache (17),diabetes (18, 28, 63), diuretic, gastrointestinal disorders (39, 50, 65), orexigenic, antihelmintic, stomachic, urethra infections, inflamed wounds (35, 50), cancer, heatstroke, kidney stones, anorexia and appetizing, costiveness and intestinal spasm (46)
**Prunus armeniaca* L. (ISTE 116213)	***Rosaceae***	Kayısı	Fruits, seeds	Eaten	0.64	Seeds are eaten raw, antihelmintic	Digestive and intestinal problems (3), intestine cancer (43)
** Prunus avium* (L.) L. (ISTE 116249)	***Rosaceae***	Kiraz	Fruit stalk, leaves, fruits	Decoction, int.	0.66	Stalks, diuretic, kidney diseases, prostate (int.). Dec. stalk and leaves, rheumatism, antiinflammatory (int.)	Kidney problems, urinary infections (1), diuretic, constipation, tonic, nephritis, kidney stones (2, 35, 46), cardiotonic, vasodilatatory, dietetic, debilitating (45), enuresis (32)
**Prunus cerasus* L. (ISTE 116224)	***Rosaceae***	Fişne	Fruits, seeds, fruit stalk	Infusion, int.	0.78	Dried seeds and stalk, dyspnea, urinary tract inflammation.	Kidney stones, diuretic (3, 23), foodstuff (29), abdominal pain (36)
** Prunus dulcis* (Mill.) D.A.Webb (ISTE 116250)	***Rosaceae***	Armut	Fruits	Eaten	0.69	Fruits are eaten	Diabetes (13, 14), constipation (14),chest and lung pains (21),
Quercus infectoria G. Olivier (ISTE 116254)	***Fagaceae***	Mazı meşesi	Galls	Cooked and eaten	0.11	Fruits are cooked and eaten to treat diabetes. The galls are boiled in water and the water is used to dye wool. Dried leaves given to animals to increase secretion of milk	Diabetes (27), fuel, dye (3, 46)
Raphanus raphanistrum subsp. *sativus* (L.) Domin (ISTE 116265)	***Brassicaceae***	Siyah turp	Roots	Grated, int.	0.04	The root is grated, kept in water and filtered, the water is sweetened with honey and drunk on an empty stomach in order to pass kidney stones.	Gastrointestinal diseases, asthma, bronchitis (46), appetizing (21)

Latin name / Specimen number	Family	Local name	Plant part used	Preparation/ Utilisation method	UV (Use value)	Ailments treated, therapeutic effect	Reported literature uses
Rosa canina L. (ISTE 116244)	***Rosaceae***	Kuşburnu	Fruits	Decoction, int.	0.11	Against cold, flu, dyspnea; expectorant. Against hemorrhoids.	Diuretic (6), antiseptic, colds and flu, diabetes disease (13, 14, 27, 29, 30, 42, 46, 59), asthma, cardiotonic and vasodilatory, respiratory tract diseases, cancer (46, 46), antitussive (27), foodstuff (29, 32), nephritis (36)
Rubus sanctus Schreb. (ISTE 116210)	***Rosaceae***	Böğürtlen, orman, zirdan	Roots, fruits, flowers	Eaten decoction, int.	0.76	Fruits, eaten raw against tonsillitis and gingivitis. Leaves and flowers, against tonsillitis	Urinary infection, diabetes, stomach ache (1), diuretic (13, 14, 30), nephralgia, kidney stones (1), anemia, tonsillitis (27, 46),constipation (14, 31), cold (12, 39), pneumonia, appetizer, prostatitis (42, 46)
Rumex crispus L. (ISTE 116226)	***Polygonaceae***	Tırşik	Leaves	Eaten	0.14	Leaves eaten, laxative and digestive regulator	Foodstuff (3), inflamed wounds (36), cough, colds, asthma, anti-inflammatory, antihemorrhoidal, gynecologic diseaes, antiphlogistic, antirheumatic; fruit (39, 41), hematomas (57),
Salix purpurea L. (RG 016)	***Salicaceae***	Söğüt	Stem, branches, leaves	Charcoal int. decoction, ext.	0.09	Charcoal obtained from the stem and branches used against meteorism(int.). Leaves, dec. against dandruff (ext.)	Anti-fever (39)
Viburnum lantana L. (ISTE 116233)	***Caprifoliaceae***	Sezi	Fruits	Chrushed, ext.	0.16	Fresh cortex is used externally as a painkiller	Foodstuff (36)
Vitis vinifera L. (ISTE 116229)	***Vitaceae***	Yabani asma	Fruits, leaves	Eaten	0.73	Fruits, eaten raw, diabetes, hypertension, to prevent edema (int.). Leaves are used to make a traditional meal called sarma.	Foodstuff (32), hair tonic (35)
Xanthium strumarium L. (ISTE 116262)	***Asteraceae***	Diken	Leaves	Infusion, int.	0.12	Inf. prepared from leaves used as antihelmintic(int.).	Rhinitis, rheumatic arthritis, diaphoretic, sedative, lumbago (38), alopecia and scurf (46)
Xeranthemum annuum L. (ISTE 116216)	***Asteraceae***	Kunık	Aerial parts	Decoction, int.	0.72	Decoction prepared from aerial parts used as antifungal.	Used for making broom (2, 33)
**Zea mays* L. (ISTE 116256)	***Poaceae***	Mısır	Style, fruits, leaves, stem, spata	Decoction, int. infusion, int. eaten	0.86	Dec. inf. styles are used for urinary tract infection and as diuretic(int.). Boiled fruit eaten, galactagogue.	Diuretic, kidney stone (2, 27, 46), enuresis (32), dysuria (36), as antilithic (41)

Inf.: infusion, **Int.**: internal. **Dec.**: decoction **Ext.**: external. *Cultivated, **(1)** Akaydin & al. 2013 **(2)** Akbulut & Bayramoğlu 2013 **(3)** Arı & al. 2015 **(4)** Ashidi & al. 2013 **(6)** Bulut & al. 2017a **(7)** Bulut & al. 2017b **(12)** Çakılcıoğlu & al. 2010 **(13)** Çakılcıoğlu & Türkoglu 2010 **(14)** Cakilcioglu & al. 2011 **(18)** Ezer & al. 2006 **(19)** Fahamiya & al. 2016 **(20)** Guarrera & al. 2007 **(21)** Güler & al. 2015 **(27)** Hayta & al. 2014 **(28)** Heinrich 2000 **(29)** Kargıoğlu & al. 2008 **(31)** Kizilarslan & Özhatay 2012 **(32)** Koçyiğit & Özhatay 2008 **(33)** Korkmaz & al. 2015 **(34)** Korkmaz & al. 2016 **(35)** Kültür 2007 **(36)** Luczaj 2012 **(38)** Mumcu & al. 2018 **(39)** Mustafa & al. 2012 **(40)** Özgökçe & Özçelik 2004 **(41)** Özüdoğru & al. 2011 **(42)** Polat & al. 2015 **(43)** Polat 2019 **(44)** Sağıroğlu & al. 2012 **(45)** Sağıroğlu & al. 2013 **(46)** Sargin & al. 2013 **(49)** Sharma & al. 2017 **(50)** Sığva & Seçmen 2009 **(54)** Tetik & al. 2013 **(57)** Tuttolomondo & al. 2006 **(59)** Yeşil & al. 2009

Fig. 4. *Anarrhinum orientale* Benth. (dried herb used for brooms).

Fig. 5. *Capsicum annuum* L. (dried for use as spice).

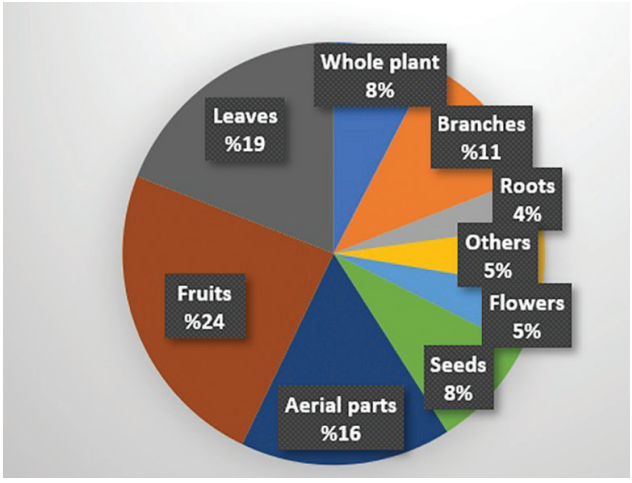

Fig. 6. Commonly used parts of collected plants.

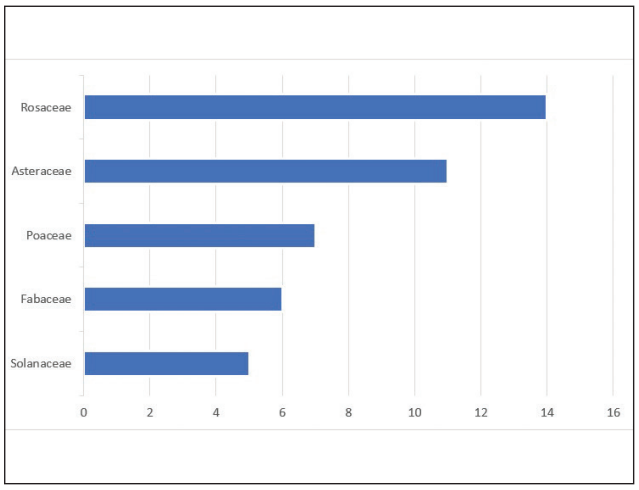

Fig.7. Number of plant families of the collected species.

leaves, aerial parts, and branches (Fig. 6). The examined plant species were mostly from the families *Rosaceae* (14 taxa), *Asteraceae* (11 taxa), *Poaceae* (7 taxa), *Fabaceae* (6 taxa), and *Solanaceae* (5 taxa) (Fig. 7).

Data analysis

The highest Use Values of taxa were calculated for *Zea mays* L. (0.86), *Morus alba* L. (0.83), *Prunus cerasus* L. (0.78), *Vitis vinifera* L. (0.73), *Juglans regia* L. (0.73), *Xeranthemum annuum* L. (0.72), and *Allium cepa* L. (0.69) (Fig 8). Respiratory diseases had the highest FIC value (0.88): 26 use reports for four taxa. The taxa reported for treatnent of respiratory diseases are *Prunus cerasus* L., *Rosa canina* L., *Abelmoschus esculentus* (L.) Moench, and *Mentha longifolia* subsp. *typhoides* (Briq.) Harley. The second highest value is related to colds and flu, with 0.85 FIC, followed by rheumatism (0.83), cardiovascular diseases (0.80), gastrointestinal disorders (0.77), kidney diseases (0.76), urinary diseases (0.66), diuretic effect (0.60) and diabetes disease (0.58). In a study by Çakılcıoğlu & al. (2010) conducted in the same region, the highest FIC score was reported for hemorrhoids (0.62), followed by diabetes (0.56) and gastrointestinal diseases

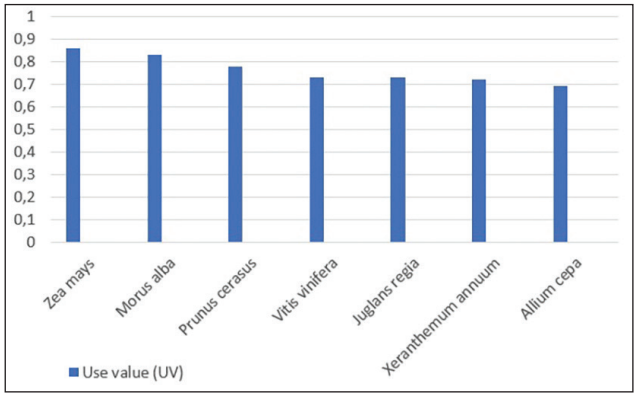

Fig.8. Use values of plant species.

Table 2. Factor Informant Consensus (FIC) values for each ailment.

Ailment categories	Number of use reports (Nur)	Number of taxa (Nt)	FIC
1. Respiratory diseases	26	4	0.88
2. Cold and flu	35	6	0.85
3. Rheumatism	7	2	0.83
4. Cardiovascular diseases	16	4	0.80
5. Gastrointestinal disorders	57	14	0.77
6. Kidney diseases	18	5	0.76
7. Urinary diseases	10	4	0.66
8. Diuretic	6	3	0.60
9. Diabetes	13	6	0.58

(0.48). In another study of Çakılcıoğlu & al., (2011) conducted in the same region, the highest FIC score was reported for rheumatism (0.58), followed by cardiovascular disorders (0.51) and hemorrhoids (0.48) (Table 2).

Discussion

Comparison with literature records

A comparison with the earlier studies conducted in the close vicinity of the research area has shown that the plants collected in the present study were used for different purposes. For example, according to the researches carried out by Çakılcıoğlu & al. (2011) in Elazığ-Maden district, *Trifolium pratense* L. was used for treatment of asthma, but it was not so in the present study. (Table 3). Likewise , according to the study of Çakılcıoğlu & al. (2011), *Morus alba* L. was used as a hypoglycemic agent and against constipation in the Maden district, but in Elmasuyu village it was used for treatment of colds, gastric ulcer and as mucoprotective agent. *Rosa canina* L. was used as an antiseptic and for treatment of diabetes in the Maden district, while in the Elmasuyu village it was used as an expectorant, against dyspnea and hemorrhoids. According

Table 3. Uses of plants for other purposes in Elmasuyu village (Elazığ, Turkey).

Latin name / Specimen number	Family	Local name	Plant part used	Preparation/ utilisation method	UV (Use value)	Ailments treated, therapeutic effect	Reported literature uses
**Acacia karroo* Hayne (RG 008)	***Fabaceae***	Akasya	Seeds	Eaten	0.08	Used for animal feed.	Appetizer, against rheumatism, female sterility, hemorrhoids (46)
Amaranthus retroflexus L. (ISTE 116217)	***Amaranthaceae***	Leğundur	Leaves	Infusion, int. cooked, eaten	0.09	Inf. leaves, against stomach ache, infertility (int). Cooked for food.	Cooked (4, 35), against sterility (40)
Anarrhinum orientale Benth. (RG 012)	***Plantaginaceae***	Süpürge otu	Aerial parts	Dried plants tied into bunches	0.55	Used for making brooms	Not reported
Astracantha condensata (Ledeb.) Podlech. (ISTE 116234)	***Fabaceae***	Gün	Aerial parts	Eaten	0.14	Used as fodder	Roots pounded to obtain gum (41)
**Capsicum annuum* L. (ISTE 116211)	***Solanaceae***	Biber	Fruits	Eaten	0.66	Used as spice	Against colds (45), analgesic, against rheumatism (46), as spice, for blood purification and against arthritis, antirheumatic heart stimulant (2)
** Citrullus lanatus* (Thunb.) Matsum. & Nakai (ISTE 116245)	***Cucurbitaceae***	Karpuz	Fruits	Eaten	0.66	Fruits are eaten	For slimming (33)
Corylus avellana L. (RG 005)	***Betulaceae***	Fındık	Fruits, wood	Eaten, dried plants tied into bunches	0.58	Fruits are eaten, branches are used to weave baskets	Against prostatitis (35), as foodstuff (29, 44)
Crypsis alopecuroides (Piller & Mitterp.) Schrad. (ISTE 116219)	***Poaceae***	Saz	Whole plant	-	0.07	Used for ornamental purposes	Not reported
**Cucumis melo* L. (ISTE 116248)	***Cucurbitaceae***	Kavun	Fruits	Eaten	0.22	Fruits are eaten	Against renal diseases (19, 54)

Latin name / Specimen number	Family	Local name	Plant part used	Preparation/ utilisation method	UV (Use value)	Ailments treated, therapeutic effect	Reported literature uses
**Cucurbita pepo* L. (RG 007)	***Cucurbitaceae***	Kabak	Fruits	Eaten	0.51	Fruits are eaten	Tonsillitis, mumps, inflammatory pains (45), digestive troubles (46)
Euphorbia macroclada Boiss. (ISTE 116230)	***Euphorbiaceae***	Dele, Sütleğen, Yılan otu	Aerial parts	Crushed, latex, ext.	0.12	The milk of the plant is used in the treatment of warts (ext.). The aerial parts are boiled in water and the water is used to dye wool dark yellow (brown)	For curing warts (12, 14, 27), arthritis (13), malaria (3), constipation (14)
**Fragaria* x *ananassa* (Duchesne ex Weston) Duchesne ex Rozier (ISTE 116255)	***Rosaceae***	Çilek	Fruits	Eaten	0.51	Fruits are eaten	Used in food preparation, to flavor dairy products (49)
**Helianthus annuus* L. (ISTE 116257)	***Asteraceae***	Ayçiçeği, Gündöndü	Aerial parts, capitulum, stem	Eaten	0.38	Seeds are eaten. Capitula are used for toys	Against colds (45), respiratory tract diseases and flu, bronchitis (46), as animal fodder, to increase milk secretion (32)
Helianthus tuberosus L. (ISTE 116246)	***Asteraceae***	Yer elması	Rhizomes	Eaten	0.11	Rhizomes are eaten	As foodstuff (3, 29), against diabetes (42)
Hibiscus trionum L. (ISTE 116220)	***Malvaceae***	Yabani bamya	Aerial parts	Eaten	0.15	Used as fodder	Against asthma, bronchitis, hemorrhoids, as expectorant (1), for treatment of colds and flu (27), diuretic, depurative, anti-inflammatory; against urinary disorders (54)
Juncus inflexus L. (ISTE 116242)	***Juncaceae***	Sepet otu	Aerial parts	Dried plants tied into bunches	0.05	Aerial parts used to weave baskets	Not reported
Kickxia elatine (L.) Dumort. (ISTE 116235)	***Scrophulariaceae***	Rezil otu	Aerial parts	Eaten	0.07	Used as fodder	Hyperhydrosis of the feed (57)
Lotus corniculatus L. (ISTE 116215)	***Fabaceae***	Gazal boynuzu	Whole plant	Eaten	0.08	Used as fodder	Sedative, antihemorrhoidal, abdominal pain, diuretic, (39), demulcent (4).
**Lycopersicon esculentum* Mill. (ISTE 116225)	***Solanaceae***	Domates	Fruits	Eaten	0,58	Consumed as food	Digestion (46), foodstuff (32)
Malus sylvestris (L.) Mill. (ISTE 116218)	***Rosaceae***	Elma	Fruits	Eaten	0.75	Fruits are eaten	Abdominal pain and indigestion (46), asthma (1), foodstuff (3), ear ache (36), colds, diabetes (39)
**Phaseolus vulgaris* L. (RG 009)	***Fabaceae***	Fasülye	Fruits	Eaten	0.52	Fruits are eaten	'Dolma' is cooked with young leaves (32)
Phragmites australis (Cav.) Trin. ex Steud. (ISTE 116260)	***Poaceae***	Kamış	Stem	Dried plants tied into bunches	0.07	Dried stems are used to weave baskets and make whistles	Nausea, urinary problems, arthritis (39), as building material, for fence making (57)

Latin name / Specimen number	Family	Local name	Plant part used	Preparation/ utilisation method	UV (Use value)	Ailments treated, therapeutic effect	Reported literature uses
Populus alba L. (ISTE 116253)	***Salicaceae***	Kavak ağacı	Stem, branches	-	0.14	Used as dye by boiling the fruits	Construction molding material (34), antihemorragic, anti-dandruff (63),
Prunus domestica L. (ISTE 116239)	***Rosaceae***	Alunça	Fruits	-	0.48	Stem and braches used as firewood	Stomach ache (1), odor and taste remover (21)
Prunus mahaleb L. (ISTE 116259)	***Rosaceae***	Melem	Fruits, stem	-	0.16	Used for grafting cherry	Kidney stones (12), urinary infections (13), diabetes (14, 28, 30)
* *Prunus dulcis* (Mill.) D.A.Webb (ISTE 116250)	***Rosaceae***	Armut	Fruits	Eaten	0.69	Fruits are eaten	Diabetes (13, 14), constipation (14),chest and lung pains (21),
Setaria verticillata (L.) P.Beauv. (RG 013)	***Poaceae***	Püskül otu	Whole plant	Eaten	0.07	Used as fodder	Not reported
**Solanum melongena* L. (RG 018)	***Solanaceae***	Patlican	Fruits	Eaten	0.58	Consumed as food	Anemia (21)
Solanum americanum Mill. (ISTE 116231)	***Solanaceae***	Yılan üzümü	Aerial parts	-	0.05	Protects plants against reptiles	Eye diseases (7), foodstuff (29, 33)
**Solanum tuberosum* L. (ISTE 116261)	***Solanaceae***	Patates	Tuber	Eaten	0.48	Consumed as food	Diabetes (21), eyeburn (29), headache (33, 36)
Trifolium pratense L. (ISTE 116268)	***Fabaceae***	Nefil	Aerial parts	Eaten	0.11	Used as fodder	Expectorant (13), astma (16), diarrhea, stomach ache (27), animal fodder (34), vulnerary (39)
Trisetum flavescens (L.) P.Beauv. (ISTE 116232)	***Poaceae***	Palah	Seeds	Eaten	0.08	Used as fodder	Not reported
**Triticum aestivum* L. (RG 014)	***Poaceae***	Buğday	Fruits	Eaten	0.16	Dried aerial parts are used as straw and animal feed in winter	Diuretic (21), analgesic (36),
Verbascum sp. (RG 017)	***Scrophulariaceae***	Yabani ot	Flowers, seeds, leaves	-	0.22	Used as fuel since it burns easily	To treat hemorrhoids (5, 28, 45), as expectorant, spasm-sedating, against tuberculosis, eczema, inflammation, wounds, as diuretic (12, 38), antitussive (15), against uterine inflammations, as dyestuff, against hair loss (41)
Vicia sativa L. (ISTE 116270)	***Fabaceae***	Fit	Whole plant	Cattle feed	0.19	Used to obtain grain fodder	Fodder (32,46)

*Cultivated, **(1)** Akaydin & al. 2013 **(2)** Akbulut & Bayramoğlu 2013 **(3)** Arı & al. 2015 **(4)** Ashidi & al. 2013 **(6)** Bulut & al. 2017a **(7)** Bulut & al. 2017b **(12)** Çakılcıoğlu & al. 2010 **(13)** Çakılcıoğlu & Türkoglu 2010 **(14)** Cakilcioglu & al. 2011 **(18)** Ezer & al. 2006 **(19)** Fahamiya & al. 2016 **(20)** Guarrera & al. 2007 **(21)** Güler & al. 2015 **(27)** Hayta & al. 2014 **(28)** Heinrich 2000 **(29)** Kargıoğlu & al. 2008 **(31)** Kizilarslan & Özhatay 2012 **(32)** Koçyiğit & Özhatay 2008 **(33)** Korkmaz & al. 2015 **(34)** Korkmaz & al. 2016 **(35)** Kültür 2007 **(36)** Luczaj 2012 **(38)** Mumcu & al. 2018 **(39)** Mustafa & al. 2012 **(40)** Özgökçe & Özçelik 2004 **(41)** Özüdoğru & al. 2011 **(42)** Polat & al. 2015 **(43)** Polat 2019 **(44)** Sağıroğlu & al. 2012 **(45)** Sağıroğlu & al. 2013 **(46)** Sargin & al. 2013 **(49)** Sharma & al. 2017 **(50)** Sığva & Seçmen 2009 **(54)** Tetik & al. 2013 **(57)** Tuttolomondo & al. 2006 **(59)** Yeşil & al. 2009

to another study prepared by Figen Tetik & al. (2013) with data from Malatya, *Carduus nutans* L. was used for gastrointestinal disorders, but no such data has been found in Elmasuyu village. It has been recorded that *Plantago lanceolata* L. was used as an expectorant and in treatment of tonsillitis in the province of Malatya, but it was used against stomach diseases in Elmasuyu. *Agrimonia eupatoria* L. was used to treat prostate and edema in Malatya but in Elmasuyu village it was applied for treatment of diabetes. *Prunus armeniaca* L. was used against constipation, diabetes and as a skin tonic in Malatya Province, but such data have not been found in Elmasuyu village. According to the findings of Çakılcıoğlu & al. 2010 in their study in the Province of Elazığ, Yazıkonak and Yurtbaşı, *Mentha longifolia* subsp. *typhoides* (Briq.) Harley has been reported to treat sore throat, but in Elmasuyu village the same plant is used against abdominal and stomach aches, colds and respiratory diseases. *Portulaca oleracea* L. is used as decoction to treat abdominal pain in Yazıkonak and Yurtbaşı districts; but it is applied to pass kidney stones and to treat anemia in Elmasuyu village. The leaves of *Rosa canina* L. are used for treatment of diabetes in Yazıkonak and Yurtbaşı districts, but they have a different usage in Elmasuyu village - against dyspnea, flu and hemorrhoids.

Ethnobotanical information and clinical studies

Ethnobotanical studies are important for recording the fading out folk culture. The use of a plant for medicinal purposes by the people constitutes the first stage of herbal-based drug production. Although it cannot be maintained that every plant is correct for human use, the usage data are important in terms of giving an idea for pharmacological and phytochemical studies. In the present study some uses of plants medicinally and as food are recorded for the first time and some clinical investigations support the medicinal usages. For example, *Xeranthemum annuum* L. is used as antifungal agent by the local people. The results from the study of Stanković & al. (2011) prove that the tested extracts have shown low to moderate antifungal activity. It is known that the species of the family *Asteraceae* are very rich in phenolic compounds and are strongly biologically active, with a strong antioxidant, antibacterial, antifungal, antiviral and antiproliferative effect. Some usage patterns recorded in the earlier studies are similar to the uses in the region. For example, crushed green bark of fresh fruits of *Juglans regia* L. is used externally against inflammatory wounds and as an antifungal agent. The study of Sytykiewicz & al. (2015) shows that the methanolic fraction derived from *Juglans regia* leaves exhibits a strong antifungal effect. Another study of Fizeşan & al. (2021) has shown that a septum extract from *J. regia* has a high anti-inflammatory effect. The fruits of *Rosa canina* L. are used against cold, flu, dyspnea, and hemorrhoids by most local people in Turkey. Clinical studies support this usage. *R. canina* contains fatty acids, phenolic compounds and minerals. Rosehip components may act as antioxidants, anti-inflammatory, antimicrobial, anti-tumour agents and decrease the cholesterol level in plasma (Vlaicu & al. 2020).

It was observed that 14 out of the 42 plants used for medicinal purposes differred from the records obtained in other studies. Intensive migration into Elazig and its environs, population changes and loss of ethnobotanical knowledge before it could be handed down from generation to generation may explain these differences. It turned out that 10 out of the 42 recorded plants to be used for medicinal purposes are cultivated. The fact that access to medical literature has been facilitated today has led to a widespread use of cultivated plants for medicinal purposes.

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