

The preliminary ethnobotanical survey of medicinal plants in Develi (Kayseri/Turkey)

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ABSTRACT

Background and Aims: In Turkey, there is a growing interest in ethnobotany due to the wealth of biological and cultural diversity. The main purpose of this study is to record and highlight the medicinal plants used therapeutically in the Develi district.

Methods: The data were obtained during different seasons of 2010-2011 through face-to-face interviews. Medicinal plants were collected with the guidance of the informants, and traditional uses was recorded. Botanical identification of all the species was made, and voucher specimens were deposited at Istanbul University, Herbarium of the Faculty of Pharmacy (ISTE).

Results: The informants reported data on 14 medicinal plants belonging to 8 botanical families. These medicinal plants are used for about 26 different purposes. The most dominant family is Lamiaceae (6 species) followed by Asteraceae (2 species). Various plant parts such as leaf, fruit, flower, root, wood and fruity branch are used; the aerial part is consumed more frequently than other plant parts.

Conclusion: Despite the modernization and cultural change, many people still benefit from the plants distributed in the Develi district. This study offers valuable information on the traditional knowledge of medicinal plants, which could form a basis for future phytochemical and pharmacological researches.

Keywords: Develi, ethnobotany, Kayseri, medicinal plants, Turkey

INTRODUCTION

Turkey has a rich flora with over 11000 taxa, approximately 34% of these are endemic. Our country gets ahead of all European countries in terms of the number of endemic plants (Güner et al., 2018; Güner, 2014). This floristic richness and cultural heritage from the past constitute a great deal of ethnobotanical knowledge which should be revealed (Yeşilada, 2013; Kendir & Güvenç, 2010).

As known, many ethnobotanical practices such as making tools or using medicinal plants are generally learned *in situ*, as children work alongside parents or elder siblings. However, technological developments and modernization change the socio-cultural structure of the society, and it is becoming

more difficult to conduct ethnobotanical studies or access to information about ethnobotanical practices. Therefore, ethnobotanical data which is about to disappear attracts scholarly attention and many researchers have begun to document this academic value (Güner, 2014; Yeşilada, 2013; Kendir & Güvenç, 2010; Cotton, 1996).

In Turkey, ethnobotanical studies have become increasingly recognised as a valuable source of information on the use and conservation of many plants, particularly after the 1980s. Many systematic field studies have begun to record traditional medicine carefully, and thus become an important resource for drug discovery research (Yeşilada, 2013; Baytop, 1999). Throughout recent years, numerous ethnobotanical studies have been published in Turkey concerning the traditional use

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of medicinal plants and many studies have been conducted in Central Anatolia (Sağiroğlu, Topuz, Ceylan, & Turna, 2013; Gençler Özkan & Koyuncu, 2005; Sezik et al., 2001; Doğan, Başlar, Ay, & Mert, 2004; Bağcı, 2000; Ertuğ, 2000).

Kayseri province is located in the central Kızılırmak section of Central Anatolia. Its eastern part is situated in upper Kızılırmak River while the southern part is in the Mediterranean region. General characteristics of the Irano-Turanian vegetation types prevail in this region, these vegetation elements such as *Consolida orientalis* (J.Gay) Schrödinger, *Glaucium flavum* Crantz, *Fumaria officinalis* L., *Isatis glauca* Aucher, *Capsella bursa-pastoris* (L.) Medik., *Silene conica* subsp. *subconica* (Friv.) Gavioli, *Pegannum harmala* L., *Melilotus officinalis* (L.) Pall., *Cirsium arvense* (L.) Scop., *Sideritis lanata* L., *Salvia multicaulis* Vahl, *Euphorbia orientalis* L., *Cynodon dactylon* (L.) Pers. can be seen in various areas of Kayseri province (Türkmen, 2006). This floral and also cultural richness forms a basis for noteworthy ethnobotanical knowledge. Although there are some prior ethnobotanical studies that have been carried out in various regions of Kayseri (Sağiroğlu et al., 2013; Gençler Özkan & Koyuncu, 2005; Sezik et al., 2001; Bağcı, 2000), traditional uses of medicinal plant in the Develi district have not been reported. The aim of the present study is to provide information about the ethnobotanical properties of medicinal plants which are used traditionally by the local people of the Develi district.

MATERIAL AND METHODS

Study area

Develi, which is one of the biggest districts of Kayseri, is situated in the central part of Turkey. Develi was established 6 km from the south of Mount Erciyes (38°23'18.6"N, 35°29'31.3"E), is surrounded by Tomarza District and Tufanbeyli District of Adana Province in the east, Yahyalı District and Saimbeyli-Feke Districts of Adana Province in the south, Yeşilhisar District in the west and İncesu District in the northwest (Figure 1). Develi

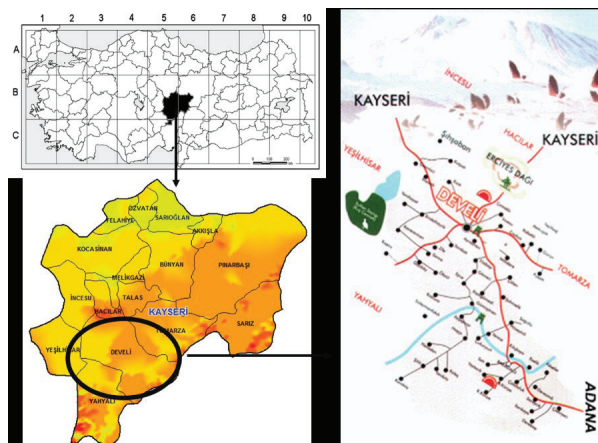


Figure 1. The geographical location of the study area.

is included in Irano-Turanian flora region and falls within the B5 grid square according to the Grid classification system used in the Flora of Turkey (Davis et al., 1988; Davis, 1965-1985).

The surface area of the district is 1887 km², and the altitude of the central district is 1150 m above sea level. The total population is 65,745 according to the population census in 2019. The most important mountains of the region are Erciyes Mountain, Karasivri Mountain, Büyük Kartın (Peri Kartın), Göktepe, Sümen- gen (Süvegen) and Bakır Mountain. The reedfield Sultan Sazlığı, which is located at the lowest part of the Develi plain, contains important floral and faunal communities. Develi is one of the least precipitation areas of our country. The average annual rainfall varies between 300 and 500 mm, and it usually falls in spring. The annual average temperature is calculated as 10.6°C. Develi has hosted various civilizations for centuries. Although the first settlement date could not exactly be determined, some ruins of the Hittite period were found in the region. After the domination of Phrygians, Persians and Seljuks, the district passed to the Ottoman administration in 1474. Develi was accepted as the district of Kozan province until 1926. When the status of Kozan changed, Develi became Kayseri district (Türkmen, 2006).

Data collection, plant materials

A field study was carried out during different seasons of 2010-2011 in the Develi district of Kayseri. After the local people were informed about the study, face-to-face interviews were held in order to document ethnobotanical knowledge. Related data were obtained from local people by using interview questions including information on local plant names, ailments and diseases treated, therapeutic effects, parts of plants used. All plant specimens were collected together with accompanied informants. Plant specimens were numbered and pressed in the field (Figures 2-5).



Figure 2. *Lavandula stoechas* L.



Figure 3. *Crataegus meyeri* Pojark.



Figure 5. *Verbascum* sp.



Figure 4. *Hypericum perforatum* L.

Collected plant specimens were identified by two of the authors (Rıdvan Çolak, Şükran Kültür) using references, i.e. Flora of Turkey and the East Aegean Islands (Davis, 1965-1985; Davis, Mill, & Tan, 1988; Güner et al., 2000) and Türkçe Bitki Adları

Sözlüğü (Baytop, 1994), and compared with specimens stored in Istanbul University, Herbarium of the Faculty of Pharmacy (ISTE). The voucher specimens were deposited in the ISTE Herbarium. The names of plant families were listed in alphabetical order. Scientific names of identified taxa were updated according to The Plant List (<http://www.theplantlist.org/>). Ethnobotanical data were screened to reveal whether the plants used have literature records or not.

RESULT AND DISCUSSION

A total of 14 plant species with ethnobotanical importance belonging to 8 botanical families were found out and documented in this research. Each species is presented with its corresponding botanical identity, herbarium sample number, family name, vernacular name, part used and ethnobotanical usage.

***Alcea pallida* (Willd.) Waldst. & Kit., R. Celik 08, Malvaceae**
Vernacular name: Gülhatmi, Gülfatma

Used parts: Leaves, roots

Ailments treated/Therapeutic effect: Asthma, cough, expectorant, diuretic (leaves)

Previous ethnobotanical literature records: Cough (Kurnaz Karagöz & Sertaser, 2017; Tetik, Civelek, & Cakılcıoğlu, 2013; Demirci & Özhatay, 2012; Keskin, 2011; Saday, 2009; Karataş, 2007; Bağcı, 2000), bronchitis (Tetik et al., 2013; Saday, 2009; Demirci & Özhatay, 2012), stomach diseases (Bağcı, 2000),

ophthalmia (Sağiroğlu et al., 2013), toothache (Sağiroğlu et al., 2013), ornamental plant (Keskin, 2011), respiratory disorders (Kurnaz Karagöz & Serteser, 2017; Keskin, 2011; Karataş, 2007), gingivitis (Oral, 2007), painkiller, kidney stone (Karataş, 2007), soothing throat (Keskin, 2011)

***Ajuga chamaepitys* subsp. *laevigata* (Boiss.) P.H.Davis, R. Celik 05, Lamiaceae**

Vernacular name: Karın ağrısı otu, Bodur otu

Used parts: Aerial parts

Ailments treated/Therapeutic effect: Abdominal pain, severe diarrhea (especially in animals), wound healing

Previous ethnobotanical literature records: Diabetes (Polat & Çakılcıoğlu, 2018), removing fear, constipation (Kaya, Dağlı, & Celik, 2020)

***Crataegus meyeri* Pojark., R. Celik 13, Rosaceae**

Vernacular name: Aliç

Used parts: Fruits, wood

Ailments treated/Therapeutic effect: Vasodilator, kidney and urinary tract purification

Previous ethnobotanical literature records: Antidiarrheal (Yeşil & Akalin, 2009), diabetes (Şenkardeş, 2014; Yeşil & Akalin, 2009), asthma, hemorrhoids (Tetik et al., 2013), cardiovascular diseases (Şenkardeş, 2014; Gençler Özkan & Koyuncu, 2005), rheumatism (Gençler Özkan & Koyuncu, 2005), kidney stone, constipation, foodstuff, fuel, tool (Şenkardeş, 2014)

***Echinophora tenuifolia* subsp. *sibthorpiana* (Guss.) Tutin, R. Celik 09, Apiaceae**

Vernacular name: Çörtük, Çörtlük

Used parts: Aerial parts

Ailments treated/Therapeutic effect: Hand, foot and mouth wounds

Previous ethnobotanical literature records: Foodstuff (Şenkardeş, 2014; Ertuğ, 2000), soup, seasoning, drinking (Doğan et al., 2004)

***Echinops ritro* L., R. Celik 14, Asteraceae**

Vernacular name: Deve diken

Used parts: Aerial parts

Ailments treated/Therapeutic effect: Stomachache

Previous ethnobotanical literature records: Foodstuff (Güneş, Savran, Paksoy, Koşar, & Çakılcıoğlu, 2018; Özüdoğru, Akaydin, Erik, & Yeşilada, 2011), fodder (Ertuğ, 2000), stomach complaints (Özüdoğru et al., 2011)

***Helichrysum plicatum* DC., R. Celik 06, Asteraceae**

Vernacular name: Altın otu

Used parts: Aerial parts

Ailments treated/Therapeutic effect: Intestinal inflammation, hemorrhoid

Previous ethnobotanical literature records: Cholesterol management, cancer (Güneş, Savran, Paksoy, Koşar, & Çakılcıoğlu, 2017), kidney and stomach ailments, depreciatory (Yeşil & Akalin, 2009), kidney stones (Demirci & Özhatay, 2012; Yeşilada et al., 1995; Yeşilada et al., 1993), diarrhea, abdominal pain, diabetes (Özdemir & Alpınar, 2015), hypertension, hypercholes-

terolemia (Kocabaş & Gedik, 2016), nephralgia (Sargin, 2015), stomach ulcer, diuretic (Özüdoğru et al., 2011), wound (Sezik et al., 2001; Tetik et al., 2013), ear ache (for baby) (Demirci & Özhatay, 2012), jaundice, dysuria, snake repellent (Yeşilada et al., 1995), antifungal, urinary dysfunction (Karaman & Kocabaş, 2001), constipation (Çömlekçiöğlü & Karaman, 2008)

***Hypericum perforatum* L., R. Celik 12, Hypericaceae**

Vernacular name: Sarı kantaron

Used parts: Aerial parts, flowers

Ailments treated/Therapeutic effect: Rheumatic pain, stomachache, kidney inflammation

Previous ethnobotanical literature records: Ulcers, allergies (Özüdoğru et al., 2011), burn, wound (Sargin & Büyükcengiz, 2018; Sargin, Selvi, & Buyukcengiz, 2015; Yeşilada et al., 1993), gastric ulcer, antibiotic, immune system booster (Sargin & Büyükcengiz, 2018), hemorrhoids (Han & Bulut, 2015; Akaydin, Şimşek, Antuluk, & Yeşilada, 2013), constipation, prostatitis, diabetes, hypertension, urinary infections, diaper rash, rheumatism, osteoporosis (Akaydin et al., 2013), stomachic, scorch cure (Demirci & Özhatay, 2012), analgesic, gastrointestinal pains, depression (Sargin, 2015), pyrosis, reflux (Sargin et al., 2015), diarrhea, colic (Özdemir & Alpınar, 2015), rheumatic pains, nervous disorders (Kocabaş & Gedik, 2016), sedative, foodstuff, fuel, dye (Akan & Bakır Sade, 2015), stomachache (Yeşilada et al., 1995; Yeşilada et al., 1993), cardiovascular diseases (Tuzlacı & Şenkardeş, 2011), spasmolytic, antiseptic, hepatitis, hemostatic, vulnerary, cholagogue, hepatoprotector, anti inflammatory, orexigenic, digestive (Everest & Öztürk, 2005), gastric diseases, muscle relaxant rheumatism, gastric pain (Uzun & Kaya, 2016), tonsillit, diuretic, expectorant, shortness of breath (Karataş, 2007), tuberculosis, cold, anthelmintic (Ezer & Avcı, 2004), relaxation, insomnia (Akgül et al., 2016), gastrointestinal system disorders (Bağcı, Erdoğan, & Doğu, 2016), contusion and burn, snake bite and scorpion bite (Çömlekçiöğlü & Karaman, 2008), appetizing (Karaman & Kocabaş, 2001)

***Lavandula stoechas* L., R. Celik 03, Lamiaceae**

Vernacular name: Karabaş otu

Used parts: Aerial parts, flowers

Ailments treated/Therapeutic effect: Headaches, smoking cessation (as an aid)

Previous ethnobotanical literature records: Cancer (Sargin & Büyükcengiz, 2018; Akan & Bakır Sade, 2015), sedative (Sargin & Büyükcengiz, 2018), pains, smoking cessation (Akan & Bakır Sade, 2015; Sargin, 2015), cardiovascular disease (Güneş et al., 2017; Sargin, 2015; Çömlekçiöğlü & Karaman, 2008), vasodilator, asthma, bronchitis, headache, brain diseases, ulcer, hypertension, insomnia (Sargin, 2015), stomachache (Güneş et al., 2017; Abay & Kılıç, 2001), analgesic (Sargin et al., 2015), epilepsy, nervousity, anodyne, stethalgia, blood stimulant, hypertension, throat disorders, digestive, obesity (Everest & Öztürk, 2005), nervous disorders (Abay & Kılıç, 2001), hypercholesterolemia (Çömlekçiöğlü & Karaman, 2008)

***Marrubium anisodon* K.Koch, R. Celik 07, Lamiaceae**

Vernacular name: Elbir otu

Used parts: Aerial parts

Ailments treated/Therapeutic effect: Kidney stones, female infertility, regulates the blood pressure
Previous ethnobotanical literature records: Not reported.

***Melissa officinalis* L., R. Celik 01, Lamiaceae**

Vernacular name: Melisa, Oğul otu

Used parts: Leaves

Ailments treated/Therapeutic effect: Cough, asthma, sedative
Previous ethnobotanical literature records: Arteriosclerosis (Paksoy, Selvi, & Savran, 2015), sedative, stress, vasodilator, soporific, female sterility (Sargin, 2015), headache, cardiovascular diseases (Demirci & Özhatay, 2012), insomnia, scorpion bite, bath, heart palpitation (Akan & Bakır Sade, 2015), tranquillizer, antidepressant, anhypnia, gastritis, angiemphraxis, epilepsy, fainting, allergy, digestive, cardiotoxic, hearth stimulant, carminative, spasmolytic, diaphoretic, disinfectant (Everest & Öztürk, 2005), cholesterol, hypertension (Oral, 2007), foodstuff (Koçak & Özhatay, 2013), anemia, diabetes, memory (Akgül et al., 2016), thyroid, sleep disturbances, stress, digestion system (Saltan & Özyaydin, 2013), antiseptic, cold (Karaman & Kocabaş, 2001)

***Peganum harmala* L., R. Celik 11, Nitrariaceae**

Vernacular name: Yüzellik, Güzellik otu

Used parts: Fruity branches, fruits

Ailments treated/Therapeutic effect: Protect against the evil eye, allergic asthma

Previous ethnobotanical literature records: Amulet (Özudoğru et al., 2011), sedative, hemorrhoids, vermifuge, menstrual diuretic (Özdemir & Alpınar, 2015), evil eye, ornaments (Öztürk, 2004), expectorant, stimulating nervous system, hair loss, eczema, malaria, dye (Akan & Bakır Sade, 2015), Parkinson, insomnia (Yaşar, Koyuncu, Turan Koyuncu, & Kuş, 2019; Akan & Bakır Sade, 2015), emmenagogue, narcotic, sedative, nutritive, cephalalgia, anti hysteria, notalgia, ophthalmalgia, omalgia, hand-tremble (Everest & Öztürk, 2005), anthelmintic, stomachache (Tugay et al., 2005), headache, hypertension, carminative (for babies) (Oral, 2007), shortness of breath, stomach ulcer, hair dandruff, hair care (Şenkardeş, 2014), foodstuff (Hakverdi & Yiğit, 2017); dermal diseases (Vural, Karavelioğulları, & Polat, 1997).

***Sideritis libanotica* subsp. *linearis* (Benth.) Bornm., R. Celik 04, Lamiaceae**

Vernacular name: Dağ çayı

Used parts: Aerial parts

Ailments treated/Therapeutic effect: Smoothing throat, vasodilator, diabetes

Previous ethnobotanical literature records: Cold (Demirci & Özhatay, 2012; Yeşil & Akalın, 2009), flu (Demirci & Özhatay, 2012), as a tonic (Yeşilada et al., 1993), foodstuff (Doğan et al., 2004), throat and flu infections (Oral, 2007)

***Teucrium chamaedrys* subsp. *sypsiense* (K.Koch) Rech.f., R. Celik 02, Lamiaceae**

Vernacular name: Kısamahmut otu

Used parts: Aerial parts

Ailments treated/Therapeutic effect: Hemorrhoid, intestinal fungal infections, antidote

Previous ethnobotanical literature records: Diabetes (Dalar, 2018), foodstuff (as tea) (Aksakal & Kaya, 2008)

***Verbascum* sp., R. Celik 10, Scrophulariaceae**

Vernacular name: Yalancı sıgır kuyruğu

Used parts: Fruits, leaves

Ailments treated/Therapeutic effect: Allergic asthma

Previous ethnobotanical literature records: draining inflammation, cough, pain of abarticulation or broken bones (Akaydin et al., 2013), asthma, expectorant (Sargin & Büyükcengiz, 2018), pruritus, shortness of breath, hair loss, dyestuff, uterine inflammations (Özudoğru et al., 2011), urinary inflammations, fissures on hand, abdominal pain (Gençler Özkan & Koyuncu, 2005), warts (Savran et al., 2008), sinusitis, nepatitis, hemorrhoids (Tuzlacı & Şenkardeş, 2011), bronchitis (Saday, 2009)

The Lamiaceae family (6 species) is the most commonly used and species-rich family in this study. It is followed by Asteraceae (2 sp.), Hypericaceae (1 taxon), Malvaceae (1 taxon), Rosaceae (1 taxon), Scrophulariaceae (1 taxon), Apiaceae (1 taxon) and Nitrariaceae (1 taxon), by their number of species. Aerial parts were primarily used for ethnobotanical uses by local people. Other used plant parts were found as leaf, fruit, flower, root, wood and fruity branch, respectively (Figure 6). During this study, a total of 26 traditional usages were recorded. Medicinal plants were used for both human and animal health. *Ajuga chamaepitys* subsp. *laevigata* (Boiss.) P. H. Davis was not used only in humans but also in animal treatment. Besides the treatment of diseases, people benefited from plants for different purposes. They believed that *Peganum harmala* L. protects them from the evil eye.

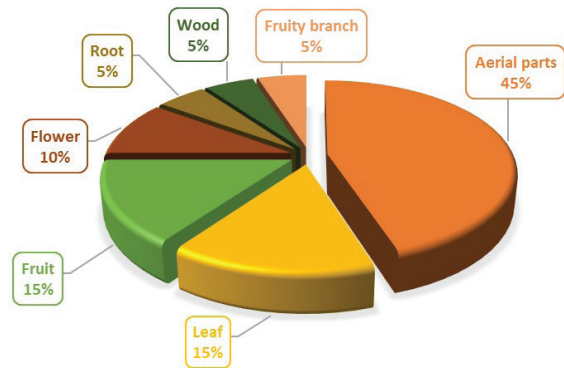


Figure 6. Plant parts used for ethnobotanical purposes ranked by frequency of use.

Recorded traditional uses in the study area were compared with those reported in ethnobotanical studies of Central Anatolia and its environs, and strong affinity was found with the ethnobotanical use. As a result of this comparison, although no medicinal use of *Teucrium chamaedrys* subsp. *sypsiense* (K.Koch) Rech.f. and *Ajuga chamaepitys* subsp. *laevigata* was found, ethnobotanical data from distant regions present several utilizations. *T. chamaedrys* subsp. *sypsiense* was used for diabetes in Van Province and (Dalar, 2018) *Ajuga chamaepitys* subsp. *laevigata* was used for diabetes; removing fear and constipation in Bingöl (Polat & Çakılcıoğlu, 2018) and Şanlıurfa Provinces (Kaya et al., 2020). Previous ethnobotanical data screening in Turkey revealed that the medicinal use of *Marrubium anisodon* K.Koch

was shown for the first time in our study. In addition, some new medicinal uses were found out in this paper: Aerial parts of *Ajuga chamaepitys* subsp. *laevigata* for abdominal pain, severe diarrhea (especially in animals) and wound healing; aerial parts of *Teucrium chamaedrys* subsp. *sypsiense* for hemorrhoid, intestinal fungal infections and as an antidote; fruits and wood of *Crataegus meyeri* Pojark as vasodilator and for kidney and urinary tract purification; aerial parts of *Echinophora tenuifolia* subsp. *sibthorpiana* (Guss.) Tutin for hand, foot and mouth wounds. Comparing this study with the studies from Aladağlar, Yahyalı and Pınarbaşı districts of Kayseri (Sağiroğlu et al., 2013; Gençler Özkan & Koyuncu, 2005; Bağcı, 2000), *Alcea pallida* (Willd.) Waldst. & Kit., *Peganum harmala*, *Crataegus meyeri*, *Verbascum* sp. and *Hypericum perforatum* L. were detected as five shared taxa used. In addition to similarities in uses, some different uses are also noticeable. For instance, while *C. meyeri* was used in the treatment of cardiac disorders and rheumatism in Pınarbaşı region (Gençler Özkan & Koyuncu, 2005), people in the Develi district have benefited from its vasodilator and kidney - urinary tract purification properties.

Some aforementioned medicinal plants contain toxic constituents that adversely affect human health, for this reason, overdose or side effects of these plants can be dangerous according to the literature. *Teucrium chamaedrys* subsp. *sypsiense* is known as a hepatotoxic plant, therefore, it should not be administered without the recommendation of authority in proper use. Photosensitization of *Hypericum perforatum* in humans is associated with excessive intake of the plant (Gruenewald et al., 2000). Special attention should be paid to the use of these plants, even though there is no notification from the local people.

CONCLUSION

The present study documented the traditional uses of 14 plant species belonging to 8 families of medicinal plants by local people. These plants are used either as a remedy for various diseases or for any other purposes in the Develi district of Kayseri. The medicinal uses of *Marrubium anisodon* were recorded for the first time in this study. It is noteworthy that local people mainly use aerial parts of the plants not underground parts (rhizomes, roots and bulbs). They make contributions to the conservation of the species in the region by preventing the indiscriminate cutting or removing the entire plant.

Since the ethnobotanical knowledge of local plants is mainly possessed by elder family members and transmitted from generation to generation, more studies should focus on compiling as much information as possible before the eventual elimination of traditional knowledge. It is believed that this study provides valuable information on medicinal plants, reinforcing the importance of continuing with ethnobotanical research in Turkey, which can lead to the development of new pharmaceuticals.

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