



TRADITIONAL USES OF MEDICINAL PLANTS IN ERZİNCAN PROVINCE, TÜRKİYE

ERZİNCAN (TÜRKİYE) İLİNDEKİ TIBBİ BİTKİLERİN GELENEKSEL KULLANIMLARI

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ABSTRACT

Objective: *This research was carried out to record the usage of plants, parts of this plant used, and methods of preparation by people living in 10 districts and 58 villages of Erzincan province.*

Material and Method: *The medicinal plant species used by the local people for treatment, was collected and determined. All traditionally used information was collected; herbarium materials were prepared, They are deposited in Erzincan Binali Yıldırım University herbarium (EBYU), Erzincan Binali Yıldırım University.*

Result and Discussion: *A total of 100 medical plants taxa pertaining to 39 families were defined in this research. Out of these, 88 species grew naturally, while 12 species were cultivated. The most widespread plant families were Asteraceae (14), Lamiaceae (8), and Rosaceae (14). Infusion was the most widely used preparation method. The utilization of traditional medicine was still extensive among the people in Erzincan. However, through increscent health service facilities in region, herbal medicine seemed to be more related to health care and illness prevention than curation. There is also the loss of traditional knowledge as it receives new immigrants. There is a gradual loss of traditional knowledge on the use of medicinal plants, both in younger generations and due to migration.*

Keywords: *Erzincan, ethnobotany, ethnopharmacology, medicinal plants, Türkiye*

ÖZ

Amaç: *Bu araştırma, Erzincan ilinin 10 ilçesi ve 58 köyünde yaşayan halkın bitkinin kullanım alanlarını, bu bitkinin kullanılan kısımlarını ve hazırlanma yöntemlerini kayıt altına almak amacıyla yapılmıştır.*

Gereç ve Yöntem: *Yöre halkının tedavi amacıyla kullandığı şifalı bitki türleri toplanarak, belirlenmiştir. Geleneksel olarak kullanılan tüm bilgiler toplanmış, herbaryum materyalleri hazırlanmış, Erzincan Binali Yıldırım Üniversitesi herbaryumunda (EBYU) depolanmıştır.*

Sonuç ve Tartışma: *Bu araştırmada 39 familyaya ait toplam 100 tıbbi bitki taksonu tanımlanmıştır. Bunlardan 88 türün doğal, 12 türün ise kültür bitkisi olduğu tespit edilmiştir. En yaygın bitki familyaları Asteraceae (14), Lamiaceae (8), Rosaceae (14) olarak gözlenmiştir. İnfüzyon en yaygın kullanılan hazırlama yöntemidir. Erzincan'da halk arasında geleneksel tıbbin kullanımı hâlâ*

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yaygındır. Bununla birlikte, bölgede artan sağlık tesisleri sayesinde, bitkisel ilaç, iyileştirmeden ziyade sağlık bakımı ve hastalıkları önlemede kullanıldığı tespit edilmiştir. Bölgede yeni göç ve genç nüfus arttığı gözlenmiştir. Hem genç nesillerde hem de göç nedeniyle şifalı bitkilerin kullanımına ilişkin geleneksel bilgide kademeli bir kayıp tespit edilmiştir.

Anahtar Kelimeler: Erzincan, etnobotani, etnofarmakoloji, tıbbi bitkiler, Türkiye

INTRODUCTION

Plants are a resource that has been used as both a protective/therapeutic and a tool throughout human history [1]. In Türkiye, one of the world's more important biodiversity, more than 30% of the about 12000 vascular plant taxa are endemic (about 4000), which is more than the number of endemic species in European countries (1352) [2-4]. Türkiye provides a variety of ecosystems due to its geographical location, climate, geology, soil and water resources, and ecological benefits such as being on bird migration routes [5-7]. Due to the diversity of the flora and fauna, the Anatolian people have had a rich source of medical plants and animal remedies for a long time, and as a result, valuable folk medicine knowledge has been acquired in the district and countryside [8].

Eastern Anatolian flora also shows diversity due to its different ecological regions, geographical differences and different climates. Erzincan Province, located in the transitional zone among the Eastern Black Sea, Eastern Anatolia, and Central Anatolia regions, is considered to be one of the most significant centers of genetic diversity and endemism in Türkiye [9]. The number of ethnobotanical studies in Erzincan province is very few. These studies have been completed in a specific region or local markets, not the general of Erzincan province (Üzümlü, Tercan, Kemah, and İliç districts) [9-12,27]. The current study was conducted to document the utilization of medicinal plants, plant parts used, and methods of preparation by individuals living in Kemah (10 villages), Üzümlü (5 villages), Tercan (6 villages), Çayırılı (4 villages), Otlukbeli (2 villages), Refahiye (9 villages), İliç (8 villages), Kemaliye (9 villages) and the center (5 villages) of Erzincan province.

MATERIAL AND METHOD

The Study Area

Erzincan province is located in Türkiye's Eastern Anatolia Region and is grouped into the B7 square. It is part of the Iran-Turanian Plant Geography Region. It is an eastern Anatolian province with a population of 239.223 and a surface area of 11.903 km² in 2023 [13-15]. Erzurum to the east, Bayburt to the north, Gümüşhane to the northwest, Tunceli to the south, and Sivas to the west surround Erzincan province (Figure 1).

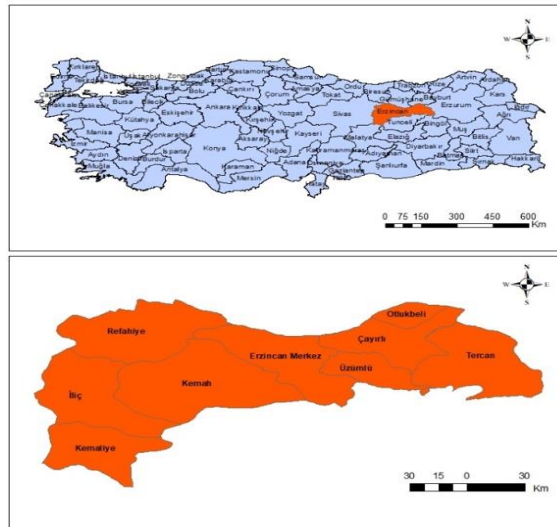


Figure 1. Geographical location of the investigation region

Data Collection

The ethnopharmacological information was gathered in the field by conducting structured and semistructured interviews with all competent people from 58 villages, including Harmankaya (1), Gözaydın (2), Apçaağa (3), Ocak (4), Yuvalı (5), Başbağlar (6), Yeşilyamaç (7), Kocaçimen (8), Salihli (9), Akdoğu (10), Uluyamaç (11), Büyükköy (12), Sabırlı (13), Ortatepe (14), Ağıldere (15), Büyükarmutlu (16), Balkaya (17), Kureyşli sarıkaya (18), Sansa (19), Pelitli (20), Bayırbağ (21), Yuvalı (22), Kemerçam (23), Ağören (24), Üçpınar (25), Konarlı (26), Yaylın (27), Başköy (28), Yaylakent (29), Yaylalar (30), Cennetpınarı (31), Baltaş (32), Dereköy (33), Sarıyazı (34), Beşikli (35), Aktaş (36), Karacalar (37), Ayranpınarı (38), Yahşiler (39), Kayabaşı (40), Eriç (41), Muratboynu (42), Küçükotlukbeli (43) Avcıçayırı (44), Gemecik (45), Sarıkoç (46), Diştaş (47), Yurtbaşı (48), Gümüşakar (49), Kürelik (50), Gazıpınarı (51), Kılıçkaya (52), Mecidiye (53), Başpınar (54), Kalecik (55), Geyikli (56), Akarsu (57), Şahaloğlu (58). Because this is a Ministry of Agriculture and Forestry project, The settlements were chosen by the Ministry of Agriculture and Forestry. settlements. A total of 150 people were interviewed face-to-face, including midwives, shepherds, foresters, farmers, healers, beekeepers, housewives, teachers, headmen, and plant collectors. While 46 of the informants were female (30.67%), the remaining 104 were male (69.33%). A questionnaire was filled out with the participants, and video photographs and audio recordings were taken during the interview, again with the permission of the participants. The interviews with the participants were randomly selected (tea houses, mosque garden, house, field, plateau etc.). During the study, the local name of the plant, the therapeutic effect of the plant, the part(s) of the plant used, and the preparation/application methods were learned from the participants.

Plant Materials

In 2022 and 2023, the plant samples were collected from the villages. The authors, Mustafa KORKMAZ and Sercan ÇORLU, pressed and described scientific names of the collected samples using the Flora of Turkey and the East Aegean Islands, the Turkish Plants List (Vineaceous Plants), the Flora of the USSR, and Flora Europaea [16-19]. The scientific names of plant species are given with reference to the plant list [20]. Voucher specimens were stored in Erzincan Binali Yıldırım University Herbarium (EBYU).

Ethnobotanical Index

The UV (use value of a species) index was calculated using the formula $UV = \sum U_i / N$, where U_i is the number of use reports stated by significant percentage for a taxon and N is the number of sources [21-23].

RESULT AND DISCUSSION

Interviews were used to capture the demographic characteristics of the participants in the field research. A total of 150 individuals from diverse backgrounds, including academicians, beekeepers, farmers, retirees, religious officers, engineers, teachers, housewives, shepherds, and individuals engaged in the collection of medicinal plants, were subjected to face-to-face interviews. Among the informants, 104 were female (69.33%), while the remaining 46 were male (30.67%). A total of 150 people (46 women and 104 men) were contacted. 2 under the age of 19, 10 between the ages of 19-35, 16 between the ages of 36-49, 84 between the ages of 50-70, and 38 above the age of 70. 13 of the participants had never attended a formal educational institution (Table 1). All the informants are native of and still living in Tercan, Otlukbeli, Çayırılı, Üzümlü, Kemah, Refahiye, İliç, and Kemaliye districts (Erzincan, Türkiye). It has been observed that most of the people who use medicinal plants are in the age range of 50-70 years. Again, it has been determined that most of the users of medicinal plants are men with primary school education and below (Table 1). In the ethnobotanical study conducted in Erzurum, a province characterized by substantial cultural and socioeconomic interaction with Erzincan, it was observed that individuals aged 50-70 derived the greatest benefits from medicinal plants [21,32]. In addition, a similar situation was reported in ethnobotanical studies conducted on Bayburt, Gümüşhane, and Sivas provinces, which are neighboring provinces of Erzincan [24-26]. It is understood that women

attach more importance to the use of medicinal plants in Erzincan, as in other provinces of Eastern Anatolia (Erzurum, Van, Elazığ, Bingöl and Tunceli) and Eastern Black Sea region (Bayburt, Gümüşhane, and Trabzon) [21,24-28,32-34].

Table 1. The demographic profile of the participants

Demographic Characteristics	Number
Age Range	
Below 19	2
19-35	10
36-49	16
50-70	84
70 and above	38
Sex	
Women	46
Men	104
Educational Levels	
Illiterate	13
Literate	6
Primary school	80
Secondary school	22
High school	19
University	8
PhD	2

A total of 100 medicinal plant taxa from 39 plant families were gathered in the Erzincan province of Türkiye (Table 2). The most common medicinal plant families were Asteraceae (14), Rosaceae (14), Lamiaceae (8), Apiaceae (5), Adoxaceae (5), Malvaceae (5), Amaryllidaceae (4), and Polygonaceae (4). A total of 100 medicinal plant taxa were collected in Erzincan and they belong to 39 different plant families. There are 88 wild species and 12 cultivated plants among them. Table 2 list the 100 herbs defined in the area, organized alphabetically by family and botanical name. According to our results, the most used taxa are *Helichrysum arenarium*, *Cephalaria procera*, *Juglans regia*, *Origanum acutidens*, *Malva neglecta*, *Tilia tomentosa*, *Thymus pseudopulegioides*, *Morus nigra*, *Plantago major*, *Pinus nigra*, *Rumex patientia*, *Rumex ponticus*, *Rheum ribes*, *Crataegus monogyna*, *Solanum tuberosum*, and *Urtica dioica*. In the fields of ethnobotany and ethnopharmacology, various studies have been conducted in different regions to document the rich diversity of plant species and their traditional uses. In the Bayburt province, Kadioğlu et al. conducted a comprehensive ethnobotanical study, identifying a total of 92 taxa from 36 families [24]. Similarly, in the Gümüşhane province, Akbulut and Zengin undertook ethnobotanical research, documenting 74 taxa that represented 38 distinct families [25]. Furthermore, in Sivas, another survey revealed the presence of 100 taxa spanning 38 different families [26]. Likewise, in the Erzurum province, an ethnobotanical study recorded 99 taxa belonging to 38 distinct families [21]. On the other hand, when studies in the Eastern Anatolia and Eastern Black Sea regions are examined, it has been determined that *Helichrysum* sp., *Malva* sp., *Cephalaria* sp., *Rumex* sp., *Crataegus* sp., *Urtica dioica*, and *Rheum ribes* are mostly used in folk medicine [21,24-28, 32-34].

The most widely utilized plant organs to prepare remedies were the aerial parts (52), leaves (30), fruits (29), roots (5), seeds (9), latex (7), bulbus (6), and Bark (3), Resina (3), and Rhizoma (3) although bark, flowers, pix liquida, tuber, and stylus were also utilized in some remedies. Similarly, in studies conducted in the surrounding provinces of Erzincan (Erzurum, Bayburt, Gümüşhane, and Sivas), it was recorded that the above-ground parts, leaves and fruits of plants used for medicinal purposes were mostly used [21,24-26]. On occasion, local people also utilized other components, such as butter, and milk to prepare remedies. The major methods for preparing remedies were infusion (55), decoction (30), raw

(26), heating (11), crushing (6), and boiling (4) (Table 2). Remedies were mostly taken internally (57%). The dosage of the medicinal preparations was often not accurate (e.g., one “pinch”, one spoon).

Table 2. Traditional uses of plants in Erzincan (Türkiye)

Family	Plant species	Local name and Herbarium Number	Used part of the plant ^a	Prep. ^b	Adm. ^c	Use	UV
Adoxaceae	<i>Sambucus ebulus</i> L.	Mürver, Patrik (EBYU- 4643)	Lea	Inf	Int	Nausea, Immunostimulant, Catarrh,	0.007
Adoxaceae	<i>Sambucus nigra</i> L.	Kara mürver, Patrik (EBYU-4575)	Lea	Inf	Int	Immunostimulant, Venous insufficiency	0.020
Adoxaceae	<i>Viburnum lantana</i> L.	Gilaburi, Gilaburin, Girabur (EBYU- 4574)	Fru	Row	Eat	Renal calculi	0.007
Adoxaceae	<i>Viburnum opulus</i> L.	Gilaburi, Gilaburin, Girabur (EBYU- 4593)	Fru	Row	Eat	Renal calculi	0.013
Adoxaceae	<i>Centaurea carduiiformis</i> DC.	Galagan (EBYU-4572)	See	Row	Eat	Venous insufficiency	0.007
Amaranthaceae	<i>Beta vulgaris</i> var. <i>vulgaris</i> L.	Pancar, Kızılca (EBYU- 4476)	Aer	Inf	Int	Constipation	0.013
Amaryllidaceae	<i>Allium vineale</i> L.	Çayır sarımsağı (EBYU- 4504)	Bul	Inf	Int	Tonsillitis	0.013
Amaryllidaceae	<i>Allium tuncelianum</i> (Kollmann) Özhatay, B.Mathew & Şiraneci	Dağ Sarımsağı (EBYU- 4480)	Bul	Inf	Int	Antidiabetic, Antihypertensive	0.027
			Bul	Cru	Ext	Otitis, Fruncle	0.020
Amaryllidaceae	* <i>Allium cepa</i> L.	Soğan, Pizaf (EBYU- 4511)	Bul	Raw	Eat	Antihypertensive, Toothache	0.027
			Bul	Raw	Ext	Wounds	0.027
			Bul	Hea	Ext	Fruncler	0.020
			Bul	Inf	Int	Tonsillitis, Catarrh, Galactagogue, Antibacterial	0.033
Amaryllidaceae	* <i>Allium sativum</i> L.	Sarımsak (EBYU- 4680)	Bul	Raw	Eat	Hypertension	0.027
			Bul	Cru	Ext	Scorpion Sting	0.007
Apiaceae	<i>Prangos ferulacea</i> (L.) Lindl.	Çaşur, Çarşır, Çakşır (EBYU- 4487)	Roo	Dec	Int	Antidiabetic	0.027
			Aer	Inf	Int	Antihelminthic, Galactagogue	0.027
			Aer	Dec	Int	Laxative, Immunostimulant,	0.007
Apiaceae	<i>Daucus carota</i> L.	Ezelteri (EBYU- 4578)	Aer	Inf	Int	Headache	0.007
Apiaceae	<i>Anethum graveolens</i> L.	Samid, Dere otu (EBYU- 4639)	Aer	Inf	Int	Hemorrhoid	0.013
Apiaceae	<i>Eryngium billardieri</i> F.Delaroche	Çahrır dikenı (EBYU- 4493)	Fru	Dec	Int	Heart failure	0.007
Apiaceae	<i>Pimpinella anisum</i> L.	Anason (EBYU- 4545)	Fru	Inf	Int	Flatulence	0.033
Asteraceae	<i>Anthemis cretica</i> L.	Papatya (EBYU-4566)	Aer	Dec	Ext	hair dye	0.013
			Aer	Inf	Int	Antidepressant, Diuretic, Sinusitis	0.040
Asteraceae	<i>Gundelia tournefortii</i> L.	Kengel, Kenger (EBYU- 4641)	Lat	Raw	Che	Flatulence, Immunostimulant, Sedative	0.010
			Lat	Dec	Int	Antidiabetic,	0.007
			Lat	Dec	Ext	Wounds	0.033
Asteraceae	<i>Helichrysum arenarium</i> subsp. <i>aucherii</i> Boiss.	Ölmez otu, Ana fatma Çiçeği (EBYU- 4642)	Aer	Inf	Int	Immunostimulant, Antidiabetic, Laxative, Diuretic, Peptic ulcer, Renal Calculi, Antitussive	0.087
			Aer	Inf	Ext	Aphta	0.047
Asteraceae	<i>Tragopogon dubius</i> Scop.	Yemlik (EBYU- 4494)	Lea	Raw	Eat	Laxative	0.047

Table 2 (continue). Traditional uses of plants in Erzincan (Türkiye)

Family	Plant species	Local name and Herbarium Number	Used part of the plant ^a	Prep. ^b	Adm. ^c	Use	UV
Asteraceae	<i>Achillea biebersteinii</i> Afan.	Civan perçemi (EBYU- 4526)	Aer	Dec	Int	Flatulence, Amenorrhoea, Dysmenorrhoea	0.020
Asteraceae	<i>Achillea millefolium</i> L.	Kılıç otu, Hılıç otu (EBYU-4563)	Lea	Raw	Ext	Hemostatic	0.013
Asteraceae	<i>Tripleurospermum monticolum</i> (Boiss. & A.Huet) Bornm.	Yabancı papatya (EBYU- 4496)	Aer	Inf	Ext	Conjunctivitis	0.013
Asteraceae	<i>Scorzonera tomentosa</i> L.	Alven (EBYU- 4539)	Lat	Raw	Ext	Wounds	0.007
Asteraceae	<i>Tagetes patula</i> L.	Kadife Çiçeği (EBYU- 4586)	Aer	Raw	Ext	Wounds	0.007
Asteraceae	<i>Artemisia absinthium</i> L.	Süprüge otu, Yeşil ot (EBYU- 4586)	Aer	Raw	Ext	Insecticide	0.007
Asteraceae	<i>Taraxacum officinale</i> Weber ex Wiggers.	Karahindiba, Sarı çiçek (EBYU- 4516)	Aer	Inf	Int	Immunostimulant	0.007
Roo			Dec	Int	Hepatoprotective	0.047	
Asteraceae	<i>Taraxacum butleri</i> Soest	Karahindiba, Sarı çiçek (EBYU- 4577)	Lea	Raw	Che	Aphta	0.007
Asteraceae	<i>Cichorium intybus</i> L.	Beyazhindiba (EBYU- 4588)	Aer	Inf	Int	Immunostimulant	0.013
Asteraceae	<i>Cota tinctoria</i> (L.) J. Gay	Sarı papatya (EBYU- 4621)	Aer	Inf	Int	Expectorant	0.007
Asteraceae	<i>Tussilago farfara</i> L.	Öksürük otu (EBYU- 4620)	Aer	Inf	Int	Anti-İnflammatory, Expectorant	0.070
Berberidaceae	<i>Berberis crataegina</i> DC.	Karamuk (EBYU- 4674)	Lea	Dec	Int	Antidiabetic, Antiparasitic	0.070
			Roo	Dec	Int	Antiparasitic	0.013
			Fru	Inf	Int	Asthma, Antidiabetic,	0.047
Boraginaceae	<i>Alkanna tinctoria</i> (L.) Tausch.	Havaciva otu, Kök boya (EBYU- 4510)	Roo	Boi	Ext	Wounds	0.020
Brassicaceae	* <i>Brassica oleracea</i> L.	Lahana	Lea	Boi	Ext	Plantar fasciitis	0.027
Caprifoliaceae	<i>Cephalaria procera</i> Fisch. Et Lall.	Guling, Gulinga, Pelemir (EBYU- 4581)	Aer	Raw	Ext	Hemostatic	0.093
Cornaceae	<i>Cornus mas</i> L.	Kızılıçık (EBYU- 4607)	Fru	Inf	Int	Immunostimulant, Antidiabetic, Nausea, Antidiarrheal	0.033
Cucurbitaceae	* <i>Cucumis sativus</i> L.	Salatalık	Fru	Raw	Ext	Wounds	0.007
Cupressaceae	<i>Juniperus foetidissima</i> Willd.	Ardıç (EBYU- 4534)	See	Raw	Int	Asthma, Hepatoprotective	0.040
			Lea	Inf	Int	Antihypertensive	0.033
			Lat	Hea	Ext	Furuncle	0.040
Cupressaceae	<i>Juniperus excelsa</i> M. Bieb.	Ardıç (EBYU- 4628)	See	Dec	Int	Antidiarrheal, Asthma	0.027
Elaeagnaceae	<i>Elaeagnus angustifolia</i> L.	İğde (EBYU- 4529)	Lea	Inf	Int	Antidiabetic, Tonsillitis	0.013
Equisetaceae	<i>Equisetum arvense</i> L.	Kırkkilit otu, boğumotu (EBYU-4571)	Aer	Inf	Ext	Lumbar hernia	0.013
Euphorbiaceae	<i>Euphorbia macroclada</i> Boiss.	Sütlegen, Sütlegen (EBYU- 4584)	Aer	Dec	Ext	Wounds	0.007
Euphorbiaceae	<i>Euphorbia seguieriana</i> Necker	Sütlegen, Sütlegen (EBYU- 4484)	Lat	Hea	Ext	Wounds, Verruca vulgaris, Bee sting	0.047
Fabaceae	<i>Coronilla orientalis</i> Miller var. <i>orientalis</i> (All.) Vitman	Sarı çiçek (EBYU- 4592)	Aer	Raw	Ext	Antibacterial	0.007
Fagaceae	<i>Glycyrrhiza glabra</i> L.	Bayam kökü, meyan kökü (EBYU- 4626)	Roo	Dec	Int	Renal Calculi, Peptic ulcer, Nausea	0.020
Fagaceae	<i>Quercus pubescens</i> Willd.	Meşe (EBYU-4569)	Bar	Dec	Int	Antidiarrheal	0.020
			Bar	Hea	Ext	Otitis	0.013

Table 2 (continue). Traditional uses of plants in Erzincan (Türkiye)

Family	Plant species	Local name and Herbarium Number	Used part of the plant ^a	Prep. ^b	Adm. ^c	Use	UV
Gentianaceae	<i>Centaurium erythraea</i> Rafn.	Kırmızı Kantaron (EBYU- 4482)	Aer	Inf	Int	Peptic ulcer	0.033
Hypericaceae	<i>Hypericum scabrum</i> L.	Sarı Kantaron (EBYU- 4528)	Aer	Mas with Olive Oil	Ext	Wound, Rheumatic pain	0.067
			Aer	Raw	Ext	Hemostatic	0.033
			Aer	Mas with Olive Oil	Int	Peptic ulcer, Sedative, Hipnotic	0.067
			Aer	Inf	Int	Nausea	0.013
Juglandaceae	* <i>Juglans regia</i> L.	Ceviz	Fru	Row	Ext	Scorpion Sting	0.080
Lamiaceae	<i>Melissa officinalis</i> L.	Oğul otu, Melisa (EBYU- 4530)	Aer	Inf	Int	Sedative, Hipnotic	0.013
Lamiaceae	<i>Mentha longifolia</i> (L.) Hudson subsp. <i>longifolia</i>	Nane (EBYU- 4549)	Aer	Inf	Int	Gastroesophageal reflux	0.020
Lamiaceae	<i>Origanum acutidens</i> (Hand.-Mazz.) Ietswaart	Annuk, Zahter (EBYU- 4546)	Aer	Inf	Int	Catarrh	0.14
Lamiaceae	<i>Salvia argentea</i> L.	Dadırgan (EBYU- 4604)	Aer	Raw	Int	Erectile dysfunction	0.013
Lamiaceae	<i>Salvia sclarea</i> L.	Potporik, Tortum (EBYU- 4521)	Aer	Inf	Int	Antidiarrheal	0.07
Lamiaceae	<i>Salvia spinosa</i> L.	Adaçayı (EBYU- 4644)	Aer	Inf	Int	Nausea	0.07
Lamiaceae	<i>Teucrium polium</i> L. subsp. <i>polium</i>	Bitotu (EBYU-4561)	Aer	Inf	Int	Headache, Asthma	0.013
Lamiaceae	<i>Thymus pseudopulegioides</i> Klokov & Des.-Shost.	Geven (EBYU- 4602)	Aer	Inf	Int	Immunostimulant	0.200
Malvaceae	* <i>Abelmoschus esculentus</i> (L.) Moench	Bamya	See	Hea	Ext	Rheumatic pain	0.020
			See	Cru	Ext	Hemostatic	0.007
Malvaceae	<i>Alcea apterocarpa</i> (Fenzl) Boiss.	Hatmi çiçeği (EBYU-4554)	Lea	Inf	Int	Nausea, Catarrh	0.007
Malvaceae	<i>Althaea armeniaca</i> Ten.	Gülfatma Çiçeği (EBYU- 4666)	Aer	Boi	Ext	Fruncler	0.067
Malvaceae	<i>Malva neglecta</i> Wallr.	Ebe gömeci, Ebe gümeci (EBYU- 4475)	Lea	Raw	Ext	Urticaria, Hemostatic	0.107
			Lea	Boi	Ext	Rheumatic Pain, Lumbal hernia	0.060
			Lea	Inf	Int	Expectorant, Urinary tract infection	0.113
Malvaceae	<i>Tilia tomentosa</i> Moench	Ihlamur (EBYU-4552)	Flo	Inf	Int	Expectorant, Nausea, Catarrh	0.167
Moraceae	<i>Morus alba</i> L.	Beyaz dut (EBYU- 4503)	Fru	Raw	Eat	Tonsilitis, Tuberculose	0.087
			Fru	Dec	Int	Tonsilitis	0.080
			Fru	Raw	Ext	Eczema	0.067
			Fru	Inf	Int	Eczema, Galactagogue	0.033
			Lea	Inf	Int	Immunostimulant, Asthma	0.067
Moraceae	<i>Morus nigra</i> L.	Kara dut (EBYU-4553)	Fru	Cru	Gar	Aphta	0.113
Paeoniceae	<i>Paeonia mascula</i> subsp. <i>mascula</i> (L.) Miller	Ağgül, Ayıgülü (EBYU- 4519)	Aer	Inf	Int	Antidiabetic, Laxative	0.067
Papaveraceae	<i>Papaver rhoeas</i> L.	Gelincik (EBYU- 4518)	Flo	Inf	Int	Antitussive	0.080
Pinaceae	<i>Pinus nigra</i> L.	Karaçam (EBYU- 4591)	Fru	Dec	Int	Nausea, Catarrh	0.120
			Pix	Hea	Ext	Wound	0.080
			Res	Hea	Int	Peptic ulcer	0.033

Table 2 (continue). Traditional uses of plants in Erzincan (Türkiye)

Family	Plant species	Local name and Herbarium Number	Used part of the plant ^a	Prep. ^b	Adm. ^c	Use	UV
Pinaceae	<i>Pinus brutia</i> L.	Sarıçam (EBYU-4501)	Res	Hea	Int	Tuberculose, Wounds	0.060
			Fru	Dec	Int	Antidiabetic, Asthma	0.033
Plantaginaceae	<i>Plantago major</i> L. subsp. <i>major</i>	Sinirli ot, Keçi dili, Hayş, Damarlı ot (EBYU-4591)	Lea	Raw	Ext	Fruncler, Rheumatic pain, Gingivitis	0.167
			Lea	Inf	Int	Antidiabetic	0.100
Plantaginaceae	<i>Platanus orientalis</i> L.	Çınar (EBYU-4481)	Lea	Inf	Int	Rheumatic pain	0.033
Poaceae	<i>Cynodon dactylon</i> (L.) Pers.	Ayrık otu (EBYU-4630)	Aer	Inf	Int	Psoriasis	0.060
Poaceae	* <i>Zea mays</i> L.	Mısır	Sty	Inf	Int	Diuretic	0.047
Poaceae	* <i>Triticum aestivum</i> L.	Kırmızı buğday	Aer	Inf	Ext	Conjunctivitis	0.033
Polygonaceae	<i>Rumex patientia</i> L.	Labada, Evelik (EBYU-4512)	Lea	Cru	Ext	Fruncler	
			Lea	Inf	Int	Laxative	0.147
Polygonaceae	<i>Rumex ponticus</i> E.H.L.Krause	Tırşo, Tırşik, Evelik (EBYU-4522)	Lea	Raw	Eat	Antidiabetic	0.133
Polygonaceae	<i>Polygonum cognatum</i> Meissn.	Madımak, Kuş ekmeği, kuş epeleği (EBYU-4474)	Aer	Inf	Int	Antidiabetic, Urinary Tract Infection	0.060
Polygonaceae	<i>Rheum ribes</i> L.	Eşgin, Işgın, Ribes (EBYU-4502)	Roo	Dec	Int	Antidiabetic, Prostatic hyperplasia, Antiasthmatic	0.267
			Aer	Raw	Int	Psoriasis, Antihypertensive	0.253
Portulacaceae	<i>Portulaca oleracea</i> L.	Semiz otu, Soğukluk, Pirpirim (EBYU-4670)	Aer	Inf	Int	Renal calculi	0.033
Ranunculaceae	<i>Ranunculus repens</i> L.	Sarı çiçek (EBYU-4515)	Aer	Cru	Ext	Fruncler	0.033
Rosaceae	<i>Rosa agrestis</i> Savi	Kuşburnu (EBYU-4479)	Fru	Dec	Int	Laxative, Nausea, Catarrh	0.113
Rosaceae	<i>Rosa canina</i> L.	Kuşburnu (EBYU-4671)	Fru	Dec	Int	Nausea, Catarrh	0.047
Rosaceae	<i>Rosa micrantha</i> Borrer ex. Sm.	Kuşburnu (EBYU-4507)	Fru	Dec	Int	Antiasthmatic, Venous stasis	0.060
Rosaceae	<i>Rosa dumalis</i> Bechst. subsp. <i>boissieri</i> (Crepin) Ö. Nilsson var. <i>boissieri</i>	Kuşburnu (EBYU-4540)	Fru	Dec	Int	Laxative, Nausea, Catarrh	0.047
Rosaceae	<i>Rubus caesius</i> L.	Böğürtlen, Ahududu (EBYU-4514)	Fru	Raw	Int	Tonsilitis	0.047
			Roo	Dec	Int	Renal calculi	0.033
Rosaceae	<i>Crataegus monogyna</i> Jacq. subsp. <i>monogyna</i> Jacq.	Alıç (EBYU-4492)	Fru	Dec	Int	Nausea, Catarrh, Rheumatic pain, Antiasthmatic, Antihyperlipidemic, Heart failure, Urinary Tract Infection	0.180
Rosaceae	<i>Cerasus avium</i> L. Moench.	Mekhem, Yabani kiraz (EBYU-4524)	Fru	Inf	Int	Rheumatic pain, Urinary Tract Infection, Diuretic,	0.047
Rosaceae	<i>Cerasus mahaleb</i> (L.) Miller	Mehlem, mahlep (EBYU-4523)	Rhi	Dec	Int	Immunostimulant, Asthma	0.033
Rosaceae	<i>Sarcopoterium spinosum</i> (L.) Spach	Dadaş otu (EBYU-4559)	Aer	Dec	Int	Urinary Tract Infection	0.007
Rosaceae	* <i>Prunus avium</i> L.	Kiraz	Fru	Inf	Int	Antitussive, Urinary Tract Infection	0.020
Rosaceae	<i>Prunus spinosa</i> L.	Dağ eriği (EBYU-4601)	Fru	Dec	Int	Antidiabetic	0.020
Rosaceae	<i>Cydonia oblonga</i> L.	Ayva (EBYU-4627)	Lea	Inf	Int	Expectorant	0.027
			See	Mas	Ext	Wounds	0.007
Rosaceae	<i>Amygdalus communis</i> L. var. <i>amara</i> DC.	Acı badem (EBYU-4669)	See	Raw	Eat	Antidiabetic	0.007
Rosaceae	* <i>Armenica vulgaris</i> Lam.	Kayısı	Fru	Inf	Int	Laxative	0.007

Table 2 (continue). Traditional uses of plants in Erzincan (Türkiye)

Family	Plant species	Local name and Herbarium Number	Used part of the plant ^a	Prep. ^b	Adm. ^c	Use	UV
Santalaceae	<i>Viscum album</i> L.	Ökse otu (EBYU- 4654)	Lea, Bar	Dec	Int	Antidiabetic	0.013
Scrophulariaceae	<i>Verbascum trichostylum</i> Hub.-Mor.	Sığır kuyruğu (EBYU- 4490)	Aer	Inf	Int	Antitussive, Tonsilitis	0.067
			Aer	Mas	Ext	Hyperpigmentation	0.060
Solanaceae	<i>Hyoscyamus niger</i> L.	Delipatpat, Banotu (EBYU- 4614)	Aer	Hea	Inh	Antiasthmatic	0.013
Solanaceae	* <i>Solanum tuberosum</i> L.	Patates	Rhi	Raw	Ext	Wounds, Rheumatic pain	0.013
			Rhi	Coo	Int	Antidiarrheal	0.200
Urticaceae	<i>Urtica dioica</i> L. subsp. <i>dioica</i>	Isırgan, Gezgezk (EBYU- 4491)	Aer	Inf	Int	Antidiabetic, Antiasthmatic, Immunostimulant, Anticarcinogen, Urinary Tract Infection, Antihypertensive	0.247
			Aer	Dec	Ext	Alopesi areata	0.100
			Aer	Raw	Ext	Rheumatic pain	0.200
			See	Dec	Int	Diuretic, Prostatic hyperplasia, Immunostimulant	0.267
Vitaceae	* <i>Vitis vinifera</i> L.	Asma, Üzüm (EBYU-4567)	Lea	Inf	Ext	Alopesi areata	0.013
Xanthorrhoeaceae	<i>Eremurus spectabilis</i> M. Bieb.	Kiriş, Çiriş (EBYU-4568)	Aer	Inf	Int	Antidiabetic	0.120
Zygophyllaceae	<i>Peganum harmala</i> L.	Üzerlik	Aer	Hea	Inh	Sedative, Hipnotic	0.053
Zygophyllaceae	<i>Tribulus terrestris</i> L.	Demir diken, Çoban çökerten (EBYU- 4655)	Aer	Inf	Int	Renal calculi	0.007

^a Plant part(s) used: Aer: Aerial parts; Bar: Bark; Bul: Bulbus; Flo: Flowers; Fru: Fruits; Lat: Latex; Lea: Leaves; Ole: Oleum; Res: Resin; Rhi: Rhizoma; Roo: Roots; See: Seeds; Sty: Stylus; Per: Pericarp; Pix: Pis liquida; Tub: Tuber; Who: Whole plant.

^b Preparations: Boi: Boiled; Cooked: Coo; Cru: Crushed; Dec: Decoction; Hea: Heated; Inf: Infusion; Che: Chewable; Mas: Maseration

^c Adm.: Administration; Int: Internal use; Ext: External use; Eat: Eaten as meal; Gar: Gargle; Inh: Inhalation, Che: Chewing

*Cultivated plants

We also documented the local names of the plants indicated by the informants. In some instances, the same vernacular name was used for more than one plant species, which might lead to misunderstanding and possibly minimize safe plant use. In other cases, the same plant had more than one vernacular name (e.g., *Cephalaria procera*: guling, gulinga, pelemir; *Plantago major*: Sinirli ot, Keçi dili, Hays, Damarlı ot). Although most of the plant names are of Turkish origin, Kurdish names have been identified [21-23].

The authors compared their findings to those of previous comprehensive ethnobotanical research carried out in the region of Erzincan (Üzümlü, Tercan, Kemah, and İliç districts) [9-12,27]. The most frequently used medicinal plant species in Erzincan were identified as *Urtica dioica*, *Rheum ribes*, *Rumex patientia*, *Plantago major*, *Peganum harmala*, *Morus nigra*, *Malva neglecta*, *Cephalaria procera*, and *Helichrysum arenarium*. These plants were also recorded in ethnobotanical studies conducted in certain districts (Üzümlü, Tercan, Kemah, and İliç districts) of Erzincan [9-12,27]. In addition to this information, all of the previous studies were carried out only in certain regions of Erzincan [9-12,27]. Moreover, the use of these plants for medicinal purposes has been similarly recorded in studies conducted in many provinces of Eastern Anatolia and Eastern Black Sea region [12,21,24,25].

Helichrysum arenarium (0,087), *Cephalaria procera* (0,093), *Juglans regia* (0,080), *Origanum acutidens* (0,140), *Malva neglecta* (0,113), *Tilia tomentosa* (0,167), *Thymus pseudopulegioides* (0,200), *Morus nigra* (0,113), *Plantago major* (0,167), *Pinus nigra* (0,120), *Rumex patientia* (0,147), *Rumex ponticus* (0,133), *Rheum ribes* (0,267), *Crataegus monogyna* (0,180), *Solanum tuberosum* (0,200), and *Urtica dioica* (0,267), had the highest UVs (Table 2). The informants utilized medical plants mainly for the treatment of diabetes, immun systems, wounds and asthma. It has been determined that the number

of plants used for cardiovascular problems, prostatic hyperplasia, erectile dysfunction, and bacterial infection are the lowest. Other studies in Eastern Anatolia have observed that medicinal plants are mostly used in skin disorders and gastro-intestinal disorders [12,21,24-26].

Helichrysum arenarium is traditionally used in Erzincan in the treatment of diabetes and gastrointestinal disorders and also as an immunostimulant. Local people living in Erzincan province reported that this plant was being used in the form of infusion. Again, local people reported that this plant is also used externally for aptha in the mouth. In previous studies, it was determined that the *Helichrysum arenarium* plant has antidiabetic, antibacterial and antifungal activity [35-37]. It has also been reported that the *Helichrysum arenarium* species is used in folk medicine in Sivas and Bayburt [24,26]. It has been reported that *Cephalaria procera* Fisch. Et Lall Erzincan was used externally as a hemostatic agent in Tercan, Çayırılı, Kemah, and Otlukbeli districts. In the *in vitro* study conducted in this direction, it was determined that *Cephalaria procera* Fisch. Et Lall showed hemostatic activity [38]. It has also been reported to be used as a hemocytatic agent in ethnobotanical studies conducted in Erzurum province [21,32]. *Urtica dioica*, *Plantago major*, *Tilia tomentosa*, *Rheum ribes*, and *Crataegus monogyna* are plants which are used in Turkey and across the World [24-33,39,40].

Our study was carried out on the whole of Erzincan and compared to the previous ethnobotanical studies on the province of Erzincan (Üzümlü, Tercan, Kemah, and İliç districts), *Allium vineale*, *Scorzonera tomentosa*, *Tagetes patula*, *Coronilla orientalis*, *Teucrium polium*, *Sarcopoterium spinosum* were recorded for the first time in the province of Erzincan [9-11,27], but it is known that these plants are used as folk medicine in other regions of Anatolia [12,24-31].

It has been determined that the local people do not value traditional knowledge as much as they used to, and those who refuse the methods of modern medicine want to benefit from this information today. In addition, the use of medicinal plants has decreased as the local people's access to the doctor-pharmacist has become easier with the developing technology. In addition to these, there are also villages evacuated due to terrorist incidents in the region where the study was conducted. These villages continue to receive immigration from other regions. New settlers do not use or know this ancient information. Due to these risks, the possibility of loss of traditional knowledge has become very high. This study can be an important and meaningful resource for Erzincan, which will prevent the loss of ethnopharmacological information, and which has severe geographical conditions and some local problems.

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AUTHOR CONTRIBUTIONS

Concept: S.G., M.K., S.Ç.; Design: S.G., M.K., S.Ç., S.T.; Control: S.G., M.K.; Sources: S.G., M.K., S.Ç.; Materials: S.G., M.K., S.Ç.; Data Collection and/or Processing: S.G., M.K., S.Ç., S.T.; Analysis and/or Interpretation: S.G., M.K., S.Ç.; Literature Review: S.G., M.K., S.Ç.; Manuscript Writing: S.G., M.K.; Critical Review: S.G., M.K., S.Ç., S.T.; Other: -

CONFLICT OF INTEREST

The authors declare that there is no real, potential, or perceived conflict of interest for this article.

ETHICS COMMITTEE APPROVAL

The authors declare that the ethics committee approval is not required for this study.

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