An ethnobotanical investigation on medicinal plants in South of Erzurum (Turkey)

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Research

Abstract

Background: This study reports the results of ethnobotanical research performed in Çat, Tekman, Hınıs, Karaçoban, Karayazı situated in the southern region of Erzurum. The ethnobotanical results include quantitative data on the diversity of medicinal plants and other usages documented in districts.

Methods: We quantitatively analyzed the diversity of medicinal plants and their uses in these districts. We collected this information through open and semi-structured interviews and questionnaires. We also collected samples of plants with the informants which were deposited at the Herbarium of the University of Ataturk. Our results were analyzed quantitatively using ethnobotanical indexes ICF, FL, UV.

Results: A total of 98 medical plants belonging to 34 families were identified in this study. Amongst these, 84 taxa are wild while 16 taxa are cultivated. The most common preparations were decoction. These 98 medicinal plants are used for medicinal purposes (we recorded 164 medicinal remedies) although, among these, 58 plants are also used as food or for other purposes.

Conclusions: The traditional medicine was still extensive among the people in Erzurum. However, there is a gradual loss of traditional information to the usage of medicinal plants in younger generations.

Keywords: Erzurum; ethnobotanical; Eastern Anatolia; medicinal plants

Özet

Amaç: Bu çalışma, Erzurum'un güney bölgesinde bulunan Çat, Tekman, Hınıs, Karaçoban, Karayazı'da yapılan etnobotanik araştırmaların sonuçlarını bildirmektedir. Etnobotanik sonuçlar, tıbbi bitkilerin çeşitliliği ve ilçelerde belgelenen diğer kullanımlar hakkında nicel verileri içerir.

Metotlar: Tıbbi bitkilerin çeşitliliğini ve bu bölgelerdeki kullanımlarını kantitatif olarak analiz ettik. Bu bilgileri açık ve yarı yapılandırılmış görüşmeler ve anketler aracılığıyla topladık. Ayrıca Atatürk Üniversitesi Herbaryumunda biriktirilen bilgileri içeren bitki örneklerini de topladık. Sonuçlarımız, etnobotanik indeksler ICF, FL, UV kullanılarak kantitatif olarak analiz edildi.

Bulgular: Bu çalışmada toplam 34 familyaya ait 98 tıbbi bitki belirlenmiştir. Bunlardan 84 takson doğal, 16 takson ekimi yapılarak yetişmektedir. En yaygın kullanım şekli dekoksiyondur. Bu 98 şifalı bitki tıbbi amaçlar için kullanılır (164 tıbbi tedavi yöntemi kaydettik), bunlardan 58 tanesi aynı zamanda gıda olarak veya başka amaçlar için de kullanılır.

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Sonuçlar: Geleneksel tıp hala Erzurum'daki insanlar arasında yaygındı. Bununla birlikte, genç nesillerde şifalı bitkilerin kullanımında kademeli olarak geleneksel bilgi kaybı yaşanmaktadır.

Anahtar kelimeler: Erzurum; etnobotanik; Doğu Anadolu; şifalı bitkiler

Background

From a historical perspective, the relationship between mankind and plants are not only limited to the usage of plants for food, clothing and shelter but also concerns their utilization for religious ceremonies, ornamentation and healthcare. Medicinal plants preferentially have considerable contributions in the healthcare scheme of local communities as the primary source of medicine for the countrified population (Yohannis *et al.* 2018). According to recent studies (Giday *et al.* 2016), there are about 422.000 flowering plants in the world and more than 50.000 are utilized medicinally.

The flora of Turkey includes approximatively 11.000 species, 33% of which are endemic, while others are relictual or relevant for other biogeographical or ecological reasons (Arı *et al.* 2018). Apart from its rich flora, Turkey hosts an extensive diversity of habitats since the country is placed at the conjuncture of three biogeographical areas (Mediterranean, Iran-Turan and Euro-Siberian). However, this diversity in plants and habitats has decreased due to a variety of threats over the last 40 years (Ozhatay 2006; Ozhatay *et al.* 2012).

Turkish people have utilized plants for various purposes since ancient times. In Turkey, ethnobotanical studies have been carried out since the Republican period in 1923. In particular, these studies have increased in recent years (Baytop 1999). The flora of East Anatolia in Turkey is also rich and has maintained a rich diversity of medicinal plants, which have long been utilized by local communities (Polat and Cakılcıoglu 2018). In the Erzurum province, areas such as Ilıca, Uzundere, Oltu, Senkaya have been previously explored by ethnobotanists studying traditional medicine (Sezik *et al.* 1997; Turan *et al*. 2003; Ozgen *et al.* 2004; Ozgökçe and Ozcelik 2004; Altundag and Ozturk 2011; Ozgen *et al.* 2012; Polat *et al.* 2012; Macit and Köse 2015). Nevertheless, to the best of our knowledge, this is the first study that explores the utilization of medicinal plants in Çat, Tekman, Hınıs, Karaçoban and Karayazı. The aim of our study is thus to report and analyze the uses of traditional herbal medicine and other usages of plants in these areas.

Materials and Methods

Study area

The largest geographical area of Turkey is the Eastern Anatolia which is in the inland and enclosed by coastal mountain ranges (Tabata *et al.* 1994). The Erzurum province is located in the Upper Euphrates Section of Eastern Anatolian area and is the largest city of Eastern Anatolia area with a population of 780.847 inhabitants and an area of 25.066 km^2, and it is the old lodgement. It states between 40°15' and 42° 35' eastbound longitudes and 40° 57' and 39° 10' northern latitudes (Figure 1) (Tortum *et al.* 2015; Atabeyoglu *et al.* 2009). The Erzurum area is neighbouring to Ağrı and Kars in the east; Artvin, Rize, and Ardahan in the north; Erzincan and Bayburt in the west; Muş and Bingöl in the south. The area belongs to the Iran-Turan Plant Geography Region and it is mostly mountainous, with altitudes ranging from 2000 m a.s.l. and 3000 m or even higher. There are also plains between the plateaus and the mountains, with altitudes between 1500 and 1800 m. The average daily temperature is -8.6 °C in the winter and 19.6 in the summer. Yearly rainfall is 453 mm and generally, it snows for 50 days while the snow cover lasts for more than 100 days (Atabeyoğlu *et al*. 2009). The research district is located on the east of the Anatolian and belongs to the Iran-Turan Plant Geography Region and it is located in the B7 and B8 grid squares in accordance with the Grid classification system formed by Davis (Davis 1965-1985). Erzurum Province is mainly formed of high lands. For instance, the altitudes of the platforms relating to the sea level are 2000 m and the altitudes above them are 3000 m or higher. There are plains between the plateaus and mountains, with altitudes between 1500 and 1800 meters. The city Erzurum, in the South, was erected on the mountain masses of the Karasu-Aras Mountains (http://www.erzurum.gov.tr/cografi-yapi). Erzurum is the twenty-ninth most crowded province in Turkey. It is the third largest city of the Eastern Anatolia Region regarding the population. From 2016, the population of the province was 762,021 with 381.138 male and 380.883 female. Percentage is as follows: 50,02% male, 49,98% female. Erzurum covers 25,355 km^2 and there are 30 people per square kilometre in the province. About 1000 people emigrate every year. The major ethnic group in the region is the Kurdish one, although Zaza, Alevist and Turkish groups also live in the province (TUİK 2018; Buran 2011; Kucukugurlu 2012). Our study area is the southern settlements of Erzurum, and mountainous, pasture areas are large and steppe-covered areas.

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Data collection

Field research was carried out by collecting ethnobotanical knowledge during structured and semi-structured interviews (Polat and Çakılcıoğlu 2018) all the informants were natives of 17 villages. For each recorded plant was filled a questionnaire throughout the conversations and in addition, videos, photos and records were taken from these people with their permit. Interviews were actualized in diversified places (tea houses, gardens, mosques, farms, houses and fields etc.) (Figure 2).

Plant materials

The collected plants were made into herbarium specimens and identified by the authors using "The Flora of Turkey and East Aegean Islands" (Davis 1965-1985; Davis 1988). The scientific names of the plant species were updated using relevant databases (http://www.theplantlist.org). Voucher specimens are stored at the Herbarium of the Faculty of Science, Ataturk University.

Ethnobotanical indexes

We calculated a variety of ethnobotanical indexes. Specifically, the Informant Consensus Factor (ICF) (Heinrich 2000) was used to measure the importance of the most commonly used species, according to informants. It was assessed according to the following formula: ICF=Nur−Nt/Nur−1, where Nur indicates the number of utilization report in each category and Nt the number of used species. A high ICF indicates a high agreement among the informants about the taxa selected for a particular use category (Table 1). We calculated the use value (UV) index using the formula UV=ΣUi/N, where Ui is the number usage report cited by a considerable for a taxon and N to the number of sources (Trotter and Logan 1986; Tardio and Pardo-de-Santayana 2008; Bano *et al.* 2014). We also calculated the fidelity level (FL) index (Friedman *et al.* 1986) using the formula: FL (%)=(Np/N)X100 where Np is the number of informants that asserted the use of a plant species to cure a specific ailment and N is the number of informants that use plants as a medicine to treat any specified illness (Friedman *et al.* 1986; Alexiades 1996).

Figure 1. Location of the study area

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Figure 2. Examples of ethnobotanical interviews

Table 1. ICF values of the category of disorders.

Disorders	Number of taxa	Number of use report	ICF
Gastrointestinal disorders	38	63	0.61
Wounds	27	48	0.79
Respiratory diseases	15	37	0.52
Skin disorders	23	45	0.63
Gynaecological diseases	10	26	0.59
Kidney and urinary system disorders	8	21	0.49
Diabetes	9	23	0.69
Anaemia and hemostatic	10	28	0.66
Rheumatism	7	19	0.57
Cardiovascular problems	2	6	0.46
Neurologic, ear and head	7	20	0.45

Results and Discussion

Shepherds, midwives, healers, woodsmen, beekeepers, farmers, housewives, mukhtar, teachers and people collecting herbs and plants, namely a total of 178 people were interviewed face to face. 98 of the informants were women (55.06%) while the remaining 80 (44.94%) were men. Experienced adults and patients and six local healers were the resources of knowledge and data (local names, part(s) of plants used, therapeutic effects, methods of preparation and administration). Furthermore, 58 taxa belonging to 23 families were used as food or for other things such as insecticide, broom, rennet etc. A total of 178 participants (98 women, 80 men) were interviewed (Table 2). All the informants are native of and still living in the Çat, Tekman, Hınıs, Karaçoban and Karayazı (Erzurum-Turkey) area. Most of the women who use medicinal plants were housewives, while most of the men were farmers. These informants reported the use of 99 medicinal plant taxa (34 plant families) (Table 3). Among these plants, 84 species are wild and 16 species are cultivated. As regards the wild species,

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Ferula huber-morathii Pesmen, *Scorzonera tomentosa* L., *Tragopogon aureus* Boiss., *Anthemis calcarea* Sosn., *Cephalaria anatolica* Shkhiyan, *Thymus haussknechtii* Velen., *Origanum acutidens* (Hand.-Mazz.) Ietsw. and *Rumex ponticus* E.H.L. Krause are endemic. The most common medicinal plant families were Asteraceae (20), Lamiaceae (10), Apiaceae (7), Rosaceae (6), Brassiacaceae (4), Liliaceae (4) and Polygonaceae (4). Some of the recorded plants (e.g., *Prangos ferulacea*, *Ferula orientalis*, *Gundelia tournefortii*, *Tragopogon reticulatus*, *Tragopogon albinervis*, *Tragopogon buphthalmoides*, *Rheum ribes*, *Allium fuscaviolaceum*, and *Orchis palustris*) are among the herbs and fruits widely collected, cultivated and sold in the region. According to our results, the most used taxa are *Malva neglecta, Ferula* spp*., Prangos ferulacea*, *Tragopogon spp., Scorzonera latifolia*, *Cephalaria* spp*., Teucrium polium*, *Plantago* spp*., Alkanna orientalis, Thymus sipyleus, Mentha* spp*., Urtica dioica, Rosa canina, Rheum ribes, Astragalus microcephalus* and *Rumex crispus*.

The most widely used plant parts to prepare folk remedies in the area were aerial parts (40), leaves (26), flowers (25), fruits (14), roots (13), seeds (10) and branches (4), however barks, bulbs, stems, and tubers were also used in some remedies. Occasionally, local people also add other components to their remedies, such as butter, olive oil, beeswax, eggs, honey or milk. The major methods for preparing remedies were decoction (48 informants), crushing (30), infusion (18) and cooking (11) but people also use the plants fresh or after crushing or chewing them. Remedies were mostly taken internally (55%). The dosage of the medicinal preparations was often not accurate (e.g., one “pinch”, one spoon).

During our study, we recorded a total of 164 medicinal uses (Table 3). Informants used medical plants most frequently for the treatment of gastrointestinal disorders (63), wounds (35), respiratory diseases (32), skin disorders (30), gynaecological diseases (13), kidney and urinary system disorders (8), diabetes (9), anaemia and hemostatic (9) and rheumatism (2). Cardiovascular problems (4) and neurologic, ear and head (7) are other prevalent complaints cured with herbal remedies. Gastrointestinal disorders, wounds, respiratory diseases and skin disorders were cured with the highest variety of medicinal plant species. The findings of this investigation revealed some interesting knowledge on plant utilizations such as using the latex of *Euphorbia* species, which is usually known to be poisonous, for treating eczema and wounds. Across various villages of the region, people mentioned that *Alkanna orientalis* is also used for wound healing. Several informants mentioned that *Teucrium polium* is used for infertility in women.

Table 2. Demographic characteristics of the participants.

Demographic characteristics	Number
Age	***Total=178***
31-40	11
41-50	39
51-60	52
61-70	44
70 above	32
Gender	***Total=178***
Female	98
Male	80
Educational level	***Total=178***
Illiterate	84
Primary school	75
Secondary school	13
High school	5
University	1
Employment status	***Total=178***
Housewife	98
Farmer	44
Pensioned	24
Shepherd	8
Other jobs	4
Total	178

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Table 3. Medicinal plants recorded in the research region Çat, Tekman, Hınıs, Karaçoban and Karayazı (Erzurum-Turkey).

Family	Plant species, voucher specimen, endemism	Local name	Plant part (s) used[a]	Preparation[b]	Adm.[c]	Use	UV
Apiaceae	*Eryngium campestre* L., ATA 10022	Kerenk, kelenk	Roo	Cru	Ext	anti-inflammatory	0.09
Apiaceae	*Falcaria vulgaris* Bernh., ATA 10018	Tepigıgaze	Aer	Coo	Eat	digestive	0.13
Apiaceae	*Ferula orientalis* L., ATA 10019	Helik, helis, heliz	Roo	Dec	Int	diabetes	0.22
Apiaceae	***Ferula huber-morathii* Pesmen, ATA 10020	Helik, helis, heliz	Roo	Cut, gained resin	Ext	wounds, tubercle	0.10
				Dec	Int	diabetes	0.08
Apiaceae	*Heracleum apiifolium* Boiss., ATA 10023	Kaşım	Fru	Dec	Int	carminative	0.27
			Roo	Boi	Ext	scabies	0.06
Apiaceae	*Malabaila dasyantha* Fisch. & C.A.Mey. ex K.Koch, ATA 10021	Mandak, mendik	Aer	Inf	Int	hemorrhoid, digestive	0.25
Apiaceae	*Prangos ferulacea* (L.) Lindl., ATA 10024	Heliz, helız	Roo Ste	Dec	Int	diabetes, cholesterol	0.31
Araceae	*Arum detruncatum* C.A.Mey. ex Schott, ATA 10025	Gari, kari, dalık	Aer	Inf	Int	stomach pains, diarrhea	0.05
Asteraceae	*Achillea millefolium* L., ATA 10026	Kalilkasipi	Cap	Inf	Int	against stomach and kidney pains	0.07
Asteraceae	*Gundelia tournefortii* L., ATA 10027	Kerenk, kelenk	Aer	Raw	Eat	digestive, appetising	0.29
Asteraceae	*Anthemis cretica* L., ATA 10028	Papatya	Flo	Boil with mik	Int, before breakfast	antitussive, stomachache	0.08
Asteraceae	*Achillea millefolium* L., ATA 10029	Pelikertik	Lea	Cru	Ext	wound healing, hemostatic	0.47
Asteraceae	*Centaurea glastifolia* L., ATA 10030	Deve dikeni, deve dişi	Aer	Dec	Int	kidney stone	0.01
Asteraceae	*Centaurea iberica* Trevir. ex Spreng., ATA 10031	Deve dikeni, deve dişi	Aer	Dec	Int	kidney stone	0.02
Asteraceae	*Cichorium intybus* L., ATA 10032	Garaz, çakçak	Roo	Burnt and mix with butter	Ext	skin diseases, wounds, anti-inflammatory, oedema, irony disease, eczema	0.36
			Cap	Burnt and mix with butter	Ext	skin diseases, wounds, anti-inflammatory, oedema	0.38
Asteraceae	*Achillea biebersteinii* Hub.-Mor., ATA 10033	Pelikertik	Lea	Cru	Ext	wound healing, hemostatic	0.47
			Lea	Cru mix with olive oil	Ext	wound healing	0.38

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			Cap	Dec	Int	diuretic, menstruel pain	0.08
Asteraceae	**_Scorzonera tomentosa_ L., ATA 10034	Beniştikok	Lat	Used as chewing gum	Ext	flatulence, appetising	0.29
Asteraceae	_Scorzonera latifolia_ (Fisch. & C.A.Mey.) DC., ATA 10035	Beniştikok	Lea	Raw	Ext Juice of roots used as gum	plaster	0.47
			Gum	Raw	Int Chewing roots	antihelmentic	0.27
Asteraceae	_Tanacetum coccineum_ (Willd.) Grierson, ATA 10036	Sendel otu	Aer	Inf	Int	cold, flu, expectorant, throat ache	0.25
			Cap	Dec	Int	cold, flu, expectorant, throat ache	0.22
Asteraceae	_Tragopogon albinervis_ Freyn & Sint., ATA 10037	Sıpink	Lat	Raw	Ext	hemostatic	0.25
Asteraceae	**_Tragopogon aureus_ Boiss., ATA 10038	Spıng, spink	Lat	Raw	Ext	hemostatic	0.24
Asteraceae	_Tragopogon reticulatus_ Boiss. & A.Huet, ATA 10039	Sıpıng, sipink	Lat	Raw	Ext	hemostatic	0.21
Asteraceae	_Tragopogon buphthalmoides_ (DC.) Boiss., ATA 10040	Sıpıng, sipink	Who	Raw	Ext Juice of roots used as gum	plaster, wound healing, intestinal inflammation	0.21
Asteraceae	_Helichrysum plicatum_ DC., ATA 10041	Sesum	Cap	Inf	Int	kidney stone	0.12
			Lea Cap	Cru mix with olive oil	Ext	wounds, scar,	0.36
				Dec	Ext	hemost atic	0.35
			Lea	Raw	Int	constipatio n	0.27
			Cap	Dec	Ext	jaundice in babies	0.26
Asteraceae	_Helichrysum armenium_ DC., ATA 10042	Sesum	Cap	Dec	Int	kidney stone, diuretic	0.16
					Ext	jaundice in babies	0.28
Asteraceae	**_Anthemis calcarea_ Sosn., ATA 10043	Papatya	Cap	Inf	Int	diuretic	0.06
Asteraceae	_Anthemis tinctoria_ L., ATA 10018	Papatya	Aer with Cap	Dec	Int Gar	sore throat, expectorant	0.13
Asteraceae	_Artemisia absinthium_ L., ATA 10044	Havşan	Aer with Cap	Raw	Int Chewed, drink juice	stomachache	0.04
Asparagaceae	_Asparagus persicus_ Baker, ATA 10045	Meraci, merajo, meroji, zazık	Aer	Inf	Int	cold, asthma	0.01
Asparagaceae	_Ornithogalum narbonense_ L., ATA 10046	Sipidak	Aer	Inf	Int	constipation	0.03
Betulaceae	_Betula alba_ L., ATA 10047	Huş, Düzik	Bra	Burnt	Ext	wounds, rheumtism	0.07
			Bar	Burnt	Ext	wounds, rheumtism	0.01
Boraginaceae	_Alkanna orientalis_ (L.) Boiss., ATA 10048	Hava civa, mıjmıjok hevajo hevaju	Roo	Burnt, coo with butter	Ext, every morning put on head	tinea barbae	0.03

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				Cru coo with butter, added beeswax	Ext	wound healing, ambustion, scar	0.56
			Aer	Coo with butter	Ext	festering sore, ambustion	0.35
				Boi	Ext with pulp for one day	ophthalmia	0.31
			Lea	Dec	Int, before breakfast	asthma, bronchitis, stomachache	0.39
				Cru	Ext for one day	ophthalmia	0.20
Brassicaceae	**Brassica oleracea* L., ATA 10049	Lahana, kelem	Lea	Cru	Ext	fungus diseases	0.06
				Cru, mix with *Plantago major*, pekmez, water and flour	Ext	furoncle, wounds	0.36
				Boi	Ext	hand injuries, wounds	0.12
Brassicaceae	*Capsella bursa-pastoris* (L.) Medik., ATA 10050	Dozik, pıronek, puronek,		Cru	Ext	headache	0.07
Brassicaceae	**Lepidium sativum* L., ATA 10051	Tere	Aer	Dec	Int	antitussive	0.11
Brassicaceae	**Raphanus sativus* L., ATA 10052	Dıvırduş	Lea	Raw	Eaten	carminative	0.23
Cannabinaceae	**Cannabis sativa* L., ATA 10053	Kenevir, kendir, çedene	Aer	Cru mix with goat oil and beeswax, waited in cold	Int as suppsitory	ınfertility in women	0.02
Caryophyllaceae	*Silene vulgaris* (Moench) Garcke, ATA 10054	Goştberg	Lea with Bra	Dec	Int	rheumatism, haemorrhoid	0.09
Chenopodiaceae	*Beta corolliflora* Zosimovic ex Buttler, ATA 10055	Dırşek	Lea	Raw	Int	constipation, stomachache	0.14
Chenopodiaceae	*Beta lomatogona* Fisch. & C.A.Mey., ATA 10056	Sılkınk	Lea	Raw	Int	constipation, stomachache	0.25
				Coo	Eat	constipation, stomachache	0.15
Chenopodiaceae	*Chenopodium album* L., ATA 10057	Sılmastık	Aer	Dec	Int	digestive, constipation	0.09
Cucurbitaceae	**Cucurbita moschata* Duchesne, ATA 10058	Balkabağı	Fru	Coo, inhaled	Ext	testicle inflammation, metritis	0.10
Cucurbitaceae	**Cucurbita pepo* L., ATA 10059	Kundir, gundır	See	Cru mix with honey	Eat 1 tablespoon before	antihelmentic	0.33

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					breakfast		
Cucurbitaceae	**Cucumis sativus* L., ATA 10060	Hıyar	Young Per	Raw	Ext	headache	0.27
Cupressaceae	*Juniperus communis* L., ATA 10061	Tüzzük, pi	Tar	Burnt with cowpat	Inh	ınfertility in women	0.13
				Heated	Ext	eczema, skin disorders	0.49
Dipsacaceae	*Cephalaria procera* Fisch et Lall., ATA 10062	Cipreş	Aer	Cru Raw	Ext	hemostatic, wound healing	0.29
Dipsacaceae	*Cephalaria tchihatchewii* Boiss., ATA 10063	Cipreş	Aer	Cru Raw	Ext	hemostatic, wound healing	0.57
Dipsacaceae	***Cephalaria anatolica* Shkhiyan, ATA 10064	Cipreş	Aer	Raw Cru	Ext	hemostatic, wound healing	0.32
Euphorbiaceae	*Euphorbia stricta* L., ATA 10065	Şirit	Lat	Raw	Ext	eczema, wounds	0.33
Fabaceae	*Glycyrrhiza glabra* L., ATA 10066	Sus	Roo	Boi	Int, for 5-6 days before breakfast	poisoning, wounds	0.04
Fabaceae	*Astragalus microcephalus* Willd., ATA 10067	Geven	Roo	Gum	Ext	hand cracks, wart	0.53
				Gum mix with butterfat and alum	Ext	wounds, pustule, oedema	0.44
Lamiaceae	*Teucrium polium* L., ATA 10068	Mervende, giya mervent	Aer with Flo	Dec with root of *Rheum ribes* and aerial part of *Thymus fallax*	Int	ınfertility in women	0.53
			Aer	Dec before breakfast	Int	eczema, hemorrhoids	0.21
Lamiaceae	*Salvia syriaca* L., ATA 10069	Sıvsıvok, Kılkırk, Melvent	Lea and Flo	Inf	Int	carminative, expecto rant	0.22
			Flo	Dec	Int	ınfertility in women	0.37
Lamiaceae	*Salvia verticillata* L., ATA 10070	Mervende, sendale, merande	Lea	Inf	Int	ınfertility in women, menstrual pain	0.34
			Flo	Inf	Int	menstrual pain	0.44
Lamiaceae	*Thymus fallax* Fisch. & C.A.Mey., ATA 10071	Catri, Çatri	Aer with Flo	Dec	Int	hemorrhoid, shortness of breath, asthma	0.36
Lamiaceae	***Thymus haussknechtii* Velen., ATA 10072	Catri, Çatri	Aer with Flo	Dec	Int	hemorrhoid, bronchitis, asthma	0.34
			Lea	Inf	Int	expectorant, flu	0.11
Lamiaceae	*Thymus sipyleus* Boiss., ATA 10073	Catri, Çatri, Cağ tiri	Aer	Dec	Int	diarrhea	0.48
Lamiaceae	*Mentha longifolia* (L.) L., ATA 10074	Yarpuz, punk, pungi	Aer with Flo	Dec	Int	expectorant, flu, respiratory problems, shortness of breath	0.12

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Lamiaceae	*Mentha aquatica* L., ATA 10075	Punk, pungi, pune, punı	Aer with Flo	Dec	Int	expectorant, flu, respiratory problems, shortness of breath	0.10
			Lea	Dec	Int	cough, flu, stomach ailments	0.24
Lamiaceae	*Origanum rotundifolium* Boiss., ATA 10076	Anıh	Aer	Inf	Int	cough, sedative, stomach ailments	0.21
Lamiaceae	***Origanum acutidens* (Hand.-Mazz.) Ietsw., ATA 10077	Anıh	Aer	Inf	Int	cough, sedative, stomach ailments	0.14
			Flo	Dec	Int	cough, flu, stomach ailments	0.22
Liliaceae	**Allium cepa* L., ATA 10078	Soğan, pivaz	Bul	Coo	Ext, put on pulp	earache	0.41
				Dec	Ext	earache	0.12
Liliaceae	*Eremurus spectabilis* M.Bieb., ATA 10079	Gullık, Gulıng, Çiriş	Aer Eat	Boi	Int	digestive	0.11
Liliaceae	**Allium sativum* L., ATA 10080	Sarımsak, sir	Bul	Cru with *Vitis vinifera* fruit and *Pyrus elaegorifoli a* bark	Ext	wounds, anti-iflammatory, scar, rubor	0.14
Liliaceae	*Allium schoenoprasum* L., ATA 10081	Sirim	Aer	Cru	Ext wrapped in a cloth	rheumatism	0.08
Juglandaceae	**Juglans regia* L., ATA 10082	Ceviz	See	Cru add egg yolk and hot tar	Ext	tinea barbae	0.07
Malvaceae	*Alcea apterocarpa* (Fenzl) Boiss., ATA 10083	Hiro	Aer with flo	Dec	Ext	hair growth, hair thickener	0.01
Malvaceae	*Malva neglecta* Wallr., ATA 10084	Berbero, dolik, dolig, tolik, ebegümeci	Lea	Boi	Inh	ınfertility in women	0.45
				Dec	Int	stomachache	0.61
					Ext, used pulp	sore throat	0.34
				Boi, used pulp	Ext	stomachache, rheumatism	0.36
				Boi mix with flour, as paste	Intravagin al	ınfertility in women, metritis	0.36
				Raw	Int	menstrual pain	0.50
			Aer	Boi with milk	Ext	sore throat	0.52
				Dec	Int	metritis	0.41
Malvaceae	*Malva sylvestris* L., ATA 10085	Berbero, dolik, dolig, tolik, ebegümeci	Lea	Inf	Int	sore throat, antiinflamatory , expectorant	0.44
Moraceae	**Morus nigra* L., ATA 10086	Tui, dut, tut	Fru	Dec	Int	anaemia	0.25
				Raw	Eat	aphtha	0.01
Moraceae	**Ficus carica* L., ATA 10087	Hincir	Lat	Cru	Ext	wart	0.11

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Moraceae	**Morus alba* L., ATA 10018	Tui, dut, tut	Fru	Dec	Int	throatache, expectorant	0.27
Oleaceae	**Olea europaea* L., ATA 10088	Zeytin	See	Cru Mix with honey	Ext	wounds	0.08
Orchidaceae	*Dactylorhiza iberica* (M.Bieb. ex Willd.) Soó, ATA 10089	Köpek sirimi	Bul	Cru	Ext and kept hot	rheumatism	0.23
Papaveraceae	*Papaver rhoeas* L., ATA 10090	Haşhaşık	Immature Fru	Raw	Eat with seedof *Juglans regia*	antihelmentic	0.04
Pinaceae	*Pinus sylvestris* L., ATA 10091	Çam	Who	Res	Ext	wounds, eczema	0.54
			Bar	Cru	Ext	wounds, eczema, analgesic,	0.49
Plantaginaceae	*Plantago major* L., ATA 10092	Pelheves	Lea	Raw, mix with coo onion	Ext	anti-inflammatory, wounds, oedema	0.35
				Raw	Ext	wounds, oedema	0.67
			Aer	Dec	Int	stomachache	0.48
Plantaginaceae	*Plantago media* L., ATA 10093	Pelheves	Lea	Boi with *Malva neglecta*, used pulp	Ext	metritis, anti-inflammatory, gynaecological diseases	0.35
Plantaginaceae	*Plantago lanceolata* L., ATA 10094	Pelheves	Lea	Cru	Ext	anti-inflammatory, oedema, wounds	0.45
				Raw, surround pericarp of *Juglans regia*	Intravagin al, wait 2-15 min	ınfertility in women	0.39
				Raw	Ext	wounds, oedema	0.52
			Aer	Dec	Int	stomachache	0.36
Poaceae	**Hordeum vulgare* L., ATA 10095	Arpa	See	Dec	Int	diuretic	0.23
Poaceae	**Triticum aestivum* L., ATA 10096	Buğday	See	Coo	Ext, Wrapped in a cloth, wait for 2-3 days on waist	stomachache	0.09
			Young See	Cru and mix with breast milk for babies	Int	carminative, stomachache	0.17
Polygonaceae	*Polygonum cognatum* Meisn., ATA 10097	Nonicucik	Aer	Cook	Eat	constipation, diabetes	0.27
				Dec	Int	diabetes	0.31
Polygonaceae	*Rumex crispus* L., ATA 10098	Dırşo	Lea	Dec with aerial part of *Polyganu m cognatum*	Int	constipation, diabetes, diuretic, digestive	0.32
				Boi	Ext waited one day	leg pain, tubercle	0.21
				Raw	Eat	digestive, constipation	

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			See	Inf	Int	diabetes	0.01
			Roo	Dec	Int	diabetes, digestive, anti-inflamatory	0.02
			See	Dec	Int	diuretic	0.09
Polygonaceae	*Rheum ribes* L., ATA 10099	Ribes, rıbes	Roo	Dec	Int	antihelmentic, energiser for abortionist	0.26
			Aer	Raw	Eat	diabetes	0.09
Polygonaceae	***Rumex ponticus* E.H.L.Krause, ATA 10100	Dırşo, tırşık, tırşok	Lea	Inf	Int	constipation, digestive	0.13
Ranunculaceae	*Ranunculus grandiflorus* L., ATA 10018	Şelepuk	Aer with Flo	Cru	Ext Applied on knees for 20 minutes	rheumatism, bruise, leg pain	0.38
Ranunculaceae	*Ranunculus kotschyi* Boiss., ATA 10101	Şelepuk	Flo	Cru	Ext Applied only 1-2 minutes	rheumatism, bruise, leg pain	0.49
Rosaceae	*Malus sylvestris* (L.) Mill., ATA 10102	Sev	Fru	Boi with *Prunus armeniaca*	Int	jaundice	0.51
Rosaceae	*Pyrus elaeagnifolia* Pallas, ATA 10103	Garçin, karçin	Lea	Raw	Ext	wounds, snakebite, scorpion sting	0.14
			Fru	Cru coo with flour	Int	diarrhea	0.34
Rosaceae	*Rosa canina* L., ATA 10104	Şilan	Fru	Dec	Int	cold, flu, hemorrhoid, diarrhea	0.43
			Roo	Dec	Int	hemorrhoid, dibetes	0.10
Rosaceae	*Rosa foedita* Herrm., ATA 10105	Şilan	Fru	Dec	Int	hemorrhoids	0.25
Rosaceae	*Crataegus pontica* K.Koch, ATA 10106	Bilan	Fru	Dec	Int	cardiac diseases, hypertension	0.12
				Raw	Eat	hypertension	0.14
Rosaceae	*Rosa pimpinellifolia* L., ATA 10108	Şilan	Fru	Dec	Int	hemorrhoid, diarrhea	0.39
Salicaceae	*Salix alba* L., ATA 10109	Söğüt, Soredar	Bar	Cru	Ext	analgesic	0.24
			Lea	Cru and mix with *Allium sativum* and yoghurt	Ext	heat prostration	0.31
					Int	poisoning	0.03
Salicaceae	*Salix armenorossica* A.K.Skvortsov, ATA 10110	Sorkun, cibrebi	Bra	Burnt	Ext	stretch marks, emollient	0.02
			Aer with Flo	Dec	Ext	lousicide, scabies	0.10
Solanaceae	*Hyoscyamus niger* L., ATA 10111	Hiroben, giyaibin, kırkurik, deli otu	Aer	Burnt	Inh	toothache	0.36
			Lea	Burnt	Inh	toothache	0.41
			See	Hea	Inh into mouth	toothache	0.43

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Ulmaceae	*Ulmus glabra* Huds., ATA 10112	Karaağaç	Roo	Cru, mix with root of *Gundelia tournefortii*, linseed oil and egg yolk	Ext Wrapped in a cloth, twice a day until healing	anti-inflamatory, wounds, scar	0.03
Urticaceae	*Urtica dioica* L., ATA 10113	Gezgezok	Aer	Inf with *Malva neglecta* and flour	Ext	calcification	0.22
				Dec	Int	diuretic, urinary system diseases, shortness of breath	0.45
			See	Raw, mix with honey	Int Before breakfast	arthritis, rheumatism	0.13

* Cultivated plants.
** Endemic plants.
[a] Plant part(s) used: Aer: Aerial parts; Bar. Bark; Bra: Branches; Bul: Bulb; Cap: Capitulum; Flo: Flowers; Fru: Fruits; Lat: Latex; Lea: Leaves; Res: Resin; Roo: Roots; Ste: Stem; See: Seeds; Tub: Tuber; Who: Whole plant.
[b] Preparations: Boi. Boiled; Cooked: Coo; Cru: Crushed; Dec: Decoction; Eaten: Eat; Hea; Heated; Inf: Infusion; Mixed: Mix.
[c] Adm.: Administration: Int; Internal use. Ext; External use; Eat: Eaten as meal; Gar: Gargle; Inh: Inhalation

Table 4. The other usages of the recorded medicinal plants used in Çat, Tekman, Hınıs, Karaçoban and Karayazı, Erzurum-Turkey.

Family	Plant species, voucher specimen, Endemism	Local Name	Plant part (s) used[a]	Way of Consumption / Way of Utilization[b]	UV
Apiaceae	*Falcaria vulgaris* Bernh., ATA 10018	Tepigıgaze, pepigıgaze	Aer	Coo with egg, Eat	0.12
			Lea	Raw, Eat	0.24
Apiaceae	*Heracleum apiifolium* Boiss., ATA 10023	Kekire	Roo	Eaten, pooled	0.29
Apiaceae	*Malabaila dasyantha* Fisch. & C.A.Mey. ex K.Koch, ATA 10021	Mandak, mendik	Ste	Pooled, Eat	0.45
			Lea	Dried, as spice for soup	0.36
			Aer	Added in cheese	0.51
Apiaceae	*Ferula orientalis* L., ATA 10019	Helik, helis, heliz	Young Aer	Raw, Eat	0.73
Apiaceae	*Ferula huber-morathii* Pesmen, ATA 10020	Helik, helis, heliz	Young Aer	Raw, Eat, as pickle	0.56
Apiaceae	*Carum carvi* L., ATA 10114	Mendık	Ste	Eat and as spice	0.36
Apiaceae	*Anthriscus nemorosa* (M.Bieb.) Spreng., ATA 10115	Hırhındak	Ste	Peeled and Eat	0.44
Apiaceae	*Eryngium campestre* L., ATA 10022	Kerenk, kelenk	Aer	Pooled and Eat	0.61
Araceae	*Arum detruncatum* C.A.Mey. ex Schott, ATA 10025	Gari, kari, dalık	Aer	Branches and leaves boiled as tea or Eat raw, as spice for soup, as food, add to cheese, pickle	0.54
Asparagaceae	*Asparagus officinalis* L., ATA 10116	Meraci, merajo, meroji, zazık	Aer	Boi, cook with egg, Eat	0.23
Asparagaceae	*Asparagus persicus* Baker, ATA 10045	Meraci, merajo, meroji, zazık	Aer	Boi, cook with egg, Eat	0.09
Asteraceae	*Artemisia santonicum* L., ATA 10117	Havşan	Aer with flo	Boi, plant water is poured into the corner of the house Rep, Ins	0.45
Asteraceae	*Artemisia campestris* L., ATA 10118	Havşan	Aer with flo	Boi, plant water is poured into the corner of the house Rep, Ins	0.21
Asteraceae	*Gundelia tournefortii* L., ATA 10027	Kerenk	Aer	Pooled and Eat	0.61

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			Roo	Juice of roots used as gum	0.45
			Aer	Raw, Eat	0.66
Asteraceae	**Helianthus tuberosus* L., ATA 10119	Sevilbinard	Roo	Making farci, Eat	0.25
			Lea	Making salad, Eat	0.12
Asteraceae	*Tussilago farfara* L., ATA 10120	Kersim	Lea	As food, Boi, removed the water and coo with egg, making farci	0.11
Asteraceae	***Scorzonera tomentosa* L., ATA 10034	Beniştikok	Lat	Used as chewing gum	0.55
Asteraceae	*Tragopogon buphthalmoides* Boiss., ATA 10040	Sıpıng, Sıpınk	Aer	Eat as salad	0.51
			Lea	Eat as salad	0.49
Brassicaceae	*Lepidium perfoliatum* L., ATA 10121	Gıci	Aer	Raw, Eat	0.34
Brassicaceae	*Lepidium latifolium* L., ATA 10122	Dıvıre dışk	Lea	Coo like spinach	0.22
			Aer	Raw, Eat	0.13
Caryophyllaceae	*Silene vulgaris* (Moench) Garcke, ATA 10123	Goştberg	Lea	Used as spice	0.09
Chenopodiaceae	*Beta corolliflora* Zosimovic ex Buttler, ATA 10055	Dırşek	Lea	Food	0.23
Chenopodiaceae	*Beta lomatogona* Fisch. & C.A.Mey., ATA 10056	Sılkınk	Lea	Coo with egg, Eat	0.12
Euphorbiaceae	*Euphorbia stricta* L., ATA 10065	Şirit	Aer	Used as fixator for dyeing	0.08
Fabaceae	*Astragalus microcephalus* Willd., ATA 10067	Geven, guni	Roo	Cru, Use as animal feed	0.57
			Who	Dri, Use as fuel	0.73
			Roo	Gum, Use as glue	0.69
				Gum, coo with sugar use as glue	0.25
Fabaceae	*Astragalus gummifer* Lab., ATA 10124	Guni	Ste	Cru, Use as animal feed	0.45
			Roo	Gum, Use as glue	0.35
Fabaceae	**Cicer arietinum* L., ATA 10125	Nohut	See	Boi with *Hordeum vulgare*, filterred, mix with flour, Use as rennet	0.21
Lamiaceae	*Mentha longifolia* (L.) L., ATA 10074	Yarpuz, punk, pungi	Lea	As spice and tea	0.68
Lamiaceae	*Mentha aquatica* L., ATA 10075	Punk, pungi, pune, punı	Lea	As spice and tea	0.45
Lamiaceae	***Nepeta nuda* L., ATA 10126	Mıjmıjok	Flo	Drink juice of flo	0.06
Lamiaceae	*Pimpinella peucedanifolia* Fisch. ex Ledeb., ATA 10127	Sıvnık	Aer	Whole plant as broom, as tea	0.11
Lamiaceae	***Pimpinella cappadocica* Boiss. & Bal., ATA 10128	Sıvnık	Aer	Whole plant as broom, as tea	0.14
Lamiaceae	*Thymus sipyleus* Boiss., ATA 10073	Catri, Çatri, Cağ tiri	Lea	Used as spice and tea	0.34
Lamiaceae	*Origanum rotundifolium* Boiss., ATA 10076	Anıh	Aer	Used as spice and tea	0.44
Lamiaceae	***Origanum acutidens* (Hand.-Mazz.) Ietsw., ATA 10077	Anıh	Aer	Used as spice and tea	0.49
Liliaceae	*Allium fuscaviolaceum* Willd. Enum, ATA 10129	Sirim	Aer	Put into cheese, trade as aromatic	0.20
Liliaceae	*Eremurus spectabilis* M.Bieb., ATA 10079	Gullık, Gulıng, Çiriş	Aer	Food as spinach	0.70
Malvaceae	*Malva neglecta* Wallr., ATA 10084	Berbero, dolik, dolig, tolik, ebegümeci	Aer	Food as spinach	0.43
Malvaceae	*Malva sylvestris* L., ATA 10085	Berbero, dolik, dolig, tolik, ebegümeci	Aer	Food as spinach	0.32
Orchidaceae	*Orchis palustris* Jacq., ATA 10130	Orkide, kortol	Bul	Trade	0.09
Orchidaceae	*Ornithogalum narbonense* L., ATA 10046	Sipidak	Aer	Spice, food as spinach	0.05
Papaveraceae	*Papaver rhoeas* L., ATA 10090	Haşhaşık	See	Raw, Eat	0.14
Poaceae	**Triticum vulgare* Vill., ATA 10131	Buğday	See	Mix with abomasum, flower of *Ranunculus kotschyi,* added 1 l water and lemon waited 30 days, Use as rennet	0.15

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Polygonaceae	*Polygonum cognatum* Meisn., ATA 10097	Nonicucik	Aer	Coo, Food as spinach	0.51
Polygonaceae	*Rumex crispus* L., ATA 10098	Dırşo	Lea	Coo, Food as spinach, making farci	0.65
Polygonaceae	*Rumex alpinus* L., ATA 10132	Dırşo, sılkok	Lea	Coo, Food as spinach	0.57
Polygonaceae	*Rumex tuberosus* L., ATA 10133	Dırşo, tırşık, tırşok	Lea	Coo, Food as spinach and drunk as tea	0.23
Ranunculaceae	*Ranunculus grandiflorus* L., ATA 10018	Şelepuk	Flo	Boi, Use as rennet	0.09
Rosaceae	*Rosa canina* L., ATA 10104	Şilan	Roo	Drunk as tea	0.24
			Bra	Drunk as tea	0.12
			Fru	Making marmalade	0.45
Rosaceae	*Crataegus pontica* K.Koch, ATA 10106	Bilan	Fru	Raw, Eat	0.43
Rosaceae	*Crataegus orientalis* Pall. ex M.Bieb., ATA 10134	Bilan	Fru	Raw, Eat	0.30
Rubiaceae	*Rubia tinctorum* L., ATA 10135	Şırtalık	Roo Who	Boi, used to dye with yellow used to dye with orange	0.39
Salicaceae	*Populus nigra* L., ATA 10136	Sipindar	Ste Bra	Making broom	0.48
Scrophulariaceae	*Verbascum* L. sp.	Maijotk, maicotk, zesmaşı, maycog	Aer with Flo	Rep, Ins Boi and plant water is poured into the corner of the house	0.32
Salicaceae	*Salix armenorossica* A.K.Skvortsov, ATA 10110	Sıkabel, soredar, sıkabel	Bra	Making broom	0.55
			Young Bra	Making basket, broom and knoble	0.39
Salicaceae	*Salix alba* L., ATA 10109	Soredar, Sıkabel	Young Bra	Making basket, broom and knoble	0.34
Salicaceae	*Populus alba* L., ATA 10137	Spindar, sipinidar	Young Bra	Making basket, broom and knoble	0.29
Urticaceae	*Urtica dioica* L., ATA 10113	Gezgezok	Aer	Food as spinach	0.68

* Cultivated plants.

** Endemic plants.

[a] Plant part(s) used: Aer: Aerial parts; Bar. Bark; Bra: Branches; Flo: Flowers; Fru: Fruits; Lea: Leaves; Roo: Roots; See: Seeds; Ste: Stem; Who: Whole plant.

[b] Way of Consumption / Way of Utilization: Boi. Boiled; Cle: Cleaning; Cooked: Coo; Cru: Crushed; Dri: Dried; Eat: Eaten.

Other uses of medicinal plants

The recorded medicinal plants are also used, in some cases, for other purposes (e.g., food, insecticide, broom, rennet, cosmetics, delighting, animal feed, amulet, fuel and dye) (Table 4). Specifically, 35 taxa are consumed in various ways as food (spice, fruit juice, salad, pickle, etc.). Among these *Prangos ferulacea, Ferula huber-morathii*, *Rheum ribes*, *Ferula orientalis, Gundelia tournefortii, Tragopogon* species*, Malva* species*, Malabaila dasyantha, Rumex crispus* and *Rosa canina* were the plants most utilised as food by the local people. Moreover, during this research, we determined that some medicinal plants are utilised as spices and it is more prevalent in rural areas. *Mentha* species*, Thymus* species*, Origanum* species*, Pimpinella* species*,* and *Carum carvi* are consumed as spices. Members of the Lamiaceae family are used as spices. In the area, some of the wild edible plants such as *Mentha* species, *Thymus* species, *Origanum* species*, Pimpinella* species*,* and *Rosa canina* are also used as herbal tea. The results are presented in Table 4.

Plant names

We also recorded the local names of the plants that were mentioned by the informants (Tables 3 and 4). In some instances, the same vernacular name was used for more than one plant species and this could cause confusion and possibly impede a safe usage of the plant. In other cases, the same plant had more than one vernacular name (e.g., *Plantago major:* pel hewes, omulwaş, sinirli ot, sinirotu; *Malva neglecta:* dolik, tollık, ebemkömeyi, ebemkömeci, ebemgömeci; *Rosa canina:* gül tonik, şilan) (Polat and Cakılcıoglu 2018; Ozgen *et al.* 2012; Korkmaz and Karakurt 2014; Korkmaz *et al.* 2016). It was also determined that most of the plant names were derived from Kurdish.

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The authors compared their results with other comprehensive ethnobotanical studies performed in the Erzurum province (Sezik *et al.* 1997; Turan *et al*. 2003; Ozgen *et al.* 2004; Ozgökçe and Ozcelik 2004; Altundag and Ozturk 2011; Ozgen *et al.* 2012; Polat *et al.* 2012; Macit and Köse 2015). The species *Plantago* species*, Malva neglecta*, *Rheum ribes* and *Rumex crispus* were determined the most largely utilised medicinal plants and were recorded at these literatures in Erzurum. In accordance with these literatures, *Prangos ferulacea* (diabetes), *Achillea biebersteinii* (wounds), *A. millefolium* (wounds), *Anthemis* species (stomachache), *Cichorium intybus* (wounds), *Alkanna* species (wounds), *Cannabis sativa* (infertility), *Cephalaria* species (wounds), *Mentha* species (expectorant), *Salvia* species (hemostatic), *Malva* species (wounds), *Rheum ribes* (diabetes), *Ranunculus* species (rheumatism), *Helichrysum* species (kidney stone), *Thymus fallax* (gastric ulcer), *Rosa* species (haemorrhoid), *Hyoscyamus niger* (toothache) and *Urtica dioica* (rheumatism) have similar usages.

The reported disorders were grouped into 11 categories depending upon the knowledge gained from the informants. Table 1 indicates the ICF values of the categories of disorders. Wounds had the highest ICF score (0.79) and the plants used to treat them include for instance *Alkanna orientalis, Achillea millefolium*, *Pinus sylvestris*, *Plantago major*. Diabetes was recorded to have the second highest ICF value (0.69) and the plants used for this problem include *Prangos ferulacea*, *Polygonum cognatum* and *Ferula orientalis*. Anaemia and the use as hemostatic were the groups with the third highest ICF value (ICF was 0.66), while the fourth highest ICF value (0.61) was recorded for gastrointestinal disorders (Table 1). *Plantago major* (0.67), *Malva neglecta* (0.61), *Cephalaria tchihatchewii* (0.57), *Alkanna orientalis* (0.56), *Pinus sylvestris* (0.54), *Teucrium polium* (0.53), *Plantago lanceolata* (0.52), *Malus sylvestris* (0.51) had the highest UVs (Table 3). The plants in the research area with a high FL were *Plantago major* (129), *Malva neglecta* (115), *Cephalaria tchihatchewii* (99), *Alkanna orientalis* (96), *Pinus sylvestris* (88), for inflammatory and wound healing conditions, *Teucrium polium* (76) for infertility in women, *Plantago lanceolata* (76) for oedema, *Malus sylvestris* (74) for jaundice, *Juniperus communis* (69) for eczema, skin disorders and *Ranunculus kotschyi* (67) for rheumatism (Table 3). As a result of assessing the interviewees that were performed in the search area, it is seen that the plants being frequently written in the interviewees are *Plantago major*, *Malva neglecta*, *Cephalaria tchihatchewii*, *Alkanna orientalis*, *Pinus sylvestris*, *Teucrium polium, Plantago lanceolata*, *Malus sylvestris, Juniperus communis* and *Ranunculus kotschyi*. These plants also have a widespread utilisation in the region and higher UVs and FLs. The uses of members of Acanthaceae, Amaryllidaceae, Aristolochiaceae, Capparaceae, Caryophyllaceae, Cistaceae, Corylaceae, Crassulaceae, Cuscutaceae, Ephedraceae, Ericaceae, Gentianaceae, Geraniaceae, Illecebraceae, Loranthaceae, Onagraceae, Paeoniaceae, Plumbaginaceae, Polygalaceae, Portulacaceae, Primulaceae, Resedaceae, Thymelaeaceae, Tiliaceae, Typhaceae, Valerianaceae, Violaceae families were found out in other studies however were not recorded in the nearby areas.

Harmful effects of medicinal plants

The informants stated that *Ranunculus* species should be utilized with care because of their serious side effects such as oedema, irritation and redness on the skin so these species must not be kept on the skin for more than 1-2 minutes. Also, *Euphorbia stricta* is a poisonous plant and the latex is liable for the toxicity of this plant and are blamed for acute dermatitis in case of on local application and can cause poisoning if consumed.

Conclusions

In this research, 98 medicinal plant taxa belonging to 34 families were found in the search region. Among these, 84 taxa grew wild and 16 taxa were cultivated, and they are utilised in the curation of many diseases. The local people utilize these plants in various ways such as decoctions or infusions etc over the course of the whole year. The most common medicinal plant families were Asteraceae (20), Lamiaceae (10), Apiaceae (7), Rosaceae (6), Brassicaceae (4), Liliaceae (4) and Polygonaceae (4). This is the first extensive research of the traditional use of medicinal plants in the Çat, Tekman, Hınıs, Karaçoban and Karayazı (Erzurum) districts, situated in the south part of Erzurum. For the first time, we recorded medicinal use of *Ulmus glabra* in our study. Because of geographical structure and local problems faced in Eastern Turkey, there are hardly any studies carried out plants. Thereby, this research might be a considerable and significative resource for further ethnobotanical research in the area.

Declarations

List of abbreviations: Aer: Aerial parts; Bar. Bark; Bra: Branches; Bul: Bulb; Cap: Capitulum; Flo: Flowers; Fru: Fruits; Lat: Latex; Lea: Leaves; Res: Resin; Roo: Roots; Ste: Stem; See: Seeds; Tub: Tuber; Who: Whole plant; Boi. Boiled; Cle: Cleaning; Cooked: Coo; Cru: Crushed; Dec: Decoction; Dri:

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Dried; Eaten: Eat; Hea; Heated; Inf: Infusion; Mixed: Mix; Adm.: Administration: Int; Internal use. Ext; External use; Eat: Eaten as meal; Gar: Gargle; Inh: Inhalation

Ethics approval and consent to participate: The study was performed by following the Ethics of the Turkish Ministry of Forestry and Water Work Natural Protection and General Directorate of National Parks.

Consent for publication: This paper does not include any individual person´s data and further consent for publication is not required.

Availability of data and materials: Additional file contains data and these data (questionnaire, videos and photos etc.) were sent to the Turkish Ministry of Forestry and Water Work Natural Protection and General Directorate of National Parks.

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