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A comprehensive ethnobotanical survey of medicinal plants for 80 villages in Trabzon (Türkiye)

Sıla Özlem ŞENER[1,*], Kamil ÇOŞKUNÇELEBİ[2], Salih TERZİOĞLU[3], Aleyna NALÇAOĞLU[4], Tuğçe Pelin GENÇKAYA[2], Ufuk ÖZGEN[5], Merve YÜZBAŞIOĞLU BARAN[1]

[1]Department of Pharmacognosy, Gulhane Faculty of Pharmacy, University of Health Sciences, Ankara, Turkiye
[2]Department of Biology, Faculty of Science, Karadeniz Technical University, Trabzon, Turkiye
[3]Department of Forest Botany, Faculty of Forestry, Karadeniz Technical University, Trabzon, Turkiye
[4]Department of Molecular Biology and Genetics, Faculty of Science, Karadeniz Technical University, Trabzon, Turkiye
[5]Department of Pharmacognosy, Faculty of Pharmacy, Karadeniz Technical University, Trabzon, Turkiye

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Abstract: The current study targeted to perform qualitative and quantitative analysis of medicinal plant taxa used in folk medicine in Trabzon. Due to its historical significance, diversity of plant species, and hosting a wide range of cultures, the Turkish city of Trabzon has significant ethnobotanical potential. Ethnobotanical data including family name, scientific name, local name, used parts, therapeutic uses, preparation methods, administration routes, and cited locations were gathered by face-to-face interviews with 645 participants mostly over 50 years old. The quantitative analyses were executed by the determination of frequency values of citation (FC), use value (UV), fidelity level (FL), and informant consensus factor (ICF). A total of 119 medicinal plant taxa belonging to 55 families were recorded with therapeutic uses for more than 100 different diseases. The most commonly used plant part and administration routes were detected as leaves (32.43%) and oral application (51.58%), respectively. The highest ICF value was assigned for the skin diseases (ICF: 0.96). *Piceae orientalis* possessed the highest value of FC (82.326%), while *Plantago major* owned the highest value of UV (0.873). *Tilia rubra* subsp. *caucasica*, *Vaccinium myrtillus*, and *Nicotiana tabacum* were the remarkable taxa due to their FL value (100%), besides the high number of user reports. The present study supplies comprehensive ethnobotanical qualitative and quantitative data (FC, UV, FL, and ICF) from 80 villages in Trabzon. The obtained ethnobotanical data are expected both provide the preliminary information to discover novel herbal drugs and passing on to next generations as an important heritage.

Key words: Ethnobotany, medicinal plants, traditional medicine, Trabzon

1. Introduction

Plants have been used as a source of medicine to alleviate and treatment for various diseases since early human history. The use of natural products obtained by minerals, plants, or animals with various therapeutic targets is as ancient as human civilization (de Pasquale, 1984; Naz et al., 2022). The earliest known written record of the use of medicinal herbs for medication manufacture was discovered on a Sumerian clay slab from Nagpur that is thought to be about 5000 years old (Petrovska, 2012). The global number of medicinal plants is estimated to be between 50,000 and 70,000 (Schippmann et al., 2006). In the last 30 years, approximately 50% of marketed drugs are regarded as derived from natural products, and various research has accentuated the basic role of natural products in the production of new drugs (Ashiq et al., 2021; Boudjelal et al., 2013). As well, ethnobotanical surveys are very beneficial to guide for the development of new drugs molecules (Süntar, 2020).

Trabzon has amassed a significant fund of traditional medicine knowledge as a result of hosting a diverse range of civilizations over the years (Yeşilada, 2002). Historically and currently, the vast majority of Turkish citizens who reside in rural and urban areas still have a rich traditional knowledge regarding the use of plants in the treatment of various diversified diseases (Kültür et al., 2021; Sargin, 2021). According to recent studies, approximately 12,265 vascular plants (Terzioğlu et al., 2021), 942 moss, and 85 ferns (Dönmez and Yerli, 2018) taxa are recorded from Türkiye. More than 1000 species in Türkiye have long been used for various medicinal purposes (Sargin et al., 2013; Yeşil and İnal, 2021).

Trabzon, the studied area, which the Ottoman Empire seized in 1461 and turned into a central region, was home

* Correspondence: silaozlem.sener@sbu.edu.tr

to Armenians, Turks, Rums, and Russians at that time, is located in the northeastern part of Türkiye (Akbulut and Bayramoglu, 2014). The population of Trabzon has been determined as 811,901, with an urban population rate of 89.6% and a rural population rate of 10.4% in 2020. According to Turkish health data from 2019, the most common disease categories in Trabzon with the highest mortality rates were circulatory system diseases, neoplasms, and respiratory system disorders, respectively (Başara Bora et al., 2022). People have been using traditional medicine to cure illnesses of many disease categories like these, primarily in rural areas as well as urban areas in Trabzon (Akbulut and Bayramoğlu, 2014; Gürdal and Öztürk, 2022). According to a recent traditional medicinal plant survey in Northeastern Anatolia, 392 plant species are distributed in Trabzon which possesses rich plant diversity due to its variable climate and heterogeneous ecological conditions (Terzioğlu and Coşkunçelebi, 2021).

Trabzon, the northeastern city of Türkiye, which is home to many different civilizations, has a significant ethnobotanical potency because of its plant diversity, its historical background, and its rich botanical heritage. Some ethnobotanical studies have been carried out at the regional level in various areas of Trabzon up to now. However, the present study is the most comprehensive one, containing interviews with 645 people, covering 17 districts and 80 villages of Trabzon.

2. Material and methods

2.1 Study area

Trabzon with coordinates 41°0'9.7092"N and 39°43'0.3468"E, has an area of 4685 km^2. It is enclosed by the Black Sea in the north, Gümüşhane in the south, Giresun in the west, and Rize in the east. Altitude of Trabzon ranges from 0 to 3376 m (Demirkapı Mountain). The main landforms of Trabzon city consist of mountainous areas, hills, and deltas (Figure 1). The mountainous areas are in the East-West direction. The hills gradually descend between the branches of the main streams. Solaklı, Yomra, Değirmendere, Sera, Kalenima, Foldere streams are the important external factors that provide the current landform. Deltas were formed by these streams (Akbulut and Bayramoğlu, 2014; Kuleyin and Nalkıran, 2020). The population of Trabzon was 808,974 for17 districts, in 2019. While more than half of the people have lived in the city center and the rest of them have lived in rural areas (Acar et al., 2007; Kuleyin and Nalkıran, 2020; Yurdigül, 2021).

The ethnobotanical survey was carried out in 80 villages of 17 districts (Akçaabat, Araklı, Arsin, Beşikdüzü, Çarşıbaşı, Çaykara, Düzköy, Hayrat, Köprübaşı, Maçka, Of, Ortahisar, Sürmene, Şalpazarı, Tonya, Vakfıkebir and Yomra) during September 2018 to December 2020 (Figure 2).

2.2 Data collections for ethnobotanical investigation

Ethnobotanical data were collected by face-to-face interviews with 645 participants mostly over 50 years old. Primary information was obtained from local authorities to identify the local people with traditional information. The interviews were carried out first with the people recommended by the local authority and then with the people encountered during the study trip to villages. Information about the demographic properties of the participants, the intent of using wild plants, local names, drying, and collection techniques, used parts of wild plants, techniques of preparation, methods of applications were recorded with the interview forms. In addition, photographs were taken during the interview to document (Figure 3).

2.3 Identification of plants

Plant samples used for ethnobotanical purposes were collected with the participants and experts' assistance after each face-to-face interview. During the field excursion, botanical features of the plants that may be required for diagnosis were recorded and photographed (Figure 4). In addition, suitable samples belonging to only native plants were deposited in the herbariums of Karadeniz Technical University, Faculty of Science, Department of Biology (KTUB), and Faculty of Forestry (KATO). Plant identification was performed by the second and third authors, who are experts in plant systematics.

2.4 Data analysis

All taxa were presented via a tabulation including family name, scientific name, local name, used parts, therapeutic uses, preparation method, administration routes, cited location, frequency of citation (FC), use value (UV), and fidelity level (FL). The value of the informant consensus factor (ICF) was also calculated for quantitative data analysis except for FC, UV, and FL.

Frequency of citation (FC)

FC value informs about the local importance of specific taxa in a particular study field (Kadir et al., 2012; Umair et al., 2017). The FC value of taxa was measured with the following equation formula:

$$FC = \frac{CP}{N} x100$$

Where CP is the number of participants cited for specific taxa, and N is the total number of participants cited for all taxa.

Use value (UV)

Use value remarks on the relative importance of specific taxa for a study field (Kadir et al., 2012; Umair et al., 2017). The UV value of taxa was measured using the following formula:

$$UV = \frac{\sum Ui}{N}$$

Figure 1. Selected photographs from different vegetation types of Trabzon A: *Vaccinium myrtillus* in alpine vegetation, B: Alpine vegetation, C: Alpine and subalpine vegetation, D: Alpine vegetation, E: Alpine vegetation, F: Alpine vegetation in spring, G: Forest and subalpine vegetation, H: Upper forest border in Trabzon and subalpine vegetation, I: Forest vegetation and site, L: Coniferous and broad-leaved mixed forest, M: Leafy forest vegetation, N: Sarıçam forest and open area in the forest, O: Uzungöl, P: Coastline and tea fields, R: *Crocus vallicola* in natural habitat, S: *Colchicum speciosum* in natural habitat, Ş: *Colchicum speciosum* and *Crocus vallicola* in a forest meadow, T: *Colchicum speciosum* in natural habitat.

Where U is the number of use reports for specific taxa stated by participants, and N is the total number of participants cited for all taxa.

Informant consensus factor (ICF)

Therapeutic uses of the ethnobotanical survey were categorized following the guidance of the

International Classification of Primary Care-2 (ICPC-2) based on the World Health Organization to detect ICF value (Weckerle et al., 2018; Redouan et al., 2020; Benitez et al., 2021). ICF values are the homogeneity of the participants' information, which was calculated by the following formula (Shopo et al., 2022; Trotter and Logan, 19

$$ICF = \frac{(Nur - Nt)}{(Nur - 1)}$$

Where Nur is the number of user reports for a specific disease category and Nt is the number of taxa for a specific disease category mentioned by all participants.

Fidelity level (FL)

The FL value reflects the percentage value of specific taxa used for the treatment of specific disease categories by participants (Weckerle et al., 2018; Redouan et al., 2020; Benitez et al., 2021). The FL value was measured with the following equation:

$$FL = \frac{(Np)}{(N)} x100$$

Where Np is the number of participants who cited specific taxa for a specific disease category and N is the

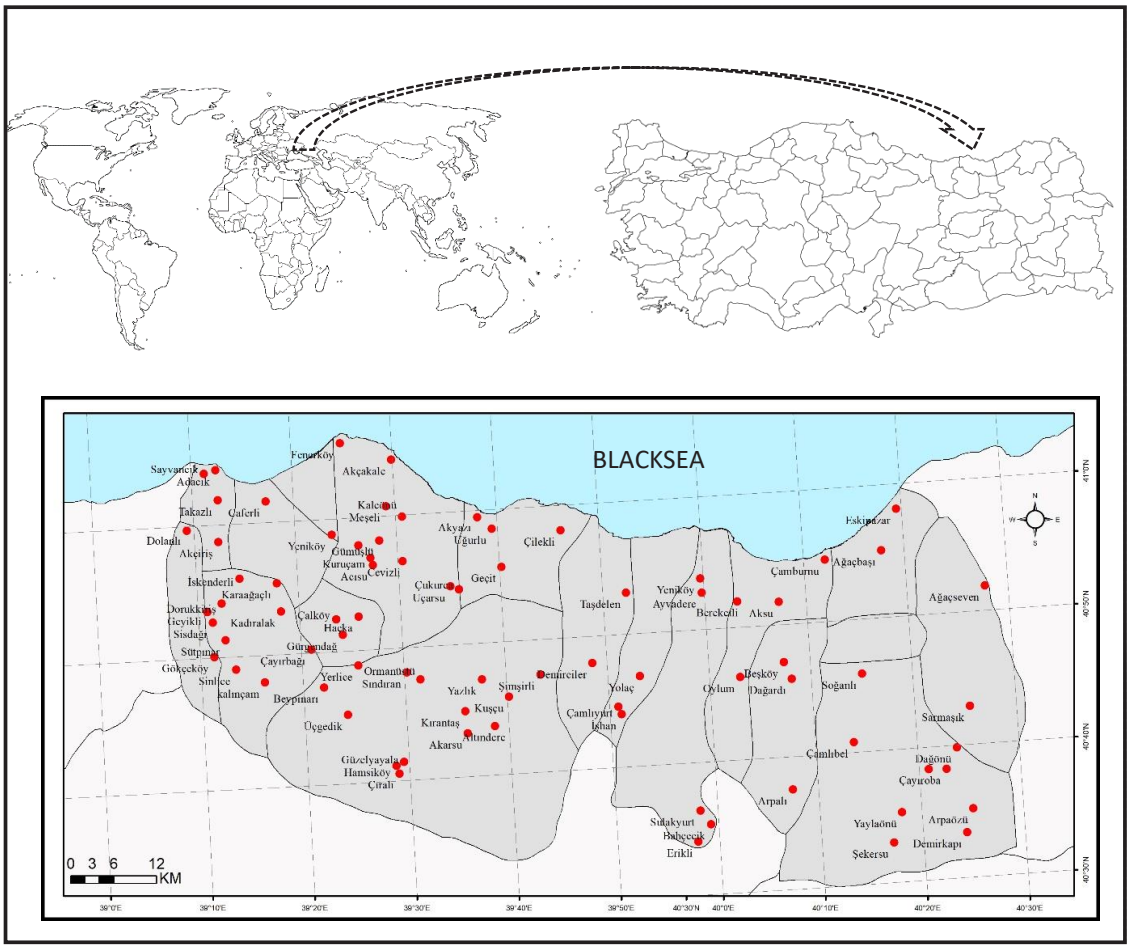

Figure 2. Geographic position of villages visited during ethnopharmacological survey in Trabzon.

total number of participants who mentioned the identical taxa for any disease category.

Clustering analysis

To show the association between the taxa and traditional uses for 17 districts in Trabzon, the most popular technique of dendogram clustering was utilized. The Unweighted Pair Group Method with Arithmetic Mean (UPGMA) with Euclidean distance was applied for statistical evaluation. Scaling was created over the distance coefficient (Emre et al., 2022; Garcia-Vallve et al., 1999; Luczak et al., 2021).

2.5 Literature research

An electronic search (Web of Science, SciFinder, Pubmed, Scirus and Google Scholar) was conducted for literature research to compare the reported species with ethnobotanical studies conducted in Trabzon and other regions.

3. Results and discussion

3.1 Demographic and location distribution

A total of 645 participants were interviewed to perform the ethnobotanical survey. The percentages of participants' gender, age and education are assessed (Table 1). 34.88% of the participants were female and 65.12% were male. Most of the participants were in the 50–70 age range (48.53%), followed by above 70 years old (43.72%). According to participants' educational data, 37.67% of the participants were primary school graduates, followed by illiterate participants (20.31%).

The survey was conducted in 80 villages located in 17 different districts of Trabzon. The number of usages are reported and percentages for each location are expressed (Table 2). Locality information demonstrated that the highest use reports (23.64%) were registered in Maçka district. According to data of the villages of Maçka, the highest use reports were recorded for Altındere (3.32%), Çıralı (4.88%), and Hamsiköy (3.12%). Dorukkiriş (in Şalpazarı) and Caferli (in Vakfıkebir) were the other notable villages, with high rates of 3.70% and 4.10%, respectively. The values of use reports for other disricts were varied between 0.10% and 3.97%.

Figure 3. Selected photographs taken during the face to face ethnopharmacological interviews from different villages A: Hıdırnebi, B: Akçakale, C: Kuruçam, D: Acısu, E: Gümüşlü, F: Erikli, G: Sulakyurt, H: Bereketli, I: Ayvadere, J: Bahçecik, K: Yolaç, L: Yeniköy, M: Fener, N: Arpaözü, O: Yeniköy, P: Demirkapı, R: Çamlıbel, S: Çayıroba, T: Şekersu, U: Yaylaönü, V: Çayırbağı, W:Yaylaönü, X: Arpaözü, Y: Yazlık, Z: Çayırbağı, AA: Sarmaşık, AB: Sarmaşık, AC: Dağardı, AD: Akarsu, AE: Ormanüstü, AF: Eskipazar, AG: Kadıralak, AH: Oylum, AI: Doğancı, AJ: Sinlice, AK: Gökçe, AL: Caferli, AM: Sisdağı.

Figure 4. Selected images of medicinal plant taxa distributed in Trabzon A: *Platanus orientalis* L., B: *Hypericum perforatum* L., C: *Hedera helix* L., D: *Rumex pulcher* (BE)L. E: *Mentha longifolia* (L.) L. subsp. *longifolia,* F: *Plantago major* L. subsp. *major,* G: *Angelica sylvestris* L., H: *Calystegia silvatica* (Kit.) Griseb., I: *Ranunculus constantinopolitanus* (DC.) d'Urv., J: *Acer heldreichii* Orph. Ex Boiss., K: *Alnus glutinosa* L., L: *Bellis perennis* L., M: *Crataegus orientalis* Pallas ex Bieb. subsp. *orientalis,* N: *Cyclamen coum* Mill., O: *Rhododendron ponticum* L. subsp. *ponticum,* P: *Caltha palustris* L., R: *Cirsium pseudopersonata* Boiss. & Balansa ex Boiss., S: *Rhododendron luteum* Sweet, T: *Crocus vallicola* Herb., U: *Heracleum platytaenium* Boiss., V: *Impatiens noli-tangere* L., W: *Colchicum speciosum* Steven, X: *Primula acaulis* (L.) L, Y: *Juglans regia* L., Z: *Rubus idaeus* L., AA: *Mespilus germanica* L., AB: *Pinus sylvestris* L., AC: *Ecballium elaterium* (L.), AD: *Ficus carica* L. subsp. *carica,* AE: *Prunus divaricata* Ledeb., AF: *Sambucus ebulus* L., AG: *Laurocerasus officinalis* M. Roem., AH: *Primula veris* L.

3.2 Taxonomic distribution

A total of 119 medicinal taxa belonging to 55 families were documented with this ethnobotanical survey (Table 3). The number of taxa belonging to each family was determined (Figure 5). Rosaceae was the most preponderant family with 16 taxa, followed by Asteraceae (12 taxa), Lamiaceae (9 taxa), Ericaceae (5 taxa), Primulaceae (4 taxa), Amaryllidaceae, Apiaceae, Betulaceae, Boraginaceae, Euphorbiaceae and Solanaceae (3 taxa each), Adoxaceae, Brassicaceae, Grossulariaceae, Malvaceae, Moraceae, Papaveraceae, Pinaceae, Plantaginaceae, Polygonaceae, Ranunculaceae, and Ulmaceae (each with 2 taxa). Only one taxon was documented for the other family. Similarly, in our data, the most dominant family was determined as Rosaceae consistent with previous literature (Akbulut and Ozkan, 2014; Yeşilyurt et al., 2017).

Previously, Akbulut, and Bayramoğlu have reported that 72 taxa belonging to 41 families for 12 different districts were located in Trabzon. In a study carried out in the urban area of Trabzon, 72 taxa belonging to 35 families were documented by Yeşilyurt et al. (Akbulut and Ozkan, 2014; Yeşilyurt et al., 2017). Similarly, in our data, the most dominant family was determined as Rosaceae by Akbulut and Ozkan and Yeşilyurt et al. (Akbulut and Ozkan, 2014; E. Yeşilyurt et al., 2017). Another previous study performed in Hayrat showed that 101 taxa belonging to 49 families were recorded and 58 of them possessed medicinal usage (Sağiroğlu et al., 2012). Yazıcıoğlu and Tuzlacı (1995) recorded 67 taxa for 10 districts located in Trabzon. To the best of our knowledge, this research is the most comprehensive study about ethnobotanical usages of the plants in Trabzon City with 119 taxa belonging to 55 families. The species *Acer heldreichii* Orph. Ex Boiss. subsp. *trautvetteri* (Medw.) A.E. Murray, *Allium schoenoprasum* L., *Angelica sylvestris* L., *Asplenium scolopendrium* L., *Carduus acanthoides* L., *Cirsium lappaceum* (Boiss.) Fisher,

Table 1. Demographic data of the participants.

Categories		Number of individuals	Frequency (%)
Sex	Female	225	34.88
	Male	420	65.12
Age	19–35 years	7	1.09
	36–49 years	43	6.67
	50–70 years	313	48.53
	More than 70 years	282	43.72
Educational status	Illiterate	131	20.31
	Literate	121	18.76
	Primary school	243	37.67
	Secondary school	57	8.84
	High school	53	8.22
	University	40	6.20

Table 2. İnformation of altitude and use reports data about stuedied villages

District/Vil.	Alt. (m)	T. use re.	Fre. (%)	District/Vil.	Alt. (m)	T. use re.	Fre. (%)
AKÇAABAT				**KÖPRÜBAŞI**			
1. Acısu	661	85	2.88	**41.** Arpalı	1840	24	0.81
2. Akçakale	567	14	0.47	**42.** Beşköy	816	10	0.34
3. Cevizlik	171	21	0.71	**43.** Dağardı	632	114	3.87
4. Çukurca	523	12	0.41	**Total**		148	5.02
5. Gümüşlü	831	82	2.78	**MAÇKA**			
6. Hıdırnebi	439	77	2.61	**44.** Akarsu	1328	51	1.73
7. Kaleönü	510	12	0.41	**45.** Altındere	1208	98	3.32
8. Kuruçam	1411	8	0.27	**46.** Çıralı	999	144	4.88
9. Meşeli	380	51	1.73	**47.** Güzelyayla	1674	51	1.73
10. Uçarsu	531	12	0.41	**48**. Hamsiköy	1700	92	3.12
Total		374	12.68	**49.** Kırantaş	989	28	0.95
ARAKLI				**50.** Kuşçu	1023	21	0.71
11. Ayvadere	1980	49	1.66	**51**. Ormanüstü	1092	39	1.32
12. Bahçecik	1739	46	1.56	**52.** Sındıran	877	61	2.07
13. Bereketli	393	9	0.31	**53**. Şimşirli	729	54	1.83
14. Erikli	1587	8	0.27	**54.** Üçgedik	1369	11	0.37
15. Sulakyurt	407	5	0.17	**55.** Yazlık	809	47	1.59
Total		117	3.97	**Total**		697	23.64
ARSİN				**OF**			
16. İşhan	906	32	1.09	**56.** Ağaçbaşı	204	24	0.81

Table 2 (Continued)

17. Yeniköy	1177	8	0.27	**57.** Ağaçseven	289	15	0.51
18. Yolaç	78	31	1.05	**58.** Eskipazar	267	24	0.81
Total		61	2.41	**Total**		63	2.14
BEŞİKDÜZÜ				**ORTAHİSAR**			
19. Adacık	10	6	0.20	**59.** Akyazı	239	19	0.64
20. Dolanlı	579	3	0.10	**60.** Çilekli	589	24	0.81
21. Sayvancık	287	35	1.19	**61**. Geçit	396	9	0.31
22. Takazlı	224	7	0.24	**62**. Uğurlu	309	95	3.22
Total		51	1.73	**Total**		147	4.98
ÇARŞIBAŞI				**SÜRMENE**			
23. Fenerköy	18	12	0.41	**63**. Aksu	45	27	0.92
24. Yeniköy	560	4	0.14	**64**. Çamburnu	830	23	0.78
Total		15	0.54	**65**. Oylum	356	34	1.15
ÇAYKARA				**Total**		84	2.85
25. Arpaözü	2101	27	0.92	**ŞALPAZARI**			
26. Çamlıbel	2093	29	0.98	**66**. Akçiriş	906	26	0.88
27. Çayıroba	1809	43	1.46	**67.** Dorukkiriş	1298	109	3.70
28. Demirkapı	2088	21	0.71	**68.** Geyikli	1017	24	0.81
29. Derindere	2001	39	1.32	**69.** Gökçeköy	522	57	1.93
30. Soğanlı	2247	22	0.75	**70**. Sinlice	941	27	0.92
31. Şekersu	713	6	0.20	**71.** Sisdağı	1117	75	2.54
32. Yaylaönü	486	3	0.10	**72.** Sütpınar	1027	27	0.92
Total		190	6.44	**Total**		345	11.70

Cirsium pseudopersonata Boiss. & Balansa ex Boiss., *Cirsium vulgare* (Savi) Ten., *Prenanthes petiolata* (K. Koch) Sennikov, *Tripleurospermum spp., Alkanna orientalis* (L.) Boiss. var. *orientalis, Lonicera orientalis* Lam., *Calystegia silvatica* (Kit.) Griseb., *Dioscorea communis* (L.) Caddick & Wilkin, *Euphorbia peplis* L., *Stachys macrantha* (K. Koch) Stearn, *Dactylorhiza euxina* (Nevski) H. Baumann & Künkele, *Caltha palustris* L., *Crataegus orientalis* Pallas ex Bieb. subsp. *orientalis*, *Sorbus umbellata* Fritch, and *Ulmus glabra* Hudson were recorded for the first time for ethnobotanical usages in Trabzon.

3.3 Plant parts used and preparation methods

It was expressed by participants that 12 different plant parts were used for herbal medicinal preparations in the study area. As shown in Figure 6, the most commonly used plant part was detected as leaves (32.43%), followed by resine (16.35%), fruit (15.58%), aerial parts (15.35%), flower (10.75%), seed (2.52%), style (2.31%), root (1.76%), stem (1.32%), bark (0.72%), rhizome (0.69%) and shoot (0.22%). The use of leaves for the preparation of herbal recipes is mostly related to the convenience of availability and collection (Baydoun et al., 2015). The resine was determined to possess a high rate, and *Picea orientalis* was one of the most used taxa encompassing the whole study area.

Various 17 preparation methods were remarked for applying medicinal taxa based on disease type and application site by participants. Most of the participants preferred to use raw materials of medicinal taxa (28.55%) for the administration of taxa. The other most frequently preparation method was defined as decoction (16.92%), followed by infusion (16.58%), crushed (9.52%), heating (9.42%), mush (5.61%), maceration (5.48%), sap (2.27%),

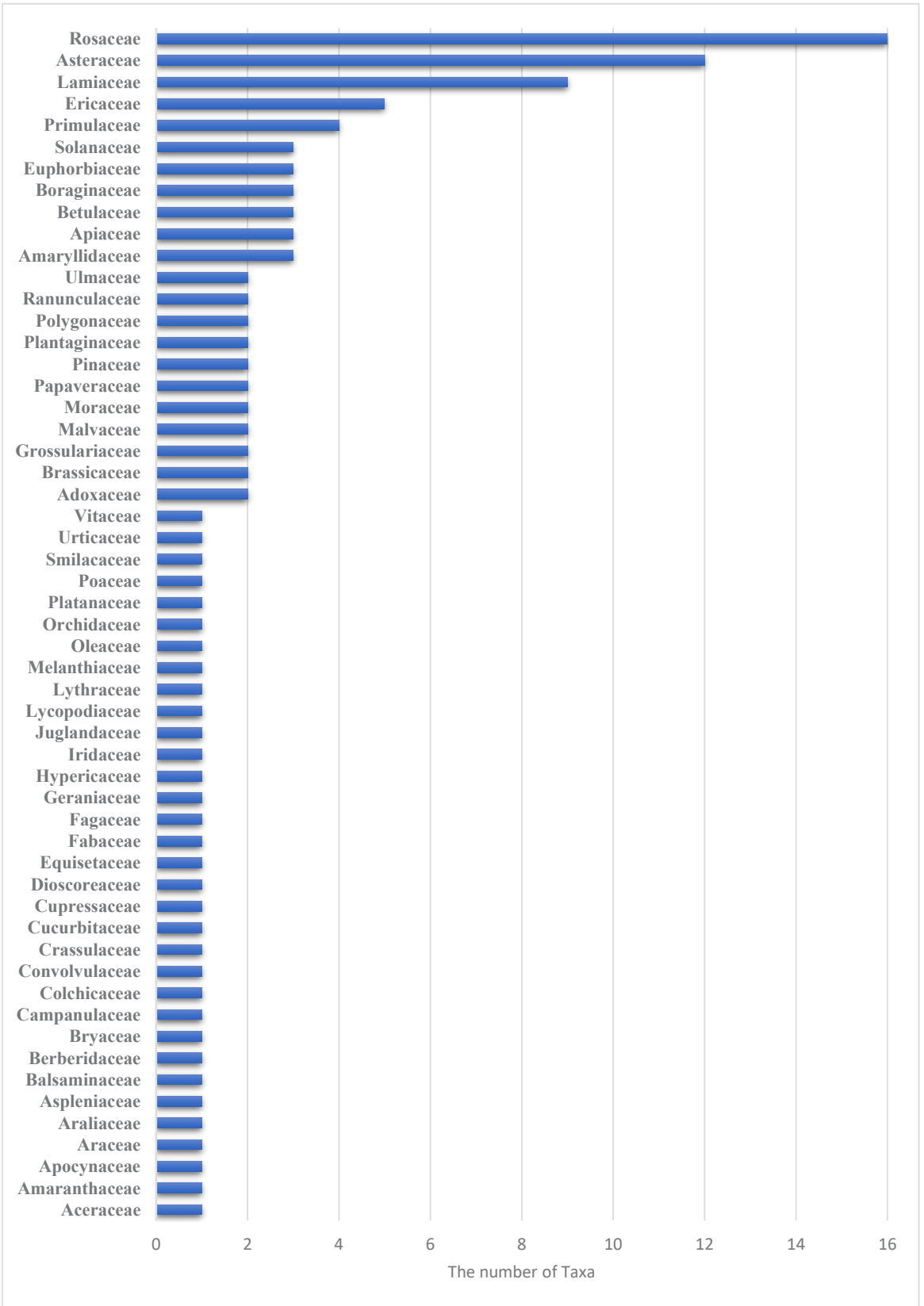

Figure 5. Distribution of medicinal plant taxa according to family name.

Table 3. Presentation of ethnopharmacological data and comparison with previous studies

Family/Scientific name/Voucher number	Local name	Used part	Therapeutic uses	Preparation/Administiration	Cited location	FC	UV	FL	References
Aceraceae									
Acer heldreichii Orph. Ex Boiss. subsp. *trautvetteri* (Medw.) A.E Murray** KATO21215	Akçaağaç	Leaves*	Cold*	Infusion/Ent. (Oral)*	54	0.155	0.002	100.000	
Adoxaceae									
Sambucus ebulus L. KATO21424	Levor, Livor, Yivdin, Yiğidin	Leaves	**Allergic contact dermatitis**	Raw/Loc. (Epidermal), Mush/Loc. (Epidermal)	1, 3, 6, 37, 46, 50, 62, 76	10.853	0.116	57.143	(Akbulut and Bayramoglu, 2014; Akbulut and Ozkan, 2014; Bozyel and Merdamert-Bozyel, 2020; Jabbari et al., 2017; Öztürk et al., 2018; Sağiroğlu et al., 2012; Yazıcıoğlu and Tuzlacı, 1995)
		Aerial parts, Leaves	**Burn**	Sap/Loc. (Epidermal) (To obtain sap the plant part is crushed)	12				
		Fruit	Cancer	Drying/Ent. (Oral)	36				
		Fruit	Diabetes	Drying/Ent. (Oral)	37, 47, 63				
		Fruit	**Eczama**	Drying/Ent. (Oral)	1, 50, 51				
		Aerial parts	Flexion	Mush/Loc. (Epidermal)	74				
		Fruit	Heart diseases*	Infusion/Ent. (Oral)	67				
		Fruit, Seed	Hemorrhoid	Drying/Ent. (Oral)	1, 10, 37, 51, 69				
		Fruit	Hemorrhoid	Molasses/Ent. (Oral)	74				
		Leaves	Hemostatic*	Crushed/Loc. (Epidermal)	35				
		Aerial parts	Knee pain	Crushed/Loc. (Epidermal), Mush/Loc. (Epidermal)	16, 74, 77				
		Leaves	General pain	Decoction/Ent. (Oral)	12, 76				
		Fruit	**Papilloma***	Crushed/Loc. (Epidermal)	35				
		Seed	Prostate	Drying/Ent. (Oral)*	69				
		Leaves	**Pruritus**	Raw/Loc. (Epidermal)	10				
		Seed	**Psoriasis**	Raw/Ent. (Oral)	9, 46				
		Leaves	Rheumatic pain	Mush/Loc. (Epidermal)	55				
		Root*	**Wound**	Ash and oinment/Loc. (Epidermal) (Ash is mixed with butter to obtain ointment)*	46				
		Leaves	**Wound**	Mush/Loc. (Epidermal)	67				
Lonicera orientalis Lam.** KTUB1355	Ayı likarbası	Fruit	*Poisonous plant*		25, 28	0.465	0.005		(Vončina et al., 2014)
Amaranthaceae									
Beta vulgaris L.	Pazı, Pezik	Leaves	**Furuncles**	Heating/Loc. (Epidermal), Mush/Loc. (Epidermal), Mush/Loc. (Epidermal)	2, 5, 6, 21, 24, 34, 35, 55, 77	6.512	0.070	76.190	(Akbulut and Bayramoglu, 2014; Hamedi and Honarvar, 2019)
		Leaves	Hemostatic	Heating/Loc. (Epidermal)	35				

Table 3 (Continued)

		Leaves	Inflammation, Pain	Heating/Loc. (Epidermal)	2, 34, 36, 46				
		Leaves	Knee pain	Heating/Loc. (Epidermal), Maceration with egg yolk/Loc. (Epidermal)	1, 69				
		Leaves	Knee pain	Maceration with egg yolk/Loc. (Epidermal) $^{+A}$*	1				
		Leaves	Prostate	Decoction/Ent. (Oral)	2				
		Leaves	Antihelmintic*	Mush/Ent. (Oral) $^{+B}$*	34				
		Leaves	**Wound, Skin crack**	Heating/Loc. (Epidermal), Mush/Loc. (Epidermal), Mush/Loc. (Epidermal) $^{+B}$*	2, 5, 24, 34, 35, 74				
		Root	Sinusitis*	Sap obtained by crushing/Loc. (Intranasal)*	68				
Amaryllidaceae									
Allium ampeloprasssum L. KATO19729	Pırasa	Leaves Leaves	Antihelmintic **Wound**	Mush/Ent. (Oral) $^{+B}$ Mush/Loc. (Epidermal) $^{+B}$	34 34	0.310	0.003	50.000	(Sharifi-Rad et al., 2016; Yazıcıoğlu and Tuzlacı, 1995)
Allium cepa L.	Soğan	Rhizome	**Wound**, Inflammation	Heating/Loc. (Epidermal), Mush/Loc. (Epidermal)	30, 56, 73	0.620	0.006	75.000	(Yazıcıoğlu and Tuzlacı, 1995)
Allium schoenoprasum L.** KATO19028	Zagoda, Yaban sarımsağı	Aerial parts Aerial parts	**Cancer** Dyspepsia	Raw/Ent. (Oral) Raw/Ent. (Oral), Infusion/Ent. (Oral)	39 44	0.310	0.003	50.000	(Sengupta et al., 2004; Sharifi-Rad et al., 2016)
Apiaceae									
Angelica sylvestris L.** KATO20666	Mandak	Leaves Leaves	**Wound*** Antihelmintic*	Mush/Loc. (Epidermal) $^{+B}$ Mush/Ent. (Oral) $^{+B}$	34 34	0.310	0.003	50.000	
Heracleum platytaenium Boiss. KATO19237	Kerke	Leaves	Galactagogue for animal*	Drying/Ent. (Oral)	75	0.620	0.006	75.000	(Erbay and Sarı, 2018)
		Stem Flower	**Hemorrhoid** **Hemorrhoid**	Raw/Ent. (Oral) (After peeling off) Decoction/Ent. (Oral)	25, 29 25, 29				
Petroselinum crispum (Mill.) A.W.Hill. KTUB1303	Maydanoz	Leaves Stem Leaves	Diabetes **Urinary tract infections** **Urinary tract infections**	Decoction/Ent. (Oral) Decoction/Ent. (Oral) Decoction/Ent. (Oral)	23 36 73	0.465	0.006	50.00	(Yazıcıoğlu and Tuzlacı, 1995; Yeşilyurt et al., 2017)
Apocynaceae									
Vinca major L. KATO8986	Zorlama out	Leaves	**Knee pain***	Mush/Loc. (Epidermal)	42	0.310	0.003	100.000	
Araceae									
Arum italicum Mill. KTUB1326	Domuz lahanası	Leaves	**Hemorrhoid**	Decoction/Ent. (Oral), Infusion/Ent. (Oral), Mush/Loc. (Epidermal)	2, 23, 56, 62	1.395	0.016	77.778	(Akbulut and Ozkan, 2014; Azab, 2017)

Table 3 (Continued)

		Rhizome	**Rheumatic pain**	Raw/Ent. (Oral)	61				
		Rhizome	Sinusitis*	Sap obtained by crushing/Loc. (Intranasal)*	45				
		Rhizome	Wound	Crushed/Loc. (Epidermal), Mush/Loc. (Epidermal)	62				
Araliaceae									
Hedera helix L. KTUB1368	Sarmaşık	Aerial parts	**Burn**	Decoction/Loc. (Epidermal)	52	0.155	0.002	100.000	(Fahimi et al., 2015)
Aspleniaceae									
Asplenium scolopendrium L.** KATO21032	Sığır dili	Leaves	**Rheumatoid arthritis***	Decoction/Ent. (Oral)	62	0.155	0.002	100.000	
Asteraceae									
Achillea millefolium L. KATO21376	Cıvan perçemi	Aerial parts	Dyspepsia	Infusion/Ent. (Oral)	27	0.155	0.003	50.000	(Ali et al., 2017)
		Aerial parts	**Cold**	Infusion/Ent. (Oral)	27				
Anthemis cretica L. KATO20749	Papatya	Flower, Aerial parts	**Asthma**	Decoction/Ent. (Oral)	40, 65	1.860	0.026	50.000	(Baytop, 1989; Dalar, 2018; Tetik et al., 2013; Yilmaz, 2018)
		Flower, Aerial parts	**Bronchitis, Dyspnoea**	Decoction/Ent. (Oral)	65				
		Aerial parts	**Cold**	Decoction/Ent. (Oral)	44, 47				
		Flower	Diabetes	Decoction/Ent. (Oral)	64				
		Flower	Hair growth	Decoction/Ent. (Oral)	39				
		Aerial parts	Sedative, insomnia	Decoction/Ent. (Oral)	39				
		Flower	Vascular diseases	Decoction/Ent. (Oral)	41				
Bellis perennis L. KATO19205	Papatya	Flower	**Dyspepsia**	Decoction/Ent. (Oral)	76	0.310	0.003	50.000	(Yazıcıoğlu and Tuzlacı, 1995)
		Flower	Wound	Ointment with butter/Loc. (Epidermal)	76				
Carduus acanthoides L.** KATO3734	Diken	Leaves	Arthralgia	Decoction/Ent. (Oral)	40	0.310	0.003	50.000	(Erbay and Sarı, 2018)
		Flower	**Hemorrhoid**	Decoction/Ent. (Oral)	40				
Cirsium arvense (L.) Scop. KATO19208	Eşek dikeni	Root	Constipation*	Decoction/Ent. (Oral)	48	0.930	0.009	50.000	(Khan et al., 2011)
		Aerial parts Flower	Diabetes	Raw/Ent. (Oral) (After peeling off), Decoction/Ent. (Oral)	15				
		Root	Diabetes	Raw/Ent. (Oral)	59				
		Flower	**Rheumatic pain***	Infusion/Ent. (Oral)	45				
Cirsium lappaceum (Boiss.) Fisher* KATO14176	At dikeni	Root	**Bronchitis***	Decoction/Ent. (Oral)	40	0.155	0.002	100.000	
Cirsium pseudopersonata Boiss. & Balansa ex Boiss.** KATO21387	İsineriz	Aerial parts	**Hemorrhoid***	Decoction/Ent. (Oral)	40	0.155	0.002	100.000	
Cirsium vulgare (Savi) Ten.** KATO20751	Eşek dikeni	Flower	**Hemorrhoid***	Raw/Ent. (Oral)	62	0.620	0.006	75.000	
		Root	Prostate*	Decoction with milk/Ent. (Oral)	6				

Table 3 (Continued)

Helichyrisum graveolens (M.Bieb.) Sweet KATO8054	Altın ot, Gümüşhane çiçeği	Flower, Aerial parts	**Cold**	Infusion/Ent. (Oral)	45, 48, 51	2.480	0.030	62.500	(Antunes Viegas et al., 2014)
		Flower	Jaundice*	Maceration in olive oil/Ent. (Oral)	10				
	Maranda, Papatya, Ölmez çiçek, Yayla çayı	Aerial parts	Urinary calculus	Infusion/Ent. (Oral)	7				
		Shoot	Urinary calculus, prostate	Infusion/Ent. (Oral)	34				
		Flower	Urinary tract infections	Infusion/Ent. (Oral), Decoction/Ent. (Oral)	44, 72				
Prenanthes petiolata (K.Koch) Sennikov** KATO19223	Sütlük out	Leaves	**Galactagogue for animal***	Drying/Ent. (Oral)	75	0.155	0.002	100.000	
Tanacetum parthenium (L.) Sch.Bip. KATO22063	Papatya	Flower	**Bronchitis, Asthma, Dyspnoea**	Infusion/Ent. (Oral), Decoction/Ent. (Oral)	77	3.411	0.053	40.909	(Pareek et al., 2011)
		Flower	**Cold, sinusitis**	Infusion/Ent. (Oral), Decoction/Ent. (Oral)	12				
		Flower, Aerial parts	Cystitis, Urinary calculus, urinary tract infections, Prostate	Decoction/Ent. (Oral)	34, 36, 67, 70				
		Flower	Inflammation	Decoction/Ent. (Oral), Infusion/Ent. (Oral)	53				
		Flower	Insomnia	Decoction/Ent. (Oral)	1				
		Flower	Liver diseases	Decoction/Ent. (Oral), Infusion/Ent. (Oral)	18				
		Flower	Pain	Crushed/Loc. (Epidermal)	47				
		Flower	Rheumatism	Raw/Loc. (Epidermal)	54				
		Flower	Stomach diseases, Stomachache	Decoction/Ent. (Oral), Infusion/Ent. (Oral)	22, 34, 48				
Tripleurospermum spp.** KATO17014	Papatya, Yayla çayı, Tilki kuyruğu	Flower, Aerial parts	**Cold**	Infusion/Ent. (Oral)	45	0.775	0.008	40.000	(Nadiroğlu et al., 2019; Tetik et al., 2013)
		Flower	Liver diseases*	Decoction/Ent. (Oral)	18				
		Leaves	Wound	Crushed/Loc. (Epidermal)	48				
Balsaminaceae									
Impatiens noli-tangere L. KATO19138	Kına	Aerial parts	**Hemorrhoid**	Raw/Loc. (Epidermal)	34	0.155	0.002	100.000	(Pavela et al., 2009)
Berberidaceae									
Berberis vulgaris L. KATO19262	Züraniye	Fruit	**Constipation**	Infusion/Ent. (Oral)	28	0.155	0.002	100.000	(Tetik et al., 2013)
Betulaceae									
Alnus glutinosa (L.) Gaertn. subsp. *barbata* (C.A.Mey.) Yalt.(C.A.Mey.) Yalt. KATO19107	Kızılağaç	Shoot	**Hemorrhoid**	Raw/Loc. (Epidermal)	63	2.791	0.031	38.889	(Anowi and Ekwueme, 2019; Erbay and Sarı, 2018; Neves et al.,

Table 3 (Continued)

		Leaves	Malaria	Raw/Loc. (Epidermal) (All body was covered by leaves)*	35			2009; Sati et al., 2011)
			Pain	Heating/Loc. (Epidermal)*	26			
		Leaves	Sedative*	Smoke/Inhalation*	52, 62			
		Bark	**Wound**, Hemostatic, **Skin resurfacing**	Decoction/Loc. (Epidermal) (When the water becomes yellow during boiling, the barks are removed. Then the water is mixed with flour. The slurry is wrapped after applied.)*	72			
		Leaves	**Wound,** Hemostatic	Crushed/Loc. (Epidermal), Sap obtained by crushing/Loc. (Epidermal)	53, 56			
		Stem	**Wound,** Hemostatic	Heating/Loc. (Epidermal)	58			
		Shoot	**Wound,** Hemostatic	Raw/Ent. (Oral), Crushed/Loc. (Epidermal)	63, 65			
Betula litwinowii Doluch. KATO15265	Kençi, Huş ağacı	Bark, Stem	**Alopecia**	Sap obtained by heating/Loc. (Epidermal)*	25, 27, 28	1.550	0.019	80.000	(Başer and Demirci, 2007; Rastogi et al., 2015)
		Bark, Stem	**Eczema**	Sap obtained by heating/Loc. (Epidermal)	29			
		Stem	Earache*	Sap obtained by heating/Loc. (Otic)*	29			
		Bark, Stem	**Fever blister***	Sap obtained by heating/Loc. (Epidermal)*	25, 27			
		Bark	Toothache*	Sap obtained by heating/Loc. (Buccal)*	28			
		Bark, Stem	**Wound**	Sap obtained by heating/Loc. (Epidermal)	39			
Corylus avellana L. var. avellana KATO19513	Fındık	Stem	Eczema*	Ash/Loc. (Epidermal) (The white part of ash was used)*	78	0.310	0.003	50.000	(Sahin et al., 2019)
		Leaves	**Prostate**	Decoction/Ent. (Oral)	2			
Boraginaceae									
Alkanna orientalis (L.) Boiss. var. *orientalis*** KATO9269	Havacıva	Aerial parts	Sore throat*	Ointment with butter/Loc. (Epidermal)*	25	1.240	0.019	87.500	(Abdel-Gelil et al., 2019)
		Root	**Burn**	Oinment with butter, Maceration with olive oil/Loc. (Epidermal)	27, 29, 40, 76			
		Root	**Wound**	Ointment with butter/Loc. (Epidermal)	27, 40			

Table 3 (Continued)

Symphytum ibericum Steven ex M.Bieb. KATO16708	Yaban tomarası	Leaves, Root	**Rheumatic pain**	Crushed/Loc. (Epidermal)	53	0.155	0.002	100.000	(Salehi et al., 2019)
Trachystemon orientalis (L.) G.Don KATO21300	Kaldirik, Somara, Tomara	Root	Fracture*	Mush/Loc. (Epidermal)	73	1.395	0.016	44.444	(Karcı et al., 2017; Uzun et al., 2004)
	Yaban tomarası	Root	Pain	Mush/Loc. (Epidermal)	5, 74				
		Leaves, Root	**Rheumatic pain**	Crushed/Loc. (Epidermal)	53				
		Leaves	**Vascular diseases***	Infusion/Ent. (Oral)	9				
		Root	Wound	Mush/Loc. (Epidermal)	68				
		Leaves	Wound, Inflammation	Crushed/Loc. (Epidermal)	77				
Brassicaceae									
Brassica oleracea L. KATO11928	Lahana, Kara lahana	Leaves	Earache	Sap obtained by crushing/Loc. (Otic)*	29	3.721	0.043	54.167	(Karcı et al., 2017; Sağiroğlu et al., 2012; Yarnell, 2015)
		Leaves	Furuncles	Heating/Loc. (Epidermal)	55				
		Leaves	Hemorrhoid	Heating/Loc. (Epidermal)	45				
		Leaves	**Knee pain**	Heating/Loc. (Epidermal), Mush/Loc. (Epidermal), Ointment with butter/Loc. (Epidermal)	43, 45, 49, 53, 69				
		Leaves	**Lumbago**	Heating/Loc. (Epidermal)	49				
		Leaves	Pain	Raw/Loc. (Epidermal)	75				
		Stem	Papilloma	Sap obtained by crushing/Loc. (Epidermal)	64				
		Leaves	Rheumatic pain	Heating/Loc. (Epidermal)	10, 51				
		Leaves	Rheumatism	Heating/Loc. (Epidermal)	48				
		Leaves	Tonsilitis	Heating/Loc. (Epidermal)	45				
Nasturtium officinale R. Br. KATO16772	Dere otu	Aerial parts	**Hemorrhoid**	Decoction/Ent. (Oral)	65	0.310	0.003	100.000	(Erbay and Sarı, 2018)
Bryaceae									
Bryum spp. KTUB1322	Topuk otu, Kara yosunu	Aerial parts	Arthralgia	Mush/Loc. (Epidermal)	36	0.930	0.011	66.667	(Yayıntaş and Irkın, 2018)
		Aerial parts	Hemorrhoid	Decoction/Ent. (Oral)	35				
		Aerial parts	**Wound, Hemostatic**	Crushed/Loc. (Epidermal), Raw after boiled with saline/Loc. (Epidermal)	49				
Campanulaceae									
Campanula lactiflora M. Bieb. KATO19199	Holhol, Mincoloş	Flower, Stem	**Diabetes***	Raw after peeling off/Ent. (Oral)	16	0.310	0.003	50.000	

Table 3 (Continued)

		Aerial parts	Urinary tract infections*	Raw/Ent. (Oral) or Infusion/Ent. (Oral)	25				
Colchicaceae									
Colchicum speciosum Steven KATO16884	Vargit, Likoser, İskordon, İt keser, İt kesiği	Rhizome	**Constipation, Dyspepsia**	Maceration with honey/Ent. (Oral)	18, 45	2.636	0.029	17.647	(Var et al., 2016; Yeşilyurt et al., 2017)
		Rhizome	Tonsilitis*	Raw/Loc. (Epidermal)	31				
		Rhizome	Head louse*	Sap obtained by crushing/Loc. (Epidermal)	7, 34				
			Poisonous plant		33, 67, 75				
Convolvulaceae									
Calystegia silvatica (Kit.) Griseb.** KATO19150	Lehçiya, domuz kökü	Rhizome	**Knee pain***	Crushed/Loc. (Epidermal)	78	0.155	0.002	100.000	
Crassulaceae									
Sempervivum sp. KATO10622	Kulak otu	Aerial part	**Earache**	Sap obtained by crushing/Loc. (Otic)	38	0.155	0.002	100.000	(Stojković et al., 2015)
Cucucrbitaceae									
Ecballium elaterium (L.) A.Rich. KATO20987	Yaban kavunu	Fruit	Sinusitis	Sap obtained by crushing/Loc. (Intranasal)	23, 59	0.465	0.005	66.667	(Altundağ and Öztürk, 2011; Erbay and Sarı, 2018)
		Fruit	**Hemorrhoid**	Sap obtained by crushing/Loc. (Epidermal) (Sap was mixed with honey before applied.)	45				
Cupressaceae									
Juniperus oxycedrus L. KATO19376	Arduç ağacı	Fruit (cone)	**Diabetes**	Infusion/Ent. (Oral)	35	0.155	0.002	100.000	(Honda et al., 1996; Öztürk et al., 2018)
Dioscoreaceae									
Dioscorea communis (L.) Caddick & Wilkin** KATO16879	Biber otu, Guayda, Poank, Sarmaşık otu	Rhizome, Fruit	**Knee pain**	Crushed/Loc. (Epidermal)	65	0.775	0.009	80.000	(Bulut and Tuzlaci, 2013)
		Root	**Knee pain**	Sap obtained by crushing/Loc. (Epidermal)	35				
		Rhizome	**Lumbago, Knee pain**	Heating/Loc. (Epidermal)	34				
		Fruit	Papilloma*	Crushed/Loc. (Epidermal)	80				
		Rhizome	Papilloma*	Crushed/Loc. (Epidermal)	34				
Equisetaceae									
Equisetum arvense L. KATO8134	At kuyruğu, Çam otu, Kırk kilit otu,	Aerial parts	Diabetes	Decoction/Ent. (Oral)	65	4.031	0.045	26.923	(Boeing et al., 2021)

Table 3 (Continued)

	Kilit otu, Pişiklik	Aerial parts	Dyspepsia	Decoction/Ent. (Oral)	62				
		Aerial parts	Gynaecological diseases	Decoction/Ent. (Oral)	1				
		Aerial parts	Heart diseases	Decoction/Ent. (Oral)	42, 62				
		Aerial parts	Hemorrhoid	Decoction/Ent. (Oral)	62				
		Aerial parts	Jaundice	Decoction/Ent. (Oral)	59				
		Aerial parts	Pain	Mush/Loc. (Epidermal)	26				
		Aerial parts	Prostate	Decoction/Ent. (Oral)	6, 35, 44, 73				
		Aerial parts	Stomachache	Decoction/Ent. (Oral)	73				
		Aerial parts	**Urinary calculus**	Decoction/Ent. (Oral)	1, 59				
		Aerial parts	**Urinary tract infections**	Decoction/Ent. (Oral)	1, 70, 72				
		Aerial parts	Wound	Raw/Loc. (Epidermal)	27				
Ericaceae									
Arbutus unedo L. KATO14458	Anderane, Orman çileği	Fruit	**Diabetes**	Drying/Ent. (Oral)	59	0.155	0.002	100.000	(Öztürk et al., 2018)
Rhododendron luteum Sweet KATO21790	Sarı Ağu, Zifin, Zifır	Aerial parts	**Scabies*** *Poisonous plant*	Decoction/Loc. (Epidermal)	63 35, 63, 71, 78	0.930	0.011	16.667	(Tasdemir et al., 2003)
Rhododendron ponticum L. subsp. *ponticum* KATO21275	Komar	Stem	**Burn**	Ash/Loc. (Epidermal) (White part of ash was used.), Sap/Loc. (Epidermal) (Plant is contact metal after heating to obtain sap)*	74	1.860	0.019	66.667	(Tasdemir et al., 2003)
		Stem	**Eczema***	Ash/Loc. (Epidermal) (White part of ash is used.), Sap/Loc. (Epidermal) (Plant is contact metal after heating to obtain sap)*	36, 47, 78				
		Root	**Fever blister***	Ash/Loc. (Epidermal)	1				
		Flower	Hypertension*	Sap obtained by crushing/Ent. (Oral)	30, 56				
		Flower	Immunostimulant*	Infusion/Ent. (Oral)	37				
		Stem	Jaundice*	Sap obtained by heating/Ent. (Sublingual) (An sublingual incision is created. Sap is applied to this incision after absorbed on cotton)*	47				
		Leaves	**Wound**	Sap obtained by heating/Loc. (Epidermal)	34				
Vaccinium arctostaphylos L. KATO21796	Ağaç likarbası, Çalıçilek, Likarba, Lifor,	Fruit	Cancer*	Raw/Ent. (Oral)	40	2.946	0.039	52.632	(Lätti et al., 2009; Uzun and Palabaş-Uzun, 2011)
		Leaves	**Cold, Cough**	Infusion/Ent. (Oral)	33, 43				
		Fruit	**Cough, Dyspnoea**	Decoction/Ent. (Oral)	76				

Table 3 (Continued)

	Lifoz	Fruit	Diabetes	Infusion/Ent. (Oral), Raw/Ent. (Oral)	22, 39				
		Leaves	Fever on the foot*	Decoction/Ent. (Oral)	79				
		Leaves	Hemorrhoid	Infusion/Ent. (Oral)	46				
		Leaves	Prostate*	Infusion/Ent. (Oral)	49				
		Fruit	Renal disorder *	Decoction/Ent. (Oral)	39				
Vaccinium myrtillus L. KATO19273	Lifos, Yer likarbası	Fruit	Antihelmintic*	Raw/Ent. (Oral)	71	1.085	0.019	100.000	
		Leaves	**Bronchitis***	Infusion/Ent. (Oral)	54				
		Leaves	**Cough, cold***	Infusion/Ent. (Oral)	43				
		Leaves	**Sore throat***	Infusion/Ent. (Oral)	40				
Euphorbiaceae									
Euphorbia oblongifolia (K.Koch) K. Koch KATO16880	Sütdoğan, Yabani galadica	Aerial parts	**Hemorrhoid***	Sap obtained by crushing/Ext	25, 71	1.240	0.012	62.500	(Erarslan et al., 2020)
		Stem	Papilloma	Sap obtained by crushing/Ext	7				
		Stem	Skin crack	Sap obtained by crushing/Ext	43				
			Poisonous plant		27				
Euphorbia peplis L.** KATO13880	Galadica, Lehçi, Siğil otu, Sütleğen, Sütlük otu, Sütlü ot	Stem	Constipation	Sap obtained by plucking/Loc. (Epidermal)	53	1.240	0.012	62.500	(Akere, 2016; Ernst et al., 2015)
		Stem	Hemostatic	Sap obtained by plucking/Loc. (Epidermal)	44				
		Leaves	**Papilloma**	Crushed/Loc. (Epidermal)	38, 54				
		Stem	**Papilloma**	Sap obtained by plucking/Loc. (Epidermal)	18, 53				
		Stem	Rheumatic pain	Sap obtained by plucking/Loc. (Epidermal)	44				
Mercurialis annua L. KATO20655	Borden, Pahter		*Poisonous plant*		45, 48, 79	1.395	0.014		(Welchman et al., 1995)
Fabaceae									
Trifolium pratense L. KATO20642	Üçgül	Aerial parts	**Antihelmintic***	Infusion/Ent. (Oral)	28	0.155	0.002	100.000	(Sabudak and Guler, 2009)
		Aerial parts	**Constipation**	Infusion/Ent. (Oral)	28				
Fagaceae									
Quercus petraea (Matt.) Liebl. subsp. *iberica* (Steven ex M. Bieb.) Krassiln. KATO21204	Meşe, Pelit, Pelit ağacı	Fruit (acorn)	Diabetes	Raw/Ent. (Oral)	45	0.620	0.009	75.000	(Polat et al., 2013)
		Bark	Stomach diseases	Decoction/Ent. (Oral)	75				
		Bark	**Wound, pressure sore**	Mush after boiled/Loc. (Epidermal)	35				
		Bark and Fruit (acorn)	**Wound,** inflammation	Ash and Raw/Loc. (Epidermal) (Bark is burned to obtain ash and applied to wound. Then, the wound is covered with acorn handle)*	18				

Table 3 (Continued)

Geraniaceae									
Geranium robertianum L. KATO16395	Turna gagası	Leaves	**Hemorrhoid**	Crushed/Loc. (Epidermal)	65	0.620	0.006	50.000	(Piwowarski et al., 2014; Uzun and Palabaş-Uzun, 2011)
		Leaves	Arthralgia	Mush/Loc. (Epidermal)	36				
		Seed	Arthralgia	Raw/Loc. (Epidermal)	36				
Grossulariaceae									
Ribes alpinum L. KATO7888	Yaban üzümü, Zavil, Zavliza	Fruit	Cold	Decoction/Ent. (Oral)	35	0.930	0.011	50.000	(Sun et al., 2021)
		Fruit	Constipation, Dyspepsia	Raw/Ent. (Oral)	45				
		Fruit	**Diabetes**	Decoction/Ent. (Oral), Raw/Ent. (Oral)	1, 35, 51				
Ribes orientale Desf. KATO13684	Zevir	Fruit	**Diabetes**	Raw/Ent. (Oral)	46	0.930	0.009	100.000	(Sun et al., 2021)
Hypericaceae									
Hypericum perforatum L. subsp. *veronense* (Schrank) H.Linb. KATO19053	Sarı kantaron, Kantaron, Yakı otu	Aerial parts	Cold	Infusion/Ent. (Oral)	59	5.271	0.056	41.176	(Karcı et al., 2017)
		Aerial parts	Dyspepsia	Infusion/Ent. (Oral)	27, 39, 77				
		Aerial parts	Knee pain, Lumbago	Infusion/Ent. (Oral), Maceration with olive oil/Loc. (Epidermal)	29, 35				
		Aerial parts	Pain	Infusion/Ent. (Oral), Maceration with olive oil/Loc. (Epidermal)	29				
		Aerial parts	Sedative	Infusion/Ent. (Oral)	27, 44, 47				
		Aerial parts	Stomach diseases, Intestinal diseases	Decoction/Ent. (Oral)	19, 35				
		Aerial parts, Flower	**Wound**	Crushed/Loc. (Epidermal), Maceration with olive oil/Loc. (Epidermal)	10, 18, 21, 27, 29, 30, 39, 41, 44, 45, 48,62				
Iridaceae									
Crocus vallicola Herb. KATO16899	Kostanitza	Rhizome	**Erectile dysfunction***	Raw/Ent. (Oral)	33	0.155	0.002	100.000	
Juglandaceae									
Juglans regia L. KATO19106	Ceviz	Leaves	Acne	Mush/Loc. (Epidermal)	62	4.961	0.059	31.250	(Gupta et al., 2019; Tetik et al., 2013)
		Leaves	Aphthae	Mush/Loc. (Epidermal)	62				
		Leaves	Burn	Decoction/Loc. (Epidermal)	10				
		Fruit (Kernel)	Bronchitis	Decoction/Ent. (Oral)	46				
		Fruit (Kernel)	Cough, Cold	Decoction/Ent. (Oral)	9, 36, 46				
		Leaves	Diabetes	Infusion/Ent. (Oral) (Upper phase is separated and then lower phase is consumed)	35				

Table 3 (Continued)

		Fruit (Eczocarp)	Eczema	Crushed/Loc. (Epidermal)	43			
		Fruit (Kernel)	Goitre	Maceration with honey/Ent. (Oral)	45			
		Leaves	**Hemorrhoid**	Decoction/Loc. (Epidermal), Infusion/Ent. (Oral)	63			
		Fruit (Kernel)	**Hypercholesteremia**	Raw/Ent. (Oral)	35, 46			
		Fruit (Kernel skin)	**Hypertension**	Decoction/Ent. (Oral)	35			
		Fruit (Endocarp)	**Hypertension**	Maceration with water/Ent. (Oral)	46, 60			
		Leaves	Knee pain	Mush/Loc. (Epidermal)	55			
		Bark	Knee pain	Raw after peeling off/Loc. (Epidermal)	80			
Lamiaceae								
Ajuga reptans L. KATO16735		Topraküstü	**Cold**	Infusion/Ent. (Oral)	54	0.155	0.002	100.000
Mentha longifolia (L.) L. subsp. *longifolia* KATO21322	Nane	Leaves	Cold	Decoction/Ent. (Oral), Infusion/Ent. (Oral)	2, 61, 73	1.240	0.012	50.000
		Leaves	Sedative	Decoction/Ent. (Oral) $^{+C*}$	41			
		Leaves	**Stomachache**	Decoction/Ent. (Oral), Drying/Ent. (Oral), Infusion/Ent. (Oral)	2, 10, 23, 36			
		Aerial parts	Urinary tract infections	Decoction/Ent. (Oral) $^{+D*}$	65			
Origanum vulgare L. KATO21629	Ehil yayla çayı	Aerial parts	**Cold**	Infusion/Ent. (Oral)	41	0.465	0.005	100.000
Prunella vulgaris L. KATO21328	Anık, Karabaş otu	Aerial parts	Cold	Infusion/Ent. (Oral)	79	0.310	0.005	50.000
		Aerial parts	**Sedative***	Infusion/Ent. (Oral)	79			
		Aerial parts	Urinary tract infections*	Infusion/Ent. (Oral)	27			
Salvia glutinosa L. KATO19187	Sıhsık otu	Aerial parts	**Heartburn***	Raw/Ent. (Oral)	76	0.155	0.002	100.000
Satureja spicigera (K.Koch) Boiss. KATO19189	Çay otu, Kekik, Timbura	Aerial parts	**Cold**	Infusion/Ent. (Oral)	53, 72	0.930	0.009	100.000
		Aerial parts	**Cough**	Maceration with honey/Ent. (Oral)	24			

Table 3 (Continued)

Thymus nummularius M.Bieb. KATO7960	Yayla çiçeği Çay otu, Yabani yayla çayı, Yayla çayı	Aerial parts	**Cold**	Infusion/Ent. (Oral)	48, 14, 41, 44, 46, 47, 65	3.256	0.037	71.429	(Gürdal and Öztürk, 2022)
		Aerial parts	Diabetes	Infusion/Ent. (Oral)	46				
		Aerial parts	Dyspepsia	Infusion/Ent. (Oral)	43				
		Aerial parts	Intestinal diseases, stomach diseases	Infusion/Ent. (Oral)	30				
		Aerial parts	Urinary tract infections	Decoction/Ent. (Oral) $^{+D*}$	65				
		Aerial parts	Urinary tract infections	Infusion/Ent. (Oral)	43				
Thymus praecox Opiz KATO16729	Çay otu, Dağ çayı, Kekik, Keklik otu, Simbora, Timbıra otu, Yayla çayı	Aerial parts	**Cold**	Decoction/Ent. (Oral), Infusion/Ent. (Oral)	5, 6, 9, 11, 21, 26, 27, 29, 33, 35-37, 39, 44-48, 50-52, 55, 59, 62, 67, 69-72, 75, 78	20.000	0.214	88.372	(Arıtuluk and Ezer, 2012; Li et al., 2019; Matejić et al., 2020)
		Aerial parts	**Cold, Fever**	Maceration with buttermilk/Loc. (Epidermal) $^{+E}$ (Applied to the body with cloth)	2				
		Aerial parts	**Cough**	Decoction/Loc. (Epidermal), Infusion/Ent. (Oral)	36, 37, 44, 73				
		Aerial parts	Constipation	Infusion/Ent. (Oral)	19				
		Aerial parts	Diabetes	Infusion/Ent. (Oral)	27				
		Aerial parts	Dyspepsia	Infusion/Ent. (Oral)	9, 19, 37, 71				
		Aerial parts	Eczema	Decoction/Loc. (Epidermal)	59				
		Aerial parts	Hemorrhoid	Infusion/Ent. (Oral)	61				
		Aerial parts	Toothache	Infusion as mouthwash/Loc. (Buccal)	46				
		Aerial parts	Urinary calculus	Infusion/Ent. (Oral)	2				
		Aerial parts	Wound	Raw/Loc. (Epidermal)	61				
Lycopodiaceae									
Lycopodium clavatum L. KATO21816	Asmalı ot	Aerial parts	**Bronchitis**	Decoction/Ent. (Oral) $^{+F*}$	65	0.465	0.005	100.000	(Cock and Vuuren, 2020)
Lythraceae									
Punica granatum L. KATO8731	Nar	Fruit	**Cold**	Sap obtained by crushing	45	0.155	0.002	100.000	(Kayani et al., 2014)
Malvaceae									
Malva neglecta Wallr. KATO19478	Cigidan, Ebegümeci, Maloşa, Moloşa, Kopçalika	Aerial parts	Cancer pain	Mush/Loc. (Epidermal)	52	4.651	0.050	26.667	(Al-Snafi, 2019; Karcı et al., 2017)
		Aerial parts	Constipation	Decoction/Ent. (Oral)	68				
		Leaves	Cough	Decoction/Ent. (Oral)	72				
		Fruit	Dyspepsia	Raw/Ent. (Oral)	29				
		Leaves	Eczema	Crushed/Loc. (Epidermal)	48, 55				
		Aerial parts	Fracture pain	Mush/Loc. (Epidermal)	5				

Table 3 (Continued)

		Fruit	**Hemorrhoid**	Raw/Ent. (Oral)	29				
		Aerial parts, Leaves	Knee pain	Mush/Loc. (Epidermal)	5, 47, 55				
		Aerial parts	Pain	Mush/Loc. (Epidermal), Mush obtained by boilling with milk/Loc. (Epidermal)	5, 77				
		Leaves	**Rheumatic pain**	Decoction with milk/Loc. (Epidermal) (To obtain mush green foem mixed with flour)*	53				
		Fruit	Urinary calculus	Decoction/Ent. (Oral)	29				
		Aerial parts	Urinary tract infections	Infusion/Ent. (Oral)	45				
		Root	**Vascular diseases**	Decoction/Ent. (Oral)	14				
		Aerial parts	Postpartum pain, Inflammation	Mush/Loc. (Intravaginal)	68				
Tilia rubra DC. subsp. *caucasica* (Rupr.) V. Engler KATO13585	Ihlamur	Flower with bracteous	**Cold, Cough**	Decoction/Ent. (Oral), Infusion/Ent. (Oral)	1, 3, 5-9, 11, 16, 21, 26, 34-38, 42-46, 48-53, 55, 59-64, 67, 69-71, 74, 75, 77	30.078	0.301	100.000	(Karaköse et al., 2019)
Melanthiaceae									
Veratrum album L. KATO16883	Lovatha, Sumaş, Zumaş, Zumah	Root	**Fungal infection on the foot**	Decoction/Loc. (Epidermal)	3, 46	1.240	0.012	75.000	(Uzun and Palabaş-Uzun, 2011; Vitalini et al., 2009)
		Root	**Head louse**	Decoction/Loc. (Epidermal)	38				
		Root, Leaves	**Scabies**	Decoction/Loc. (Epidermal)	37, 53				
			Poisonous plant		29, 35				
Moraceae									
Ficus carica L. subsp. *carica* KATO14395	İncir	Fruit	**Allergic contact dermatitis**	Latex obtained by plucking/Loc. (Epidermal)	64	3.256	0.034	76.190	(Badgujar et al., 2014; Karcı et al., 2017)
		Fruit	**Eczema**	Latex obtained by plucking/Loc. (Epidermal)	51				
		Bark	Hemorrhoid	Ash/Loc. (Epidermal) (Ash is mixed with water to obtain slurry.)	6				
		Fruit	**Papilloma**	Latex obtained by plucking/Loc. (Epidermal)	7, 41, 46, 56, 59, 62, 77, 80				
		Fruit	Urinary tract infections	Decoction/Ent. (Oral)	73				
		Fruit	**Wound**	Latex obtained by plucking/Loc. (Epidermal)	19, 57, 63				

Table 3 (Continued)

		Fruit, Leaves	Poisoning	Latex obtained by plucking/Loc. (Epidermal)	17, 77				
Morus alba L. KATO9266	Dut	Fruit Leaves	**Cough** Osteoporosis	Molasses/Ent. (Oral) Decoction/Ent. (Oral)	21 10	0.310	0.003	50.000	(Bagachi et al., 2013)
Oleaceae									
Fraxinus angustifolia Vahl. subsp. *oxycarpa* (Willd.) Franc & Rocha KATO14049	Diş budak	Fruit	**Urinary tract disorder**	Decoction/Ent. (Oral)	59	0.155	0.002	100.000	(Neves et al., 2009)
Orchidaceae									
Dactylorhiza euxina (Nevski) H.Baumann & Künkele subsp. *euxina** KATO21054	Gugu çiçeği	Leaves	**Wound**	Sap obtained by crushing/Loc. (Epidermal)	76	0.155	0.002	100.000	(Bozyel and Merdamert-Bozyel, 2020)
Papaveraceae									
Chelidonium majus L. KATO18928	Demre otu, Demruh otu, Kırlangıç otu	Stem Aerial parts Stem Aerial parts	**Eczama** **Fungal infection on the foot** Pain **Wound**	Sap obtained by crushing/Ext Decoction/Loc. (Epidermal) Crushed/Loc. (Epidermal) Raw/Loc. (Epidermal)	51, 78 47 18 78	1.085	0.011	85.714	(Erarslan et al., 2020; Gilca et al., 2010)
Papaver rhoeas L. KATO21019	Gelincik	Seed	**Eye diseases**	Steam/Loc. (Intraocular)	38	0.155	0.002	100.000	(Grauso et al., 2021)
Pinaceae									
Piceae orientalis (L.) Peterm. KATO16877	Akunduruk, Çam, Doruk, Ladin (Also the resine of the species called as pisar, zift or aladimastika by locally.)	Resine Bark Resine Resine Fruit (pine cone) Fruit (pine cone) Resine Resine	**Aphthae*** **Burn** **Burn** Lazy bowel syndrome Cough Diabetes Diabetes Dyspepsia	Raw by chewing/Ent. (Oral) Ash and ointment/Loc. (Epidermal) (To obtain ointment ash mixed with butter) Ointment with butter/Loc. (Epidermal) Raw by chewing/Int Decoction/Ent. (Oral), Maceration with honey/Ent. (Oral) Decoction/Ent. (Oral) Raw/Ent. (Oral) Raw by chewing/Int	1 5 5, 21, 33 33 29, 37 1 1, 29 1, 3-6, 9, 11, 12, 16, 18, 25, 27-29, 33, 37, 39, 40, 43, 44-50, 52, 53, 56-	82.326	0.747	67.012	(Akbulut and Ozkan, 2014; Bussmann et al., 2017)

Table 3 (Continued)

					58, 60, 62, 63, 66, 67, 69, 71, 74, 77				
		Resine	Dyspnoea, Bronchitis	Decoction with milk/Ent. (Oral)	21				
		Fruit (pine cone)	Dyspnoea	Decoction/Ent. (Oral), Molasses/Ent. (Oral)	21, 35, 43, 48, 53, 71-73				
		Resine	**Eczema**	Ointment with butter/Loc. (Epidermal), Raw/Loc. (Epidermal)	6, 29				
		Resine	Facial palsy*	Raw by chewing/Ent. (Oral)	29, 33, 71				
		Resine	Fracture pain	Raw/Loc. (Epidermal)	34				
		Resine	**Furuncles,** Inflammation	Heating/Loc. (Epidermal), Raw/Loc. (Epidermal)	18, 25, 34-36, 48, 51, 55, 71, 72, 74				
		Resine	Knee pain	Heating/Loc. (Epidermal)	58				
		Resine	Pain	Decoction/Loc. (Epidermal), Heating/Loc. (Epidermal), Raw/Loc. (Epidermal)	45, 52, 75				
		Bark	Rheumatic pain	Decoction/Loc. (Epidermal)	69				
		Resine	Antihelmintic	Raw/Ent. (Oral)	1				
		Resine	**Skin crack**	Raw/Loc. (Epidermal), Heating/Loc. (Epidermal), Ointment with butter/Loc. (Epidermal)	1, 3-6, 9, 11, 12, 16, 21, 25-30, 33-37, 39, 40, 43, 44, 46-53, 57, 58, 62, 66, 67, 69, 71, 73, 74, 77, 78, 79				
		Resine	Peptic ulcer	Raw by chewing/Int	33				
		Resine	Stomach diseases	Crushed/Ent. (Oral), Decoction/Ent. (Oral), Powdered/Ent. (Oral), Raw/Ent. (Oral), Raw by chewing/Ent. (Oral)	22, 34-36, 48, 51, 54, 72, 75				
		Resine	Stomachache	Ointment with honey/Loc. (Epidermal)	72				
		Root	Vascular diseases	Decoction/Ent. (Oral)	34				
		Resine	**Wound, Hemostatic**	Raw/Loc. (Epidermal), Heating/Loc. (Epidermal), Ointment with butter/Loc. (Epidermal)	5, 6, 13, 16, 18, 22, 30, 31, 33-37, 43-45, 47-52, 55, 56, 58, 62, 65, 66-68, 70-74, 76, 77, 79				
Pinus sylvestris L. KATO23229	Sarıçam, Yalamuk	Bark	**Asthma**	Raw by licking/Ent. (Oral)	38	0.310	0.003	50.000	(Tetik et al., 2013)
		Resine	Wound	Ointment with butter and honey/Loc. (Epidermal)	38				

Table 3 (Continued)

Plantaginaceae									
Plantago lanceolata L. KATO21020	İnce damar otu, Kesik otu, Yılan dili	Leaves	Hemorrhoid	Sap obtained by crushing/Loc. (Epidermal)	63	12.558	0.202	85.185	(Karcı et al., 2017; Polat et al., 2015, 2013; Tetik et al., 2013)
		Leaves	**Hemostatic, Wound**	Crushed/Loc. (Epidermal), Heating/Loc. (Epidermal), Powdered/Loc. (Epidermal), Raw/Loc. (Epidermal), Sap obtained by crushing/Loc. (Epidermal)	11-13, 15-18, 25, 27, 28, 43, 47, 51-53, 55, 58, 63-65, 66, 69, 73, 74, 76, 80				
		Leaves	Pain	Decoction/Ent. (Oral), Infusion/Ent. (Oral)	5, 73				
		Leaves	Rheumatic pain	Raw/Loc. (Epidermal)	54				
		Leaves	Inflammation	Heating/Loc. (Epidermal)	12				
Plantago major L. subsp. *major* KATO21020	Bağ yaprağı, Damar otu, Kan keser otu, Siğle otu, Nevroflo	Leaves	**Burn**	Mush/Loc. (Epidermal), Raw/Loc. (Epidermal)	43, 46	74.729	0.873	89.792	(Karcı et al., 2017; Polat et al., 2015, 2013; Samuelsen, 2000; Tetik et al., 2013)
		Leaves	Cold, Sorethroat	Decoction/Ent. (Oral)	28				
		Leaves	Cough	Decoction/Ent. (Oral)	51, 53				
		Leaves	Diabetes	Infusion/Ent. (Oral)	9, 46				
		Seed	Diabetes	Decoction/Ent. (Oral)	75				
		Leaves	Dyspepsia	Decoction/Ent. (Oral), Infusion/Ent. (Oral), Raw/Ent. (Oral)	6, 40, 45, 53				
		Leaves	Dyspnoea, Bronchitis	Decoction/Ent. (Oral), Infusion/Ent. (Oral)	43, 77				
		Leaves	**Eczema**	Mush/Loc. (Epidermal)	35				
		Leaves	**Furuncles**	Crushed/Loc. (Epidermal), Heating/Loc. (Epidermal), Mush/Loc. (Epidermal), Ointment with butter/Loc. (Epidermal), Raw/Loc. (Epidermal), Sap obtained by crushing/Loc. (Epidermal)	1, 5-7, 11, 20, 25, 33, 35, 37, 42-44, 46, 48, 50, 52, 55, 56, 62, 64, 70, 77				
		Leaves	Headache	Heating/Loc. (Epidermal)	36				
		Leaves	Heart diseases	Decoction/Ent. (Oral), Infusion/Ent. (Oral), Maceration with honey/Ent. (Oral)	1, 36, 40, 45, 46, 62, 73				
		Leaves	Heart diseases, Hemorrhoid	Maceration with honey/Ent. (Oral) [+G*]	40				
		Leaves	Hemorrhoid	Infusion/Ent. (Oral), Decoction/Ent. (Oral)	11, 12, 72				
		Leaves	Hypercholesteremia	Decoction/Ent. (Oral)	68				

Table 3 (Continued)

		Leaves	Inflammation	Infusion/Ent. (Oral)	46				
		Leaves	Knee pain	Maceration with egg yolk	1, 46, 54				
		Leaves	Knee pain	Maceration with egg yolk/Loc. (Epidermal)$^{+A*}$	1				
		Leaves	Pain	Mush/Loc. (Epidermal), Mush after boiled with milk/Loc. (Epidermal)	5, 23, 64, 74				
		Leaves	Prostate	Decoction/Ent. (Oral), Infusion/Ent. (Oral)	48				
		Leaves	Rheumatic pain	Decoction/Ent. (Oral) Heating/Loc. (Epidermal),	36				
		Leaves	Rheumatism	Mush/Loc. (Epidermal)	35, 70				
		Leaves	Stomachache	Infusion/Ent. (Oral)	68				
		Leaves	Stomach diseases	Decoction/Ent. (Oral), Infusion/Ent. (Oral)	51, 71				
		Leaves	Urinary tract infections	Decoction/Ent. (Oral), Infusion/Ent. (Oral)	36, 46, 48, 68				
		Leaves	Vascular diseases	Decoction/Ent. (Oral), Infusion/Ent. (Oral)	8, 11, 13, 26, 33, 39, 41, 44, 46, 47, 48, 51, 65, 78				
		Seed	Vascular diseases	Decoction/Ent. (Oral)	1, 74				
		Leaves	**Wound, Hemostatic**	Crushed/Loc. (Epidermal), Heating/Loc. (Epidermal), Mush/Loc. (Epidermal), Ointment with butter/Loc. (Epidermal), Raw/Loc. (Epidermal), Sap obtained by crushing/Loc. (Epidermal)	1-6, 9, 11-13, 15-18, 21-23, 25-32, 35-51, 55-67, 69, 71, 73-76, 78-80				
Platanaceae									
Platanus orientalis L. KATO14774	Çınar	Leaves	**Calcification**	Decoction/Ent. (Oral)	10	0.930	0.009	66.667	(Hajhashemi et al., 2011; Tetik et al., 2013)
		Leaves	Diabetes	Decoction/Ent. (Oral)	61				
		Leaves	**Knee pain**	Decoction/Ent. (Oral), Mush/Loc. (Epidermal)	53, 46				
		Leaves	Rheumatism	Decoction/Ent. (Oral)	53				
Poaceae									
Zea mays L. subsp. *mays* KATO19805	Mısır	Style, Aerial parts	Bronchitis	Decoction/Ent. (Oral)	9, 46, 65	11.318	0.115	44.286	(Brobbey et al., 2017; Gürdal and Öztürk, 2022; Okokon et al., 2019; Polat et al., 2015; Sahin et al., 2019)
		Style, Aerial parts	Bronchitis	Decoction/Ent. (Oral) $^{+F*}$	65				
		Style	Diabetes	Decoction/Ent. (Oral)	77				
		Style	Dyspnoea	Decoction/Ent. (Oral)	77				
		Style	Hemorrhoid	Decoction/Ent. (Oral)	64				

Table 3 (Continued)

		Style	Osteoporosis	Decoction/Ent. (Oral)	9, 46				
		Style	Prostate	Decoction/Ent. (Oral), Infusion/Ent. (Oral)	6, 9, 34, 68				
		Style	Prostate	Decoction/Ent. (Oral) $^{+H*}$	68				
		Style	**Sedative**	Smoke/Inhalation	6, 9, 21, 44, 46, 52, 60, 62-64, 71, 77, 80				
		Style	Urinary calculus	Decoction/Ent. (Oral), Infusion/Ent. (Oral)	10, 30				
		Style	Urinary tract disorder	Decoction/Ent. (Oral), Infusion/Ent. (Oral)	34, 44-46, 50, 52, 53, 68, 72, 73, 77				
Polygonaceae									
Rumex acetosella L. KATO11862	Eksiza, Ekşica, Ekşiliza	Aerial parts	Diabetes	Raw after peeling/Ent. (Oral)	54	0.620	0.006	25.000	(Öztürk et al., 2018)
		Leaves	**Knee pain**	Maceration with egg yolk/Loc. (Epidermal)$^{+A*}$	1				
		Leaves	Antihelmintic	Mush/Ent. (Oral) $^{+B*}$	34				
		Leaves	Wound	Mush/Loc. (Epidermal) $^{+B*}$	34				
Rumex pulcher L. KATO11861	Evelek, Lapada, Lapaza	Leaves	**Allergic contact dermatitis**	Raw/Loc. (Epidermal)	33, 37, 45, 46, 49, 52, 53, 74, 79	9.147	0.091	69.192	(Erarslan et al., 2020; Kizilarslan and Özhatay, 2012; Öztürk et al., 2018; Vasas et al., 2015)
		Root	Antidote for heavy metal poisoning*	Sap obtained by crushing/Ent. (Oral)	45				
		Leaves	**Bruising**	Decoction/Ent. (Oral)	26				
		Leaves	Cough, Cold	Decoction/Ent. (Oral)	43				
		Tohumları	Diabetes	Decoction/Ent. (Oral)	8				
		Leaves	**Furuncles**	Heating/Loc. (Epidermal), Maceration with butter/Loc. (Epidermal)	51, 69, 74				
		Leaves	Knee pain	Heating/Loc. (Epidermal)	43, 46, 66,				
		Aerial parts	Knee pain	Mush/Loc. (Epidermal) $^{+I*}$	43				
		Root	**Scabies**	Maceration with yoghurt/Loc. (Epidermal)	69				
		Root	Stomachache	Decoction/Ent. (Oral)	45				
		Leaves	**Wound**, Hemostatic, Inflammation	Heating/Loc. (Epidermal)	35, 36, 46				
Primulaceae									
Cyclamen coum Mill. KATO19140	Domuz ayuşağı, Horoz ağusu, Lehsi, Yaban Ayuşağı	Rhizome	**Eczema, Wound**	Crushed/Loc. (Epidermal)	8	0.930	0.011	41.000	(Bokov et al., 2020; Mahomoodally et al., 2021)
		Rhizome	Sinusitis	Sap obtained by crushing/Loc. (Intranasal)*	18				
			Poisonous plant		78				
Primula acaulis (L.) L. KATO19142		Aerial parts	**Stomach diseases, intestinal diseases***	Decoction/Ent. (Oral)	76	0.155	0.002	100.000	

Table 3 (Continued)

Primula auriculata Lam. KATO21273	Aynı sefa	Aerial parts	**Cardiac dysrhythmia***	Infusion/Ent. (Oral)	40	0.155	0.002	100.000	
Primula veris L. subsp. *columnae* (Ten.) Lüdi KATO21274	Kuşluk çiçeği	Flower	**Jaundice**	Decoction/Ent. (Oral)	38	0.155	0.002	100.000	(Tewari et al., 2017)
Ranunculaceae									
Caltha palustris L.** KATO16796	Düdük	Root	**Pain***	Mush/Loc. (Epidermal)	5	0.310	0.003	100.000	
Ranunculus constantinopolitanus (DC.) d'Urv. KATO22251	Sarraf çiçeği, Sarı çiçek, Psarrah	Flower	**Arthralgia**	Crushed/Loc. (Epidermal), Mush/Loc. (Epidermal)	36, 70	11.938	0.127	70.130	(Aslam et al., 2012; Küpeli Akkol et al., 2012b; Uzun and Palabaş-Uzun, 2011)
		Flower	Bronchitis, Cough, Dyspnoea*	Decoction/Ent. (Oral), Infusion/Ent. (Oral)	18, 51, 65				
		Flower	Dyspepsia	Decoction/Ent. (Oral)	18				
		Flower	Fungal infection on the foot	Raw/Loc. (Epidermal)	38				
		Flower	Infertility*	Maceration with honey/Ent. (Oral)	45				
		Flower	**Knee pain**	Crushed/Loc. (Epidermal), Raw/Loc. (Epidermal)	3, 11, 16, 18, 25, 27, 28, 37, 39, 40, 43-47, 53, 62, 66, 67, 69-71, 74				
		Flower	Neonatal jaundice*	Decoction/Ent. (Oral)	18				
		Flower	Pain	Sap obtained by crushing/Loc. (Epidermal)	35				
		Flower	Rheumatic pain	Crushed/Loc. (Epidermal), Mush/Loc. (Epidermal)	29				
		Flower	Rheumatism	Crushed/Loc. (Epidermal)	36, 51, 53, 73, 78				
		Flower	Stomach diseases	Infusion/Ent. (Oral)	46				
		Aerial parts, Flower	Wound	Raw/Loc. (Epidermal), Crushed/Loc. (Epidermal)	12, 38, 44				
Rosaceae									
Alchemilla pseudocartalinica Juz. KATO12117	Aslan pençesi, Beyazida, Biadida, Çefrika, Difliza, Fındık otu, Keltat	Aerial parts	Bronchitis	Decoction/Ent. (Oral), Infusion/Ent. (Oral)	40, 51	4.651	0.047	26.667	(Altundağ and Öztürk, 2011; Dogan et al., 2016; Korkmaz et al., 2016)
		Leaves	Cold	Decoction/Ent. (Oral)	70				
		Flower, Seed	Cold	Infusion/Ent. (Oral)	40, 45				
		Flower, Leaves	Constipation	Decoction/Ent. (Oral)	38				
		Leaves	Diabetes*	Decoction/Ent. (Oral)	70				
		Flower, Leaves	**Dysmenorrhoea**	Decoction/Ent. (Oral)	35				

Table 3 (Continued)

		Aerial parts	Dyspepsia	Infusion/Ent. (Oral)	6				
		Aerial parts	Eczema	Raw/Loc. (Epidermal)	43				
		Flower	Eczema	Crushed/Loc. (Epidermal)	43				
		Aerial parts, Leaves	**Gynaecological diseases**	Decoction/Ent. (Oral), Infusion/Ent. (Oral)	35, 40, 43, 48				
		Flower	Headache, Migraine	Decoction/Ent. (Oral)	27				
		Aerial parts	Hemorrhoid	Mush/Loc. (Epidermal)	33				
		Aerial parts	Hepatitis	Decoction/Ent. (Oral)	40				
		Flower	Pain	Crushed/Loc. (Epidermal)	43				
		Aerial parts	**Premenstrual syndrome**	Infusion/Ent. (Oral)	39				
		Aerial parts	Sedative	Decoction/Ent. (Oral) $^{+C*}$	41				
		Aerial parts	Sedative	Infusion/Ent. (Oral)	6				
		Aerial parts	Urinary tract infections	Decoction/Ent. (Oral) $^{+D*}$	65				
		Aerial parts, Leaves	Urinary tract infections	Decoction/Ent. (Oral), Infusion/Ent. (Oral)	47, 70				
Cerasus avium (L.) Moench KATO19080	Kiraz	Fruit (Pedicel)	Cough, Cold	Decoction/Ent. (Oral)	72	1.240	0.012	37.500	(Dogan et al., 2016; Korkmaz et al., 2016; Tetik et al., 2013)
		Fruit (Pedicel)	Diarrhea	Decoction/Ent. (Oral)	72				
		Bark	Intestinal diseases	Decoction/Ent. (Oral)	72				
		Fruit (Pedicel)	**Urinary tract infections**	Decoction/Ent. (Oral)	68, 70, 72				
Crataegus orientalis Pallas ex Bieb. subsp. *orientalis*** KATO19308	Kocakarı meyvesi	Fruit	**Hemorrhoid**	Decoction/Ent. (Oral)	53	0.155	0.002	100.000	(Caliskan et al., 2017)
Cydonia oblonga Mill. KATO19083	Ayva	Bark, Leaves	**Cold, cough**	Decoction/Ent. (Oral), Infusion/Ent. (Oral)	2, 4-6, 9, 16, 21, 33-36, 45, 46, 48-50, 52, 53, 55, 56, 63, 67, 70, 71, 77, 80	13.023	0.172	98.810	(Tetik et al., 2013; Yeşilada et al., 1999)
		Bark	**Cold, cough**	Steam/Loc. (Intranasal)*	2, 9, 33, 35, 36, 46				
		Leaves	Stomachache	Infusion/Ent. (Oral)	63				
Fragaria vesca L. KATO19085	Amofta, Dağ çileği	Fruit	**Hemorrhoid**	Raw/Ent. (Oral)	3, 4, 9	0.465	0.005	100.000	(Erbay and Sarı, 2018)
Laurocerasus officinalis M. Roem. KATO21182	Karayemiş, Taflan	Leaves	Bruise	Decoction/Loc. (Epidermal)	45	19.070	0.192	60.163	(Akbulut et al., 2019; Caliskan et al., 2017; Dogan et
		Fruit, Seed	**Diabetes**	Drying/Ent. (Oral), Decoction/Ent. (Oral),	1, 5, 6, 9, 10, 19, 21, 23, 24, 33,				

Table 3 (Continued)

				Raw/Ent. (Oral)	40, 42, 45, 46, 52, 56, 58, 62-64, 66, 67, 69, 71, 77				al., 2016; Karcı et al., 2017; Öztürk et al., 2018; Yeşilada et al., 1999)
		Seed	Diarrhea	Raw/Ent. (Oral)	33				
		Leaves	Earache	Heating/Loc. (Epidermal), Mush/Loc. (Epidermal)	1, 5, 21, 37, 62, 77				
		Fruit	Fracture pain	Maceration with honey/Ent. (Oral)	43				
		Leaves	Head louse*	Decoction/Loc. (Epidermal) (The hair was washed by aqueous extracts)	18				
		Leaves	Headache	Heating/Loc. (Epidermal)	22, 55				
		Fruit	Hemorrhoid	Drying/Ent. (Oral)	58				
		Fruit, Seed	Hemorrhoid	Maceration with honey/Ent. (Oral)	56				
		Leaves	Infertility for woman*	Heating/Loc. (Epidermal)	30, 56				
		Leaves	Knee pain	Heating/Loc. (Epidermal), Mush/Loc. (Epidermal)	5, 49, 75				
		Leaves	Lumbago	Heating/Loc. (Epidermal)	49				
		Leaves	Pain	Mush/Loc. (Epidermal)	8, 11				
		Fruit	Postpartum pain*	Deoction/Ent. (Oral)	23				
		Leaves	Rib pain	Raw/Loc. (Epidermal) (first honey is smeared)	53				
		Leaves	Sinusitis	Heating/Loc. (Epidermal)	22				
Mespilus germanica L. KATO19088	Döngel, Muşmula, Töngel	Leaves, Bark, Leaves	**Cold**, Urinary tract infections	Infusion/Ent. (Oral), Decoction/Ent. (Oral), Infusion/Ent. (Oral)	2, 77, 68,71	1.860	0.019	58.333	(Dogan et al., 2016; Tetik et al., 2013; Yeşilada et al., 1999)
Prunus divaricata Ledeb. KATO20632	Yaban eriği	Fruit	**Prostate***	Infusion/Ent. (Oral)	28	0.155	0.002	100.000	
Prunus x domestica L. KATO14874	Kara erik	Leaves	**Vascular diseases**	Decoction/Ent. (Oral)	59	0.155	0.002	100.000	(Jabeen and Aslam, 2011)
Pyrus communis L. subsp. *sativa* (DC.) Hegi KATO19093	Armut	Fruit	**Diabetes**	Crushed/Loc. (Epidermal)	35	0.155	0.002	100.000	(Öztürk et al., 2018)
Rosa canina L. KATO21190	Kuşburnu, İtburnu	Fruit	Cold	Decoction/Ent. (Oral), Infusion/Ent. (Oral), Raw/Ent. (Oral)	6, 11, 34, 35, 44, 46, 67, 77	12.868	0.129	57.831	(Tetik et al., 2013; Yeşilada et al., 1999)
		Fruit	Constipation	Decoction/Ent. (Oral)	76				
		Fruit	Diabetes	Infusion/Ent. (Oral), Raw/Ent. (Oral)	3, 52				

Table 3 (Continued)

		Fruit	**Hemorrhoid**	Decoction/Ent. (Oral), Infusion/Ent. (Oral), Raw/Ent. (Oral)	5, 11, 27, 34-38, 43-45, 48, 49, 51, 53, 62, 67				
Rubus idaeus L. KATO23202	Ahududu, Avat, Avat dikeni,	Leaves	**Aphthae**	Decoction as mouthwash/Loc. (Buccal)*	25	3.721	0.037	54.167	(Dogan et al., 2016; Erarslan et al., 2020; Menković et al., 2011; Rocabado et al., 2008)
	Böğürtlen,	Leaves	Bronchitis, Cold	Infusion/Ent. (Oral)	46				
	Kırmızı	Root	Hemorrhoid	Infusion/Ent. (Oral)	53				
	Handogoba,	Fruit	Hemorrhoid	Raw/Ent. (Oral)	9, 46				
	Vado	Leaves	Hemostatic	Heating/Loc. (Epidermal), Raw/Loc. (Epidermal)	34-36				
		Leaves	Knee pain	Crushed/Loc. (Epidermal)	36				
		Root	Prostate	Decoction/Ent. (Oral) $^{+H*}$	68				
		Fruit	**Scurf**	Crushed/Loc. (Epidermal)	22				
		Leaves	**Wound**	Crushed/Loc. (Epidermal)	1, 8, 35				
Rubus platyphyllos (K.) Koch KATO14878	Avat, Böğürtlen	Leaves	**Burn***	Drying/Loc. (Epidermal)	6, 77	1.085	0.011	100.000	
Rubus sanctus Schreber. KATO20634	Avat, Diken,	Bark	Alopecia*	Ash/Loc. (Epidermal)	64	0.930	0.009	66.667	(Yeşilada et al., 1999)
	Mora	Root	**Hemorrhoid**	Infusion/Ent. (Oral)	37				
Sorbus aucuparia L. KATO13755	Alabo, Alabu,	Fruit	Cancer	Raw/Ent. (Oral)	38	1.550	0.016	80.000	(Bozyel et al., 2019; Öztürk et al., 2018; Sołtys et al., 2020)
	Alapo, Anis	Fruit	**Diabetes**	Decoction/Ent. (Oral), Drying/Ent. (Oral), Raw/Ent. (Oral)	25, 27, 28, 40				
		Fruit	Hypertension	Decoction/Ent. (Oral)	37				
Sorbus umbellata Fritch** KATO19580	Floş	Seed	**Constipation***	Drying/Ent. (Oral), Raw/Ent. (Oral)	25	0.155	0.002	50.000	
		Seed	Antihelmintic*	Drying/Ent. (Oral), Raw/Ent. (Oral)	25				
Smilacaceae									
Smilax excelsa L. KATO20741	Diken doruğu, Diken ucu,	Shoot	**Hemorrhoid***	Decoction/Ent. (Oral), Infusion/Ent. (Oral)	35, 40	0.620	0.006	50.000	(Akbulut and Ozkan, 2014)
	İzmilaks, Kırmızı	Root	Local anesthetic*, pain	Raw/Loc. (Epidermal)	61				
	Mizmilak, Kurt otu	Shoot	Urinary tract infections	Decoction/Ent. (Oral) $^{+D*}$	65				
Solanaceae									
Hyoscyamus reticulatus L. KTUB1348	Patpat otu, Diş otu	Seed	**Eye diseases, Tear ducts disorders***	Steam/Loc. (Intraocular) (The head circumference is covered with a cloth and the eyes are contacted with steam)	29, 41	0.620	0.006	100.000	
Nicotiana tabacum L.	Tütün	Leaves	**Hemostatic**	Drying/Loc. (Epidermal), Raw/Loc. (Epidermal)	1, 5, 9, 21, 34, 35, 42, 44, 46, 59, 60, 62, 63, 73	4.961	0.050	100.000	(Karcı et al., 2017)

Table 3 (Continued)

Physalis alkekengi L. KTUB1339	Altın çilek	Fruit	**Hemorrhoid**	Drying/Ent. (Oral)	45	0.310	0.003	100.000	(Li et al., 2018)
Ulmaceae									
Ulmus glabra Hudson KATO21197	Karaçam	Resine	**Skin crack, Wound, Burn**	Raw/Loc. (Epidermal)	44	0.310	0.003	75.000	(Karakaya et al., 2019)
	Karaağaç	Leaves	Sedative*	Smoke/Inhalation	1				
Ulmus minor Mill. KATO8409	Karaağaç	Leaves	Pain	Infusion/Ent. (Oral)	53	0.155	0.002	100.000	(Guarrera, 2005)
Urticaceae									
Urtica dioica L. subsp. *dioica* KATO19102	Isırgan	Aerial parts	**Bleeding of the nose**	Drying/Loc. (Epidermal)	80	28.837	0.310	35.000	(Bozyel et al., 2019; Caliskan et al., 2017; Karcı et al., 2017; Öztürk et al., 2018; Polat et al., 2013; Sahin et al., 2019; Yeşilada et al., 1999)
		Aerial parts	Lazy bowel syndrome, Constipation	Decoction/Ent. (Oral), Infusion/Ent. (Oral)	5, 67				
		Aerial parts	Bronchitis, Cold	Decoction/Ent. (Oral), Infusion/Ent. (Oral)	43				
		Aerial parts	Cancer	Decoction/Ent. (Oral)	39, 40				
		Root	Cancer	Sap obtained by crushing/Ent. (Oral)	40				
		Aerial parts	Cold	Decoction/Ent. (Oral)	6, 9, 46, 54, 71, 68				
		Seed	Cold, Cough	Maceration with honey/Ent. (Oral)	21, 43, 47, 51, 67				
		Seed	Cold, Cough	Decoction/Ent. (Oral)	40				
		Seed	Cold, Fever	Maceration with buttermilk/Loc. (Epidermal) $^{+E}$ (Applied to the body with cloth)	2				
		Aerial parts	Constipation	Decoction/Ent. (Oral)	35				
		Aerial parts	Diabetes	Infusion/Ent. (Oral)	74				
		Aerial parts	Dyspepsia	Decoction/Ent. (Oral), Infusion/Ent. (Oral), Maceration with honey/Ent. (Oral)	43, 52, 53, 77				
		Aerial parts	Dyspnoea	Decoction/Ent. (Oral)	20				
		Aerial parts	Gynaecological diseases, infertility*	Steam/Loc. (Intravaginal)*	77				
		Seed	**Heart diseases, Hemorrhoid**	Maceration with honey/Ent. (Oral) $^{+G*}$	40				
		Aerial parts	**Hemorrhoid**	Decoction/Ent. (Oral)	8, 10, 23, 68				
		Aerial parts	**Hemorrhoid**	Mush/Loc. (Epidermal)	66, 47				
		Root	**Hemorrhoid**	Decoction/Ent. (Oral)	48				
		Seed	**Hemorrhoid**	Infusion/Ent. (Oral)	43				
		Aerial parts	Hemostatic, wound	Crushed/Loc. (Epidermal)	1, 55				
		Aerial parts	Hemostatic, wound	Decoction/Ent. (Oral)	76				

Table 3 (Continued)

		Seed	Immunostimulant	Maceration with honey/Ent. (Oral)	29, 45, 69, 71				
		Aerial parts	Itchiness on hair follicle	Decoction/Loc. (Epidermal)	59				
		Aerial parts	Knee pain	Decoction/Ent. (Oral), Infusion/Ent. (Oral), Mush/Loc. (Epidermal), Raw/Loc. (Epidermal)	6, 11, 16, 17, 27, 40, 41, 43, 44, 47, 50, 52, 53, 58, 63-67, 77, 79				
		Aerial parts	Knee pain	Mush/Loc. (Epidermal) $^{+I*}$	43				
		Root	Pain	Decoction/Ent. (Oral)	5				
		Aerial parts	Pain	Mush/Loc. (Epidermal)	5				
		Aerial parts	Prostate	Decoction/Ent. (Oral)	38, 44				
		Aerial parts	Prostate	Decoction/Ent. (Oral) $^{+H*}$	68				
		Leaves	Prostate	Decoction/Ent. (Oral)	68, 76				
		Aerial parts	Psoriasis	Decoction/Loc. (Epidermal)	8, 19				
		Aerial parts	Renal disorder	Decoction/Ent. (Oral)	1				
		Aerial parts	**Rheumatic pain**	Decoction/Ent. (Oral), Heating/Loc. (Epidermal), Mush/Loc. (Epidermal), Sap obtained by crushing/Loc. (Epidermal)	5, 33, 36, 43, 46, 48, 64, 74, 80				
		Seed	**Rheumatic pain**	Mush/Loc. (Epidermal), Raw/Loc. (Epidermal)	5, 52, 62, 74				
		Aerial parts	**Rheumatism**	Decoction/Ent. (Oral)	53				
		Aerial parts	Rheumatoid arthritis	Mush/Loc. (Epidermal)	68				
		Leaves	Savage by dog	Decoction/Ent. (Oral)	23				
		Aerial parts	Sedative	Decoction/Ent. (Oral) $^{+C*}$	41				
		Aerial parts, Seed	Stomach diseases, Stomachache	Decoction/Ent. (Oral), Infusion/Ent. (Oral)	48, 68, 73				
		Seed	Stomach diseases, intestinal diseases	Maceration with honey/Ent. (Oral)	27				
		Aerial parts	Urinary calculus	Decoction/Ent. (Oral)	34, 51				
		Aerial parts	Urinary tract infections	Decoction/Ent. (Oral) $^{+D*}$	65				
		Aerial parts	Urinary tract infections	Decoction/Ent. (Oral)	33, 62				
		Aerial parts	Urinary tract infections	Mush/Loc. (Intravaginal)*	65				
		Aerial parts	**Vascular diseases**	Infusion/Ent. (Oral)	65				
		Leaves	Wound	Raw/Loc. (Epidermal)	23				
Vitaceae									
Vitis labrusca L.	Üzüm	Fruit	**Cold, Fever**	Maceration with buttermilk/Loc.	2	0.155	0.002	100.000	(Egea et al., 2015)

Table 3 (Continued)

KATO19265	(Epidermal) $^{+E*}$ (Applied to the body with cloth)

Therapeutic uses belonging to the most common diseases categories for the particular species are marked in bold. Ent: Enteral, Loc: Local, *Not reported, **First ethnopharmacological report for Trabzon, $^{+}$ Herbal mixtures, $^{A\text{-}B\text{-}C\text{-}D\text{-}E\text{-}F\text{-}H\text{-}I}$ Marks for each herbal mixtures. [1]Acısu, [2]Akçakale, [3]Cevizlik, [4]Çukurca, [5]Gümüşlü, [6]Hıdırnebi, [7]Kaleönü, [8]Kuruçam, [9]Meşeli, [10]Uçarsu (AKÇAABAT); [11]Ayvadere, [12]Bahçecik, [13]Bereketli, [14]Erikli, [15]Sulakyurt (ARAKLI); [16]İşhan, [17]Yeniköy, [18]Yolaç (ARSİN); [19]Adacık, [20]Dolanlı, [21]Sayvancık, [22]Takazlı (BEŞİKDÜZÜ); [23]Fenerköy, [24]Yeniköy (ÇARŞIBAŞI); [25]Arpaözü, [26]Çamlıbel, [27]Çayıroba, [28]Demirkapı, [29]Derindere, [30]Soğanlı, [31]Şekersu, [32]Yaylaönü (ÇAYKARA); [33]Beypınarı, [34]Çalköy, [35]Çayırbağı, [36]Gürgendağ, [37]Haçka, [38]Yerlice (DÜZKÖY); [39]Dağönü, [40]Sarmaşık (HAYRAT); [41]Arpalı, [42]Beşköy, [43]Dağardı (KÖPRÜBAŞI); [44]Akarsu, [45]Altındere, [46]Çıralı, [47]Güzelyayla, [48]Hamsiköy, [49]Kırantaş, [50]Kuşçu, [51]Ormanüstü, [52]Sındıran, [53]Şimşirli, [54]Üçgedik, [55]Yazlık (MAÇKA); [56]Ağaçbaşı, [57]Ağaçseven, [58]Eskipazar (OF); [59]Akyazı, [60]Çilekli, [61]Geçit, [62]Uğurlu (ORTAHİSAR); [63]Aksu, [64]Çamburnu, [65]Oylum (SÜRMENE); [66]Akçiriş, [67]Dorukkiriş, [68]Geyikli, [69]Gökçeköy, [70]Sinlice, [71]Sisdağı, [72]Sütpınar (ŞALPAZARI); [73]İskenderli, [74]Kadıralak, [75]Kalınçam, [76]Karaağaçlı (TONYA); [77]Caferli (VAKFIKEBİR); [78]Çamlıyurt, [79]Demirciler, [80]Taşdelen (YOMRA).

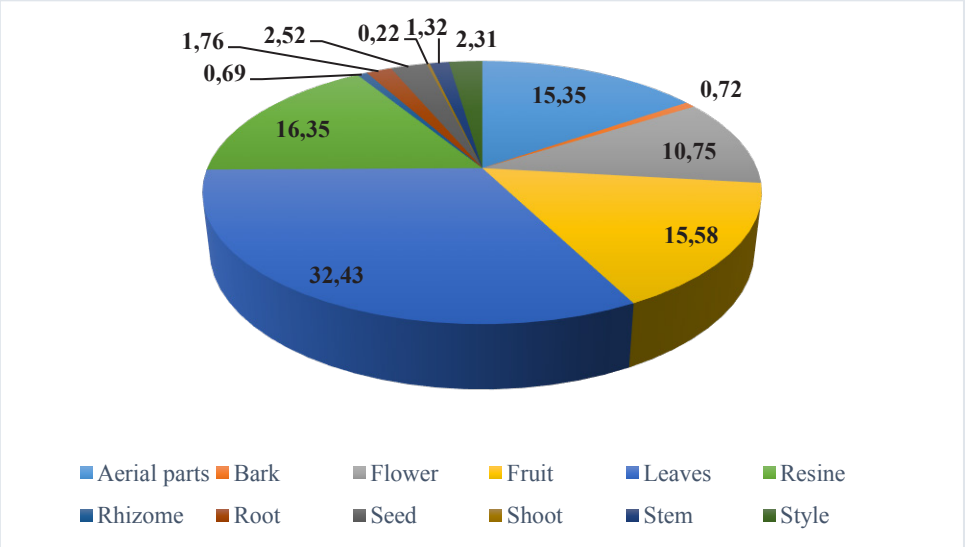

Figure 6. Distribution of medicinal plant according to type of plant parts.

drying (1.51%), smoke (1.20%), ointment (0.63%), latex (0.58%), pickle (0.57%), ash (0.44%), and steam (0.38%) with powdered and molasses composing the remaining share (Figure 7). The decoction is the most frequent preparation method for herbal medicinal recipes. Boiling causes the extraction of bioactive components from medicinal parts of the taxa and protects the herbal medicines longer compared with cold extraction (Amjad et al., 2020). As well as the preparation methods were associated with the used plant parts. According to results, mostly used plant parts were detected as follows; flower for decoction (41.34%), aerial parts for infusion (44.30%) and steam (50.00%), leaves for crushed (59.60%), heating (77.93%), mush (43.82%), sap (33.33%), and powdered (62.50%), fruit for maceration (64.37%), drying (54.17%), latex (94.44%), pickle (100%) and molasses (100%), style for smoke (92.14%), resine for ointment (35.00%) and stem for ash (57.14%) (Figure 7).

3.4 Medicinal plants administration route

Drugs are administered to the human body through various routes, enteral, parenteral, inhalation or local. Generally, enteral, parenteral and inhalation administrations produce a systemic effect, while local applications applied to the skin and mucous membranes produce a local effect (Khan and Roberts, 2018; Mignani et al., 2013; Verma et al., 2010). Oral (51.58%) and sublingual (0.03%) applications from the enteral administration route were observed for the medicinal taxa in the study. Inhalation applications constituted 1.35% of all administrations. Also, local administrations such as buccal (0.13%), epidermal (46.27%), intranasal (0.20%), intraocular (0.16%), intravaginal (0.16%) and otic (0.10%) applications were observed to be used by participants (Figure 8). The most frequent administration type was oral application, followed by epidermal application.

3.5 Data analysis

Frequency of citation and use value

The FC and UV values provide important data for the identification of potential taxa, and suggestions to uncover novel herbal drugs concerning further phytochemical, pharmacological, and toxicological study (Amjad et al., 2020; Kadir et al., 2012). The FC values varied between 82.326% and 0.155%. *Piceae orientalis* possessed the highest FC value. Other taxa that had an important FC value greater than 10% were *Plantago major*, *Urtica dioica*, *Tilia rubra* subsp. *caucasica*, *Thymus praecox*, *Plantago lanceolata*, *Laurocerasus officinalis*, *Cydonia oblonga*, *Rosa canina*, *Ranunculus constantinopolitanus*, *Sambucus ebulus*, and *Zea mays* (Table 3).

The high UV value of medicinal taxa supports high recognition of the taxa for therapeutic uses and abundance of the taxa in the study area. Also, taxa that possess high UV value have more biologically active potential (Amjad et al., 2020). The UV value of taxa ranged between 0.002 and 0.873. High UV values were observed on similar taxa that had high FC values like *Plantago major* (0.873), *Piceae orientalis* (0.747), *Urtica dioica* (0.310), *Tilia rubra* subsp. *caucasica* (0.301), *Thymus praecox* (0.214), *Plantago lanceolata* (0.202), *Laurocerasus officinalis* (0.192), *Cydonia oblonga* (0.172), *Rosa canina* (0.129), *Ranunculus constantinopolitanus* (0.127), *Sambucus ebulus* (0.116) and *Zea mays* (0.115) (Table 3). The medicinal taxa with low

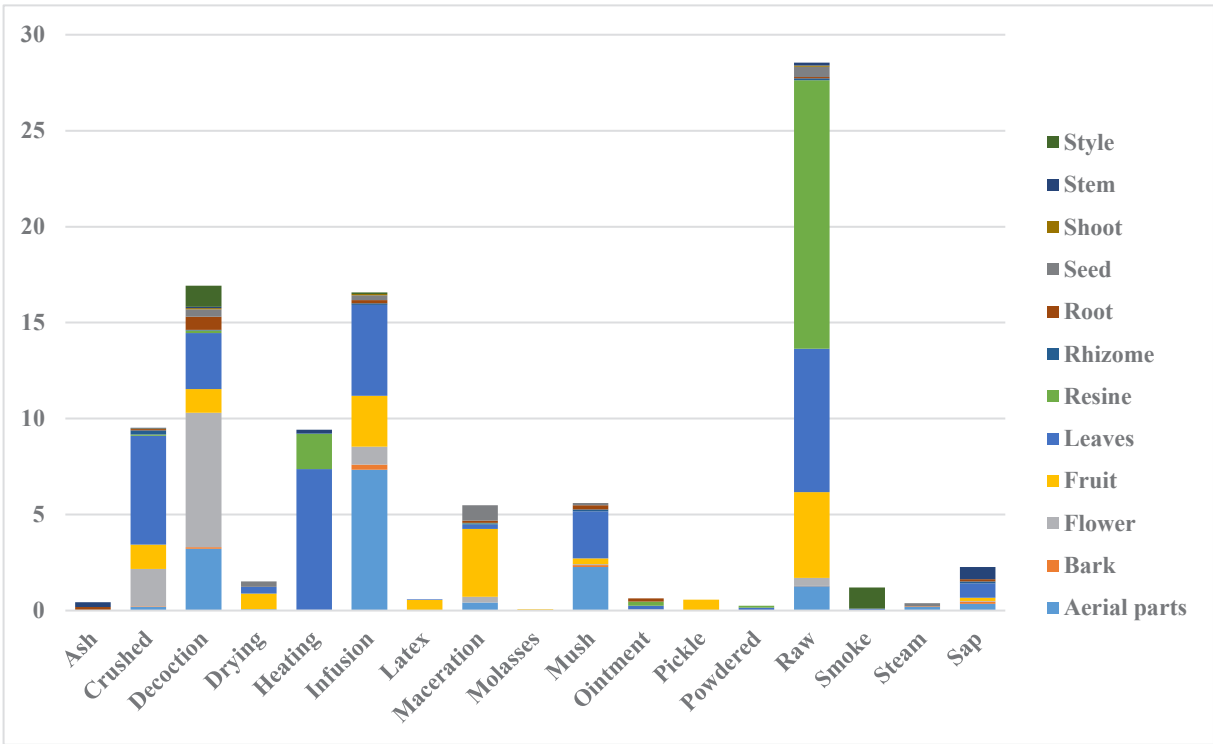

Figure 7. Distribution of medicinal plant according to plant parts and preparations.

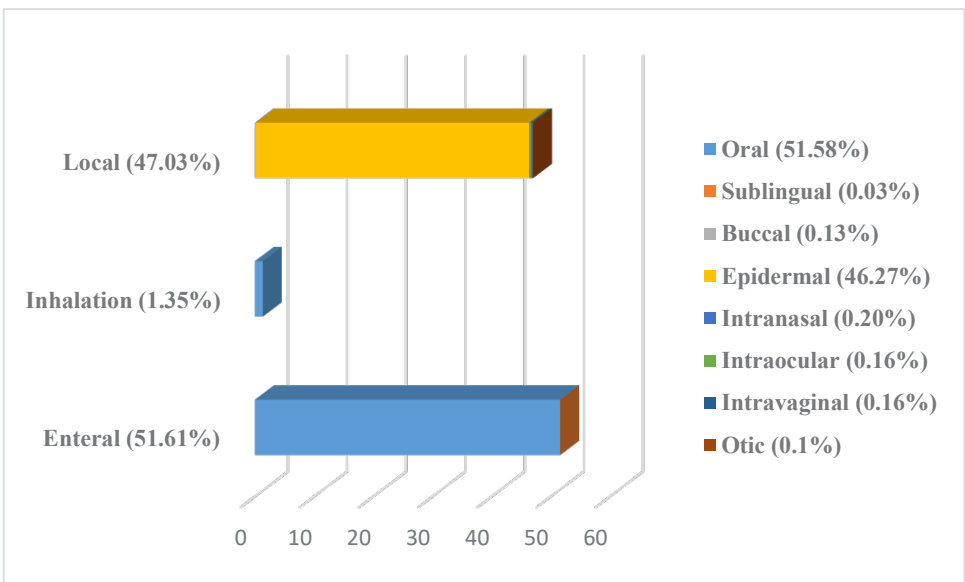

Figure 8. Distribution of medicinal plant according to administration types.

UV are valuable to hand down to the next generations, so these taxa should also be considered (Khan et al., 2018).

Informant consensus factor

A total of 2944 use reports were categorized for 17 different disease categories and poisoning plants (Table 4). The therapeutic uses of medicinal taxa were categorized according to the International Classification of Primary Care-2 (ICPC-2) of WHO (Weckerle et al., 2018; Redouan et al., 2020; Benitez et al., 2021). ICF takes a value between 0 and 1. The high value is close to 1, remarking that taxa

are defined by using well-defined knowledge, and their therapeutic uses are immensely bartered by participants. A low ICF value close to 0 indicates that the taxa are selected randomly and therapeutic uses of them are not exchanged by participants (Amjad et al., 2020). The ICF values varied from 0.50 to 0.96 (Table 4). The highest ICF value was recorded for diseases of the skin (0.96), followed by diseases of the respiratory system (0.93), blood, blood forming organs and immune mechanism category (0.90) and diseases of ear (0.87). According to previous studies conducted in different regions in Türkiye, it has been proven that the highest ICF value was observed in different disease categories like behavioral and emotional disorders (Karcı et al., 2017), diseases of the circulatory system (Gürdal and Öztürk, 2022), diseases of the genitourinary system (Yeşilyurt et al., 2017), diseases of the skin (Hayta et al., 2014; Polat et al., 2015), diseases of the respiratory system (Akbulut et al., 2019), endocrine, nutritional or metabolic diseases (Polat et al., 2013) and neoplasms (Özüdoğru et al., 2011). Diseases of skin category were

Table 4. The values of ICF for medicinal taxa in Trabzon.

Uses categories	Medicinal uses	N. use re.	N. ta.	ICF	The most preferred taxa
General and Unspecified	Cancer (Unspecified), General Inflammation, General pain, Malaria	90	26	0.72	*Plantago major*
Blood, Blood Forming Organs and Immune Mechanism	Immunostimulant	11	2	0.90	*Urtica dioica*
Digestive	Antihelmintic, Constipation, Diarrhea, Dyspepsia Jaundice, Heartburn, Hepatitis, Intestinal diseases, Liver diseases, Neonatal jaundice, Stomachache, Stomach diseases, Toothache	246	39	0.84	*Picea orientalis*
Eye	Eye diseases, Tear ducts disorders	5	3	0.50	*Hyoscyamus reticulatus*
Ear	Earache	24	4	0.87	*Laurocerasus officinalis*
Cardiovascular	Cardiac dysrhythmia, Heart diseases, Hemorrhoid, Hypertension, Hypercholesteremia, Rheumatic pain, Rheumatism, Vascular diseases	297	45	0.85	*Urtica dioica*
Musculoskeletal	Arthralgia, Calcification, Flexion, Knee pain, Lumbago, Rheumatoid arthritis, Rib pain, Osteoporosis	170	25	0.86	*Ranunculus constantinopolitanus*
Neurological	Migraine, Headache	10	4	0.77	*Laurocerasus officinalis*
Psychological	Sedative, insomnia	48	9	0.83	*Zea mays*
Respiratory	Asthma, Bleeding of the nose, Bronchitis, Cold, Dyspnoea, Sinusitis, Sore throat, Tonsilitis	618	46	0.93	*Tilia rubra* subsp. *caucasica*
Skin	Alopecia, Aphthae, Bruise, Contact dermatitis, Burn, Eczama, Fever blister, Fungal infection, Furuncles, Wound, Hair growth, Head louse, Itchiness on hair roots, Scurf, Skin crack, Papilloma, Savage, Scabies, Skin resurfacing, Psoriasis	1145	49	0.96	*Plantago major*
Endocrine/Metabolic and Nutritional	Goitre, Diabetes	135	27	0.81	*Laurocerasus officinalis*
Urological	Cystitis, Kidney stone, Urinary calculus, Urinary tract infections	71	20	0.73	*Zea mays*
Pregnancy, Childbearing, Family Planning	Postpartum pain and inflammation, Infertility	10	3	0.78	*Laurocerasus officinalis*
Female Genital	Dysmenorrhoea, Gynaecological diseases, Premenstrual syndrome	13	4	0.75	*Alchemilla pseudocartalinica*
Male Genital	Erectile dysfunction, Prostate	25	13	0.50	*Zea mays*

N. use re.: Number of use reports, N. ta.: Number of taxa, ICF: Informant consensus factor

supported by two studies among these studies (Hayta et al., 2014; Polat et al., 2015). Also, to the best of our knowledge, it has been found any study included ICF values in Trabzon province except for Sürmene and the city center (Gürdal and Öztürk, 2022; Yeşilyurt et al., 2017).

The most popular taxon was *Plantago major* for diseases of the skin, *Tilia rubra* subsp. *caucasica* for diseases of the respiratory system; *Picea orientalis* for diseases of the digestive system and *Ranunculus constantinopolitanus* for diseases of the musculoskeletal system (Table 4). There are some studies on therapeutic uses of mentioned taxa in related disease categories (Akbulut and Ozkan, 2014; Karaköse et al., 2019; Karcı et al., 2017; Uzun and Palabaş-Uzun, 2011). *Laurocerasus officinalis*, the most popular taxa for three different categories, was conspicuous another taxon. Previous studies showed that the taxa possess different ethnobotanical uses for various diseases (Karcı et al., 2017).

In accordance with the ethnobotanical uses of some of these species, their biological effects have been proven by various studies. *Plantago major* and its constituents like ursolic acid and oleanolic acid have been proven to enhance wound closure and accelerate wound healing time via inhibition of nitric oxide production and increasing fibroblast proliferation (Kartini et al., 2021). *Laurocerasus officinalis* has been showed to have antiinflammatory and antinociceptive activity based on its phenolic constituents like 2-O-β-D-glucopyranosyl-2-hydroxyphenylacetic acid, kaempferol-3-O-β-D-xylopyranosyl-(1→2)-O-β-D-glucopyranoside, (+)-catechin (Küpeli Akkol et al., 2012a). The antinociceptive and antiinflammatory effects of *Laurocerasus officinalis* may be related to its obtained ethnobotanical data on therapeutic uses such as migraine, headache, rheumatoid arthritis, and earache. At a dose of 100 mg/kg in rats, methanolic extract of *Ranunculus constantinapolitanus* showed antiinflammatory action with inhibition values of 23.3% (Küpeli Akkol et al., 2012b). This impact may be related to the usage of *Rannunculus constantinopolitanus* in ethnobotany. Although there are limited phytochemical and biological activity studies about *Tilia rubra* subsp. *caucasica* and *Picea orientalis* research directly related to their presented ethnobotanical uses have not been found.

Fidelity level (FL)

Plants which have recurrent ethnobotanical uses also have therapeutic potential. Thus, the plants that possess high FL values should be a sign of their therapeutic potential for a particular disease (Kadir et al., 2012). However, a disadvantage of this method is that the FL can be high for plants with few citations; nevertheless, plants with more citations may have lower FL (Andrade-Cetto and Heinrich, 2011).

FL values for the study ranged between 16.667 and 100 (Table 3). A 100% value of FL was recorded for 50 taxa. But, most of them had low FC and UV values due to their low use report numbers. The most remarkable taxon was *Tilia rubra* subsp. *caucasica,* which had 192 use reports for respiratory diseases in terms of 100% FL value. *Vaccinium myrtillus* and *Nicotiana tabacum* with relatively high use reports are other noteworthy species according to 100% FL value. *Cydonia oblonga* (98.810%), *Plantago major* (89.792%) *Thymus praecox* (88.372%), *Chelidonium majus* (85.714%), and *Plantago lanceolata* (85.185%) could be shown among the up-front taxa with a high number of use reports and relatively high FL value. *Tilia rubra* subsp. *caucasica* (cold, cough), *Nicotiana tabacum* (hemostatic), *Cydonia oblonga* (cold, cough), *Plantago lanceolata* (wound), *Thymus praecox* (cold, cough), and *Plantago major* (wound, furuncles, eczema) have been reported to cure related diseases used for determination of FL value (Abdel-Gelil et al., 2019; Karcı et al., 2017; Li et al., 2019; Tetik et al., 2013).

Clustering analysis

Based on the data from the 17 districts, hierarchical clustering was performed to compare between the distance and traditional usage for districts (Figure 9). At the median point of 12, the analysis produced 34 major clusters. Araklı and Sürmene which are two districts close to each other displayed a high degree of resemblance. Despite their great distance from one another, Beşikdüzü and Çaykara had much in similarity. Both Maçka and Akçaabat distinguished out from the other districts, although Maçka was the most distinctive. This can be attributed to the fact that Maçka has a larger area, more use reports number and species data compared to other districts.

3.6 Ethnobotanical novelties

Up till now, a few ethnobotanical research has been conducted in various Trabzon regions. However, this study is the most detailed, as it includes 645 interviews and investigates 80 villages and 17 districts in Trabzon. Also, some villages in Trabzon were studied for the first time. The ethnobotanical studies conducted in all districts in Trabzon except for 1 district include detailed used parts, therapeutic uses, preparation methods, administration routes, cited locations, administration routes, and statistical data.

As a result of this research, the most detailed ethnobotanical usages of the plants (119 taxa belongs to 55 families) were recorded for Trabzon city. The ethnobotanical usages for 19 species growing in Trabzon which are *Acer heldreichii* Orph. Ex Boiss. subsp. *trautvetteri* (Medw.) A.E. Murray, *Allium schoenoprasum* L., *Angelica sylvestris* L., *Asplenium scolopendrium* L., *Carduus acanthoides* L., *Cirsium lappaceum* (Boiss.) Fisher, *Cirsium pseudopersonata* Boiss. & Balansa ex Boiss.,

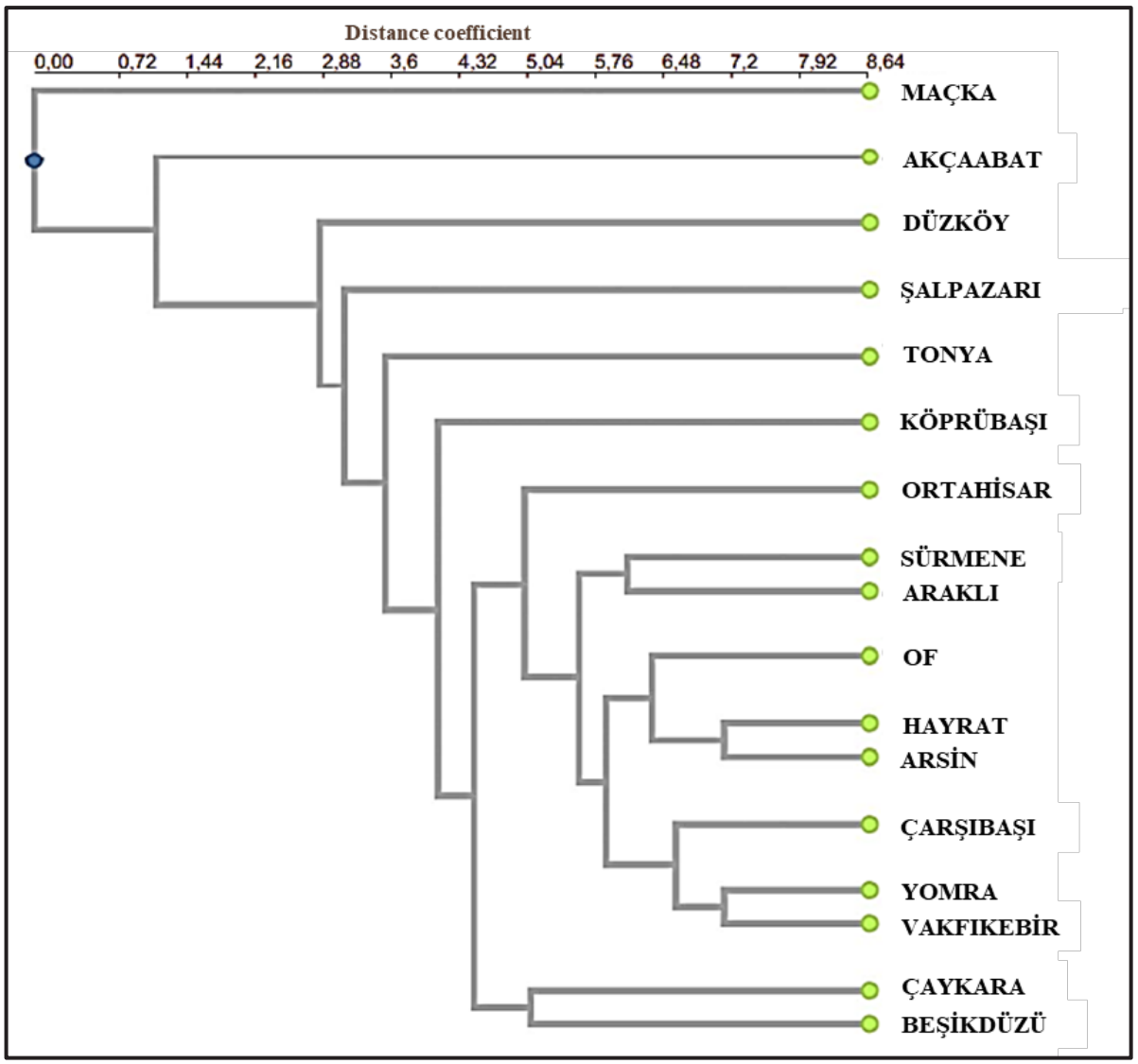

Figure 9. Dendrogram constructed with UPGMA clustering (with Euclidean distance) of 17 different districts in Trabzon.

Cirsium vulgare (Savi) Ten., *Prenanthes petiolata* (K. Koch) Sennikov, *Tripleurospermum* spp., *Alkanna orientalis* (L.) Boiss. var. *orientalis*, *Lonicera orientalis* Lam., *Calystegia silvatica* (Kit.) Griseb., *Dioscorea communis* (L.) Caddick & Wilkin, *Euphorbia peplis* L., *Stachys macrantha* (K. Koch) Stearn, *Dactylorhiza euxina* (Nevski) H. Baumann & Künkele, *Caltha palustris* L., *Crataegus orientalis* Pallas ex Bieb. subsp. orientalis, *Sorbus umbellata* Fritch, and *Ulmus glabra* Hudson detected for the first time.

Some novel usages were identified for the common plants like: *Sambucus ebulus* (Heart diseases), *Beta vulgaris* (Antihelmintic, 1 use report), *Vinca major* (Knee pain), *Arum italicum* (Sinusitis), *Asplenium scolopendrium* (Rheumatoid arthritis), *Cirsium arvense* (Rheumatic pain), *Cirsium lappaceum* (Bronchitis), *Cirsium pseudopersonata* (Hemorrhoid), *Cirsium vulgare* (Prostate), *Helichyrisum graveolens* (Jaundice), *Prenanthes petiolata* (Galactagogue), *Alnus glutinosa* (Sedative), *Betula litwinowii* (Earache), *Trachystemon orientalis* (Vascular diseases), *Campanula lactiflora* (Diabetes), *Colchicum speciosum* (Head louse), *Calystegia silvatica* (Knee pain), *Dioscorea communis* (Papilloma), *Rhododendron ponticum* (Immunostimulant), *Vaccinium arctostaphylos* (Cancer), *Vaccinium myrtillus* (Bronchitis), *Trifolium pratense* (Antihelmintic), *Crocus vallicola* (Erectile dysfunction), *Primula auriculata* (Cardiac dysrhythmia), *Caltha palustris* (Pain), *Ranunculus constantinopolitanus* (Neonatal jaundice), *Prunus divaricata* (Prostate), *Rubus platyphyllos* (Burn), *Rubus sanctus* (Alopecia), *Sorbus umbellata* (Constipation), *Hyoscyamus reticulatus* (Tear

ducts disorders), *Ulmus glabra* (Sedative), *Smilax excelsa* (Local anesthetic), and *Urtica dioica* (infertility).

Current therapeutic usages have been compared with phytochemical and biological activity studies of species belonging to the related or similar species to correlate with ethnobotanical data. *Sambucus ebulus*'s fruit infusion has been proven to be beneficial for metabolic illnesses linked to oxidative stress and imbalanced lipid profiles because of its potent antiinflammatory and antioxidative effects (Jabbari et al., 2017). Sing and Kanwar (2018) have showed that Akuammine was isolated from *Vinca major* (Singh and Kanwar, 2018). Akuammine has been determined to own antinociceptive properties via mu opioid receptor (Creed et al., 2021). Pharmaceutical studies showed that extracts from some *Arum* species have antibacterial and antioxidant effects (Kozuharova et al., 2020). *Asplenium scolopendrium* has been revealed to display antioxidant activity related to the content of quercetin, rutin, kaempferol, kaempferol-3-O-glycoside and luteolin (Ismail et al., 2019). Some *Cirsium* species have a wide range of bioactivities, including hepatoprotective, antiinflammatory, antioxidation, and antitumor, according to recent pharmacological investigations (Luo et al., 2021). *Helichrysum* species include various phytochemical content such as terpenoids, flavonoids, chalcones, phenolic acids, terpenes, as well as essential oils. *Helichrysum* species have been reported to have antioxidant, antiinflammatory, and hepatoprotective activities based on phytochemical constituents (Akinyede et al., 2021). These effects can be contritubuted to use for jaundice. Based on components like oregonin and hirsutanonol, some *Alnus* species have been shown to exhibit nitric oxide synthase (NOS) inhibitory action (Sati et al., 2011). Wegener and Volke (2010) have demonstrated that NOS inhibitors have antidepressant effect (Wegener and Volke, 2010). *Alnus glutinosa*'s traditional use as a sedative may be related to its NOS inhibitory potential. Betulin and its derivatives have been isolated from *Betula* species (Rastogi et al., 2015). The antinociceptive impact of betulin has been revealed to be significantly more effective than aspirin or paracetamol in vivo rodent studies (Hordyjewska et al., 2019). Sacan (2018) demonstrated that flavonoids, phenolics, and anthocyanins found in *Trachystemon orientalis* provide it with a strong antioxidative effect (Sacan, 2018). Traditional use report for vascular disease may be associative with its strong antioxidative activity. Some *Campanula* species have been revealed to have α-glucosidase inhibitory effect (Alhage et al., 2018; Sarikurkcu et al., 2021). The reported usage of *Campanula lactiflora* for diabetes may be connected to its potentially glucosidase inhibitory effect. The presence of colchicine and its derivatives in *Colchicum speciosum*, and insecticidal properties of colchicine have been established (Davoodi et al., 2021; Lin et al., 2020). The use of *Colchicum speciosum* for treating head louse may be connected to insecticidal activity brought due to colchicine. The pharmacological activities of *Calystegia soldanella*'s aqueous and methanol extracts have been demonstrated to include analgesic and antiinflammatory properties. *Calystegia soldanella* reduced NO generation, iNOS protein, and mRNA expression (Lee et al., 2017). *Calystegia silvatica*'s usage for its analgesic effect may be related to potential of having similar impact of *C. soldanella*. In human prostate cancer PC-3 cells, anthocyanin-polyphenolic extract from *Vaccinium arctostaphylos* has been determined to reduce the survival rate of malignant cells and GST gene expression (Gorbanzadeh and Zaefizadeh, 2017). Clinical studies have proven the positive effect of *Crocus sativus* on erectile dysfunction through increasing of sperm motility and normal morphology (Maleki-Saghooni et al., 2018). Another species from the same genus, *Crocus vallicola* may have same potential consistency with its ethnobotanical usage. *Primula veris* has been shown to have a cardioprotective effect in experimental chronic heart failure in relation to its flavonoid content. The effect was evidenced in an in vivo study with lessen animal deaths, decreasing in the level of chronic heart failure markers in experimental animals, and increasing in myocardial contraction and relaxation rate. *Primula veris* has been shown to display an increasing effect of an increase inventricular pressure level compared to the control group (Latypova et al., 2019). *Primula veris* and *Primula auriculata* have been revealed to include rich and similar flavonoid content (Kurt-Celep et al., 2022; Latypova et al., 2019). The ethnobotanical use of *Primula auriculata* in cardiac dysrhythmia may be related to its flavonoid content like *Primula veris*. Accordance with the ethnobotanical uses for infertility, oral administration of *Urtica dioica* extract has been found to improve reproductive function by improving antioxidant activity in polycystic ovary syndrome (PCOS) induced mice. The extract also has been shown to have increasing effect of the number of recovered oocytes, normal oocytes, blastocysts, as well as the fertilization rate, which are all reproductive parameters (Bandariyan et al., 2021).

In this study, the usage of the different plant part types, new preparation method and/or administration were revealed for specified medicinal taxa mentioned in therapeutic uses in literature data or not. Some of them are expressed as follows: Ash of *Sambucus ebulus* root was mixed with butter to treat wounds, sap of *Beta vulgaris* root were applied as intranasal for sinusitis, leaves of *Alnus glutinosa* were wrapped on all body for malaria, sap of *Betula litwinowii* obtained by heating was applied as otic for earache and as buccal for toothache, the white part of ash obtained from *Corylus avellana* stem were administered as epidermal for eczema, ointment with butter of *Alkanna*

orientalis aerial parts was used as epidermal to treat sore throat, sap of *Rhododendron ponticum* stem obtained by heating and conctacting with cold metal were used for treatment of burn and eczema, sap of *Rhododendron ponticum* stem was applied as sublingual for jaundice, to treatment wound, ash of *Quercus petraea* bark was applied and, then covered its acorn handle, decoction of *Rubus ideaus* was used as mouthwash for aphthae, steam of *Urtica dioica* were administered as intravaginal for gynaecological diseases or infertility.

Herbal medicinal mixtures have been proven to enhance of the therapeutic effectiveness for many diseases based on synergistic effects (Tugume and Nyakoojo, 2019). Nine different herbal mixtures (called A, B, C, D, E, F, G, H, I) that are used for various diseases were exhibited in this study (Table 3). Leaves of *Beta vulgaris*, *Plantago major*, and *Rumex acetosella* generated mixture A, which was prepared as a maceration with egg yolk for treatment of knee pain. Mixture B included leaves of *Allium ampeloprasssum*, *Angelica sylvestris* and *Rumex acetosella* were taken orally for its antihelmintic effect and applied epidermally as mush for wound healing effect. Mixture C consisted of aerial parts of *Alchemilla pseudocartalinica*, *Mentha longifolia*, and *Urtica dioica* were used for sedative effect as decoction form by oral. Mixture D comprised of *Mentha longifolia* leaves, aerial parts of *Thymus nummularius*, *Alchemilla pseudocartalinica*, and *Urtica dioica*, *Smilax excelsa* shoot were remarked to treaturinary tract infections as a decoction by oral. Mixture E contained *Thymus praecox* aerial parts, *Urtica dioica* seed, *Vitis labrusca* fruit were applied to the body with a cloth as maceration with buttermilk for cold and fever. Aerial part of *Lycopodium clavatum* and *Zea mays* constituted mixture F and used for the treatment of bronchitis as a decoction by oral. *Plantago major* leaves and *Urtica dioica* created mixture G and used for heart diseases and treatment of hemorrhoid as maceration with honey by oral. Aerial parts of *Rumex pulcher* and *Urtica dioica* are composed of mixture I applied epidermally for healing knee pain asmush. In this study, *Urtica dioica* has been revealed to be the most preferred taxon for herbal mixtures

4. Conclusion

The present study is a comprehensive ethnobotanical study to reveal and report the medicinal taxa for 80 villages in Trabzon. For the first time, ethnobotanical surveys of some villages were substantiated. A total of 119 medicinal plant taxa belonging to 55 families were recorded via face-to-face interviews with 645 participants, mostly over 50 years old. Nineteen medicinal taxa for Trabzon province were documented for the first time. Some novelties about traditional therapeutic uses, preparation methods, and/or types of administration methods of medicinal taxa were ascertained through the present study. Novel herbal mixtures were determined for the treatment of various diseases. The obtained ethnobotanical preliminary data is a valuable source for the researchers working with medicinal plants. Our records can guide further investigation to uncover novel plant-derived drugs and molecules. In addition, with this study valuable information about medical taxa were recorded for pass on to the next generations.

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Authors' contributions

Sila Ozlem Sener devised the manuscript, performed face-to-face interviews with participants, collected plant materials, organizated ethnobotanical data, performed statistical analysis, and conducted literature search. Kamil Coskuncelebi performed face-to-face interviews with participants, collected plant materials, identified plant materials, generated herbarium records, revised the statistical analysis and revised the manuscript. Salih Terzioglu performed face-to-face interviews with participants, collected plant materials, identified plant materials and generated herbarium records, revised the manuscript. Aleyna Nalcaoglu performed face-to-face interviews with participiants, literature search and revised the manuscript. Tugce Pelin Gençkaya generated herbarium records, literature search, revised the manuscript. Ufuk Ozgen performed face-to-face interviews with participants. Merve Yüzbaşıoğlu Baran generated performed literature search and statistical analysis, revised the manuscript.

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