



Folk medicinal plants of Yeniçağa (Bolu-Türkiye)

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Abstract This ethnobotanical pharmaceutical study was carried out in the Yeniçağa district of Bolu Province, situated in northwest Anatolia. Our objectives were to gather and identify taxa utilized by locals for medicinal purposes, and to provide insights into traditional folk medicine practices. The collecting of plants took place during several excursions made between May 2017 and September 2018. The collected data were organized based on use reports (UR). As well, calculations were made for the cultural importance index (CI) and informative consensus factor (F_{IC}) of the data. The study identified 92 plant taxa belonging to 34 families utilized as folk medicine. According to the URs, the findings indicate that plants were predominantly employed for treating wounds, colds, diabetes, headaches, diarrhea and as sedatives. The CI values revealed that the most prominent medicinal plant species were *Hypericum perforatum* L. (0.59), *Thymus longicaulis* subsp. *longicaulis* C. Presl. (0.59), *Rubus aetnicus* Weston (0.55), *Rosa canina* L. (0.51), and *Papaver rhoeas* L. (0.49). The most prevalent families included Asteraceae (17.4%), Lamiaceae (10.9%) and Rosaceae (7.6%). Neurological system disorders (0.87), endocrine/metabolic and nutritional system disorders (0.85), skin disorders (0.84), respiratory system disorders

(0.80) and cardiovascular system disorders (0.79) had the highest FIC values. Within the research area, 12 taxa were recorded for the first time as being used medicinally in Türkiye. Traditional medicine remains prevalent within the community, particularly in rural villages of the research area.

Keywords Ethnobotany · Folk medicinal plants · Yeniçağa · Bolu · Türkiye

Introduction

Since they first appeared, humans have maintained a reciprocal relationship with both animate and inanimate entities, as can be understood from early archaeological findings. Humans have used plants primarily for food and medicine, and secondarily for clothing, fuel, toys, etc. (Yıldırım 2004; Kendir and Güvenç 2010; Faydaoğlu ve Sürücüoğlu 2011; Öztürk et al. 2016; Pandey and Tripathi 2017; Tunon et al. 2024). This knowledge, initially acquired through trial and error, has been transmitted to the present. Out of this millenia-old connection between humans and plants was born the science of ethnobotany, where the serious research carried out is now universally recognised as important (Kendir and Güvenç 2010; Öztürk et al. 2016).

Ethnobotany is the field of ethnobiology that analyses the direct relations between humans and biota and the mutual relationship between plants

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and humans. It is a branch of science that examines the folk culture related to the plants in a region, the relationship between the people living in that region and those plants, and the plants that have a role in the life of those people (Tuzlacı 2016; Albuquerque et al. 2017). Ethnobotany is the study of all the kinds of plants significant to the people in a region. It studies both the practical roles of plants—for medicine, food, cosmetics, dyes, construction, tools, toys and clothing—and the intangible roles of plants—for rituals, divination, social life and music (Yıldırım 2004; Öztürk et al. 2016; Łuczaj et al. 2024; Tunon et al. 2024).

Ethnobotanical research provides a great deal of valuable information about both past and present relationships among plants and societies. This information has been acquired through trial and error and transmitted across generations. Ethnobotanical research plays a critical role in the transfer of this information to future generations (Yıldırım 2004; Tuzlacı 2006; Öztürk et al. 2016; Tuzlacı 2016; Pandey and Tripathi 2017). These ethnobotanical studies ensure the protection of ethnobotanical information that has become a traditional heritage, of endemic and relict plants, and of plants that are genetic resources. As well, these studies ensure the transfer of the obtained information and cultural heritage to future generations (Öztürk et al. 2016). Furthermore, the information obtained from these studies constitutes an important resource in determining the medicinal and economic value of plants and in developing new drugs in the pharmaceutical industry (Tuzlacı 2006; Öztürk et al. 2016; Albuquerque et al. 2017; Pandey and Tripathi 2017).

With the whole European continent containing approximately 12,000 plant taxa, according to “Flora of Turkey and the East Aegean Islands”, the flora of Türkiye is strikingly diverse and abundant: approximately 13,000 taxa, including subspecies and varieties, and 1251 genera belonging to 174 families (Davis 1965–1985; Davis et al. 1988; Güner et al. 2000; Özhatay et al. 2019). The total number of endemic taxa in all European countries is approximately 2750; the total number in Türkiye exceeds 4000, making the country exceptionally rich in endemic species (Özhatay et al. 2019).

Türkiye, possessing this bountiful and diverse flora and this broad natural distribution of wild forms of many cultivated plants, and being the

centre of differentiation of many genera and sections, is an especially rich area for ethnobotanical studies (Tuzlacı 2006; Kendir and Güvenç 2010).

However, it is now indisputable that this wealth is under great threat. As in countless regions of the world, development projects in Türkiye—agriculture, animal husbandry, forestry, industry, urbanization and water resource use—are negatively affecting plant habitats. This damage has occurred over the last forty years.

In a study that is a step taken towards protecting Türkiye’s rich plant areas and that determined these areas systematically and comprehensively, 122 places have been designated as important plant areas (IPA). There are 18 IPAs in the Black Sea Region, which includes our research area. Four of these 18 IPAs encompass the lands of Bolu Province; notably, one of them (Yeniçağa Lake IPA No: 21) is located within the boundaries of Yeniçağa district (Byfield and Özhatay 2005).

Yeniçağa Lake IPA in northwestern Anatolia covers Türkiye’s largest calcareous peat bog and basin lake. With its rich peat flora, this region hosts many rare taxa including *Carex lasiocarpa* Ehrh., *Najas marina* subsp. *marina* L., *Pedicularis karoii* Freyn, *Ranunculus lingua* L. and *Jacobaea paludosa* (L.) G.Gaertn., B.Mey. et Scherb. However, the area currently faces serious threats from peat extraction, afforestation, drainage of peatland areas, and the flow of wastewater from residential areas into the lake. These threats led the area, which was previously classified ‘Endangered Habitats’ according to the Bern Convention (Byfield and Özhatay 2005), to be approved as a ‘Wetland of National Importance’ in 2014 (<https://bolge9.tarimorman.gov.tr>, Accessed: 27.12.2024). This designation further increases the importance of the region in terms of nature conservation.

The district’s significant flora, particularly around the lake area, has deteriorated because of the reasons listed above and because of the increased urbanization and development of sectors such as logistics and health following from the building of highways crossing the district. These factors have led to an inevitable decline in the local knowledge of plants. The region is thus worth investigating from this perspective.

Our research was carried out with field studies to determine the plants with a long history of utilization for therapeutic purposes by the inhabitants of Yeniçağa district.

The objectives of this study were to

- Collect and identify plants employed for therapeutic purposes by the locals in Yeniçağa, along with associated traditional knowledge,
- Compare this information with previously conducted ethnobotanical studies in Türkiye to identify and document novel traditional plant uses specific to the country.
- Contribute novel ethnobotanical data to the scientific literature that can inform and guide future ethnopharmacological studies.

Materials and methods

Study area

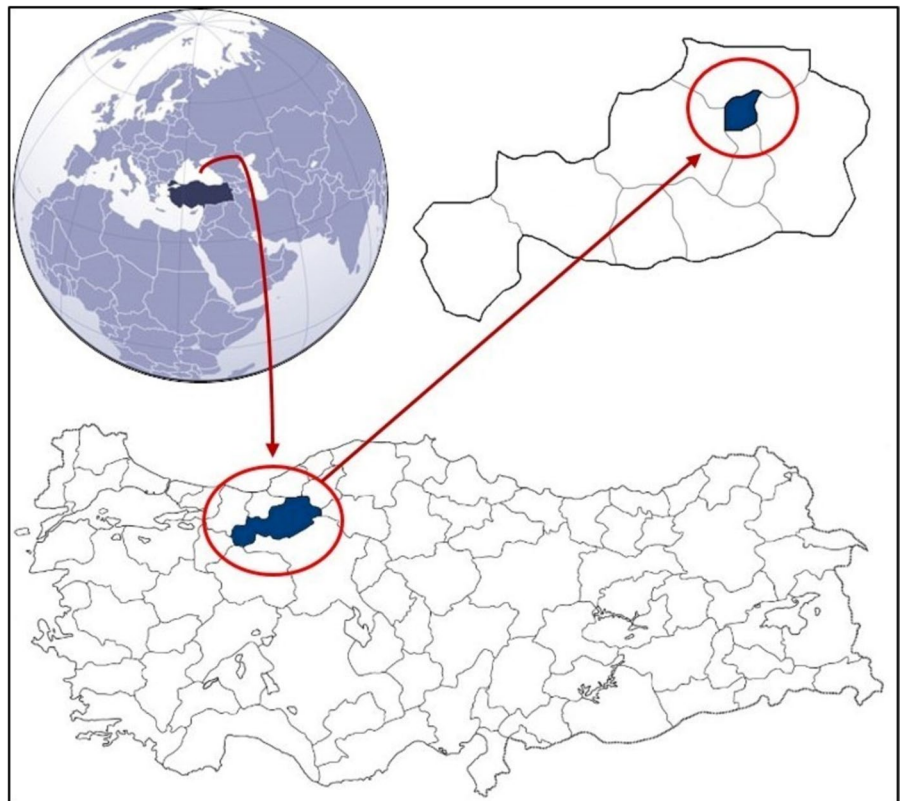
Yeniçağa (40° 44' 40"–40° 51' 33" N, 31° 55' 57"–32° 07' 52" E) is a district of Bolu Province located in the Western Black Sea region of Türkiye (<https://earth.google.com>, Accessed: 27.12.2024) (Fig. 1). Bolu City is in the west of the province, Gerede district in

the east, Dörtdivan district in the south and Mengen district in the north. Yeniçağa district, also in the west of the province, is 37 km from Bolu City, 150 km from Ankara and 305 km from Istanbul (<http://www.yenicaga.bel.tr>, Accessed: 27.12.2024). Yeniçağa Lake, with an elevation of 989 m and an area of approximately 286 hectares, is located just north of the town of Yeniçağa (Fig. 2).

The town of Yeniçağa is located on the shore of Yeniçağa Lake, on a small plain made by the alluvium filling of a depression formed as a result of the activities of the North Anatolian Fault Line (Yalçiner 1996). Yeniçağa Plain forms a lowland between the highlands in the north and south, and has an average elevation of 1000 m. The surface area of the district is 225 km². Kocabaş Mountain is the highest point of the district at 1150 m (Figs. 3 and 4) (<http://www.yenicaga.bel.tr>, Accessed: 27.12.2024).

The history of Yeniçağa district dates back seven centuries, when today's Eskiçağa Village was founded in a valley among three hills. The settlement was called Çağa at that time, and was a town in Gerede district (YENKAV 2024). Çağa suffered

Fig. 1 Geographical location of Yeniçağa in Bolu-Türkiye



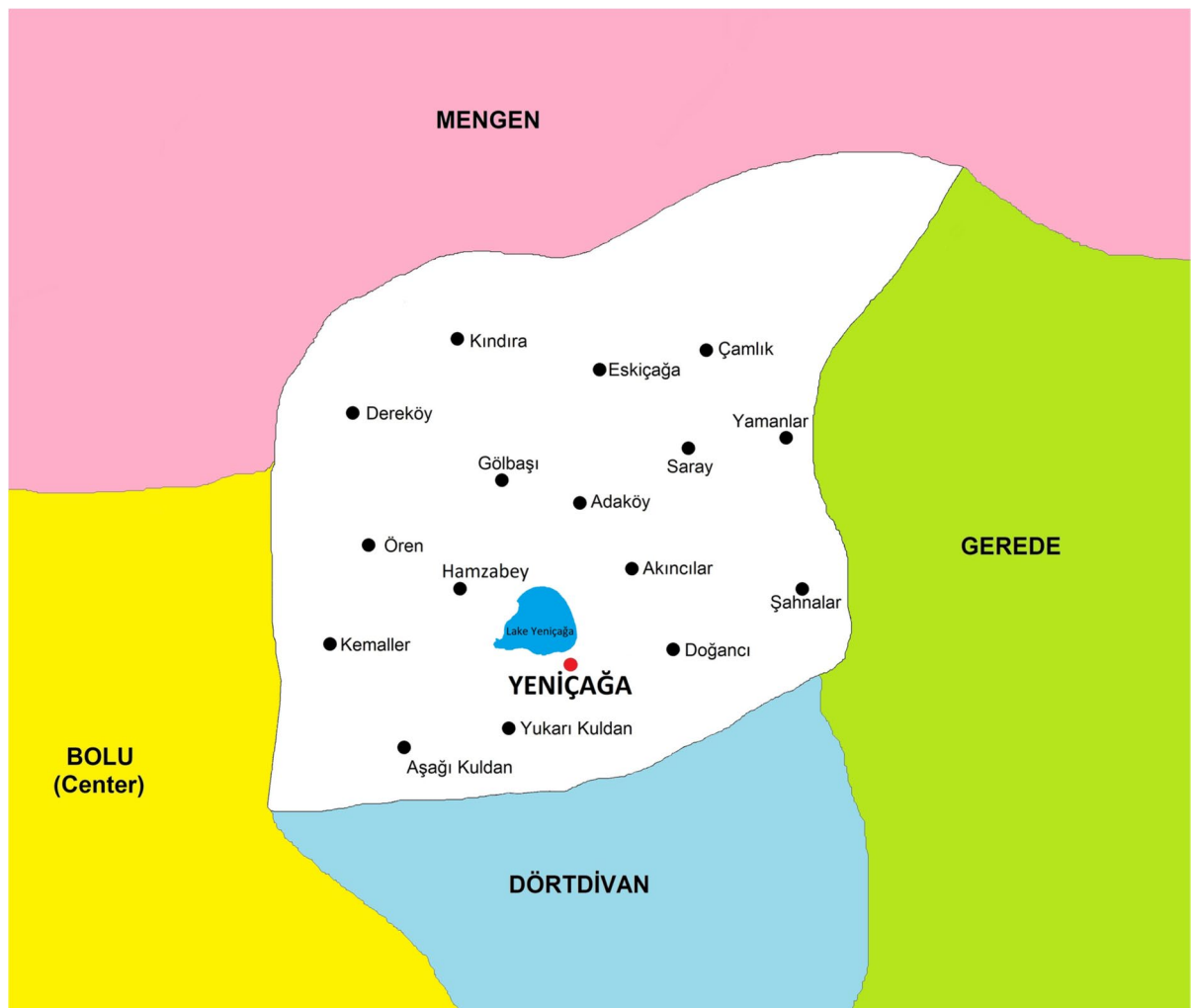


Fig. 2 Villages of Yeniceağaç

Fig. 3 A view from the settlement by Yeniceağaç Lake



Fig. 4 A view from the shore of Yeniçağa Lake



extensive damage from two great fires in the nineteenth and twentieth centuries, and the inhabitants relocated to the larger area south of the lake. They established today's town of Yeniçağa there in 1910. Çağa thus lost its former importance and became the village of Eskiçağa in Yeniçağa district (<http://www.yenicaga.bel.tr>, Accessed: 27.12.2024).

The cultural heritage of the district includes 14 th-century mosques, tombs and baths (YENKAV 2024).

Yeniçağa, the smallest (2.71%/225 km²) district of Bolu Province, has 16 villages: Hamzabey, Akıncılar, Doğancı, Saray, Adaköy, Ören, Şahnalar, Dereköy, Kemaller, Aşağı Kuldán, Yukarı Kuldán, Yamanlar, Kındıra, Gölbaşı, Çamlık and Eskiçağa. The town of Yeniçağa has 3 neighbourhoods: Asilbey, Camiatik and Gölyüzü (Fig. 2, Table 1) (SBB 2024; <http://www.yenicaga.gov.tr>, Accessed: 27.12.2024).

The 2024 census puts the total population of the district at 6585, with 4290 residents in the town and 2295 in the villages (TUIK 2024). The language of the district is Turkish. The study area is characterized by a homogeneous demographic structure, with no significant cultural, ethnic, or religious differences observed.

Yeniçağa Lake, a 'Wetland of National Importance', harbours many kinds of fish and bird species and has a bird observation tower and a viewpoint on its shore. The lake is also an area where people spend recreational time: bird, plant and butterfly-watching, photo safaris, nature walks, cycling tours,

fishing, water sports, etc. (<https://bolge9.tarimorman.gov.tr>; <http://bolu.gov.tr>; <http://www.yenicaga.bel.tr>, Accessed: 27.12.2024).

Agricultural activity in the region is relatively low. Wheat, barley and oats are the main grain crops; apples, pears, plums, beans and squash are the main fruits and vegetables. In addition, sugar cane, vetch and corn are grown as feed. Poultry farming, bee-keeping, and cattle and sheep breeding are also carried out. The main underground resources of the district are iron, lignite, kaolin, mineral water and peat (<http://www.yenicaga.gov.tr>, Accessed: 27.12.2024).

The mountains in northern Anatolia run east–west, with three ranges in the west and two in the east. The western ranges—the Bolu, Abant and Koroğlu mountains—are located in Bolu Province in the Western Black Sea region (Özhatay et al. 2005).

Yeniçağa is in the Western Black Sea climatic zone and is influenced by the Marmara and the central Anatolian climatic zones. The district experiences hot and dry summers, and cold and rainy winters, with an annual average temperature of 10.5 °C. Although rainfall is expected in every season in the district, the highest precipitation falls in winter, while the lowest is observed in summer. The annual average precipitation is 554.8 mm (MGM 2025).

The district is located in the Euxine section of the Euro-Siberian phytogeographic region. As in most Euxine regions, areas below the tree line are covered with forests—except where they have been damaged

Table 1 Visited villages of Yeniçağa

Village name	Gps	Altitude (m)	Ecology	Number of inhabitants	Number of interviews
Adaköy	40° 47' 47" N 32° 02' 50" E	1001	Coastal lands and agricultural lands	139	3
Akıncılar	40° 47' 13" N 32° 03' 00" E	1005	Coastal lands and agricultural lands	179	3
Aşağı Kuldan	40° 45' 34" N 31° 59' 55" E	1066	Mixed forests and agricultural lands	117	3
Çamlık	40° 48' 57" N 32° 04' 08" E	1199	Woodland and agricultural lands	86	2
Dereköy	40° 48' 35" N 31° 57' 29" E	1112	Coniferous forest and agricultural lands	164	4
Doğancı	40° 46' 21" N 32° 04' 01" E	1108	Agricultural lands	174	3
Eskiçağa	40° 49' 09" N 32° 01' 57" E	1038	Coniferous forest and agricultural lands	101	3
Gölbaşı	40° 48' 07" N 32° 01' 20" E	1078	Agricultural lands	114	4
Hamzabey	40° 47' 13" N 31° 59' 47" E	1000	Coastal lands and agricultural lands	300	3
Kemaller	40° 46' 51" N 31° 57' 41" E	1184	Woodland and agricultural lands	98	4
Kındıra	40° 43' 06" N 31° 45' 25" E	1019	Coniferous forest and agricultural lands	130	3
Ören	40° 47' 39" N 31° 57' 55" E	1088	Woodland and agricultural lands	136	4
Saray	40° 48' 09" N 32° 04' 08" E	1090	Woodland and agricultural lands	156	3
Şahnalar	40° 46' 28" N 32° 04' 55" E	1141	Shrublands and agricultural lands	167	2
Yamanlar	40° 48' 34" N 32° 06' 35" E	1239	Coniferous forest and agricultural lands	115	4
Yukarı Kuldan	40° 45' 32" N 32° 01' 17" E	1098	Agricultural lands	119	3

and replaced by shrubs. The forests at lower elevations are generally composed of deciduous trees and often evergreen shrubs; at higher elevations, conifers are more numerous and even dominant (Davis 1965).

No previous study of flora has covered the entire Yeniçağa district. However, there has been one study of the flora of Yeniçağa Lake. It identified a total of 345 taxa, 12 of which are endemic (Sümer 2002). In addition, to confirm the preliminary data of the study, the plants registered in “Flora of Turkey and the East Aegean Islands” were scanned and 74 taxa, 3 of which are endemic, were identified (Davis 1965–1985; Davis et al. 1988; Güner et al. 2000). Even the findings acquired from the lake area alone revealed the floristic richness of the region.

Some of the most prevalent and commonly observed trees, shrubs and herbs documented in our study area were *Pinus sylvestris* var. *hamata* Steven, *Quercus* spp., *Cornus mas* L., *Pyrus elaeagnifolia* Pall., *Crataegus* spp., *Tilia rubra* subsp. *caucasica* (Rupr.) V.Engl., *Fagus orientalis* Lipsky, *Rosa canina* L., *Corylus avellana* var. *avellana* L., *Anchusa azurea* Mill., *Centaurea* spp., *Echium vulgare* L., *Euphorbia* spp., *Convolvulus arvensis* L., *Hypericum perforatum* L., *Salvia* spp., *Ranunculus constantinopolitanus* d'Urv., *Senecio leucanthemifolius* subsp. *vernalis* (Waldst. et Kit.) Greuter, *Vicia* spp., *Lythrum*

salicaria L., *Petasites hybridus* (L.) G.Gaertn., B.Mey. et Scherb. and *Polygala anatolica* Boiss. et Heldr.

Field study and data collection

This ethnobotanical study aimed to gather and compile information about the use of wild plant taxa in the research area for food, medicine and other purposes. To this end, a 25-day field study was carried out in the 3 neighbourhoods and 16 villages of Yeniçağa district in 2017 and 2018. The study was done during various months and seasons in order to take into account the growth periods of the plants. This study was conducted using methods in accord with the best practices in ethnobotanical and ethnopharmacological research (Ghorbani et al. 2006; Martin 2010; Leonti 2022).

All settlements were visited in these field studies, and information was collected by interviewing a total of 51 local residents (17 men, 34 women): housewives, farmers, mukhtars, shepherds, workers, civil servants and other occupations. Ethnobotanical information was also obtained from an open-ended questionnaire (Appendix). Prior to each interview, verbal information was given and consent was obtained. The

Code of Ethics of the International Society of Ethnobiology (ISE 2008) was adhered to.

The interviews were conducted in various places (houses, gardens, tea and coffee houses, fields and forests) in the form of conversations. In the questionnaire (Appendix), the interviewees were asked about the traditional use of plants as food, as treatments and as other functions (fuel, ornaments, toys, etc.). During the interviews, all the information given by the interviewees was recorded: the local names used for medicinal plants, the names of the parts of these plants, the disorders for which they are used, their effects, and their methods of preparation and application; the local names used for food plants, the names of the parts of these plants and the methods of preparation; and the plants used for different functions (Fig. 5).

Afterward, all the plants that were referred to were photographed and collected.

Yeniçağa is located in square 'A4' according to the quadratic system in "Flora of Turkey and the East Aegean Islands" (Davis 1965–1985; Davis et al. 1988; Güner et al. 2000). Thus, all collected specimens were located in this square.

The plant specimens gathered from the study area were given special numbers in the Marmara University Faculty of Pharmacy Herbarium (MARE), dried and kept in a deep freezer ($-18\text{ }^{\circ}\text{C}$) for at least two days. They were then glued to cardboard and labelled, and became herbarium specimens. These specimens

were identified using "Flora of Turkey and the East Aegean Islands" (Davis 1965–1985; Davis et al. 1988; Güner et al. 2000), "Illustrated Flora of Turkey Vol 2" (Güner et al. 2018) and the faculty herbarium, and are now stored in the Marmara University Faculty of Pharmacy Herbarium (MARE).

The scientific names of taxa were checked using "List of Plants of Turkey" (Güner 2012) and updated according to World Flora Online (WFO 2024). Plants cultivated in the region were marked with (*) after their names.

Calculations

Ethnobotanical data were collected from a total of 51 local people, who stated that they used plants for treatments. The use report (UR), cultural importance index (CI) and informant consensus factor (F_{IC}) were utilized as quantitative methods for the use and importance of plants in the region (Tables 2, 3).

The utilisation report (UR) is the sum of all informants in each use category for a species or the sum of all utilisation reports in each use category (Tardío and Pardo-De-Santayana 2008). The evaluation of each UR of a species with a UR helps us to determine the sociocultural importance of plants (Heinrich 2000). For this reason, plants used by more than one reporter for a use category are considered culturally important, while plants used by only one or



Fig. 5 Frames from the interviews in the research area

Table 2 Folk medicinal plants of Yeniçağa (Bolu-Türkiye)

Botanical name, Family and Specimen number	Local name	Plant part used	Ailments treated/ Therapeutic effect	Preparation	Administration, dosage	Rpt	CI	References
APIACEAE								
<i>Ammi majus</i> L., MARE 20948	Diş otu, Kürdan otu	Fruits	Appetiser	Decoction	Int	6	0.12	(113) ^b
ARACEAE								
<i>Arum euxinum</i> R.R.Mill., MARE 20852	Nivik, Yılan otu, Yılan biçağı	Tuber	Hemorrhoids Anemia Cardiovascular diseases	Infusion - -	Ext Int Int	3 3 3	0.18	Hemorrhoids (27) (27) ^b
ASTERACEAE								
<i>Anthemis cretica</i> L., MARE 20914	Papatya	Capitula	Headache	Infusion	Int	9	0.18	(4,45,61,66,73,78,109) ^b
<i>Arctium minus</i> (Hill) Bernh., MARE 20952 [Syn.: <i>A. minus</i> (Hill) Bernh. subsp. <i>minus</i>]	Diken otu	Aerial parts	Abdominal pain	Infusion	Int	3	0.06	(1,27,30,80,96,102,108,111) ^b
<i>Carduus acanthoides</i> subsp. <i>acanthoides</i> L., MARE 20919	Deve dikenini, Diken otu, Saka dikenini	Capitula	Constipation	Infusion	Int	3	0.06	(83) ^b
<i>Centaurea depressa</i> M.Bieb., MARE 20862, 20,879	Bozbaş otu, Gökbaş otu, Peygamber çiçeği	Aerial parts	Appetiser Analgesic Kidney diseases Skin diseases	Infusion Infusion Infusion Bath	Int Int Int Ext	4 3 2 6	0.30	Appetiser (28) (48,68) ^b
<i>Centaurea solstitialis</i> subsp. <i>solstitialis</i> L., MARE 20942,20,953	Çakırdikenini	Capitula Aerial parts	Stomach ulcer	Infusion	Int	6	0.12	(1,17,21,27,47,61,65,68,75,76,81, 85,97,99,103,104,110) ^b
<i>Cirsium hypoleucum</i> DC., MARE 20963	Deve dikenini, Mor diken	Aerial parts	Stomach disorders	Infusion	Int	3	0.06	(50) ^b

Table 2 (continued)

Botanical name, Family and Specimen number	Local name	Plant part used	Ailments treated/ Therapeutic effect	Preparation	Administration, dosage	Rpt	CI	References
<i>Cota tinctoria</i> (L.) J.Gay, MARE 20949 [Syn.: <i>Anthemis tinctoria</i> L. var. <i>discoidea</i> (All.) DC.]	Papatya	Capitula	Skin diseases	Infusion	Ext	3	0.06	(25,37,45,59,65,68,70,72,86,93,103,111,112) ^b
<i>Cota tinctoria</i> subsp. <i>parnassica</i> (Boiss. et Heldr.) Oberpr. et Greuter, MARE 20898 [Syn.: <i>Anthemis tinctoria</i> L. var. <i>pallida</i> DC.]	Papatya	Capitula	Insomnia Sedative	Infusion Infusion	Int Int	1 2	0.06	Sedative (17) (17,19,52) ^b
<i>Helichrysum graveolens</i> (M.Bieb.) Sweet, MARE 20979	Altun otu	Aerial parts	Weight loss Digestive system diseases	Infusion Infusion	Int Int	5 6	0.30	(31,49) ^b
<i>Jacobaea erratica</i> (Bertol.) Fourr., MARE 20988 [Syn.: <i>Senecio aquaticus</i> Hill subsp. <i>erraticus</i> (Bertol.) Mathews]	Kanarya otu	Aerial parts	Gallstone Diarrhea	Infusion Infusion	Int Int	4 6	0.12	(28) ^b
<i>Leontodon hispidus</i> var. <i>hispidus</i> L., MARE 20925	Aslan otu, Karahindiba	Aerial parts	Digestive system diseases	Infusion	Int	3	0.06	(28) ^b
<i>Petasites hybridus</i> (L.) G.Gaertn., B.Mey. et Scherb., MARE 20895	Devetabani, Kabalak otu	Leaves	Swelling Boil Analgesic	Decoction Poultice Decoction	Ext Ext Ext	2 1 3	0.12	Analgesic (22,28) Swelling (28) (12,22,83) ^b

Table 2 (continued)

Botanical name, Family and Specimen number	Local name	Plant part used	Ailments treated/Therapeutic effect	Preparation	Administration, dosage	Rpt	CI	References
<i>Senecio leucanthemifolius</i> subsp. <i>vernalis</i> (Waldst. et Kit.) Greuter, MARE 20846, 20,858 [Syn.: <i>S. vernalis</i> Waldst. et Kit.]	Kanarya otu	Aerial parts	Diarrhea Emmenagogue	Decoction Decoction	Int Int	5 4	0.18 (35,80,99) ^b	Emmenagogue (28)
<i>Taraxacum pseudobrachyglossum</i> Soest, MARE 20841	Karahindiba	Aerial parts	Sedative Digestive system diseases	Infusion Infusion	Int Int	5 4	0.18 (28) ^b	
<i>Tripleurospermum rosellum</i> var. <i>album</i> E.Hossain, MARE 20859, 20,876	Papatya	Capitula	Insomnia Sedative Skin diseases Stomach disorders	Infusion Infusion Infusion Infusion	Int Int Ext Int	3 2 6 1	0.23 (32) ^b	Sedative (32)
<i>Tripleurospermum tenuifolium</i> Freyn ex Freyn et E.Brandis, MARE 20980	Papatya	Capitula	Skin care	Infusion	Ext	4	0.08	–
BETULACEAE								
<i>Corylus avellana</i> var. <i>avellana</i> L. ^a , MARE 20958, 20,992	Dağ fındığı	Seed	Cardiovascular diseases	-	Int	3	0.12	Cardiovascular diseases (15,31,43,49,74)
		Leafy branches	Diabetes	Infusion	Int	3	(27,29,31,43,96,110) ^b	
BORAGINACEAE								
<i>Anchusa azurea</i> Mill., MARE 20904, 20,907 [Syn.: <i>A. azurea</i> Miller var. <i>azurea</i>]	Sığirdili	Aerial parts	Sedative Eczema	Infusion Macerated in olive oil	Int Ext	6 6	0.23	Eczema (28) Sedative (28) (54,59,60,66,70,72,74,75,88,89,91,104,111,112) ^b

Table 2 (continued)

Botanical name, Family and Specimen number	Local name	Plant part used	Ailments treated/ Therapeutic effect	Preparation	Administration, dosage	Rpt	CI	References
<i>Anchusa leptophylla</i> Roem. et Schult., MARE 20847, 20,954 [Syn.: <i>A. leptophylla</i> Roem. et Schult. subsp. <i>leptophylla</i>]	Ballık, Engerek otu, Sigirdili	Aerial parts	Antipyretic Headache	Infusion Infusion	Int Int	1 5	0.12 (28) ^b	
<i>Cerinth minor</i> subsp. <i>auriculata</i> (Ten.) Domac, MARE 20851	Alacakız, Livarotu	Aerial parts	Abdominal pain	Decoction	Int	3	0.06 (58) ^b	Abdominal pain (28)
<i>Echium vulgare</i> L., MARE 20906, 20,978	Engerek otu	Aerial parts	Headache Antipyretic	Infusion Infusion	Int Int	5 4	0.23	Skin care (28) Headache (109)
<i>Myosotis arvensis</i> Hill, MARE 20831, 20,877 [Syn.: <i>M. arvensis</i> (L.) Hill subsp. <i>arvensis</i>]	Mine çiçeği, Unut- mabeni, Kan otu	Fruits Aerial parts	Skin care Insomnia Sedative Cold	Crushed Infusion Infusion Infusion	Ext Int Int Int	3 3 2 4	0.18	–
<i>Onosma cinerea</i> Schreb., MARE 20864 [Syn.: <i>O. tauricum</i> Pallas ex Willd. var. <i>tauricum</i>]	Emzik otu	Aerial parts	Wound	Soaked in water for a while	Ext	3	0.06	–
BRASSICACEAE <i>Alyssum trichos- tachyum</i> Rupr., MARE 20866, 20,889 [Syn.: <i>A. repens</i> Baumg. var. <i>stenophyllum</i> Hal.]	Kuduz otu, Kirkuduz otu	Aerial parts	Kidney diseases Abdominal pain	Decoction Decoction	Int Int	2 4	0.12	–

Table 2 (continued)

Botanical name, Family and Specimen number	Local name	Plant part used	Ailments treated/ Therapeutic effect	Preparation	Administration, dosage	Rpt	CI	References
<i>Capsella bursa-pastoris</i> Medik., MARE 20868	Çobançantası	Aerial parts	Kidney diseases	Decoction	Int	1	0.12	Diarrhea (28)
			Urinary tract diseases	Infusion	Int	1		Emmenagogue (28) Kidney diseases (36,38,53) Urinary tract diseases (30)
			Diarrhea	Decoction	Int	1		(10,17,22,24,25,29,30,34,36,38,46, 50,53,59,60,70,73,76,86,88,91, 93,95,99,106,107,111) ^b
			Emmenagogue	Infusion	Int	3		
CAPRIFOLIACEAE								
<i>Lomelosia argentea</i> (L.) Greuter et Burdet, MARE 20947 [Syn.: <i>Scabiosa argentea</i> L.]	Süprüge otu, Yazı süprügesi	Aerial parts	Scabies	Infusion	Ext	3	0.06	Scabies (60,70) (28) ^b
CARYOPHYLLACEAE								
<i>Dianthus carthusianorum</i> L., MARE 20933	Karanfil otu	Aerial parts	Antiseptic	Infusion	Ext	3	0.06	–
<i>Moenchia mantica</i> (L.) Bartl., MARE 20888, 20916 [Syn.: <i>M. mantica</i> (L.) Bartl. subsp. <i>mantica</i>]	Dördüz otu	Aerial parts	Urinary tract diseases	Infusion	Int	6	0.12	–
<i>Silene vulgaris</i> (Moench) Garcke, MARE 20911 [Syn.: <i>S. vulgaris</i> (Moench) Garcke var. <i>vulgaris</i>]	Gıvışkan otu, Yumurta otu	Whole plant	Urinary tract diseases Digestive system diseases	Infusion Infusion	Int Int	2 1	0.06	Urinary tract diseases (34,60,70,86) Digestive system diseases (91) (53,91) ^b
<i>Stellaria media</i> (L.) Vill., MARE 20863 [Syn.: <i>S. media</i> (L.) Vill. subsp. <i>media</i>]	Kuş otu, Serçe otu	Aerial parts	Kidney diseases Diuretic Eczema	Infusion Infusion Infusion	Int Int Ext	6 3 3	0.23	Diuretic (28) (12,25,35,38,50) ^b

Table 2 (continued)

Botanical name, Family and Specimen number	Local name	Plant part used	Ailments treated/ Therapeutic effect	Preparation	Administration, dosage	Rpt	CI	References
CELASTRACEAE								
<i>Euonymus europaeus</i> L., MARE 20991	Koçara	Leafy and fruiting branches	Psoriasis	Macerated in olive oil	Ext	9	0.18	–
<i>Euonymus latifolius</i> subsp. <i>latifolius</i> Mill., MARE 20962	Koçara	Leafy and fruiting branches	Psoriasis	Macerated in olive oil	Ext	9	0.18	–
CONVOLVULACEAE								
<i>Convolvulus arvensis</i> L., MARE 20905, 20,920	Tarla sarmaşığı	Aerial parts	Constipation Prostate disorders Diuretic Wound	Boiled Boiled Boiled Extracted by crushing the stem	Int Int Int Ext	2 2 2 3	0.18	Constipation (58,60,70,85,86) Diuretic (83) Prostate disorders (34) Wound (28,74,95) (34,57,58,70,76,85,86,104) ^b
<i>Convolvulus galaticus</i> Rost. ex Choisy, MARE 20921	Boz sarmaşık, Şemsiye otu, Tarla sarmaşığı	Aerial parts	Toothache	Infusion	Ext	3	0.06	Toothache (99) (47) ^b
CORNACEAE								
<i>Cornus mas</i> L. ^a , MARE 20960, 20,994	Kızılçık, Kiren	Fruits	Diabetes Cold	– Mixed with water and sugar and boiled to prepare ‘Sherbet’	Int. (eaten) Int	3 5	0.35	Antipyretic (17,20,34,44,83) Cold (2,17,31,44,83,91) Diabetes (2,15,17,29,32,36,38,44,45,46,59,94) Stomach ulcer (56) (2,12,15,16,17,20,25,29,30,31,32,34,36,38,39,44,45,52,56,63,73,76,78,81,83,89,91,94,96,110) ^b
<i>Cornus sanguinea</i> subsp. <i>australis</i> (C.A.Mey.) Jáv., MARE 20961	Melez kızılçık	Fruits	Stomach ulcer Weight loss Antipyretic Cold	Mixed with water and sugar and boiled to prepare ‘Sherbet’ Decoction Decoction Decoction	Int Int Int Int	2 7 1 3	0.06	(2,22,29,63) ^b

Table 2 (continued)

Botanical name, Family and Specimen number	Local name	Plant part used	Ailments treated/ Therapeutic effect	Preparation	Administration, dosage	Rpt	CI	References
CUPRESSACEAE								
<i>Juniperus oxycedrus</i> L., MARE 20938 [Syn.: <i>J. oxycedrus</i> L. subsp. <i>oxycedrus</i>]	Ardıç	Cones	Respiratory tract diseases	Decoction	Int	6	0.12	Respiratory tract diseases (28,74,112) (1,2,4,7,11,14,15,19,22,23,32,34,36,48,49,56,57,61,64,65,68,69,71,74,75,76,79,81,83,86,87,89,93,95,96,97,98,102,103,104,105,106,108) ^b
DENNSTAEDTIACEAE								
<i>Pteridium aquilinum</i> (L.) Kuhn, MARE 20918	Eğrelti otu	Rhizome	Anthelmintic	Decoction	Int	3	0.06	Anthelmintic (28,40) (16,43,65,76,83,109) ^b
EQUISETACEAE								
<i>Equisetum palustre</i> L., MARE 20874	Atkuyruğu, Kırk kilit otu, Kurtbağa çamı	Aerial parts	Kidney diseases Cough Rheumatic pain	Infusion Infusion Infusion	Int Int Ext	2 1 3	0.12	Cough (53) Kidney diseases (32) (53,75,104) ^b
EUPHORBACEAE								
<i>Euphorbia amygdaloides</i> L., MARE 20835 [Syn.: <i>E. amygdaloides</i> L. var. <i>amygdaloides</i>]	Sütlegən	Latex	Wart Callosity Wound	– – –	Ext. (1–2 drops) Ext. (1–2 drops) Ext. (1–2 drops)	2 2 2	0.12	Wart (28) (64) ^b
<i>Euphorbia anacampseros</i> var. <i>anacampseros</i> Boiss., MARE 20860	Sütlegən	Latex	Wart Callosity Wound	– – –	Ext. (1–2 drops) Ext. (1–2 drops) Ext. (1–2 drops)	1 1 1	0.06	Wart (28) Wound (75) (28) ^b

Table 2 (continued)

Botanical name, Family and Specimen number	Local name	Plant part used	Ailments treated/ Therapeutic effect	Preparation	Administration, dosage	Rpt	CI	References
<i>Euphorbia pannonica</i> Host, MARE 20923 [Syn.: <i>E. nicaensis</i> All. subsp. <i>glareosa</i> (Pallas ex Bieb.) A. Radcliffe-Smith var. <i>lastocarpa</i> Boiss.]	Sütüğe	Latex	Wart Callosity Wound	– – –	Ext. (1–2 drops) Ext. (1–2 drops) Ext. (1–2 drops)	6 4 2	0.23	(83) ^b
<i>Euphorbia stricta</i> L., MARE 20837	Sütüğe	Latex	Wart Callosity Wound	– – –	Ext. (1–2 drops) Ext. (1–2 drops) Ext. (1–2 drops)	5 2 2	0.18	Callosity (28) Wart (28) (28) ^b
FABACEAE								
<i>Chamaecytisus hirsutus</i> (L.) Link, MARE 20836, 20,878	Keçi tırılı	Aerial parts	Eczema Abdominal pain	Infusion Infusion	Ext Int	3 3	0.12	–
<i>Chamaecytisus supinus</i> (L.) Link, MARE 20891	Poruk otu	Aerial parts	Cardiovascular diseases	Infusion	Int	2	0.06	–
<i>Colutea ciliata</i> Boiss. et Balansa, MARE 20897, 20,993	Patlangaç	Flowering branches	Emmenagogue Pruritus	Infusion Decoction	Int Ext	1 3	0.06	Pruritus (28) (39,58,86,99,108) ^b
<i>Polygala anatolica</i> Boiss. et Heldr., MARE 20838, 20,854, 20,924	Keçisedefi otu	Aerial parts	Diabetes	Decoction	Int	2	0.04	(53,75) ^b
<i>Trifolium officinalis</i> L., MARE 20900 [Syn.: <i>Melilotus officinalis</i> (L.) Desr.]	Sarıyonca, Kokulu yonca	Aerial parts	Diarrhea Rheumatic pain	Infusion Boiled	Int Ext. (as poultice)	2 1	0.06	Rheumatic pain (28,38) (38,48,60,70,86,108) ^b

Table 2 (continued)

Botanical name, Family and Specimen number	Local name	Plant part used	Ailments treated/ Therapeutic effect	Preparation	Administration, dosage	Rpt	CI	References
<i>Vicia dalmatica</i> A.Kern., MARE 20885, 20,901, 20,908 [Syn.: <i>V.</i> <i>cracca</i> L. subsp. <i>stenophylla</i> Vel.]	Meşe figi	Aerial parts	Diabetes	Infusion	Int	3	0.06	(59) ^b
FAGACEAE								
<i>Quercus pubescens</i> subsp. <i>pubescens</i> Willd., MARE 20926, 20,983, 20,996 [Syn.: <i>Q.</i> <i>virgiliana</i> Ten.]	Meşe	Branch bark and leaves	Eczema Skin diseases	Infusion Infusion	Ext Ext	2 4	0.12	(4,8,19,45,74,108) ^b
HYPERICACEAE								
<i>Hypericum perforatum</i> L., MARE 20931, 20,935, 20,944, 20,965, 20,968, 20,970, 20,977	Sarı kantaron	Aerial parts	Sedative Analgesic Cold Diarrhea Wound Burn	Infusion Infusion Infusion Infusion Macerated in olive oil Macerated in olive oil	Int Int Int Int Ext Ext	6 5 3 2 12 2	0.59	Analgesic (15,32,34,43,48,89,90) Burn (15,21,32,34,46,52,73,83,89, 90,93,95,97,98) Cold (4,32,34,44,49,83,105) Diarrhea (38,86) Sedative (15,17,20,29,36,38,39,43, 44,49,56,60,70,106) Wound (7,9,14,15,17,20,21,22,29, 30,32,33,36,38,43,44,46,49,56, 65,68,73,74,76,80,81,83,89,90, 91,93,95,97,98,103,105,106,10 8,109,110) (4,5,7,9,14,15,16,17,18,20,21,22, 23,27,29,30,32,33,34,36,37,38, 39,40,42,43,44,46,48,49,52,56, 63,64,65,68,69,71,74,76,80,81, 82,83,86,87,88,90,91,92,93,94, 95,97,98,103,104,105,106,108, 109,110) ^b

Table 2 (continued)

Botanical name, Family and Specimen number	Local name	Plant part used	Ailments treated/ Therapeutic effect	Preparation	Administration, dosage	Rpt	CI	References
IRIDACEAE								
<i>Iris sintenisii</i> Janka, MARE 20892	Süsen çiçeği, Kir zambağı	Aerial parts	Urinary tract diseases	Decoction	Int	6	0.29	(116) ^b
LAMIACEAE								
<i>Lamium purpureum</i> var. <i>purpureum</i> L., MARE 20845	Balıhbaba	Aerial parts	Wound	Decoction	Ext	9		
<i>Mentha longifolia</i> subsp. <i>typhoides</i> (Briq.) Harley, MARE 20937, 20.986 [Syn.: <i>M.</i> <i>longifolia</i> (L.) Hudson subsp. <i>typhoides</i> (Briq.) Harley var. <i>typhoides</i>]	Yabani nane, Yarpuz	Aerial parts	Kidney diseases Mumps	Infusion Poultice	Int Ext	9 9	0.35	Kidney diseases (51) (6,13,16,22,51) ^b
		Aerial parts	Abdominal pain	Infusion	Int	9	0.18	Abdominal pain (16,38,44,51,74,75,77,83,85,88,91,99,112) (2,4,13,16,22,25,33,38,43,44,51,56,59,60,61,64,65,68,70,74,75,76,80,81,83,85,86,88,91,95,99,100,103,109,112) ^b
<i>Mentha spicata</i> L. subsp. <i>spicata</i> , MARE 20873	Yabani nane, Yarpuz	Aerial parts	Cold	Infusion	Int	6	0.23	Cold (31,34,38,43,51,55,59,70,73,88,89,91,111,107,109)
			Expectorant	Infusion	Int	3		Stomach disorders (31,51,68,94,102,109,110)
			Stomach disorders	Infusion	Int	3		(12,22,31,34,38,43,50,51,55,7,59,63,65,70,80,88,89,91,97,98,101,110,111,107,109) ^b
<i>Salvia dichroantha</i> Stapf, MARE 20955	Adaçayı	Aerial parts	Sore throat	Infusion	Int	4	0.23	(28,51) ^b
			Sedative	Infusion	Int	5		
			Digestive system diseases	Infusion	Int	2		
			Urinary tract diseases	Infusion	Int	1		
<i>Salvia sclarea</i> L., MARE 20969	Adaçayı	Aerial parts	Headache	Infusion	Int	12	0.23	(7,13,32,34,37,45,51,53,58,74,86,99,104) ^b

Table 2 (continued)

Botanical name, Family and Specimen number	Local name	Plant part used	Ailments treated/ Therapeutic effect	Preparation	Administration, dosage	Rpt	CI	References
<i>Salvia tomentosa</i> Mill., MARE 20975	Adaçayı	Aerial parts	Sore throat Sedative Digestive system diseases Urinary tract dis- eases	Infusion Infusion Infusion Infusion	Int Int Int Int	4 6 2 1	0.25	Digestive system diseases (28,32) Sedative (17,18) Sore throat (17,18,34,98) (1,13,17,18,24,31,32,34,38,42,43, ,51,56,64,65,68,75,76,79,89,90, ,98,102) ^b
<i>Salvia verbenaca</i> L., MARE 20957	Nane	Aerial parts	Cold	Infusion	Int	3	0.06	(28) ^b
<i>Salvia verticillata</i> subsp. <i>amasiaca</i> (Frey et Bornm.) Bornm., MARE 20896, 20,939	Sahte adaçayı, Hart salbaşı	Aerial parts	Sore throat Headache Cold	Infusion Infusion Infusion	Int Ext Int	3 1 2	0.12	Cold (28,51) (32,51,83,99,108) ^b
<i>Stachys byzantina</i> K.Koch, MARE 20903	Bozkarabaş otu, Karabaş otu	Aerial parts	Cold	Infusion	Int	9	0.18	Cold (13,22)
<i>Thymus longicaulis</i> subsp. <i>longicaulis</i> C. Presl., MARE 20890, 20,945, 20,974 [Syn.: <i>T. longicaulis</i> C. Presl. subsp. <i>longicaulis</i> var. <i>longicaulis</i>]	Kekik	Aerial parts	Sore throat Skin care Hair care Wound	Infusion Decoction Macerated in olive oil Decoction Macerated in olive oil Macerated in olive oil	Int Ext Ext Ext Ext Ext Ext	15 3 1 4 1 6	0.59	Sore throat (32,56) Wound (30) (8,19,25,30,32,38,42,51,56,63) ^b
LILIACEAE								
<i>Allium rotundum</i> L., MARE 20936 [Syn.: <i>A. scorodoprasum</i> L. subsp. <i>rotundum</i> (L.) Stearn]	Mor çiçekli sarımsak, Yabani pirasa	Bulb	Immunostimulant	–	Int	3	0.06	(50,59,86,87) ^b
<i>Leucojum aestivum</i> L., MARE 20871	Göl soğanı	Aerial parts	Digestive system diseases	Infusion	Int	3	0.06	(116) ^b

Table 2 (continued)

Botanical name, Family and Specimen number	Local name	Plant part used	Ailments treated/ Therapeutic effect	Preparation	Administration, dosage	Rpt	CI	References
<i>Muscari armeniacum</i> H.J. Veitch, MARE 20832	Arap simbulü, Kedi nanesi, Muştürüm	Aerial parts	Eczema	Macerated in olive oil for a week	Ext	6	0.23	(114) ^b
LORANTHACEAE								
<i>Viscum album</i> subsp. <i>album</i> L., MARE 20842, 20.989	Ökse otu	Whole plant	Diabetes	Infusion	Int	11	0.22	Diabetes (15,25,39,45,58,64,79,80,82,87,95,99,103) (15,16,17,19,20,25,27,29,32,33,34,36,39,40,46,56,58,64,65,68,70,71,73,76,77,79,80,82,83,87,89,95,98,99,100,102,103,104,106,108) ^b
LYTHRACEAE								
<i>Lythrum salicaria</i> L., MARE 20927, 20.951, 20.966, 20.990	Hevhulma otu	Aerial parts Roots	Diarrhea Gum diseases	Infusion Decoction	Int Ext	9 3	0.23	Diarrhea (28) (28) ^b
MALVACEAE								
<i>Alcea biennis</i> Wintertl, MARE 20928 [Syn.: <i>A. pallida</i> Waldst. et Kit.]	Hatmi çiçeği	Flowers	Cold Cough	Infusion Infusion	Int Int	2 1	0.12	Cold (64,68,73,109) Cough (17,30,33,68,73,87,91) (17,33,64,68,73,76,87,91,109) ^b
ORCHIDACEAE								
<i>Anacamptis boryi</i> (Rchb.f.) R.M.Bateman, Pridgeon et M.W.Chase, MARE 20883 [Syn.: <i>Orchis morio</i> subsp. <i>morio</i> L.]	Gelincik salebi, Mor salep	Aerial parts Tubers	Variouse veins Cough	Boiled Decoction	Ext. (as poultice) Int	3 3	0.06	Cough (28,32) (28,32) ^b

Table 2 (continued)

Botanical name, Family and Specimen number	Local name	Plant part used	Ailments treated/ Therapeutic effect	Preparation	Administration, dosage	Rpt	CI	References
<i>Neotinea tridentata</i> (Scop.) R.M.Bateman, Pridgeon et M.W.Chase, MARE 20881 [Syn.: <i>Orchis tridentata</i> Scop.]	Mor orkide	Aerial parts	Wound	Macerated in olive oil	Ext	3	0.06	(32) ^b
OROBAN- CHACEAE								
<i>Euphrasia pectinata</i> Ten., MARE 20922	Göz otu	Aerial parts	Respiratory tract diseases	Infusion	Int	6	0.18	Eye infections (38)
PAPAVERACEAE								
<i>Papaver rhoeas</i> L., MARE 20913, 20,981	Gelincik, gelin otu	Aerial parts	Sedative Insomnia Cold Burn	Infusion Infusion Infusion Macerated in olive oil	Int Int Int Ext	2 1 4 6	0.49	Burn (106) Cold (106) Insomnia (95,106,110) Sedative (22,46,60,65,70,97) Wound (106) (9,17,22,25,30,32,33,34,36,38,45, 49,55,59,60,65,70,72,74,83,88,89, 98,102,104,106,107,109) ^b
<i>Roemeria hispida</i> (Lam.) Stace, MARE 20861 [Syn.: <i>Papaver hybridum</i> L.]	Gelincik, gelin otu	Aerial parts	Sedative Insomnia Cold Burn	Infusion Infusion Infusion Macerated in olive oil	Int Int Int Ext	2 1 4 4	0.33	–
PINACEAE								
<i>Pinus sylvestris</i> var. <i>hamata</i> Steven, MARE 20875, 20,880	Sarıçam, Çam	Immature cones and shoots Cones and branches	Respiratory tract diseases Antiseptic	Decoction Soaked in water for a while	Int Ext	3 3	0.12	Respiratory tract diseases (22) (2,16,19,22,25,27,31,32,38,43,48, 49,111) ^b

Table 2 (continued)

Botanical name, Family and Specimen number	Local name	Plant part used	Ailments treated/ Therapeutic effect	Preparation	Administration, dosage	Rpt	CI	References
PLANTAGINACEAE								
<i>Globularia trichosantha</i> Fisch. et C.A.Mey., MARE 20882	Küre çiçeği, Tüylü küre çiçeği	Aerial parts	Abdominal pain	Decoction	Int	3	0.06	(28,53) ^b
<i>Plantago lanceolata</i> L., MARE 20856	Sinir otu	Aerial parts	Wound Wart	Boiled Boiled	Ext. (as poultice) Ext. (as poultice)	4 8	0.23	Wart (4,9,44,74) Wound (4,15,17,25,30,32,33,38,40,43,44,46,49,50,58,59,62,68,74,76,77,78,81,83,84,85,86,88,89,91,95,98,101,111) (14,9,15,17,20,25,30,32,33,34,36,38,43,44,46,49,50,58,59,62,64,68,69,74,76,77,78,83,84,85,86,88,89,91,92,95,98,101,103,104,105,106,108,110,111) ^b
<i>Plantago major</i> subsp. <i>major</i> L., MARE 20973	Sinir otu, Siğil otu	Aerial parts	Wound Wart Cough Stomach disorders Sedative	Boiled Boiled Infusion Infusion Infusion	Ext. (as poultice) Ext. (as poultice) Int Int Int	6 6 3 1 2	0.35	Cough (15,32,43,49,77,78,80) Sedative (36,44) Stomach disorders (4,29,40,43,49,75,92,110) Wart (38,74,79,80,100,105) Wound (2,4,5,8,11,15,19,23,25,26,30,31,32,33,35,38,40,41,43,44,46,49,50,53,58,59,61,62,66,74,83,88,89,91,96,98,99,100,101,104,109,111,112) (1,2,3,5,7,8,10,11,15,16,19,22,23,25,26,27,29,30,31,32,33,36,37,38,39,40,41,42,43,44,45,46,48,49,50,53,58,59,62,66,70,73,74,75,77,78,79,80,83,84,88,89,91,92,96,98,100,101,102,104,105,108,109,110,112) ^b
POLYGONACEAE								
<i>Polygonum cognatum</i> Meisn., MARE 20849	Madırmak, Kuş pidesi	Aerial parts	Abdominal pain Diarrhea		Int. (eaten) Int. (eaten)	4 2	0.12	Abdominal pain (16,27,88,91) (10,15,17,32,33,45,58,62,66,73,87,88,91,96,99,104) ^b

Table 2 (continued)

Botanical name, Family and Specimen number	Local name	Plant part used	Ailments treated/ Therapeutic effect	Preparation	Administration, dosage	Rpt	CI	References
PRIMULACEAE								
<i>Lysimachia vulgaris</i> L., MARE 20982	Karga otu	Aerial parts	Antipyretic Wound	Infusion Infusion	Int Ex	1 1	0.04	(115) ^b
RANUNCULACEAE								
<i>Adonis flammea</i> Jacq., MARE 20848, 20,853	Kandamlası, Cin lalesi	Aerial parts	Skin diseases	Infusion	Ext	6	0.12	(114) ^b
<i>Caltha palustris</i> L., MARE 20872 [Syn.: <i>C. polypetala</i> Hochst.]	Su nergisi, Lilpar	Aerial parts	Sedative	Infusion	Int	3	0.06	(28) ^b
<i>Ranunculus con- stantinopolitanus</i> d'Urv., MARE 20840, 20,857, 20,870	Düğün çiçeği, kırlangıç otu	Aerial parts	Analgesic	Infusion	Int	9	0.18	Analgesic (8,22,29,49,80) (4,8,15,29,49,53,70,73) ^b
ROSACEAE								
<i>Agrimonia eupatoria</i> L., MARE 20976	Kızilotu	Aerial parts	Sore throat Wound	Infusion Boiled	Int Ext. (as poultice)	2 1	0.06	Sore throat (28) (24,25,73,83,85,111) ^b
<i>Crataegus monogyna</i> Jacq., MARE 20839 [Syn.: <i>C. monogyna</i> subsp. <i>monogyna</i> Jacq.]	Alıç, Kotan alıcı	Leafy and flowering branches Fruits	Heart diseases Diabetes	Infusion	Int Int. (eaten)	6 3	0.18	Diabetes (15,17) Heart diseases (8,15,17,32,33,36,56,60,61,70,72,74,81,83,85,86,89,95,103,111) (8,15,17,30,32,33,34,36,45,56,60,65,68,70,76,83,85,86,98,103,106,107,110,109) ^b
<i>Filipendula vulgaris</i> Moench, MARE 20894	Çayır melikesi	Aerial parts	Antipyretic Rheumatic pain	Infusion Infusion	Int Ext	3 3	0.12	(28,48) ^b
<i>Pyracantha coccinea</i> M. Roem., MARE 20995	Ateş dikenini	Leafy and fruiting branches	Hypertension	Infusion	Int	3	0.06	(9,22) ^b

Table 2 (continued)

Botanical name, Family and Specimen number	Local name	Plant part used	Ailments treated/Therapeutic effect	Preparation	Administration, dosage	Rpt	CI	References
<i>Pyrus elaeagnifolia</i> Pall., MARE 20984 [Syn.: <i>P. elaeagnifolia</i> subsp. <i>elaegnifolia</i> Pall.]	Ahlat	Fruits	Diarrhea		Int. (eaten)	3	0.06	Diarrhea (4,15,17,23,32,37,56,75,78,108) (11,15,17,20,32,37,59,69,74,75,83,95) ^b
<i>Rosa canina</i> L., MARE 20909, 20,959, 20,985	Kuşburnu, yabani gül	Fruits	Cold	Infusion	Int	2	0.51	Antiseptic (60,70)
			Immunostimulant	Infusion	Int	4		Cold (15,17,19,20,25,31,32,34,37,38,39,42,43,44,46,47,48,49,56,57,59,60,61,63,65,68,70,73,74,75,76,78,79,80,81,82,83,85,86,87,88,89,91,93,95,97,100)
			Respiratory tract diseases	Infusion	Int	6		
			Diabetes		Int. (eaten)	12		
		Leafy branches	Antiseptic	Infusion	Ext. (applied to wounds)	2		Diabetes (2,4,8,11,15,17,23,24,25,27,33,37,38,43,44,46,47,49,58,59,60,70,73,75,76,79,80,89,95,105,108)
								Respiratory tract diseases (28,44,61)
								Immunostimulant (11,15,17,47,95,99)
								(1,2,4,5,8,10,11,15,16,17,18,19,20,21,22,23,24,25,27,30,31,32,36,37,38,39,42,43,44,45,46,47,48,49,56,58,59,61,62,63,68,70,72,73,74,75,77,78,80,81,82,83,85,88,89,91,92,93,95,96,97,98,99,100,101,102,103,104,105,106,107,108,109,110,111,112) ^b
<i>Rubus aetniscus</i> Weston, MARE 20972 [Syn.: <i>R. canescens</i> var. <i>glabratus</i> (Godr.) Davis et Meikle]	Bögürtlen	Fruits	Diabetes		Int. (eaten)	8	0.55	Diabetes (32,36,52)
			Strengthening		Int. (eaten)	4		Hemorrhoids (28,32)
		Aerial parts	Hemorrhoids	Decoction	Int	6		Strengthening (28)
			Wound	Boiled	Ext. (as poultice)	6		Wound (32,65)
			Burn	Boiled	Ext. (as poultice)	4		(30,36,83,105) ^b

Table 2 (continued)

Botanical name, Family and Specimen number	Local name	Plant part used	Ailments treated/ Therapeutic effect	Preparation	Administration, dosage	Rpt CI	References
SCROPHULARIACEAE							
<i>Veronica chamaedrys</i> L., MARE 20834	Yavşan otu	Aerial parts	Skin diseases	Infusion	Ext	3	0.16 (98) ^b
			Mouth sores	Infusion	Ext	2	
			Liver diseases	Decoction	Int	3	

Rpt. Reports, Int. Internal use, Ext. External use

^aCultivated plant

^bDifferent usage

(1) Fujita et al. 1995; (2) Yeşilada et al. 1999; (3) Sezick et al. 1991; (4) Ezer and Avcı 2004; (5) Simsek et al. 2004; (6) Uzun et al. 2004; (7) Yeşilada et al. 1993; (8) Elçi and Erik 2006; (9) Koyuncu et al. 2009; (10) Sarper et al. 2009; (11) Ayarın 2010; (12) Koca and Yıldırım 2010; (13) Koyuncu et al. 2010; (14) Sezick et al. 1992; (15) Tuttu 2017; (16) Güler et al. 2015; (17) Uzun 2015; (18) Dikilitaş 2016; (19) Günbatan et al. 2016; (20) Uzun and Kaya 2016; (21) Yeşilyurt et al. 2016; (22) Sağiroğlu et al. 2017; (23) Yeşilyurt et al. 2017; (24) Batı Erdem 2018; (25) Gürbüz et al. 2019; (26) Özvatani et al. 2020; (27) Gürbüz et al. 2021; (28) Tuzlacı 2016; (29) Akbulut and Özkan 2014; (30) Doğan and Doğan 2025; (31) Akbulut et al. 2022; (32) Şenkardeş et al. 2022; (33) Emre et al. 2021; (34) Fakir et al. 2009; (35) Bozkurt 2021; (36) Ecevit Genç and Özhatay 2006; (37) Eminagaoglu et al. 2017; (38) Sen et al. 2022; (39) Ezer and Arsan 2006; (40) Gürdal and Öztürk 2021; (41) Kadioğlu et al. 2021; (42) Karaköse et al. 2019; (43) Karaköse 2022; (44) Karci et al. 2017; (45) Gözüt et al. 2024; (46) Polat et al. 2015; (47) Emre et al. 2024; (48) Güneş and Özhatay 2011; (49) Sener et al. 2023; (50) Yazıcıoğlu and Tuzlacı 1995; (51) Selvi et al. 2022; (52) Akaydın et al. 2013; (53) Akbulut and Zengin 2023; (54) Akgül et al. 2018; (55) Gürdal and Kültür 2013; (56) Albayrak and Daşkın 2018; (57) Arsan et al. 2013; (58) Han and Bulut 2015; (59) Hayta et al. 2014; (60) Kılıç and Bağcı 2013; (61) Baykan et al. 2023; (62) Bozkurt 2024; (63) Bulut 2011; (64) Kargılıoğlu et al. 2010; (65) Bulut and Tuzlacı 2015; (66) Muca Yiğit and Gözüt; (67) Bulut et al. 2019; (68) Bulut et al. 2017; (69) Uysal et al. 2010; (70) Cakılcıoğlu et al. 2011; (71) Uysal et al. 2012; (72) Demir and Demir 2022; (73) Uleay and Senel 2024; (74) Doğan 2024; (75) Honda et al. 1996; (76) Bulut and Tuzlacı 2013; (77) Ertuğ 2000; (78) Karakaya et al. 2020; (79) Kargılıoğlu et al. 2008; (80) Kızıllarslan and Özhatay 2012; (81) Koçyiğit and Özhatay 2006; (82) Korkmaz et al. 2016; (83) Kültür 2007; (84) Mükemre et al. 2015; (85) Olcay et al. 2022; (86) Özdemir and Alpınar 2015; (87) Özüdoğru et al. 2011; (88) Polat 2019; (89) Polat and Satıl 2012a; (90) Polat and Satıl 2012b; (91) Polat et al. 2013; (92) Sağlı ve Akalın 2001; (93) Sargın and Büyükcengiz 2019; (94) Şenkardeş and Tuzlacı 2014; (95) Sevgi et al. 2022; (96) Sezick et al. 1997; (97) Tuzlacı and Bulut 2007; (98) Tuzlacı and Aymaz 2001; (99) Tuzlacı and Doğan 2010; (100) Yeşil and Akalın 2009; (101) Tabata et al. 1994; (102) Tuzlacı and Erol 1999; (103) Tuzlacı and Şenkardeş 2011; (104) Yeşilada et al. 1995; (105) Tuzlacı and Tolon 2000; (106) Uğulu et al. 2009; (107) Paksoy et al. 2016; (108) Sezick et al. 2001; (109) Yayman Yazgı and Emre 2024; (110) et al. 2010; (111) Tetik et al. 2013; (112) Yeşil and İnal 2021; (113) Guzel et al. 2015; (114) Doğan 2014; (115) Arı et al. 2015; (116) Sağiroğlu et al. 2023

Table 3 F_{IC} values of category of ailments

Ailment categories	Number of use report (<i>nur</i>)	Number of taxa (<i>nt</i>)	Informant consensus factor (F_{IC})
Neurological System	32	5	0.87
Endocrine/Metabolic and Nutritional System	67	11	0.85
Skin and subcutaneous tissue	237	37	0.84
Respiratory System	107	22	0.80
Cardiovascular System	29	7	0.79
Psychological	52	12	0.78
Blood, Blood Forming Organs and Immune System	10	3	0.78
Genital—Urological System	54	14	0.76
Digestive System	128	33	0.75

two reporters have low cultural importance (Heinrich 2000).

The cultural importance index (CI) is the ratio of the total number of people who provided information (UR) in each use category for a species to the total number of people (N) who provided information in the study (Tardío and Pardo-De-Santayana 2008; Medeiros et al. 2011). It is calculated using the formula $CI = UR/N$, and this index reveals the diversity, prevalence, versatility and relative importance of the use of plants for each species (Tardío and Pardo-De-Santayana 2008; Medeiros et al. 2011).

The informant consensus factor (F_{IC}) was developed by Trotter and Logan (1986) to identify potentially effective medicinal plants and was adapted by Heinrich et al. It is the ratio between ‘the number of use reports in each category (*nur*) minus the number of taxa used (*nt*)’ and ‘the number of use reports in each category (*nur*) minus one’ (Trotter and Logan 2019). It is calculated using the formula $F_{IC} = (nur - nt) / (nur - 1)$ (Heinrich et al. 1998; Heinrich 2000; Medeiros et al. 2011). This factor shows how homogeneous the ethnobotanical information is and ranges from 0 to 1. A high value indicates that the informants have a high degree of consensus among the taxa used in the disease categories, while a low value indicates that the informants cannot reach a consensus among the taxa used in the disease categories (Heinrich et al. 1998; Heinrich 2000; Medeiros et al. 2011).

Separate F_{IC} values were created for each of the neurological system, the endocrine/metabolic and nutritional systems, the skin and subcutaneous

tissue, the respiratory system, the cardiovascular system, psychological, blood-forming organs and the circulatory and immune systems, the genitourinary system and the digestive system usage categories. All of them were organised (Table 3) according to International Classification of Primary Care (ICPC-3 2020).

Results

Demographic characteristics of informants

During our interviews, all settlements were visited and a total of 51 people participated. The gender distribution of informants was 17 men and 34 women. Demographic information about the participants was collected through face-to-face interviews. The geographical distribution of informants within the research area was five from the town (9.8%) and 46 from the villages (90.2%). Their age range was 30 to 80, with an average age of 54. Ten were 30–44 years of age, 16 were 45–59, 20 were 60–74 and 5 were over 75. The participants’ occupational groups included housewives, farmers, mukhtars, shepherds, workers, civil servants and retirees. Of the participants, 10 were illiterate (19.6%), 6 had completed elementary school (11.8%), 10 had finished middle school (19.6%), 15 had graduated from high school (29.4%) and 10 held university degrees (19.6%) (Fig. 6, Table 4).

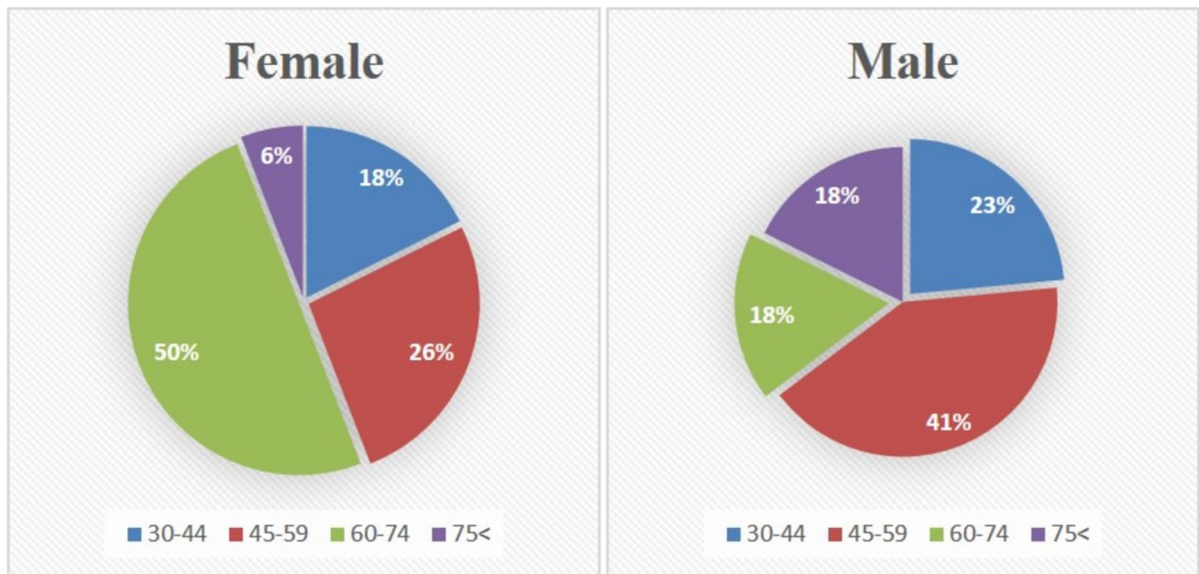


Fig. 6 Age groups of informants

Medicinal plants and associated knowledge

Plants used for medicinal purposes in Yeniçağa are listed alphabetically in Table 2. The listings include the Latin name of the plant, synonym (if any), herbarium number(s); local name, the plant parts that are utilized, effect(s) of treatment, method of preparation, method of application, number of usage reports (UR), cultural importance index (CI) and comparison with studies conducted in neighbouring provinces. The synonyms of the plants are given in parentheses next to the plant name in Table 2 according to the plant list (Güner 2012; WFO 2024).

A total of 92 taxa from 34 families were recorded by this study as being used in traditional folk medicine in Yeniçağa. Of these plants, 90 were found wild in the region and 2 were cultivated (marked with an asterisk). The most commonly used traditional medicinal plant families were Asteraceae (17.4%), Lamiaceae (10.9%) and Rosaceae (7.6%), according to the number of taxa (Table 2).

In the research area, 751 UR of 197 remedies involving 92 taxa were recorded. When the CI values were evaluated on a taxon basis, *Hypericum perforatum*, *Thymus longicaulis* subsp. *longicaulis* C. Presl., *Rubus aetniscus* Weston, *Rosa canina* and *Papaver rhoeas* L. were found to be the most commonly used plants to treat ailments in Yeniçağa (Table 5).

On the other hand, 48 taxa were observed to have uses similar to those in our study. Based on our comparative assessment, *Rosa canina* (recorded in 18 regions), *Plantago major* subsp. *major* (recorded at 15 sites and *Hypericum perforatum* (recorded at 11 sites) were the most common medicinal plants in Yeniçağa and its surrounding areas. Furthermore, among these, *Rosa canina* (recorded at 86 points), *Plantago major* subsp. *major* L. (recorded at 70 points), and *Hypericum perforatum* (recorded at 66 points), which are the most common medicinal plants in both Yeniçağa and throughout Türkiye, stand out due to their high usage rates. The results of the comparison are presented in Table 2.

One of these taxa, *Hypericum perforatum*, ranks first both in our study (CI: 0.59) and in one of the comparison studies (Polat et al. 2015), as seen in Table 2. *H. perforatum* is employed especially for treating wounds and burns, and as sedative in both our research area and surrounding areas (Sezik et al. 1992; Ezer and Arısan 2006; Koyuncu et al. 2009; Akbulut and Özkan 2014; Polat et al. 2015; Uzun 2015; Uzun and Kaya 2016; Yeşilyurt et al. 2016; Karcı et al. 2017; Sağıroğlu et al. 2017; Tuttu 2017; Karaköse 2022; Sen et al. 2022; Senkardes et al. 2022; Sener et al. 2023).

Rosa canina, the most commonly used plant in Türkiye, is ranked fourth in our study (CI: 0.51 and

Table 4 Demographic characteristics of the informants (n = 51)

Features	Number	Frequency
<i>Gender</i>		
Female	34	66.7
Male	17	33.3
<i>Educational level</i>		
Illiterate	10	19.6
Elementary school	6	11.8
Middle school	10	19.6
High school	15	29.4
University	10	19.6
<i>Age groups</i>		
30–44	10	19.6
45–59	16	31.4
60–74	20	39.2
75 <	5	9.8
<i>Occupation</i>		
Housewife	15	29.4
Farmer	8	15.7
Shepherd	4	7.84
Mukhtar	6	11.8
Worker	5	9.8
Civil servants	4	7.84
Retired	9	17.6
<i>Place, where lived</i>		
Town	5	9.8
Village	46	90.2

Table 5 Cultural importance (CI) index of the most important taxa in Yeniçağa

Plant name	Cultural importance (CI) index
<i>Hypericum perforatum</i>	0.59
<i>Thymus longicaulis</i> subsp. <i>longicaulis</i>	0.59
<i>Rubus aetniscus</i>	0.55
<i>Rosa canina</i>	0.51
<i>Papaver rhoeas</i>	0.49

is ranked at the top in the comparison studies (Polat et al. 2015; Eminagaoglu et al. 2017). *R. canina* is used in both our research area and the comparison studies area, especially as a treatment for colds, diabetes and respiratory tract ailments, and as an immunostimulant (Yeşilada et al. 1999; Ezer and Avcı

2004; Elçi and Erik 2006; Ezer and Arısan 2006; Ayandın 2010; Polat et al. 2015; Uzun 2015; Günbatan et al. 2016; Uzun and Kaya 2016; Eminagaoglu et al. 2017; Karcı et al. 2017; Tuttu 2017; Yeşilyurt et al. 2017; Batı Erdem 2018; Gürbüz et al. 2019; Karaköse et al. 2019; Gürbüz et al. 2021; Akbulut et al. 2022; Sen et al. 2022; Karaköse 2022; Senkardes et al. 2022; Sener et al. 2023).

T. longicaulis subsp. *longicaulis* is a taxon recorded as commonly used in many comparison study areas according to the literatures in Türkiye. In Yeniçağa, it is the second most commonly used plant (CI: 0.59). The usage of *T. longicaulis* subsp. *longicaulis* for sore throats, which appeared in our study, is found in only one comparison study (Senkardes et al. 2022). Different usages have been revealed in other comparison studies: for coughs, shortness of breath, colds, influenza, diabetes, dysmenorrhea, rheumatism, bruises, weight loss, abdominal pains and digestive ailments, and as anthelmintic, expectorant and panacea (Elçi and Erik 2006; Günbatan et al. 2016; Gürbüz et al. 2019; Karaköse et al. 2019; Sen et al. 2022; Senkardes et al. 2022). A decoction or infusion prepared mostly from the aerial parts of the plant is used internally for respiratory and digestive system disorders.

Unlike *T. longicaulis* subsp. *longicaulis*, *Plantago major* subsp. *major* is recorded as the most commonly used taxon in the comparison studies region, but it's not commonly used in Yeniçağa. *P. major* subsp. *major* is especially used in both our research area and the comparison studies region as a treatment for wounds, warts, stomach disorders and coughs, and as a sedative (Yazıcıoğlu and Tuzlacı 1995; Yeşilada et al. 1999; Ezer and Avcı 2004; Simsek et al. 2004; Elçi and Erik 2006; Ayandın 2010; Akbulut and Özkan 2014; Polat et al. 2015; Günbatan et al. 2016; Karcı et al. 2017; Tuttu 2017; Yeşilyurt et al. 2017; Gürbüz et al. 2019; Özvatan et al. 2020; Bozkurt 2021; Gürdal and Öztürk 2021; Kadioğlu et al. 2021; Akbulut et al. 2022; Karaköse 2022; Sen et al. 2022; Senkardes et al. 2022; Sener et al. 2023). Studies conducted in other regions of Türkiye and in Europe have recorded similar uses of *P. major* subsp. *major*, especially as a treatment for wounds and coughs (Polat and Satıl 2012a, b; Hayta et al. 2014; Koleva et al. 2015; Mükemre et al. 2015; Jakeli et al. 2018; Bussmann et al. 2020; Kazancı et al. 2020; Yeşil and İnal 2021). The

leaves are boiled and used externally for wounds, while an infusion is usually prepared and used internally for coughs.

A comparative analysis was conducted between our findings and those of studies from surrounding regions. Table 6 summarizes the degree of

Table 6 Use and taxa similarities across neighboring studies

No.	Study area	Total number of medicinal taxa per study	Total number of common taxa with our study	Number of common taxa with similar uses	Similarity percentage with our results (%)	Number of common taxa with dissimilar uses	Dissimilarity percentage with our results (%)
1	Uzun 2015	87	14	9	9.8	14	15.2
2	Sağıroğlu et al. 2017	90	15	6	6.5	13	14.1
3	Ezer and Avcı 2004	50	10	5	5.4	8	8.7
4	Gürbüz et al. 2019	122	13	4	4.3	13	14.1
5	Elçi and Erik 2006	23	6	4	4.3	6	6.5
6	Gürbüz et al. 2021	69	10	3	3.3	9	9.8
7	Yeşilada et al. 1999	61	6	3	3.3	6	6.5
8	Uzun and Kaya 2016	52	6	3	3.3	6	6.5
9	Güler et al. 2015	104	10	2	2.2	9	9.8
10	Günbatan et al. 2016	79	8	2	2.2	8	8.7
11	Koyuncu et al. 2009	41	5	2	2.2	5	5.4
12	Ayandın 2010	29	4	2	2.2	4	4.3
13	Koyuncu et al. 2010	68	5	1	1.1	4	4.3
14	Batı Erdem 2018	26	4	1	1.1	4	4.3
15	Simsek et al. 2004	50	3	1	1.1	3	3.3
16	Dikilitaş 2016	28	3	1	1.1	3	3.3
17	Yeşilyurt et al. 2016	35	3	1	1.1	3	3.3
18	Yeşilyurt et al. 2017	43	3	1	1.1	3	3.3
19	Özvatan et al. 2020	6	1	1	1.1	1	1.1
20	Fujita et al. 1995	55	7	0	0	7	7.6
21	Sarper et al. 2009	50	4	0	0	4	4.3
22	Koca and Yıldırım 2010	21	4	0	0	4	4.3
23	Uzun et al. 2004	46	1	0	0	1	1.1

overlap between our findings and neighboring ethnobotanical studies in terms of medicinal plant taxa and their uses. It provides data on the total number of medicinal taxa recorded in each comparative study, the number of taxa shared with our results, and the respective percentages of similarity and dissimilarity based on usage patterns (Fujita et al. 1995; Yeşilada et al. 1999; Ezer and Avcı 2004; Simsek et al. 2004; Uzun et al. 2004; Elçi and Erik 2006; Koyuncu et al. 2009, 2010; Sarper et al. 2009; Ayandın 2010; Koca and Yıldırım 2010; Güler et al. 2015; Uzun 2015; Dikilitaş 2016; Günbatan et al. 2016; Uzun and Kaya 2016; Yeşilyurt et al. 2016, 2017; Sağıroğlu et al. 2017; Batı Erdem 2018; Gürbüz et al. 2019, 2021; Özvatan et al. 2020).

In our comparison, a study from Eskişehir (Uzun 2015), which lies to the southwest of Bolu. Notably, this study, identified 9 taxa in common with similar uses in both territories and 15 taxa have local names in common. This situation may initially be explained by the absence of significant cultural differences among local populations in terms of plant use. While it may be assumed that a higher number of taxa documented in neighboring studies would naturally lead to a greater overlap in commonly used medicinal plants, the broader comparison suggests otherwise. The overlap appears to be more closely related to the prevalence and prominence of certain species in the flora and vegetation of the study area and its surroundings. This is supported by the observation that the total number of medicinal taxa reported in previous studies

does not always correlate proportionally with the number of taxa shared with our findings.

Figure 7, presents the top 7 comparative studies and their geographic locations, highlighting the highest levels of similarity in medicinal plant use with the present study.

The results of the comparative analysis offer valuable insight into regional patterns of traditional medicinal knowledge (Fig. 7). The fact that our study shares the highest number of taxa (28) with Tuzlacı's (2016) nationwide ethnobotanical review is expected, considering the compilation nature of the work. However, more significant is the observation that the studies which follow Tuzlacı's in terms of similarity were all conducted in areas either surrounding Yeniçağa-Bolu (Uzun 2015) or within the Black Sea Region (Karcı et al. 2017; Tuttu 2017; Karaköse 2022; Sen et al. 2022; Senkardes et al. 2022). These regions share comparable floristic compositions as well as cultural and demographic characteristics. This pattern suggests that ethnobotanical knowledge is strongly influenced by both ecological factors—such as the presence and abundance of certain taxa—and socio-cultural continuity within a region.

The 12 medicinal taxa and their 21 uses presented in Table 7 are newly reported from Türkiye, with no prior documentation of these taxa and uses in the existing literature.

Our study was compared with previous comprehensive ethnobotanical studies conducted throughout Türkiye. In this comparison, it has been found that

Fig. 7 Top 7 reference investigations with the highest number of similar use-reports compared to our findings, including the total number of similar uses

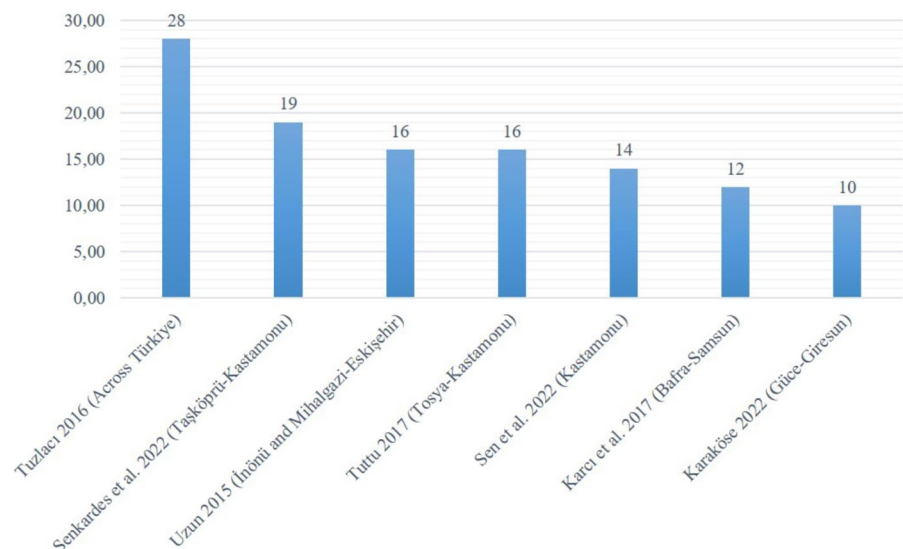


Table 7 Newly reported medicinal plants and uses in Türkiye

Family	No.	Botanical name	Therapeutic uses
Asteraceae	1	<i>Tripleurospermum tenuifolium</i>	Capitula/Infusion/Ext./Skin care
Betulaceae	2	<i>Corylus avellana</i> var. <i>avellana</i>	Leafy branches/Infusion/Int./Diabetes
Boraginaceae	3	<i>Myosotis arvensis</i>	Aerial parts/Infusion/Int./Insomnia Aerial parts/Infusion/Int./Sedative Aerial parts/Infusion/Int./Cold
	4	<i>Onosma cinerea</i>	Aerial parts/Soaked in water for a while/Ext./Wound
Brassicaceae	5	<i>Alyssum trichostachyum</i>	Aerial parts/Decoction/Int./Kidney diseases Aerial parts/Decoction/Int./Abdominal pain
	6	<i>Dianthus carthusianorum</i>	Aerial parts/Infusion/Ext./Antiseptic
Caryophyllaceae	7	<i>Moenchia mantica</i>	Aerial parts/Infusion/Int./Urinary tract diseases
	8	<i>Euonymus europaeus</i>	Leafy and fruiting branches/Macerated in olive oil/Ext./Psoriasis
Celastraceae	9	<i>Euonymus latifolius</i> subsp. <i>latifolius</i>	Leafy and fruiting branches/Macerated in olive oil/Ext./Psoriasis
	10	<i>Chamaecytisus hirsutus</i>	Aerial parts/Infusion/Ext./Eczema Aerial parts/Infusion/Int./Abdominal pain
Fabaceae	11	<i>Chamaecytisus supinus</i>	Aerial parts/Infusion/Int./Cardiovascular diseases Aerial parts/Infusion/Int./Emmenagogue
	12	<i>Roemeria hispida</i>	Aerial parts/Infusion/Int./Sedative Aerial parts/Infusion/Int./Insomnia Aerial parts/Infusion/Int./Cold Aerial parts/Macerated in olive oil/Ext./Burn Aerial parts/Boiled/Ext. (as poultice)/Wound
Papaveraceae			

total 197 remedies for 92 recorded taxa in Türkiye, where Yeniçağa is located. Additionally, no prior use records were found for 12 of these 92 taxa in previously conducted ethnobotanical research in Türkiye. Thus, the 21 uses associated with these 12 taxa have been recorded for the first time (Tables 2, 7). Although there is existing research and information available for some of these taxa, it is clear that further investigations are warranted for others.

According to the literature, species belonging to the genus *Myosotis* are known to contain various bioactive compounds, including alkaloids, saponins, and higher fatty acids (Shinkarenko 2008). However, detailed phytochemical investigations specifically focusing on *Myosotis arvensis* Hill remain limited. In traditional medicine, *M. arvensis* has been used for the treatment of malignant tumors affecting the oral cavity and reproductive organs, as well as in cases of tuberculosis (Shinkarenko and Vasil'ev 2008). Additionally, in Central Italy, *M. arvensis* has been applied topically in the form of leaf packs to relieve tired eyes (Lucchetti 2019). In Northern Europe, the aerial parts of *M. arvensis* are traditionally prepared as alcoholic

extracts or decoctions to relieve respiratory tract disorders (Pranskuniene 2018). Its use aligns with the treatment of the common cold as recorded in our study.

Euonymus europaeus L. oil has been found to contain significant amounts of carotenoids and tocopherols, exceeding the levels present in most commonly used edible oils (Vrubel et al. 2018). According to the literature, such concentrations of these bioactive compounds are sufficient to exert wound-healing effects. Supporting its traditional medicinal use, the fresh trunk bark of *E. europaeus* has been topically applied as a vulnerary and cicatrizant, indicating its potential in promoting tissue repair and skin regeneration (Di Novella et al. 2013). The use of *E. europaeus* in the treatment of psoriasis, as reported in our study, is also noteworthy in this context, and further research in this direction could prove beneficial.

The present study confirms the anti-inflammatory activity of *Tripleurospermum tenuifolium* Freyn ex Freyn et E.Brandis. The high content of linoleic acid and palmitic acid is likely responsible for the significant anti-inflammatory activity observed (Erdoğan

et al. 2015). *Corylus avellana* has been identified as a source of bioactive phytochemicals, with the potential to exert beneficial effects on human health (Bottone et al. 2019). Additionally, *Onosma cinerea* was evaluated for its in vivo anti-inflammatory and antinociceptive activities (Tosun et al. 2008). Furthermore, the methanol extract of *Roemeria hispida* (Lam.) Stace demonstrated antimicrobial activity (Mohammed et al. 2023).

In addition to the traditional use of plants as treatment, they are used in other ways (as food, spice, fuel, etc.). *Thymus longicaulis* subsp. *longicaulis*, employed as traditional medicine in the region, is consumed as a spice, the fruits of *Rosa canina*, *Rubus aetnicus* and *Cornus mas* are used in making marmalade, and *C. mas* is used in preparing sherbet.

The aerial parts of *Polygonum cognatum* Meisn. are used in cooking (by adding olive oil, tomato paste, salt and water), the aerial parts of *Stellaria media* (L.) Vill. are consumed in pies and raw in salads, and the leaves of *Petasites hybridus* are used as a stuffing.

Pinus sylvestris var. *hamata*, *Quercus pubescens* subsp. *pubescens* Willd. and *Juniperus oxycedrus* L., which are used as folk medicine in the region, are also utilised as fuel.

Lathyrus undulatus Boiss., *Trifolium pratense* L., *Vicia sativa* subsp. *nigra* Ehrh., *Vicia pannonica* Crantz, *Onobrychis oxydonta* Boiss. and *Sinapis arvensis* L. are used as animal feed.

Our study found that some of the endemics in the local flora (*Arum euxinum* R.R.Mill., *Euphorbia anacampseros* var. *anacampseros* Boiss., *Salvia dichroantha* Stapf, *Taraxacum pseudobrachyglossum* Soest and *Tripleurospermum rosellum* var. *album* E.Hossain) were among the plants used by the locals as treatments (Davis 1965–1985; Davis et al. 1988; Guner et al. 2000, 2012) (Fig. 8).

Among these, *Arum euxinum* and *Salvia dichroantha* are in the least concern (LC) category, while *Tripleurospermum rosellum* var. *album* is in the vulnerable (VU) (Ekim et al. 2000; Tehditalundabtkiler 2011). No evaluation was found for *Euphorbia anacampseros* var. *anacampseros* or *Taraxacum pseudobrachyglossum*.

In addition, the usage information of two wild orchids [*Anacamptis boryi* (Rchb.f.) R.M.Bateman, Pridgeon et M.W.Chase and *Neotinea tridentata* (Scop.) R.M.Bateman, Pridgeon et M.W.Chase], which are at least as important as the endemic plants just mentioned, is included in our study (Fig. 9).

As an earlier study stated, these taxa are at risk due to overharvesting for commercial purposes (Ozhatay et al. 2005). It is also noted that *Anacamptis boryi* is classified as Near Threatened (NT), and *Neotinea tridentata* is classified as Least Concern (LC) on The IUCN Red List (2024). Additionally, these plants are protected under CITES (2013).

On the positive side, we learned from the locals that these orchids were not collected for economic

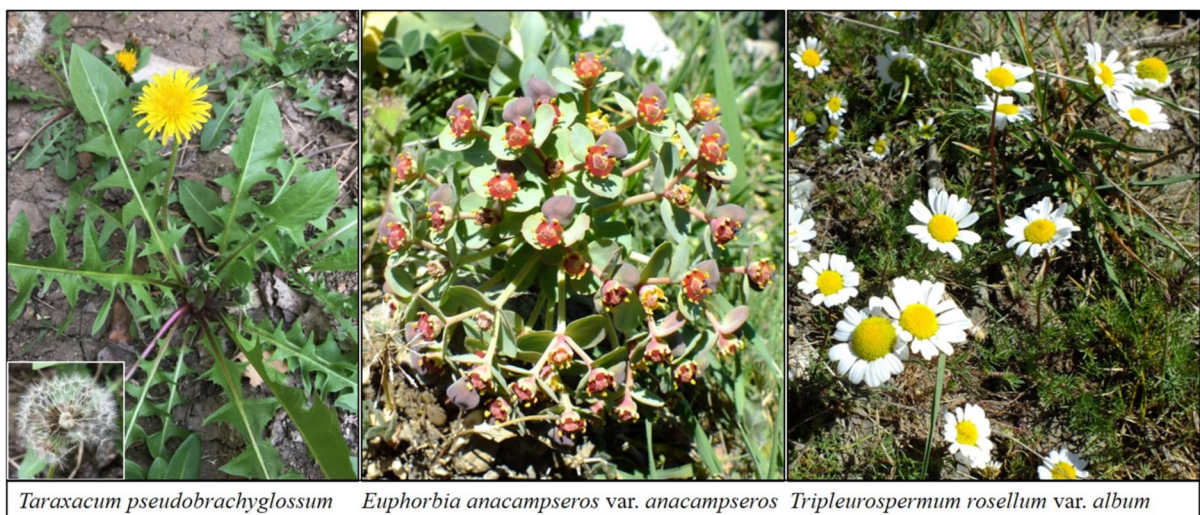


Fig. 8 Some of the endemic taxa used for medical purposes in the research area



Fig. 9 Orchids from the research area

gain as in other regions (Senkardes et al. 2022), but only for therapeutic use. We reminded them at every opportunity that these plants should not be collected excessively, even for therapeutic purposes.

Plant parts and preparation methods

The plant parts most frequently utilized in traditional uses were aerial parts (59.22%), branches (9.71%), fruits (7.77%), other parts (7.77%), capitula (6.79%), latex (3.88%), tuber (1.94%), whole plant (1.94%) and leaves (0.97%) (Fig. 10).

The main preparation methods were infusion (51.64%), decoction (16.39%), directly (10.66%), boiled (7.38%), macerated in olive oil (7.38%) and other methods (6.56%) (Fig. 11). The study recorded 121 treatments, with 60.33% of these used internally (73 uses) and 39.67% used externally (48 uses).

The plants used in the region are not used in the form of any herbal mixture; all of them are used alone. If herbal products such as olive oil were added during the preparation, these products were accepted

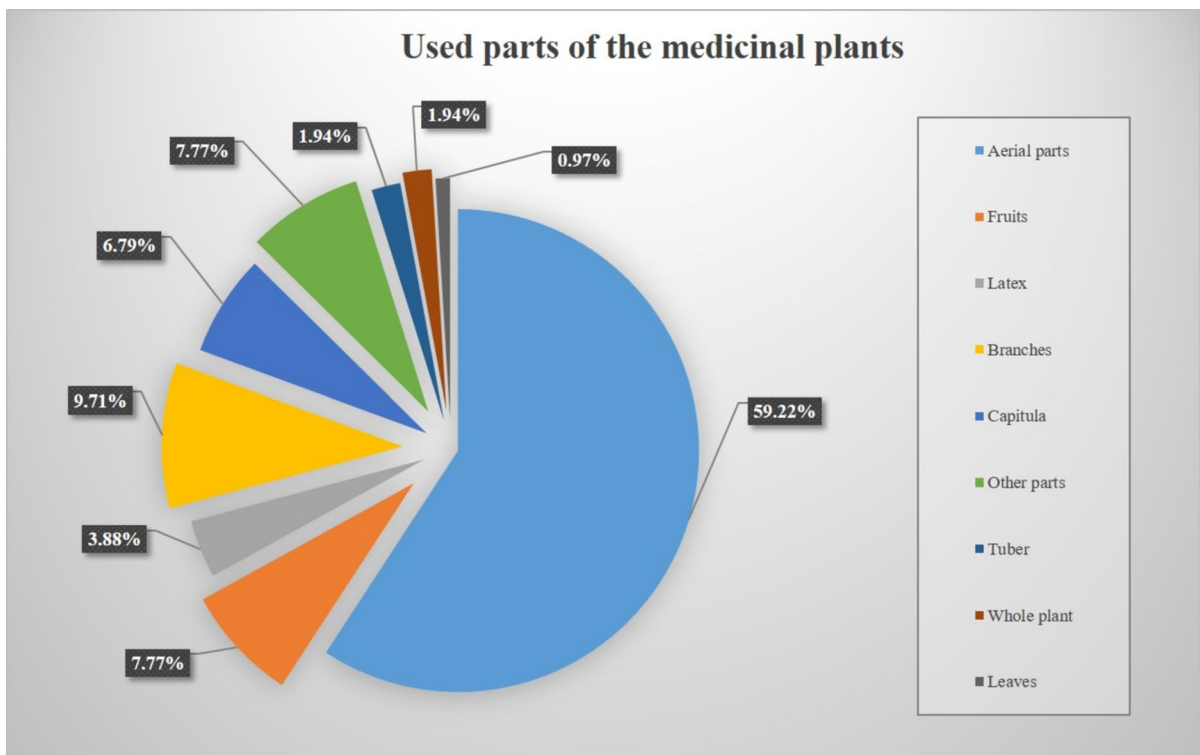
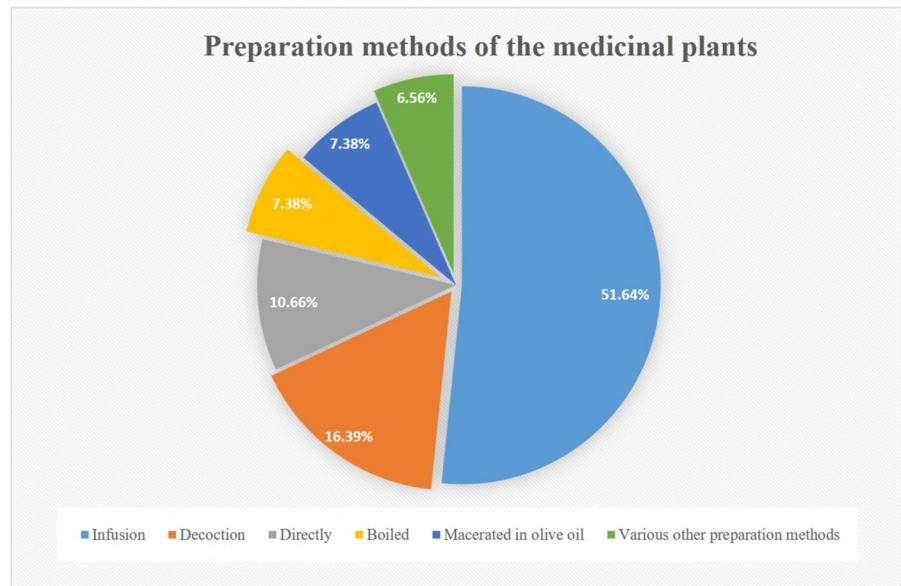


Fig. 10 Used parts of the medicinal plants in the study

Fig. 11 Preparation methods of the medicinal plants in the study



as an auxiliary substance and not included in special herbal mixtures.

It was also stated that excessive or long-term use of any medicinal plant in the region should be avoided. For instance, during the use of *Plantago* spp. in the treatment of wounds and warts, the application should be discontinued as soon as an effect is observed; otherwise, there is a risk of affecting a larger area, potentially leading to irritation.

Mirroring our study, the comparison studies identified the most common preparation methods as infusion, decoction and direct use, and they identified the plant parts most commonly used as aerial parts, leaves, fruits and flowers (Polat et al. 2015; Eminağaoğlu et al. 2017; Karcı et al. 2017; Akbulut et al. 2022; Karaköse 2022; Senkardes et al. 2022; Şen et al. 2022).

Plant names

Recording the vernacular names of plants contributes to the elucidation of traditional knowledge of plants and to the identification of the plants. A total of 115 local names used by the locals for the plants included in this study were recorded. The study also determined that some plants are known in the region by the same local name regardless of species or genus. In some cases, different species within the same genus share the same local name.

These species are presented in Table 8, such as: (Karahindiba: *Leontodon hispidus* var. *hispidus*—*Taraxacum pseudobrachyglossum*; Papatya: *Anthemis cretica*—*Cota* spp.—*Tripleurospermum* spp.) or to different taxa of the same genus (Koçara: *Euonymus europaeus*—*E. latifolius* subsp. *latifolius*; Sütleğen: *Euphorbia amygdaloides*—*E. anacampseros* var. *anacampseros*—*E. pannonica*—*E. stricta*). The reason for this is likely the similarities of their external appearances or the similarities of their purposes.

The same vernacular names used for similar or different taxa have also been encountered in studies conducted not only within the research area but also in neighboring regions and across various parts of Türkiye. One possible explanation for this is the wide distribution of certain plant species, which are known and recognized in multiple regions. Another reason may be the cultural similarities among different regions. Since the culture of our study area does not significantly differ from that of the surrounding regions, we observe that the names of many plants—such as kuşburnu (*Rosa canina*), papatya (*Matricaria chamomilla*), gelincik (*Papaver* spp.), ökse otu (*Viscum album*), sinir otu (*Plantago* spp.) and *Polygonum cognatum* (madımak) -tend to be similar.

Table 8 The same vernacular name(s) used for more than one plant species

Local name(s)	Botanical name(s)
Sığirdili	<i>Anchusa azurea</i> , <i>A. leptophylla</i>
Papatya	<i>Anthemis cretica</i> , <i>Cota tinctoria</i> , <i>C. tinctoria</i> subsp. <i>parnassica</i> , <i>Tripleurospermum rosellum</i> var. <i>album</i> , <i>T. tenuifolium</i>
Diken otu	<i>Arctium minus</i> , <i>Carduus acanthoides</i> subsp. <i>acanthoides</i>
Tarla sarmaşığı	<i>Convolvulus arvensis</i> , <i>C. galaticus</i>
Koçara	<i>Euonymus europaeus</i> , <i>E. latifolius</i> subsp. <i>latifolius</i>
Sütleğen	<i>Euphorbia amygdaloides</i> , <i>E. anacampseros</i> var. <i>anacampseros</i> , <i>E. Pannonica</i> , <i>E. stricta</i>
Karahindiba	<i>Leontodon hispidus</i> var. <i>hispidus</i> , <i>Taraxacum pseudobrachyglossum</i>
Gelincik, Gelin otu	<i>Papaver rhoeas</i> , <i>Roemeria hispida</i>
Sinir otu	<i>Plantago lanceolata</i> , <i>P. major</i> subsp. <i>major</i>
Yabani nane, Yarpuz	<i>Mentha longifolia</i> subsp. <i>typhoides</i> , <i>M. spicata</i> subsp. <i>spicata</i>
Adaçayı	<i>Salvia dichroantha</i> , <i>S. Sclarea</i> , <i>S. tomentosa</i>
Kanarya otu	<i>Jacobaea erratica</i> , <i>Senecio leucanthemifolius</i> subsp. <i>vernalis</i>

Data analyses

The reports collected were categorized into nine usage categories, which classified the illnesses into ethnomedicinal categories based on the emic perceptions of the informants (Table 3), in accordance with the ICPC-3 classification.

Four of the medicinal use categories indicated above are represented by the most commonly used taxa, which have high use reports (UR) in these categories. These are listed according to the number of use reports (UR) for each use category in Table 9.

The main ailments/therapeutic effects according to the URs for which traditional uses were recorded were wounds (UR: 79), colds (UR: 47), as a sedative (UR: 43), diabetes (UR: 40), headaches (UR: 32), diarrhea (UR: 30), abdominal pains (UR: 29), skin problems (UR: 28), sore throats (UR: 28), warts (UR: 28), kidney disorders (UR: 22), digestive system disorders (UR: 21), respiratory system disorders (UR: 21), pains (UR: 20), eczema (UR: 20), psoriasis (UR: 18), urinary tract disorders (UR: 17) and burns (UR: 16) (Table 2).

Based on the F_{IC} numbers, complaints of the neurological system (headaches) had the highest degree of consensus with 0.87 (Table 3). This study revealed that about 5.38% (5 plants) of all recorded taxa were used to treat headaches (UR: 32). Those with the highest numbers of URs were *Salvia sclarea* L. (UR: 12) and *Anthemis cretica* L. (UR: 9).

This was followed by endocrine/metabolic and nutritional disorders (appetite, diabetes, weight loss) with 0.85 (Table 3). This study found that approximately 11.83% of all recorded taxa (11 plants) were used to treat endocrine/metabolic and nutritional disorders, with 67 of the usage reports in this category. *Rosa canina* (UR: 12), *Viscum album* subsp. *album* L. (UR: 11), *Cornus mas* (UR: 10) and *Rubus aetnicus* (UR: 8) represented the highest UR numbers for endocrine/metabolic and nutritional disorders.

The third highest degree of consensus was skin and subcutaneous tissue disorders (boils, burns, callosities, eczema, pruritus, psoriasis, scabies, swellings, warts, wounds, etc.) with 0.84 (Table 3). In this study, 40.86% (38 plants) of all taxa were recorded for skin ailments (UR: 237). *Hypericum perforatum* and *Papaver rhoeas* (UR: 12 each) were the most important taxa used to treat wounds. The most frequently mentioned treatments were, respectively, maceration of the aerial parts of the plant with olive oil and a poultice of the aerial parts of the plants.

The fourth highest category based on the number of F_{IC} (0.80) was respiratory system (colds, sore throats) (Table 3). Of all the taxa recorded, 23.65% (22 plants) was for respiratory system disorders (UR: 107). *Thymus longicaulis* subsp. *longicaulis* (UR: 15), prepared as an infusion, was the most important taxa used for sore throats.

These four groups were followed by cardiovascular system (0.79), psychological (0.78), blood-forming

Table 9 The most common plant species with high UR in ailment categories

Ailment categories	Botanical name	Number of use report (Nur)
Neurological System	<i>Salvia sclarea</i>	12
	<i>Anthemis cretica</i>	9
	<i>Anchusa leptophylla</i>	5
	<i>Echium vulgare</i>	5
	<i>Salvia verticillata</i> subsp. <i>amasiaca</i>	1
Endocrine/Metabolic and Nutritional System	<i>Rosa canina</i>	12
	<i>Viscum album</i> subsp. <i>album</i>	11
	<i>Cornus mas</i>	10
	<i>Rubus aetnicus</i>	8
	<i>Ammi majus</i>	6
	<i>Helichrysum graveolens</i>	5
Skin and subcutaneous tissue	<i>Papaver rhoeas</i>	18
	<i>Thymus longicaulis</i> subsp. <i>longicaulis</i>	15
	<i>Hypericum perforatum</i>	14
	<i>Euphorbia pannonica</i>	12
	<i>Muscari armeniacum</i>	12
	<i>Plantago lanceolata</i>	12
	<i>Plantago major</i> subsp. <i>major</i>	12
	<i>Roemeria hispida</i>	10
	<i>Rubus aetnicus</i>	10
	<i>Euonymus europaeus</i>	9
	<i>Euonymus latifolius</i> subsp. <i>latifolius</i>	9
	<i>Euphorbia stricta</i>	9
	<i>Iris sintenisii</i>	9
Respiratory System	<i>Thymus longicaulis</i> subsp. <i>longicaulis</i>	15
	<i>Mentha spicata</i> subsp. <i>spicata</i>	9
	<i>Stachys byzantina</i>	9
	<i>Rosa canina</i>	8
	<i>Euphrasia pectinata</i>	6
	<i>Juniperus oxycedrus</i>	6
	<i>Cornus mas</i>	5
	<i>Salvia verticillata</i> subsp. <i>amasiaca</i>	5

organs and the circulatory and immune systems (0.78), genitourinary system (0.76) and digestive system (0.75) (Table 3). The aforementioned medicinal use categories are represented by the most common plant species, which exhibit high URs within these categories. The first four use categories are listed by UR number in Table 9.

There is no previous study conducted in Yeniçağa that includes or excludes the informant consensus factor (FIC) or any other calculations.

Therefore, several studies that were conducted in the comparison studies region and that calculated the

FIC were examined (Polat et al. 2015; Eminağaoğlu et al. 2017; Karcı et al. 2017; Akbulut et al. 2022; Karaköse 2022; Senkardes et al. 2022; Şen et al. 2022), and the four categories with the highest values were evaluated.

In our study, neurological system disorders ranked first with an FIC of 0.87, and headaches stood out with a UR of 32. In the comparison studies, the highest FIC in this category were 0.92 (Senkardes et al. 2022), 0.75 (Karcı et al. 2017), 0.64 (Akbulut et al. 2022), 0.42 (Polat et al. 2015), 0.41 (Karaköse 2022), 0.25 (Şen et al. 2022) and 0.20 (Eminağaoğlu et al.

2017). Headaches UR were 0, 0, 12, 0, 20, 6 and 0, respectively.

In our study, endocrine/metabolic and nutritional system disorders ranked second with an FIC of 0.85, and diabetes stood out with a UR of 40. In the comparison studies, the highest FIC values in this category were 0.62 (Karaköse 2022), 0.55 (Akbulut et al. 2022), 0.24 (Şen et al. 2022) and 0.22 (Eminağaoğlu et al. 2017). Diabetes UR were 60, 23, 6 and 0, respectively.

Skin and subcutaneous tissue disorders ranked third with an FIC of 0.84 in our study, and wounds stood out with a UR of 79. The highest FIC in this category were 0.94 (Senkardes et al. 2022), 0.71 (Karaköse 2022), 0.62 (Polat et al. 2015), 0.61 (Akbulut et al. 2022), 0.55 (Karcı et al. 2017), 0.47 (Şen et al. 2022) and 0.28 (Eminağaoğlu et al. 2017) in the comparison studies. Diabetes UR were 404, 69, 0, 20, 0, 11 and 0, respectively.

Respiratory system disorders ranked fourth in our study with an FIC of 0.80, and colds stood out with a UR of 47. The highest FIC in this category in the comparison studies were 0.95 (Senkardes et al. 2022), 0.86 (Karaköse 2022), 0.76 (Akbulut et al. 2022), 0.73 (Şen et al. 2022), 0.69 (Karcı et al. 2017), 0.49 (Polat et al. 2015) and 0.43 (Eminağaoğlu et al. 2017). Colds UR were 298, 0, 46, 31, 0, 0 and 0, respectively.

Discussion

According to our comparison with studies conducted both in the surrounding regions and throughout Türkiye, 48 taxa were found to have similar uses, with *Rosa canina*, *Plantago major* subsp. *major*, and *Hypericum perforatum* being the most widely used among them. We believe that this similarity is primarily due to the demographic, cultural, and floristic resemblance of the study area to the surrounding regions. Additionally, the observed similarity at the national level can largely be attributed to the widespread use of well-known and broadly distributed taxa among the general population.

According to the literature on *H. perforatum*, the plant is used for similar purposes, especially wound and burn treatments, in various regions of Türkiye and even other countries, in addition to our research area (Polat and Satıl 2012a, b; Kazancı et al. 2020;

Emre et al. 2021). An oleate prepared by soaking the aerial parts of *H. perforatum* in olive oil is used to treat wounds and burns. The main active constituents of *H. perforatum*, which has wound and burn healing effects, are hyperforin, hypericin, flavonoids and steroids (Jarić et al. 2018; Krishnan and Thomas 2019; Kwiecień et al. 2021).

R. canina, it is seen that the plant is used for similar purposes, especially to treat colds and diabetes, in various regions in Türkiye and even abroad, in addition to our research area (Cakilcioglu et al. 2011; Polat et al. 2013; Hayta et al. 2014; Mükemre et al. 2015; Paksoy et al. 2016; Polat 2019; Kazancı et al. 2020; Dogan A 2024; Emre et al. 2024). A decoction prepared mostly from the fruit of the plant is used internally for colds and diabetes. *R. canina* contains ascorbic acid, minerals, phenolic components and fatty acids, and is notable for its antioxidant, immunomodulatory and anticancer properties (Demir and Özcan 2001; Doğan and Özçelik 2017; Hendrysiak et al. 2023).

Thymus longicaulis subsp. *longicaulis* has a relatively high CI value in our study (CI: 0.59), but not in the comparison studies. The primary components of *T. longicaulis* subsp. *longicaulis* include vitamins, minerals, essential oils, and antioxidants. Therapeutic effects such as antiseptic, expectorant, and spasmolytic properties are attributed to the essential oil and flavonoids derived from the plant (Sarıkurkcu et al. 2010; Elkiran 2022).

However, *Plantago major* subsp. *major*, one of the plants commonly used according to many of the comparison studies, is among the top 10 most used plants in Yeniçağa with its low CI value (CI: 0.35). In addition to bioactive compounds such as polysaccharides, lipids, caffeic acid derivatives, flavonoids, iridoid glycosides and terpenoids, *P. major* subsp. *major* was also found to contain alkaloids and some organic acids. A number of activity studies such as wound healing, anti-inflammatory, antiulcerogenic and antioxidant have also been conducted, which may help explain these therapeutic effects of the plant in folk medicine (Samuelsen 2000).

As mentioned above, these taxa are both recognized in traditional medicine and have been the subject of extensive activity studies. In our study area, their uses were further confirmed in terms of their similarity of application.

Additionally, our study identified 12 taxa with uses that had not been recorded in previous ethnobotanical research conducted in Türkiye, alongside their similar uses. Therefore, 21 uses associated with these 12 taxa have been recorded for the first time (Tables 2 and 7). While some of these taxa have existing research and information, it is clear that further investigation is needed for others.

Species within the *Myosotis* genus are known to contain bioactive compounds such as alkaloids, saponins, and fatty acids, although detailed studies on *Myosotis arvensis* are limited. This plant has been used in traditional medicine for treating tumors, tuberculosis, and eye fatigue, and in Northern Europe, it is utilized for respiratory disorders.

Euonymus europaeus oil contains carotenoids and tocopherols, known for their wound-healing properties. The fresh bark is traditionally used for tissue repair and skin regeneration, and its application in psoriasis treatment is also significant.

The study confirms the anti-inflammatory activity of *Tripleurospermum tenuifolium*, attributed to its high content of linoleic and palmitic acids. *Corylus avellana* is recognized for its bioactive compounds that may benefit human health. *Onosma cinerea* has shown anti-inflammatory and pain-relieving effects, while *Roemeria hispida* demonstrated antimicrobial activity.

No sufficient studies have been found regarding the active compounds responsible for the therapeutic effects and the underlying mechanisms of action of the taxa listed in Table 7, including those mentioned above, whose uses are newly reported in our study. This highlights the need for further research in this area.

Conclusion

This study is the first comprehensive study of the traditional uses of medicinal plants in Yeniçağa district in Bolu Province. In this ethnobotanical study, we see that 92 taxa belonging to 34 families are used medicinally. In addition, a total of 197 therapeutic uses are documented. These findings indicate a significant amount of ethnobotanical knowledge in this district of rich vegetation and deep history.

The study shows that the vegetation of the district contains a broad variety of plants, including those

that are endangered (especially orchids and bulbous plants) and those that are endemic.

Long-term protective measures should be taken in order to secure the generation of these plants. The importance of medicinal plants for Türkiye and for the rest of the world is obvious. Properly managing the process from planting to harvesting and from production to trade is necessary to both control the collection of wild medicinal plants and prevent damage to biodiversity. In this way, these plants can be grown in certain areas and contribute economically to the local people.

However, the study also shows that none of the residents of the district under the age of 30 have any interest in plants, and that the majority of those who have any interest are over the age of 60. Both of these facts are worrying for the future of our plant-human relationship. They are a call for immediate action to ensure the continuation of the mutually beneficial interaction between humans and our environment.

Our study shows that traditional knowledge about medicinal plants in the region is not being transferred to the younger generations, and that this knowledge mostly remains with the elderly. This means that this traditional knowledge will decrease in the near future and then eventually disappear.

In order to prevent this dire result, we must share this traditional knowledge with the young. Brochures about the ethnobotanical uses of plants can be prepared, events in schools can be organized, the subject can be brought up in local festivals and meetings, and relevant news and announcements can be posted on social media, which are especially popular with the new generation.

Ethnobotanical studies, both those that have been conducted and those that will be conducted, also constitute a resource to preserve this knowledge and to strengthen its transfer from generation to generation.

Our ethnobotanical study is also scientific evidence that the use of traditional folk medicine continues to be important in society, especially in rural areas. As well, our study is evidence that it is possible to record in written form valuable information about plants used in folk medicine in Yeniçağa, and to transfer this valuable information from generation to generation.

Moreover, the fact that no previous ethnobotanical records were found for 12 of the taxa documented in this study highlights the continued

potential for uncovering novel traditional knowledge in Türkiye. This finding provides encouraging evidence for the value of conducting further research in this and similar regions in the future. Finally, the information obtained from this and similar ethnobotanical studies about remarkable medicinal plants, coupled with phytochemical and pharmacological studies that reveal the mechanisms of the therapeutic effects of these plants, will play a crucial role in the discovery of new active compounds and new drugs.

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Data availability The raw data supporting the conclusion of this article will be made available by the authors, without undue reservation.

Declarations

Conflict of interest The authors declare that they have no conflict of interest.

Appendix: Questionnaire form

1. Participant's name and surname.
2. Participant's age and sex.
3. Participant's telephone and address.
4. Participant's educational level.
5. Interview date.
6. Participant's place of residence.
7. Participant's duration of residence.
8. Plant's local name.
9. Human/animal health.
10. Ailments treated/therapeutic effect.
11. Plant part used.
12. Preparation.
13. Administration.
14. Dosage.
15. Length of treatment.
16. Age group of patients (baby, child, adult).
17. Side effect.
18. Other ethnobotanical uses.

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