

The folk-medicinal plants of Kadişehir (Yozgat – Turkey)

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Abstract

This paper contains significant ethnobotanical information on folk-medicinal plants and their ethnopharmacological uses in Kadişehir. The aim of the study was mainly to collect and identify the plants used therapeutically by the local people, and to make available information about traditional herbal medicine. It was undertaken during the period 2011–2012 and is based on plants collected during field work. Fifty-six plants used in folk-medicine and belonging to 34 families were identified in this study. Of these, 48 species were wild, and 8 species were cultivated plants. The most common families were Rosaceae (12.5%), Lamiaceae (8.9%) and Asteraceae (7.1%); and the most common preparations were decoctions (36.7%). In addition, a cultural importance index (*CI*) and use report (*UR*) were calculated for each species. Based on the *CI*, the most important plants were *Cydonia oblonga* (0.77), *Ecballium elaterium* (0.66), *Urtica urens* (0.66), *Vitis vinifera* (0.66), *Plantago lanceolata* (0.65), *Plantago major* subsp. *major* (0.65) and *Rosa canina* (0.62). We found three species of plant (*Astragalus noaeanus*, *Populus ×canescens* and *Salvia cyanescens*) which had never before been reported to have medicinal properties.

Keywords: ethnobotany; traditional medicine; Kadişehir; Yozgat; Turkey

Introduction

It is a well-known fact that, throughout the centuries, plants, owing to their many beneficial properties, have played a significant role in the daily life of human beings, providing food and medicines, as well as other advantages, e.g. plant fibres for clothes, wood for building etc. In other words, plants used for various illnesses are placed first in order of importance as natural resources. Treatment with traditional folk-medicine is still esteemed highly, particularly by those who have no access to modern healthcare. Thus, it is inevitable that so-called traditional folk-medicine mostly originates from plants. Around 80% of the world's population use plants to treat several illnesses [1]. Medicinal plants are an important source of modern drugs; indeed, about 25% of the drugs prescribed worldwide come from plants [2].

The Turkish flora contains 9582 species of vascular plants, with some 3155 being endemic [3]. Historically, having sheltered many Anatolian civilizations, Turkey is rich both in the variety of its cultural and natural resources, and accordingly, traditional herbal medicine plays a prominent role in Turkey. Many ethnobotanical studies have been carried out by researchers in various regions of Turkey [4–83]. Such areas as central Anatolia are well studied, whereas other parts

of Turkey, such as south-east Anatolia, still await thorough investigation [84]. Another example of a hitherto neglected region, in terms of investigation, is that of Kadişehir. Nevertheless, Akdağmadeni, the closest neighbor to Kadişehir, was studied [51].

Material and methods

Study area

Kadişehir is located in central Turkey (39–40' N, 34–35' E), at an altitude of 1040 m above sea level (Fig. 1). Kadişehir consists of a single sub-district and 26 villages. It covers an area of 578 km² and has a population of 15 000. Approximately 5000 people live in the city center, whereas the remainder lives in the sub-district and villages. Kadişehir is flanked by Zile (Tokat) to the north, Saraykent (Yozgat) and Akdağmadeni (Yozgat) to the south, Sulusaray (Tokat) and Yıldızeli (Sivas) to the east and Çekerek (Yozgat) to the west (Fig. 2).

Deveci Mountain (1907 m) is the highest elevation to the north of Kadişehir. The location of the region's most important plateau is named Alçılı Seki. Additionally, Çekerek Çayı, the region's largest river, is located towards the southern border of the county.

The climate in the area is typically steppe, with an annual mean temperature of 11°C, and a mean rainfall of 594 mm. The main crops of Kadişehir are wheat, barley, sugar beet, vetch and sunflower [85].

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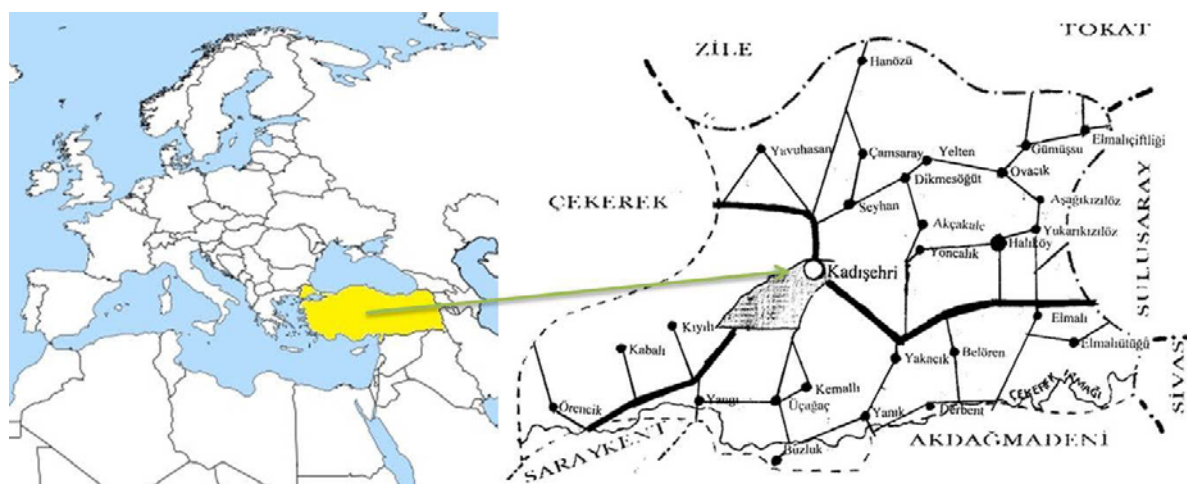


Fig. 1 Geographical location of the study area.



Fig. 2 General view of Kadişehri and villages.

The collected plants were identified by the authors based on the *Flora of Turkey and East Aegean Islands* [89–91] and *Flora Europaea* [92]. Voucher specimens were deposited at the Herbarium of Faculty of Pharmacy, University of Marmara (MARE).

Data analysis

A simple cultural importance index (*CI*) [93] was calculated for each species using the following formula: $CI = UR / N$; where *UR* (number of use report) – the total number of uses recorded for each species; *N* = the total number of respondents participating in the research. For that reason, for each taxon referred to by a respondent as having a medicinal use (detailed in Tab. 1), that report has been recorded as a use-report (*UR*).

Field study

Ethnobotanical data was collected by means of open and semi-structured interviews [86–88] with local people. The interviews took the form of general conversations and a strict questionnaire (Appendix S1). We asked the participants to show us methods for preparing the medicinal plants that they used, and we usually collected the plants with local people. In some cases, certain plants were collected beforehand from the same locality that the interviews were made.

A total of 65 people were interviewed. Of the 65 participants who took part in the questionnaire, 38 were female, and 27 were male. The age of participants varied from 40 to 90, the mean age being 63. They included farmers, housewives, shepherds, mukhtar (headmen of villages) and cafe owners. Interviews were conducted at various places (coffee houses, gardens, houses, fields, etc.). The three interviewees had migrated from eastern Anatolia 20 years ago and are now considered to have become an integral part of the population of the area. During the interviews, various information was collected [e.g. local names, part(s) of the plants used, ailments treated, therapeutic effect, methods of preparation and methods of administration] from experienced adults and patients. In addition, any harmful effects of the folk-medicine, if declared, were also recorded.

Results

The plants used for medicinal purposes in Kadişehri are presented in Tab. 1 and Tab. 2 and arranged alphabetically according to their botanical names, together with relevant information. Taxonomical changes to The Plant List [94] are shown in parentheses in Tab. 1, together with popular scientific names. During this study, 94 specimens were collected in the research area. Fifty-six medicinal plant species, belonging to 34 families, were recorded for the research area. Of these, 48 species were wild, and 8 species were cultivated plants. The most common medicinal plant families were Rosaceae (12.5%), Lamiaceae (8.9%) and Asteraceae (7.1%).

The plant parts most commonly used for the preparation of remedies were aerial parts (35.8%), leaves (16%), fruits (8.4%), flowers (7.5%), subterranean parts (6.6%) and other parts (25.7%).

The local people sometimes also used other ingredients, such as butter, flour, tahina, yoghurt, honey and milk to prepare the remedies.

The main preparation methods were decoction (36.7%) and direct application (11.9% without any preparation), crushing (13.8%) and various other ways of preparation (31.1%).

Tab. 1 Folk medicinal plants of Kadişehir (Yozgat, Turkey).

Botanical name, family and specimen number	Local name	Plant part used	Ailments treated/therapeutic effect	Preparation	Administration	UR (use report)	CI	Similar usage in literature
<i>Achillea biebersteinii</i> Afan. (<i>Achillea arabica</i> Kotschy) (Asteraceae, MARE 13988, 14490)	Eşek otu	Aerial parts	Abdominal pain	Decoction	Int.	22	0.34	Abdominal pain [51] [8,17,31,33] ^b
<i>Achillea nobilis</i> L. subsp. <i>neilreichii</i> (Kerner) Velen. (Asteraceae, MARE 14010)	Eşek otu	Aerial parts	High cholesterol	Decoction	Int.	18	0.28	
<i>Allium sativum</i> L. ^a (Amaryllidaceae, MARE 14492)	Sarımşak	Bulbil	Against high blood pressure	Crushed	Eaten after breakfast	36	0.55	Against high blood pressure [17,31,72,78]
<i>Armeniaca vulgaris</i> Lam. ^a (<i>Prunus armeniaca</i> L.) (Rosaceae, MARE 14494)	Kayısı	Fruits	Constipation	-	Eaten	35	0.54	Constipation [72] [78] ^b
<i>Astragalus noaeanus</i> Boiss. [<i>Astracantha noeana</i> (Boiss.) Podl.] (Fabaceae, MARE 14108)	Keven	Root	Varicosis	Crushed	Wrapped in a cloth, ext.	20	0.31	
<i>Berberis crataegina</i> DC. (Berberidaceae, MARE 13980, 14495)	Karamih dikenii, Kızamık	Fruits	Mouth diseases	-	Eaten	14	0.22	[11,33,78] ^b
<i>Centaurea iberica</i> Trev. ex Spreng. (Asteraceae, MARE 14103)	Çakır dikenii	Aerial parts	Diabetes	Decoction	Int.	6	0.09	
<i>Cerintho minor</i> L. subsp. <i>auriculata</i> (Ten.) Domac (Boraginaceae, MARE 14324)	-	Aerial parts	Rheumatism	Decoction	Ext. bath	23	0.35	
<i>Colutea cilicica</i> Boiss. et Bal. (Fabaceae, MARE 14105)	Nazar otu, Patlangıç	Flowering branches	Wound	Infusion	Ext.	17	0.26	
<i>Convolvulus arvensis</i> L. (Convolvulaceae, MARE 14102)	Dağ sarımaşığı	Latex (obtained from root)	Constipation	-	Int.	6	0.38	[17] ^b
<i>Crataegus microphylla</i> C. Koch (Rosaceae, MARE 13764)	Aliç	Fruits	Shortness of breath	Infusion	Int.	32	0.49	
<i>Crataegus tanaetifolia</i> (Lam.) Pers. (Rosaceae, MARE 13970, 13984)	Aliç	Branches Leaves & flowers Leaves & flowers	Shortness of breath Stomach ailments High cholesterol	Decoction Decoction Decoction	Int. Int. Int.	20 11 5	0.55	

Tab. 1 (continued)

Botanical name, family and specimen number	Local name	Plant part used	Ailments treated/therapeutic effect	Preparation	Administration	UR (use report)	CI	Similar usage in literature
<i>Cyclamen coum</i> Miller var. <i>coum</i> (Primulaceae, MARE 14436)	Domuzavşağı	Tuber	Infertility	Heated then fasten with string	Applied in the vagina for 1 week	5	0.08	[8] ^b
<i>Cydonia oblonga</i> Miller (Rosaceae, MARE 13972)	Ayva	Leaves	Cough	Decoction	Int.	28	0.77	Expectorant [31,72] Cough [8,57,72,78] ^b
		Leaves	Expectorant	Decoction	Int.	22		
<i>Cynodon dactylon</i> (L.) Pers. var. <i>dactylon</i> (Poaceae, MARE 13976, 13983)	Ayrık otu	Whole plant	Abdominal pain	Decoction	Int.	8	0.40	Kidney ailments [8,51] [72] ^b
		Whole plant	Constipation	Decoction	Int.	7		
		Whole plant	Kidney ailments	Decoction	Int.	11		
<i>Echballium elaterium</i> (L.) A. Rich. (Cucurbitaceae, MARE 14582)	Acı kavun	Fruit juice	Sinusitis	-	Dropped into the nostrils	43	0.66	Sinusitis [8,17,31,78] [32] ^b
<i>Echium italicum</i> L. (Boraginaceae, MARE 14115)	Sülük otu	Aerial parts	Wound	Cutting into small pieces and boiled in water	Wrapped in a cloth, ext.	9	0.14	Wound [32]
<i>Elaeagnus angustifolia</i> L. ^a (Elaeagnaceae, MARE 14007)	İğde	Flowers	Infertility	Mixed with honey (1 kg) and flowers (1 kg)	Eaten 2 spoonfull for 1 month	5	0.08	[51,78] ^b
<i>Erodium cicutarium</i> L. subsp. <i>cicutarium</i> (Geraniaceae, MARE 13739)	Danadili	Aerial parts	Stomach ailments	Decoction	Int.	10	0.15	
<i>Eryngium camppestre</i> L. var. <i>viridens</i> Link (Apiaceae, MARE 14104, 14116)	Şeker dikeni, Şeker kangalı	Young stem	Diabetes	-	Eaten	3	0.11	[8,33,51,72] ^b
		Young stem	Shortness of breath	-	Eaten	4		
		Latex	Callus	-	Ext.	23	0.42	[72] ^b
<i>Euphorbia macroclada</i> Boiss. (Euphorbiaceae, MARE 13758, 13999, 14003, 14110)	Sütleşen	Latex	Infertility	Dropped on the wool	Applied in the vagina for 3 days	4		
<i>Frangula alnus</i> Miller subsp. <i>alnus</i> (Frangulaeaceae, MARE 13758, 13999, 14003, 14110)	Banişto	Flowering branches & stem bark	Wound	Boiled in water then mixed with flour	Wrapped in a cloth, ext.	19	0.29	
<i>Glaucium grandiflorum</i> Boiss. et Huet var. <i>grandiflorum</i> (Papaveraceae, MARE 13977)	Gelincik	Aerial parts	Cough	Decoction	Int.	33	0.51	
<i>Hyoscyamus niger</i> L. (Solanaceae, MARE 14000)	Diş otu	Flowers	Toothache	Decoction	Gargle	3	0.57	Toothache [31,32,57,72] Against itching in the eyes [57] [8,51] ^b

Tab. 1 (continued)

Botanical name, family and specimen number	Local name	Plant part used	Ailments treated/therapeutic effect	Preparation	Administration	UR (use report)	CI	Similar usage in literature
<i>Hyoscyamus reticulatus</i> L. (Solanaceae, MARE 13997)	Diş otu, Kınacık	Seeds	Toothache	Boiled in water and inhaled through mouth. Small white worms with black head are dropped.	Ext.	19		
		Seeds	Against itching in the eyes	Boiled in water and eyes are exposed to steam	Ext.	15		
		Flowers	Toothache	Decoction	Gargle	3	0.57	Toothache [72]
		Seeds	Toothache	Boiled in water and inhaled through mouth. Small white worms with black head are dropped.	Ext.	19		
		Seeds	Against itching in the eyes	Boiled in water and eyes are exposed to steam	Ext.	15		
<i>Juglans regia</i> L. ^a (Juglandaceae, MARE 13974)	Ceviz	Leaves	Rheumatism	-	Wrapped in a cloth, ext.	21	0.32	Rheumatism [32] [8,17,31,72] ^b
<i>Juniperus oxycedrus</i> L. subsp. <i>oxycedrus</i> (Cupressaceae, MARE 13985)	Ardıç	Cones	Stomach ailments	Decoction	Int.	14	0.22	Stomach ailments [17,78] [16,32,33,51,72] ^b
<i>Malva neglecta</i> Wallr. (Malvaceae, MARE 13981, 14109)	Ebe gümeçi, Kömeç	Aerial parts	Rheumatism	Boiled in water	Wrapped in a cloth, ext.	7	0.26	Kidney ailments [8] Rheumatism [33] [11,31,53,57,72] ^b
<i>Peganum harmala</i> L. (Zygophyllaceae, MARE 14012)	Üzerlik	Aerial parts	Kidney ailments	Cooked	Eaten	4		
		Aerial parts	Shortness of breath	Decoction	Int.	6		
		Aerial parts	Epilepsy	Heated	Inhaled	2	0.18	Haemorrhoids [17,33,78]
		Fruits	Haemorrhoids	-	Int., taken as a pill for 30 days	6		
		Aerial parts	Haemorrhoids	Boiled in water	Ext. bath	4		
<i>Petroselinum crispum</i> (Miller) A. W. Hill (Apiaceae, MARE 13973)	Maydanoz	Aerial parts	Stomach ailments	Decoction	Int.	9	0.43	Urinary system diseases [17,31] Stomach ailments [72]

Tab. 1 (continued)

Botanical name, family and specimen number	Local name	Plant part used	Ailments treated/therapeutic effect	Preparation	Administration	UR (use report)	CI	Similar usage in literature
<i>Pinus nigra</i> J.F. Arnold subsp. <i>nigra</i> var. <i>caramanica</i> (Loudon) Rehder (Pinaceae, MARE 13993)	Çam	Aerial parts Resine (obtained from stem)	Urinary system diseases Bronchitis	Decoction Boiled in milk	Int. Int.	19 19	0.29	[32,57] ^b
<i>Plantago lanceolata</i> L. (Plantaginaceae), MARE 14004	Bağyaprağı, Kırkbahar	Leaves Leaves	Wound Abscess	Crushed Crushed	Wrapped in a cloth, ext. Wrapped in a cloth, ext.	21 21	0.65	Abscess [72,78] Wound [11,51,78] [32] ^b
<i>Plantago major</i> L. subsp. <i>major</i> (Plantaginaceae, MARE 13969, 13995, 14491)	Bağyaprağı, Kırkbahar	Leaves Leaves	Wound Abscess	Crushed Crushed	Wrapped in a cloth, ext. Wrapped in a cloth, ext.	21 21	0.65	Wound [8,51,72,78] Abscess [16,17,31,32,57]
<i>Polygonum cognatum</i> Meissn. (Polygonaceae, MARE 14006)	Madımak	Root	Kidney stones	Decoction	Int.	7	0.11	[51] ^b
<i>Populus xanescens</i> (Aiton) Sm. ^a (Salicaceae, MARE 13978)	Kavak	Stem bark	Scabies	Burned	Ashes applied on skin, ext.	6	0.10	
<i>Prunus divaricata</i> Ledeb subsp. <i>divaricata</i> (Rosaceae, MARE 14328)	Dağ eriği	Fruits	Diabetes	-	Eaten	8	0.12	
<i>Prunus spinosa</i> L. subsp. <i>dasyphylla</i> (Schur) Domin (Rosaceae, MARE 14488)	Gövem	Fruits	Diabetes	-	Eaten	8	0.12	
<i>Ranunculus kotschyi</i> Boiss. (Ranunculaceae, MARE 13788)	Mayıs çiçeği, Yayla çiçeği	Aerial parts	Rheumatism	Crushed	Wrapped in a cloth, ext.	5	0.12	
<i>Rosa canina</i> L. (Rosaceae, MARE 13982, 13989, 14013, 14493)	Kuşburnu	Aerial parts Fruits Fruits Fruits	Infertility Shortness of breath Diabetes Haemorrhoids	Boiled in water Decoction Decoction Jam	Ext. bath Int. one teacup two times a day Int. one teacup in the morning Int. eaten 1 spoonful before breakfast	3 18 3 6	0.57	Haemorrhoids [32,33,57,78] Diabetes [33] Stomach ailments [57] [17,51,72] ^b
		Young shoots Fruits	Wound Stomach ailments	Heated Decoction	Ext. Int.	3 7		

Tab. 1 (continued)

Botanical name, family and specimen number	Local name	Plant part used	Ailments treated/therapeutic effect	Preparation	Administration	UR (use report)	CI	Similar usage in literature
<i>Rumex crispus</i> L. (Polygonaceae, MARE 13987, 14008)	Efelik	Leaves	Constipation	Cooked	Int. eaten	20	0.35	[51] ^b
<i>Salix alba</i> L. (Salicaceae, MARE 13778, 13975, 13998)	Söğüt	Leaves	Tonsillitis	Crushed	Wrapped in a cloth, ext.	3		
		Leaves	Cardiovascular diseases	Decoction	Int.	4	0.42	[51] ^b
		Stem bark	Antiinflammatory	Decoction	Int.	10		
		Leaves	Rheumatism	Boiled in water	Wrapped in a cloth, ext.	10		
		Leaves	Diabetes	Decoction	Int.	3		
<i>Salvia cyanescens</i> Boiss. et Bal. (Lamiaceae, MARE 14113)	Kazankarası	Aerial parts	Diabetes	Decoction	Int.	4	0.06	
<i>Salvia sclarea</i> L. (Lamiaceae, MARE 14107, 14325)	Yağlıkara	Leaves	Rheumatism	Crushed	Wrapped in a cloth, ext.	7	0.11	
<i>Satureja wiedemanniana</i> (Lallem.) Valen. (Lamiaceae, MARE 14009)	Kekik	Aerial parts	Stomach ailments	Decoction	Int.	16	0.43	[17] ^b
		Aerial parts	Gall bladder ailments	Decoction	Int.	3		
		Leaves	Shortness of breath	Decoction	Int.	9		
<i>Teledium imperati</i> L. subsp. <i>orientale</i> (Boiss.) Nyman (Caryophyllaceae, MARE 14114)	Demra otu	Aerial parts	Wound	Crushed with milk and butter	Ext.	11	0.17	
<i>Teucrium polium</i> L. (Lamiaceae, MARE 14005, 14112)	Yavşan	Aerial parts	Sunstroke	Boiled in water	Ext. bath	3	0.43	Anorexia [33,78] Sunstroke [33,51] [11,17,32,51] ^b
		Aerial parts	Diarrhea	Decoction	Int. 1 spoonful	14		
		Aerial parts	Allergy	Boiled in water	Ext. bath	2		
		Aerial parts	Nausea	Decoction	Int.	6		
		Aerial parts	Anorexia (children)	Decoction	Int. 1 spoonful	3		
<i>Thymus sipyleus</i> Boiss. subsp. <i>rosulans</i> (Borbás) Jalas (Lamiaceae, MARE 13804)	Kekik	Aerial parts	Stomach ailments	Decoction	Int.	22	0.58	Stomach ailments [31,33,72] Shortness of breath [11] [8,17,53,78] ^b
		Aerial parts	Gall bladder ailments	Decoction	Int.	6		
		Aerial parts	Shortness of breath	Decoction	Int.	10		
<i>Tripleurospermum parviflorum</i> (Willd.) Pobed. (Asteraceae, MARE 13756)	Koyungözü, Papatya	Capitulum	Diabetes	Decoction	Int.	3	0.32	
		Aerial parts	Shortness of breath	Decoction	Int.	10		

Tab. 1 (continued)

Botanical name, family and specimen number	Local name	Plant part used	Ailments treated/ therapeutic effect	Preparation	Administration	UR (use report)	CI	Similar usage in literature
<i>Ulmus glabra</i> Hudson (Ulmaceae, MARE 13971)	Kara ağaç	Aerial parts	High cholesterol	Decoction	Int.	4		
		Aerial parts	Wound	Boiled in water	Wrapped in a cloth, ext.	4		
<i>Urtica dioica</i> L. (Urticaceae, MARE 13979, 13986)	Isırgan	Stem bark	Boil	Boiled in water	Wrapped in a cloth, ext.	3	0.05	
		Whole plant	Shortness of breath	Decoction	Int.	6	0.14	[11,17,31–33,51,57,72] ^b
<i>Urtica urens</i> L. (Urticaceae, MARE 13740, 13750, 14002)	Isırgan	Aerial parts	Wound	Cooked in water and flour	Wrapped in a cloth, ext.	3		
		Aerial parts	Rheumatism	Crushed	Wrapped in a cloth, ext.	23	0.66	Rheumatism [32,72]
<i>Verbascum glomeratum</i> Boiss. (Scrophulariaceae, MARE 14001, 14011)	Sığırkuyruğu	Aerial parts	Wound	Crushed	Wrapped in a cloth, ext.	3		
		Aerial parts	Kidney ailments	Decoction	Int.	5		
		Aerial parts	Diabetes	Crushed with yoghurt	Int.	3		
		Aerial parts	Rheumatism	Boiled in water	Wrapped in a cloth, ext.	9		
		Flowers & flowering branches	Stomach ailments	Infusion	Int.	5	0.26	
<i>Viscum album</i> L. subsp. <i>album</i> (Santalaceae, MARE 13742, 13759, 14327, 14885, 14487)	Kökçe, Ökse otu	Flowers	Cough	Mixed with honey	Eaten	8		
		Leaves	Rheumatism	Boiled in water	Wrapped in a cloth, ext.	4		
		Leaves	Diabetes	Decoction	Int., after meal, ½ glass of water	3	0.57	Diabetes [31,51,57] Shortness of breath [16,51] [8,32,33,78] ^b
		Leaves	Shortness of breath	Decoction	Int.	28		
<i>Vitis vinifera</i> L. ^a (Vitaceae, MARE 14486)	Üzüüm	Leaves	Stomach ailments	Decoction	Int.	6		
		Fruits	Anaemia	Molasses	Int. one teacup	33	0.66	Anaemia [8,72,78] [32] ^b
<i>Zea mays</i> L. subsp. <i>mays</i> ^a (Poaceae, MARE 14497, 14498)	Mısır	Fruits	Stomach ailments	Molasses mixed with tahina	Int. one spoonfull before meals for 10–15 days	10		
		Stylus	Diuretic	Infusion	Int.	12	0.37	Diuretic [51] Kidney ailments [32]
		Stylus	Kidney ailments	Infusion	Int., before meals	12		

^a Cultivated plant. ^b Different usage. Int. – internal use; Ext. – external use. The new plant uses were marked as bold.

Tab. 2 Multiherbal recipes used as folk medicine in Kadişehir.

Recipe	Plant	Plant part used	Ailments treated, therapeutic effect	Preparation	Administration
1	<i>Berberis crataegina</i> <i>Juglans regia</i>	Flowering branches Seeds	Wound	Boiled in water then crushed	Ext.
2	<i>Hypericum perforatum</i> <i>Salix alba</i>	Whole plant Leaves	Haemorrhoids	Boiled in water	Ext.
3	<i>Malva neglecta</i> <i>Urtica dioica</i>	Aerial parts Aerial parts	Rheumatism	Boiled in water then added flour	Ext.

During the study, a total of 109 remedies were recorded. Most remedies were taken internally (60.5%; [Tab. 1](#), [Tab. 2](#)).

Some of the medicinal plants were also used in multi-herbal recipes containing two or more species. These are presented in table ([Tab. 2](#)). Of these, *Hypericum perforatum* was used only in multi-herbal recipes.

Astragalus noaeanus, *Crataegus tanacetifolia*, *Salvia cyanescens* and *Satureja wiedemanniana* ([Fig. 3](#)) are all endemic taxa used for medicinal purposes in Kadişehir [[95](#)].

According to the calculation based on cultural importance index (CI) the most important plants were *Cydonia oblonga* (0.77), *Ecballium elaterium* (0.66), *Urtica urens* (0.66), *Vitis vinifera* (0.66), *Plantago lanceolata* (0.65), *Plantago major* subsp. *major* (0.65) and *Rosa canina* (0.62; [Tab. 1](#)).

The most frequent type of medicinal use record is shortness of breath (143 UR), stomach ailments (110 UR), rheumatism (109 UR) and wounds (100 UR).

**Fig. 3** *Satureja wiedemanniana* (endemic species to Turkey).

According to the interviewees, *Ranunculus kotschyi*, should be handled with care since an over-dose (long-term exposure) could prove dangerous.

The natives call certain different plant species by the same vernacular name. For example: *Achillea biebersteinii*–*Achillea nobilis* subsp. *neilreichii* (*Eşek otu*), *Crataegus microphylla*–*Crataegus tanacetifolia* (*Alıç*), *Hyoscyamus niger*–*Hyoscyamus reticulatus* (*Diş otu*), *Plantago lanceolata*–*Plantago major* subsp. *major* (*Bağ yaprağı*, *Kırkbahar*), *Satureja wiedemanniana*–*Thymus sipyleus* subsp. *rosulans* (*Kekik*) and *Urtica dioica*–*Urtica urens* (*Isırgan*).

Discussion

Some of the vernacular names of the medicinal plants were recorded in this study for the first time [[96,97](#)]. They are as follows: *Karamih dikenii* (*Berberis crataegina*), *Domuzavşağı* (*Cyclamen coum* var. *coum*), *Şeker kangalı* (*Eryngium campestre* var. *virens*), *Banişto* (*Frangula alnus* subsp. *alnus*), *Kınacık* (*Hyoscyamus reticulatus*), *Kırkbahar* (*Plantago lanceolata*, *Plantago major* subsp. *major*) and *Demra otu* (*Telephium imperati* subsp. *orientale*).

We compared our study with other comprehensive ethnobotanical studies on plants used for folk-medicine growing in neighboring areas [[8,11,16,17,31–33,51,57,72,78](#)] The results of this comparison are presented in table ([Tab. 1](#)). According to this comparison, *Plantago major* subsp. *major*, recorded from ten localities, *Urtica dioica* and *Viscum album*, recorded from eight localities, were the most common medicinal plants occurring in Kadişehir and adjacent areas.

Comparison between the traditional uses of plants, as found in our literature [[4–83](#)], also revealed that *Astragalus noaeanus*, *Populus ×canescens* and *Salvia cyanescens* were recorded in Turkey for the first time in the present study. *Astragalus noaeanus* is an endemic species that is used for varicosis. Furthermore, *Astragalus* has the highest ratio of endemism (61.3%) [[98](#)]. *Populus ×canescens* is a cultivated plant and is used to treat scabies. *Salvia cyanescens* is an endemic species whose aerial parts are used, or is prepared as a decoction. This plant is used to treat diabetes. *Salvia* has many species and, in the literature review that we conducted, we found that some of these were mainly used for abdominal pain and the common cold [[4–83](#)].

Some of medicinal plants have been recorded as wild edible plants in our study area. They include: *Berberis crataegina*, *Cydonia oblonga*, *Eryngium campestre* var. *virens*,

Malva neglecta, *Polygonum cognatum*, *Prunus divaricata* subsp. *divaricata*, *Prunus spinosa* subsp. *dasyphylla*, *Rosa canina*, *Rumex crispus*, and *Urtica urens*. In addition, *Rosa canina* and *Thymus sipyleus* subsp. *rosulans* are used as a herbal tea and *Satureja wiedemanniana* and *Thymus sipyleus* subsp. *rosulans* are used for spicing food. Some of these plants are collected by local people and sold in the local bazaar. Apart from these plants, the literature [99] states that the following wild plants of Turkey are also edible and used as food: *Cerinth minor* subsp. *auriculata*, *Convolvulus arvensis*, *Crataegus tanacetifolia*, *Malva neglecta*, *Plantago lanceolata*, *Plantago major* subsp. *major*, *Ranunculus kotschyi*, *Salvia sclarea*, *Tripleurospermum parviflorum* and *Urtica dioica*.

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Authors' contributions

The following declarations about authors' contributions to the research have been made: research design: GB; undertaking of interviews: MİH; writing the manuscript: GB.

Competing interests

No competing interests have been declared.

Supplementary material

The following supplementary material for this article is available online at <http://pbsociety.org.pl/journals/index.php/asbp/rt/suppFiles/asbp.2015.021/0>:

1. Appendix S1: questionnaire form.

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Conclusion

This present study is the first of its kind to investigate fully those plants used in the traditional folk-medicine of the Kadişehir district, since it is the first study to record the use of *Astragalus noaeanus*, *Populus ×canescens* and *Salvia cyanescens* in Turkey. Furthermore, this study provided the opportunity to record valuable information about plants used in folk-medicine before it is completely lost. Not only does this ethnobotanical study prove, once again, that the use of traditional folk-medicine in Kadişehir is still prevalent, especially amongst those living in small villages, but it also provides a reliable guide to plants as a resource of medicines yet to be discovered.

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