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

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Abstract

This paper contains significant ethnobotanical information on folk-medicinal plants and their ethnopharmacological uses in Kadışehri. 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; Kadışehri; 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 Kadışehri. Nevertheless, Akdağmadeni, the closest neighbor to Kadışehri, was studied [51].

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Material and methods

Study area

Kadışehri is located in central Turkey (39–40′ N, 34–35″ E), at an altitude of 1040 m above sea level (Fig. 1). Kadışehri consists of a single sub-district and 26 villages. It covers an area of 578 km^2 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. Kadışehri 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 Kadışehri. 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 Kadışehri are wheat, barley, sugar beet, vetch and sunflower [85].

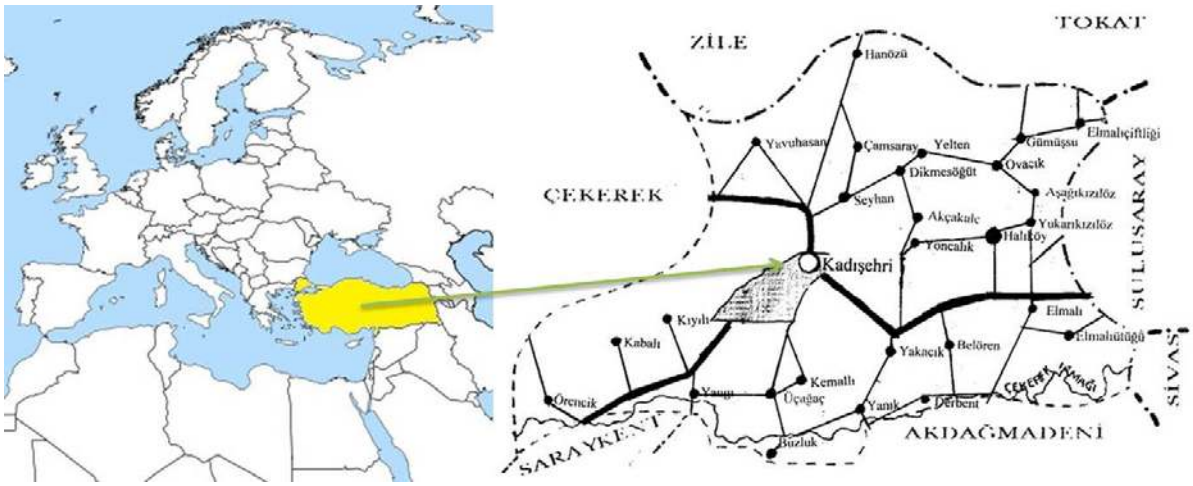

Fig. 1 Geographical location of the study area.

Fig. 2 General view of Kadışehri and villages.

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.

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).

Results

The plants used for medicinal purposes in Kadışehri 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 Kadışehri (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
Achillea biebersteinii Afan. (*Achillea arabica* Kotschy) (Asteraceae, MARE 13988, 14490)	Eşek otu	Aerial parts	Abdominal pain	Decoction	Int.	22	0.34	Abdominal pain [51] [8,17,31,33][b]
Achillea nobilis L. subsp. *neilreichii* (Kerner) Velen. (Asteraceae, MARE 14010)	Eşek otu	Aerial parts	**High cholesterol**	Decoction	Int.	18	0.28	
Allium sativum L.[a] (Amaryllidaceae, MARE 14492)	Sarımsak	Bulbil	Against high blood pressure	Crushed	Eaten after breakfast	36	0.55	Against high blood pressure [17,31,72,78]
Armeniaca vulgaris Lam.[a] (*Prunus armeniaca* L.) (Rosaceae, MARE 14494)	Kayısı	Fruits	Constipation	-	Eaten	35	0.54	Constipation [72] [78][b]
Astragalus noaeanus Boiss. [*Astracantha noeana* (Boiss.) Podl.] (Fabaceae, MARE 14108)	Keven	Root	Varicosis	Crushed	Wrapped in a cloth, ext.	20	0.31	
Berberis crataegina DC. (Berberidaceae, MARE 13980, 14495)	Karamıh dikeni, Kızamık	Fruits	**Mouth diseases**	-	Eaten	14	0.22	[11,33,78][b]
Centaurea iberica Trev. ex Spreng. (Asteraceae, MARE 14103)	Çakır dikeni	Aerial parts	Diabetes	Decoction	Int.	6	0.09	
Cerinthe minor L. subsp. *auriculata* (Ten.) Domac (Boraginaceae, MARE 14324)	-	Aerial parts	**Rheumatism**	Decoction	Ext. bath	23	0.35	
Colutea cilicica Boiss. et Bal. (Fabaceae, MARE 14105)	Nazar otu, Patlangıç	Flowering branches	Wound	Infusion	Ext.	17	0.26	
Convolvulus arvensis L. (Convolvulaceae, MARE 14102)	Dağ sarmaşığı	Latex (obtained from root)	Constipation	-	Int.	6	0.38	[17][b]
		Latex	**Haemorrhoids**	-	Int.	11		
		Latex	Against intestinal worms	-	Int.	8		
Crataegus microphylla C. Koch (Rosaceae, MARE 13764)	Alıç	Fruits	**Shortness of breath**	Infusion	Int.	32	0.49	
Crataegus tanacetifolia (Lam.) Pers. (Rosaceae, MARE 13970, 13984)	Alıç	Branches	**Shortness of breath**	Decoction	Int.	20	0.55	
		Leaves & flowers	**Stomach ailments**	Decoction	Int.	11		
		Leaves & flowers	**High cholesterol**	Decoction	Int.	5		

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
Cyclamen coum Miller var. coum (Primulaceae, MARE 14436)	Domuzavşağı	Tuber	Infertility	Heated then fasten with string	Applied in the vagina for 1 week	5	0.08	[8][b]
Cydonia oblonga 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		
Cynodon dactylon (L.) Pers. var. *dactylon* (Poaceae, MARE 13976, 13983)	Ayrık otu	Whole plant	**Abdominal pain**	Decoction	Int.	8	0.40	Kidney ailments [8,51] [72][b]
		Whole plant	Conspitation	Decoction	Int.	7		
		Whole plant	Kidney ailments	Decoction	Int.	11		
Ecballium elaterium (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]
Echium italicum 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]
Elaeagnus angustifolia 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]
Erodium cicutarium L. subsp. *cicutarium* (Geraniaceae, MARE 13739)	Danadili	Aerial parts	**Stomach ailments**	Decoction	Int.	10	0.15	
Eryngium campestre L. var. *virens* 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		
Euphorbia macroclada Boiss. (Euphorbiaceae, MARE 13758, 13999, 14003, 14110)	Sütleğen	Latex	Callus	-	Ext.	23	0.42	[72][b]
		Latex	**Infertility**	Dropped on the wool	Applied in the vagina for 3 days	4		
Frangula alnus Miller subsp. *alnus* (*Frangula dodonei* Ard.) (Rhamnaceae, MARE 14111)	Banişto	Flowering branches & stem bark	Wound	Boiled in water then mixed with flour	Wrapped in a cloth, ext.	19	0.29	
Glaucium grandiflorum Boiss. et Huet var. *grandiflorum* (Papaveraceae, MARE 13977)	Gelincik	Aerial parts	Cough	Decoction	Int.	33	0.51	
Hyoscyamus niger 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
		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		
Hyoscyamus reticulatus L. (Solanaceae ,MARE 13997)	Diş otu, Kınacık	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		
Juglans regia L.[a] (Juglandaceae, MARE 13974)	Ceviz	Leaves	Rheumatism	-	Wrapped in a cloth, ext.	21	0.32	Rheumatism [32] [8,17,31,72][b]
Juniperus oxycedrus L. subsp. *oxycedrus* (Cupressaceae ,MARE 13985)	Ardıç	Cones	Stomach ailments	Decoction	Int.	14	0.22	Stomach ailments [17,78] [16,32,33,51,72][b]
Malva neglecta Wallr. (Malvaceae, MARE 13981, 14109)	Ebe gümeci, 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]
		Aerial parts	Kidney ailments	Cooked	Eaten	4		
		Aerial parts	Shortness of breath	Decoction	Int.	6		
Peganum harmala L. (Zygophyllaceae, MARE 14012)	Üzerlik	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		
Petroselinum crispum (Miller) A.W. Hilla (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
		Aerial parts	Urinary system diseases	Decoction	Int.	19		
Pinus nigra J.F. Arnold subsp. *nigra* var. *caramanica* (Loudon) Rehder (Pinaceae, MARE 13993)	Çam	Resine (obtained from stem)	Bronchitis	Boiled in milk	Int.	19	0.29	[32,57][b]
Plantago lanceolata L. (Plantaginaceae), MARE 14004	Bağyaprağı, Kırkbahar	Leaves	Wound	Crushed	Wrapped in a cloth, ext.	21	0.65	Abscess [72,78] Wound [11,51,78] [32][b]
		Leaves	Abscess	Crushed	Wrapped in a cloth, ext.	21		
Plantago major L. subsp. *major* (Plantaginaceae, MARE 13969, 13995, 14491)	Bağyaprağı, Kırkbahar	Leaves	Wound	Crushed	Wrapped in a cloth, ext.	21	0.65	Wound [8,51,72,78] Abscess [16,17,31,32,57]
		Leaves	Abscess	Crushed	Wrapped in a cloth, ext	21		
Polygonum cognatum Meissn. (Polygonaceae, MARE 14006)	Madımak	Root	**Kidney stones**	Decoction	Int.	7	0.11	[51][b]
Populus ×canescens (Aiton) Sm.[a] (Salicaceae, MARE 13978)	Kavak	Stem bark	**Scabies**	Burned	Ashes applied on skin, ext.	6	0.10	
Prunus divaricata Ledeb subsp. *divaricata* (Rosaceae, MARE 14328)	Dağ eriği	Fruits	Diabetes	-	Eaten	8	0.12	
Prunus spinosa L. subsp. *dasyphylla* (Schur) Domin (Rosaceae, MARE 14488)	Gövem	Fruits	Diabetes	-	Eaten	8	0.12	
Ranunculus kotschyi Boiss. (Ranunculaceae, MARE 13788)	Mayıs çiçeği, Yayla çiçeği	Aerial parts	Rheumatism	Crushed	Wrapped in a cloth, ext.	5	0.12	
		Aerial parts	**Infertility**	Boiled in water	Ext. bath	3		
Rosa canina L. (Rosaceae, MARE13982, 13989, 14013, 14493)	Kuşburnu	Fruits	Shortness of breath	Decoction	Int. one teacup two times a day	18	0.57	Haemorrhoids [32,33,57,78] Diabetes [33] Stomach ailments [57] [17,51,72][b]
		Fruits	Diabetes	Decoction	Int. one teacup in the morning	3		
		Fruits	Haemorrhoids	Jam	Int. eaten 1 spoonful before breakfast	6		
		Young shoots	**Wound**	Heated	Ext.	3		
		Fruits	Stomach ailments	Decoction	Int.	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
Rumex crispus L. (Polygonaceae, MARE 13987, 14008)	Efelik	Leaves	Constipation	Cooked	Int. eaten	20	0.35	[51][b]
		Leaves	Tonsillitis	Crushed	Wrapped in a cloth, ext.	3		
Salix alba L. (Salicaceae, MARE 13778, 13975, 13998)	Söğüt	Leaves	Cardiovascular diseases	Decoction	Int.	4	0.42	[51][b]
		Stem bark	Antiinflamatory	Decoction	Int.	10		
		Leaves	Rheumatism	Boiled in water	Wrapped in a cloth, ext.	10		
		Leaves	Diabetes	Decoction	Int.	3		
Salvia cyanescens Boiss. et Bal. (Lamiaceae, MARE 14113)	Kazankarası	Aerial parts	**Diabetes**	Decoction	Int.	4	0.06	
Salvia sclarea L. (Lamiaceae, MARE 14107, 14325)	Yağlıkara	Leaves	**Rheumatism**	Crushed	Wrapped in a cloth, ext.	7	0.11	
Satureja wiedemanniana (Lallem.) Velen. (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		
Telephium imperati L. subsp. *orientale* (Boiss.) Nyman (Caryophyllaceae, MARE 14114)	Demra otu	Aerial parts	Wound	Crushed with milk and butter	Ext.	11	0.17	
Teucrium polium 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		
Thymus sipyleus Boiss. subsp. *rosulans* (Borbâs) 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 baldder ailments**	Decoction	Int.	6		
		Aerial parts	**Shortness of breath**	Decoction	Int.	10		
Tripleurospermum parviflorum (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
		Aerial parts	**High cholesterol**	Decoction	Int.	4		
		Aerial parts	**Wound**	Boiled in water	Wrapped in a cloth, ext.	4		
Ulmus glabra Hudson (Ulmaceae, MARE 13971)	Kara ağaç	Stem bark	Boil	Boiled in water	Wrapped in a cloth, ext.	3	0.05	
Urtica dioica L. (Urticaceae, MARE 13979, 13986)	Isırgan	Whole plant	Shortness of breath	Decoction	Int.	6	0.14	[11,17,31–33,51, 57,72][b]
		Aerial parts	Wound	Cooked in water and flour	Wrapped in a cloth, ext.	3		
Urtica urens L. (Urticaceae, MARE 13740, 13750, 14002)	Isırgan	Aerial parts	Rheumatism	Crushed	Wrapped in a cloth, ext.	23	0.66	Rheumatism [32,72]
		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		
Verbascum glomeratum Boiss. (Scrophulariaceae, MARE 14001, 14011)	Sığırkuyruğu	Flowers & flowering branches	Stomach ailments	Infusion	Int.	5	0. 26	
		Flowers	Cough	Mixed with honey	Eaten	8		
		Leaves	**Rheumatism**	Boiled in water	Wrapped in a cloth, ext.	4		
Viscum album L. subsp. *album* (Santalaceae, MARE 13742, 13759, 14327, 14885, 14487)	Kökçe, Ökse otu	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		
		Leaves	**Stomach ailments**	Decoction	Int.	6		
Vitis vinifera L.[a] (Vitaceae, MARE 14486)	Üzüm	Fruits	Anaemia	Molasses	Int. one teacup	33	0.66	Anaemia [8,72,78] [32][b]
		Fruits	Stomach ailments	Molasses mixed with tahina	Int. one spoonfull before meals for 10–15 days	10		
Zea mays L. subsp. *mays*[a] (Poaceae, MARE 14497, 14498)	Mısır	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 Kadışehri.

Recipe	Plant	Plant part used	Ailments treated, therapeutic effect	Preparation	Administration
1	*Berberis crataegina* *Juglans regia*	Flowering branches Seeds	Wound	Boiled in water then crushed	Ext.
2	*Hypericum perforatum* *Salix alba*	Whole plant Leaves	Haemorrhoids	Boiled in water	Ext.
3	*Malva neglecta* *Urtica dioica*	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 Kadışehri [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: *Karamıh dikeni* (*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 Kadışehri 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: *Cerinthe minor* subsp. *auriculata*, *Convolvulus arvensis*, *Crataegus tanacetifolia*, *Malva neglecta*, *Plantago lanceolata*, *Plantago major* subsp. *major*, *Ranunculus kotschyi*, *Salvia sclarea*, *Tripleurospermum parviflorum* and *Urtica dioica*.

Conclusion

This present study is the first of its kind to investigate fully those plants used in the traditional folk-medicine of the Kadişehri 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 Kadişehri 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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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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