



Preserving the richness of nature: cultural and ecological importance of edible wild plants in Sivas

Zakine Kadioglu · Faruk Yildiz · Ali Kandemir · Kemal Cukadar · Nalan Nazan Kalkan · Huseyin Vurgun · Veysel Donderalp · Recep Korkut · Ozkan Kaya

Received: 5 December 2023 / Accepted: 16 January 2024
© The Author(s), under exclusive licence to Springer Nature B.V. 2024

Abstract This comprehensive article offers a thorough exploration of the abundant plant species that hold a deep connection with the history and daily life of Sivas, within the context of its traditional culture and ethnobotany. The Asteraceae family, which encompassed 22 species, emerged as the most diverse family. Other notable families included Brassicaceae (8 species), Fabaceae (9 species), Polygonaceae (10 species), Apiaceae (11 species), and Lamiaceae (21 species), and the study systematically classified 128

plant species and subplants into 29 different families. The study categorized these plants based on their edible parts to understand their role in Sivas' culinary traditions, revealing a wide range of edible components, including leaves, seeds, flowers, roots, tubers, gum, fruits, branches, and more. *Cerintho minor*, *Berberis vulgaris*, *Stachys lavandulifolia* and others provided nourishing leaves and young shoots. The study categorized plants based on their preparation methods, highlighting their integral role in Sivas' traditional cuisine. Seeds namely *Echinops orientalis* and *Cephalaria procera* introduced culinary diversity, while certain plants, such as *Geranium tuberosum* and *Cirsium rhocephalum*, contributed edible roots, expanding the repertoire of local dishes. Whether utilized in cooked dishes, salads, or as spices, these plants impart unique flavors and aromas to the local culinary creations. Whether used in cooked dishes, salads, or as spices, these plants add unique flavors and aromas to local food. Spices such as *Mentha longifolia* and *Thymus leucotrichus* enriched the culinary landscape, while *Thymus sipyleus* and *Ziziphora clinopodioides* brought their distinct tastes to dishes. The repeated use of common names across different species, such as “Yemlik” “Yağlıca” “Nane” and “Kekik” suggests a shared cultural heritage and linguistic connection among these plants, further emphasizing their significance in the local context. Five species have been newly documented as additions to the flora of Sivas. In summary, this study underscores the importance of preserving

Supplementary Information The online version contains supplementary material available at <https://doi.org/10.1007/s10722-024-01888-6>.

Z. Kadioglu · K. Cukadar · N. N. Kalkan · H. Vurgun · V. Donderalp · R. Korkut · O. Kaya (✉)
Republic of Turkey Ministry of Agriculture and Forestry,
Erzincan Horticultural Research Institute, 24060 Erzincan,
Turkey
e-mail: kayaozkan25@hotmail.com; ozkan.kaya@ndsu.edu

F. Yildiz
Institute of Science, Erzincan Binali Yıldırım University,
24100 Erzincan, Turkey

A. Kandemir
Faculty of Art and Science, Department of Biology,
Erzincan Binali Yıldırım University, 24100 Erzincan,
Turkey

O. Kaya
Plant Sciences, University of North Dakota, Fargo, ND,
USA

and appreciating the botanical knowledge and practices of Sivas traditional culture and ethnobotany. The numerical values within the findings quantitatively showcase the ecological and cultural richness of these plant species, thus making this subject a vital area of study for researchers and a valuable resource for conservationists aiming to safeguard this unique cultural and botanical heritage.

Keywords Sivas traditional culture · Botanical heritage · Edible wild plants · Ecological and cultural significance

Introduction

In a world characterized by a continuously expanding global population, the challenge of ensuring food security has become increasingly pressing (FAO 2017). While modern agriculture predominantly relies on a limited selection of cultivated crops, a vast and underutilized resource exists in the form of wild edible plants. Despite the incredible diversity of plant life on Earth, only a fraction of it has been incorporated into our agricultural systems, with approximately 3,000 species cultivated on a large scale (Gepts 2004). However, wild edible plants, often brimming with essential nutrients and displaying resilience in the face of environmental challenges, hold tremendous potential in supplementing our diets, particularly during periods of food scarcity (Pieroni et al. 2005). Ethnobotanical research has emerged as a critical tool in preserving the traditional knowledge and cultural significance associated with these plants, thereby preventing the erosion of invaluable information (Tardío et al. 2002).

The rich ethnobotanical diversity of wild edible plants is a global phenomenon, with each region offering its own unique insights into the utilization of these resources (Turner 1975). In the Mediterranean region, for example, the time-honored tradition of utilizing wild edible plants is deeply entrenched in the local culture, yet this precious knowledge is at risk of fading into obscurity (Pieroni 1999). In India, a country marked by diverse climatic and ecological conditions that provide fertile ground for biodiversity, indigenous communities have relied on wild edible plants for sustenance and medicinal purposes for generations (Kala 2007). In China, efforts to

protect and pass on traditional knowledge related to biological diversity and wild edible plants have been prioritized (CBD 2005). Even in Spain, a nation with a varied climate and geography, the practice of using wild plants as a food source endures (Dufour and Wilson 1994). Turkey's diverse geography and climate have long provided a rich tapestry of edible wild plants that have been essential to Turkish cuisine. Coastal regions boast aromatic herbs like oregano, thyme, and rosemary, while the Anatolian plateau yields staple foods such as lentils, chickpeas, and wheat.

In Turkey, foraging for wild greens, locally referred to as "ot," is a cherished and widespread tradition. These edible plants play a dual role: not only do they enrich the flavors of Turkish cuisine, but they also symbolize the profound and inseparable bond between the land and the culture. This practice involves the gathering of a diverse array of plants, including but not limited to nettles, purslane, and wild garlic, which subsequently find their way onto dinner tables across the country. This connection between nature and culinary heritage has made Turkey a haven for food enthusiasts and individuals intrigued by the rich gastronomic traditions of the region.

The importance of wild food plants for food security and plant genetic resources is a multifaceted topic that warrants comprehensive exploration. Wild food plants, often overlooked, are integral to human sustenance and agricultural diversity. Understanding their significance involves recognizing their role in providing alternative food sources, especially in times of agricultural challenges. Moreover, these plants contribute to the broader genetic diversity of crops, offering resilience against pests, diseases, and environmental changes. There exists a requisite for scholarly investigations directed towards elucidating the intrinsic nexus between wild food plants, the assurance of food security, and the conservation of genetic resources essential for the enduring sustainability of agricultural ecosystems. Within the realm of ethnobotanical research, numerous investigations have extensively examined the diverse array of wild food plants across various regions in Turkey, leaving behind a valuable repository of knowledge. The exploration of ethnobotanical aspects related to edible wild plants in different regions provides a profound insight into their cultural importance and their potential in addressing the

ever-growing global demand for food. However, it is within the province of Sivas that we find a particularly promising source of comprehensive insights into its rich assortment of edible plant species. This research contributes to the dissemination of locally edible policies that are being promoted for local nutrition, playing a significant role in preserving the cultural heritage of Sivas province. Therefore, it offers a current and comprehensive overview of the use and knowledge of wild edible plants in the region, updating and preventing ethnobotanical information.

Materials and methods

Study area

This study had a broad geographical scope, encompassing all the districts within Sivas's province. These districts include Akıncılar, Divriği, Doğanşar, Gemerek, Gürün, Hafik, İmranlı, Kangal, Koyulhisar, Suşehri, Şarkışla, Ulaş, Yıldızeli, and Zara, as depicted in Fig. 1. The region's topography varies from high plateaus to mountainous terrains, positioning it as one of Turkey's prominent plateau-rich provinces, and it has a well-established tradition of consuming wild edible plants. Sivas's province,

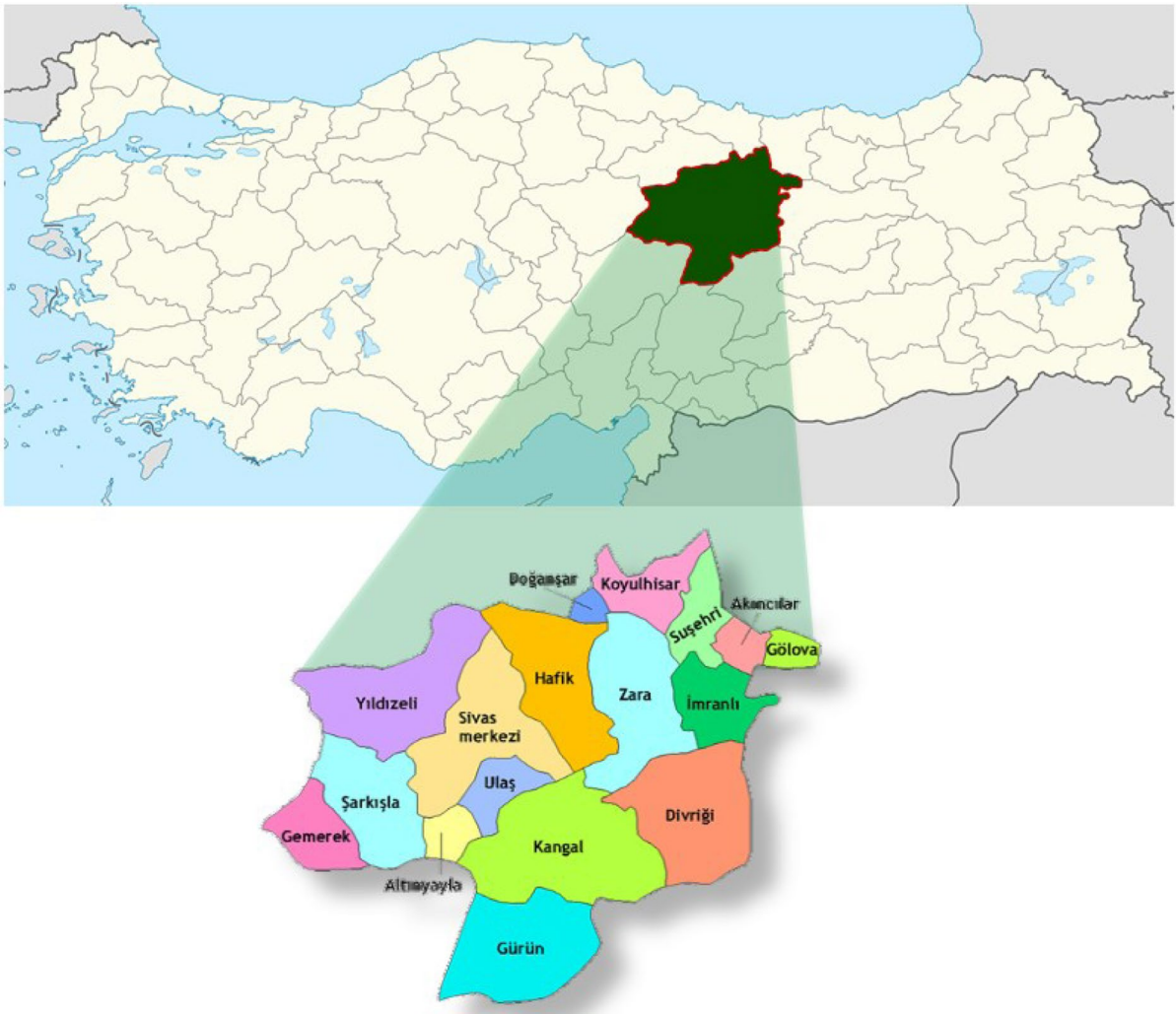


Fig. 1 Geographical location of the study area

situated in the central part of Turkey, offers a diverse topographical and climatic landscape. Sivas is surrounded by mountain ranges, including the Aladağlar and the Eastern Taurus Mountains, contributing to its distinctive and picturesque landscape. The province's altitude and geographic location lead to a range of climate patterns. The annual temperature fluctuations are considerable, with temperatures plummeting to as low as $-40\text{ }^{\circ}\text{C}$ during winter and rising to approximately $30\text{ }^{\circ}\text{C}$ during the summer months. Sivas experiences a continental climate characterized by cold winters with substantial snowfall and warm summers.

Site selection and survey

Conscious village selection was carried out in each district for a comprehensive biodiversity inventory based on altitude and vegetation cover. The process of selecting these villages received valuable assistance from Development Agents and agricultural specialists working in the study areas. Once these villages were identified, an extensive inventory of wild edible plant species was initiated in each of them. The methodology entailed visiting a total of five different villages within each district, amounting to a comprehensive coverage of 140 villages or small towns across the 14 districts under examination. The data collection phase spanned from 2018 to 2019, encompassing the period from April to October. During this timeframe, intensive fieldwork was conducted to compile detailed inventories of the wild edible plants present in the region. Furthermore, ethnobotanical interviews were conducted with local elders. These interviews were designed to foster open and in-depth discussions, adhering to the recommendations outlined by Martin in 2018. These dialogues were instrumental in uncovering the rich ethnobotanical knowledge within the local community. Preference was given to older and experienced individuals, especially women, as they typically possessed more comprehensive knowledge about edible wild plants compared to men. Each village involved ten informants in the interviews, accumulating to a total of 763 informants (563 female, 200 male) with an average age of 63. The informants were requested to provide comprehensive lists of wild food plants in the region and to detail their knowledge regarding the consumption and gathering of each wild

edible plant species. This included information on past and present usage, processing techniques, modes of consumption, Turkish vernacular names, the plant part utilized, traditional preparation methods, and consumption timings. Wild food plant uses were categorized into seven categories, including vegetables (with subcategories like cooked, raw, and pickles), spices, beverages, seeds, fruits, exudates, and subterranean parts (Supplementary material 1).

Plant identification

The identification of reported wild edible plants was carried out following the methods outlined in Davis et al. (1988) and Davis (1965–1985). Prof. Dr. Ali Kandemir conducted the identifications, and two specimens of each wild edible plant species, along with detailed information on the collection locality, plant characteristics, vernacular names, native culinary uses, and cultural significance, were deposited in the herbarium of the Turkey Seed Gene Bank in Ankara and the Erzincan Horticultural Research Institute.

Data analysis

The Cultural Importance (CI) index was employed to evaluate the significance of the studied species according to Tardio and Pardo-De-Santayana (2008). The CI index for a species (UVs) was calculated as the sum of informants mentioning its use-category divided by the total number of informants interviewed in the survey (763). Additionally, the total CI of each use-category was determined by adding the CI values of all the species within that category, and the average CI of the category was calculated by dividing the total CI by the number of species reported in that category. For example, consider the case of *Vicia cracca* L., where 111 informants mentioned its use as a cooked vegetable, 90 as a raw vegetable, and 330 as seed. Therefore, $CI = (111 + 90 + 330) / 763 = 0.70$. As another example, in the use-category “seeds” which includes species like *Echinops orientalis* Trautv., *Gundelia tournefortii* L., *Cephalaria procera* Fish.&Ave-Lall., *Vicia cracca* and *Vicia narbonensis* L., 552, 105, 720, 330 and 275 people mentioned these uses, respectively. Their CI values as seeds were 0.72, 0.14, 0.94, 0.43, and 0.36. The total CI of the “seeds” category was 2.60 ($0.72 + 0.14 + 0.94 + 0.43$

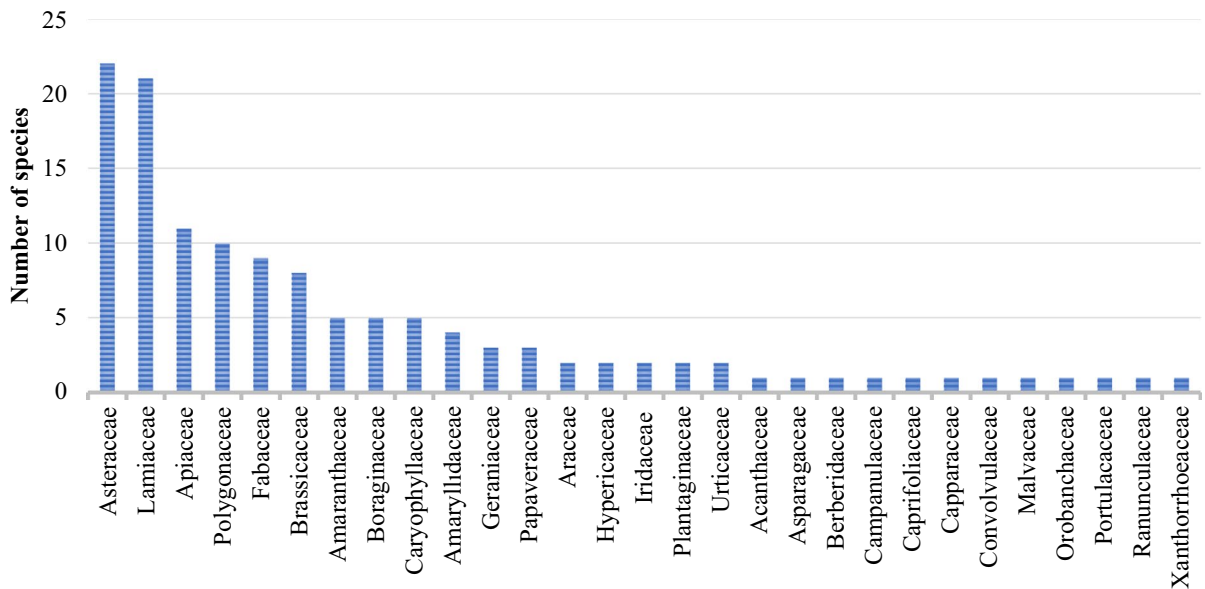


Fig. 2 Distribution of plant species according to families

+0.36), and the average CI was 0.52 (0.26 divided by five, the number of species in the “seeds” category).

Results

The provided plant species were categorized into 29 different families. The collective diversity of plant species within these families amounted to 128 species or sub-plants. Among these, the Asteraceae family stood out as the most diverse, encompassing a total of 22 species. Other notable families included Lamiaceae with 21 species, Apiaceae with 11 species, Polygonaceae with 10 species, Fabaceae with 9 species, and Brassicaceae with 8 species. Some families, such as Acanthaceae, Asparagaceae, Berberidaceae, Campanulaceae, Caprifoliaceae, Capparaceae, Convolvulaceae, Malvaceae, Orobanchaceae, Portulacaceae, Ranunculaceae and Xanthorrhoeaceae were represented by a single species each. Each of these families contained a variety of plant species or subplants, contributing to the rich diversity of botanical life within these families (Fig. 2). Additionally, it was observed that 4 of the 128 species (*Scorzonera tomentosa* L., *Hypericum thymopsis* Boiss., *Salvia hypargeia* Fisch.& C.A. Mey. and *Sideritis armeniaca* Bornm.) included in the study were native

to Turkey. Five species (*Acanthus hirsutus* Boiss., *Agrostemma githago* L., *Asyneuma virgatum* (Labill.) Bornm., *Sisymbrium loeselii* L., *Zosima absinthifolia* (Vent.) Link.) have been newly documented as additions to the flora of Sivas. Images of field research, descriptions of the species by local people, usage methods and some of the collected species are given in Figs. 3 and 4.

Classify plants according to edible parts

The plants listed were classified into several categories based on their edible parts. Many of these plants were valued for their leaves and young shoots, which were suitable for consumption. Some plants provided edible onions and leaves, such as *Allium vineale* L. and *Allium atroviolaceum* Boiss. A few plants, including *S. tomentosa*, *Scorzonera latifolia* (Fisch. & C. A. Mey.) DC., and *G. tournefortii*, produced edible gum, which had both culinary and medicinal uses. These plants were valued for their flavorful onions and nutritious leaves. Some plants, like *Geranium tuberosum* L. *Cirsium rhocephalum* C.A Mey., *Scorzonera suberosa* subsp. *suberosa* K.Koch, and *Lathyrus tuberosus* L., had edible roots and root collars, which were used in various dishes, contributing



Fig. 3 Field research and usage methods

to the diversity of the local cuisine. Conversely, another group of edible plants included *Beta trigyna* Walds. & Kit., *Chenopodium foliosum* (Moench) Asch., *Amaranthus retroflexus* L., *Atriplex nitens* Schkuhr, *Chenopodium album* subsp. *Album* L., and various others. These greens played a significant role in various dishes and served as a valuable source of nutrition. Among them *Erodium orientale*, *Convolvulus procera*, and *Vicia cracca* in addition to leaves and shoots, some plants featured edible seeds. These seeds could be consumed directly or used as ingredients in a variety of dishes. Specific plants like *Geranium tuberosum*, *Lathyrus tuberosus*, and *Crocus biflorus* subsp. *tauri* (Maw) B. Mathew offered edible tubers or subterranean parts, further enhancing the range of available edible plant resources. One unique contribution to the edible plant resources in the region was made by *Erodium cicutarium* (L.) L' Her., known for its edible branches and leaves. *Berberis vulgaris* L. and *Chenopodium foliosum* were highly regarded for their edible fruits, which not only added to the nutritional diversity but also contributed to culinary variety. Several plants were also known for their edible flowers, such as *Consolida orientalis* (J.

Gay.) Schrödinger and *Papaver argemone* L. These flowers were prized for their distinctive flavors and found their way into various culinary preparations. *Erodium orientale* provided edible seed heads. The edible parts of these plants encompassed a wide range of components, including leaves, onions, seeds, flowers, roots, tubers, subterranean parts, gum, fruits, branches, leaves, and receptacula, highlighting the rich culinary and medicinal heritage of the region. This diversity reflected the rich culinary and medicinal heritage of the region, showcasing the versatility of local plant resources (Table 1).

Classify plants according to preparation

The plants listed were classified according to their preparation into several categories. The first category, "Plants Used in Dishes (Category 1)," revealed a plethora of botanical resources that enriched the flavors of dishes. *Beta trigyna*, bearing names such as Kızılca, Unlucaşpanağı, and Silmastik, was a staple ingredient. *A. nitens*, known by various names like Telotu, Has Telotu, Beypancar, Şakşak, Sılmık, and Tak, also contributed its unique taste to various preparations. The culinary world benefited from the

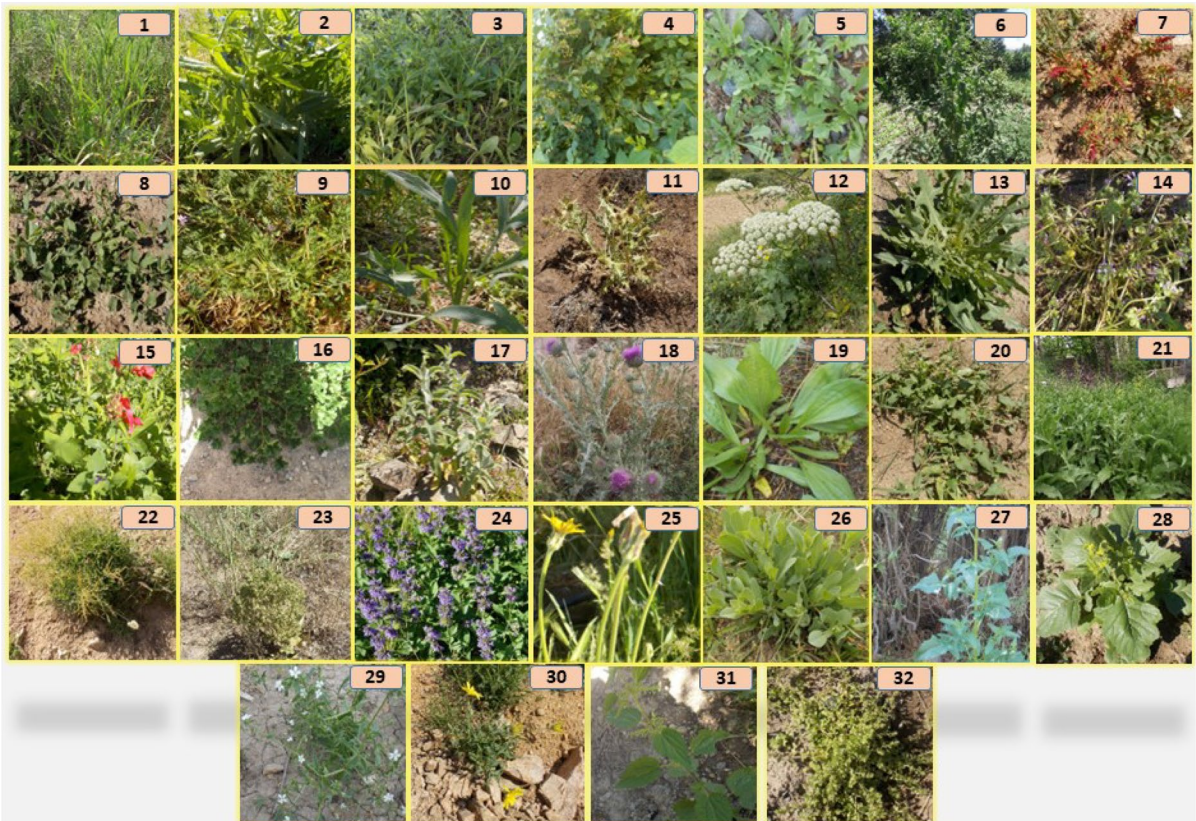


Fig. 4 Some of the collected species (1: *Agrostemma githago* 2: *Anchusa leptophylla* 3: *Asperugo procumbens* 4: *Berberis vulgaris* 5: *Capsella bursa-pastoris* 6: *Chenopodium album* subsp. *album* 7: *Chenopodium foliosum* 8: *Convolvulus arvensis* 9: *Erodium cicutarium* 10: *Falcaria vulgaris* 11: *Gundelia tournefortii* 12: *Heracleum pastinacifolium* 13: *Lactuca serriola* 14: *Lamium amplexicaule* 15: *Lathyrus tuberosus* 16: *Malva neglecta* 17: *Mentha longifolia* 18: *Onopordum*

acanthium 19: *Plantago major* 20: *Polygonum cognatum* 21: *Rumex crispus* 22: *Rumex scutatus* 23: *Salvia aethiopis* 24: *Salvia verticillata* subsp. *verticillata* 25: *Scorzonera cana* var. *jacquiniana* 26: *Silene vulgaris* var. *vulgaris* 27: *Sinapis alba* 28: *Sinapis arvensis* 29: *Stellaria holostea* 30: *Tragopogon buphthalmoides* var. *latifolius* 31: *Urtica dioica* 32: *Veronica biloba*)

inclusion of *A. retroflexus*, referred to as Hoşveren, Karatelce, Bostangüzeli, Kızılıcık, and Darıca, as well as *C. album* subsp. *album* L., locally recognized as Telotu, Unluca, Telce, Telceli, Tahtacık, and Kül-lüpancar. *C. foliosum*, known as Yemiş, Pancar, and Kuşüzümü, added its distinct flavors, and *C. rhizocephalum* known as Mecikkulağı, enriched the culinary heritage. *Onopordum acanthium* L., with its various monikers such as Kangal, gelenk, Devedikeni, and Kangaldikeni, became a source of unique tastes, and *Centaurea* sp. was another valued component. *G. tournefortii*, known as Kenger and Işgın, offered a touch of the wild to dishes, while *Taraxacum* sp., referred to as Kedi Tırnağı, contributed its own special flavor. *Carduus nutans* L., recognized

as Eşek Dikeni and At kengeri, also played a noteworthy role in dish preparations. *Cirsium arvense* (L.) Scop., going by names like Dikence, Kregü, and Köygöçüren, found its place in the culinary landscape. *Cichorium intybus* L., known as Göğhanık, Cincık, Kanagug, and Çıtlak, brought a pleasant bitterness to the table. *Lactuca serriola* L., with its local names Keklikotu and Yağlıca, added a touch of bitterness to dishes. *Arctium tomentosum* Mill., commonly known as Kabalak, offered a unique flavor that enhanced culinary experiences. *Rumex obtusifolius* subsp. *subalpinus* (Schur) Celak. locally referred to as Yaprak and Çayıraprağı, also played a role in traditional dishes. *Polygonum aviculare* L., bearing names like Madımak and Atmadımağı, brought

Table 1 Selected attribute of the surveyed wild edible plants used in the Sivas province (Upper Kızılırmak Part of Anatolia, Türkiye)

Species/family	Turkish local name	Edible parts	Preparation	Season	CI	Specimen code
Acanthaceae						
<i>Acanthus hirsutus</i> Boiss	Ayıpençesi	F	Raw, tea	May	0.04	581103
Amaranthaceae						
<i>Beta trigyna</i> Walds.& Kit	Kızılca, Unlucaşpanağı, Silmastik	YL, SH	Dishes	May–June	0.85	580903
<i>Atriplex nitens</i> Schkuhr	Telotu, Has Telotu, Beypancar, Şakşak, Sılmık, Tak	YL, SH	Dishes, dolma	May–June	0.56	580904
<i>Amaranthus retroflexus</i> L.	Hoşveren, Karatelce, Bostangüzeli, Kızılıcak, Darıca	YL, SH	Dishes	May–July	0.89	580905
<i>Chenopodium album</i> subsp. <i>album</i> L.	Telotu, Unluca, Telce, Telceli, Tahtacık, Kül-lüpancar	YL, SH	Dishes	May–June	0.88	580906
<i>Chenopodium foliosum</i> (Moench) Asch	Yemiş, Pancar, Kuşüzümü	YL, SH	Dishes, fruits	May–June	0.26	580907
Amaryllidaceae						
<i>Allium vineale</i> L.	Körmen, Soğanak,	L, O	Raw	May	0.20	580704
<i>Allium dictyoprasum</i> C. A. Meyer Ex Kunth	Soğan	L	Raw, roasted	May–June	0.25	580908
<i>Allium scorodoprasum</i> L.	Soğan	L	Raw, roasted	May	0.28	580201
<i>Allium atroviolaceum</i> Boiss	Sirim, Körmen, Çayırsoğanı, Geyiksoğanı	L, O	Dishes	May	0.26	580,909
Apiaceae						
<i>Scandix iberica</i> M. Bieb	Çemenpancarı	YL,SH, SE	Spice, cooked	May	0.46	581303
<i>Chaerophyllum bulbosum</i> L.	Baldırgan Nazeyışgını	YL, SH	Dishes, pickle	May–June	0.56	580910
<i>Carum carvi</i> L	Çemen, Anason	YL,SH, SE	Cooked, raw,	May–June	0.44	581302
<i>Anthriscus nemorosa</i> (M. Bieb) Spreng	Baldırgan, Nazeyışgını	YL, SH	Dishes, pickle, raw	May–June	0.47	581301
<i>Heracleum pastinacifolium</i> K. Koch	yaryaprağı	YL, SH	Raw	May–June	0.89	581304
<i>Zosima absinthifolia</i> (Vent.) Link	Peynirotu	YL, SH	Pickle	May–June	0.22	581202
<i>Echinophora tenuifolia</i> subsp. <i>sibthorpiana</i> (Guss.) Tutin	Çördük	YL, SH	Raw, spice	May–June	0.42	580965
<i>Ferula orientalis</i> L.	Çaşur	YL, SH	Cooked, pickle	June–July	0.50	581005
<i>Eryngium billardiense</i> F. Delaroche	Boğa dikeni, Yılandikeni, Kenger, Şekerdikeni	YSH	Raw, dishes	May–June	0.53	580961
<i>Eryngium campestre</i> L.	Boğa dikeni, Yılandikeni, Kenger, Şekerdikeni	YL, SH	Raw, dishes	May–June	0.51	580962
<i>Falcaria vulgaris</i> Bernh	Gazayağı	YP	Dishes	May–June	1.00	580963

Table 1 (continued)

Species/family	Turkish local name	Edible parts	Preparation	Season	CI	Specimen code
Araceae						
<i>Arum rupicola</i> Boiss	Kara Nivik Gavurpancarı, Livingç, Liğiç	L	Dishes	May–June	0.83	588102
<i>Eminium rauwolfii</i> var. <i>rauwolfii</i> (Blume)Schott	Ala Nivik	YL	Dishes	May–June	0.89	588103
Asparagaceae						
<i>Asparagus officinalis</i> L.	Merecik, Mereco, Kuşkonmaz	YSH	Cooked	April–May	0.94	588104
Asteraceae						
<i>Tragopogon coloratus</i> C.A.Mey	Sping, yemlik, spidak	YSH, L	Raw, Dishes	May–June	0.66	580911
<i>Tragopogon porrifolius</i> subsp. <i>longirostris</i> (Sch. Bip.) Greuter	Sping, yemlik	YSH, L	Raw, Dishes	May–June	0.64	580964
<i>Tragopogon dubius</i> Scop	Sping, Yemlik, Spidak	YSH, L	Raw, Dishes	May–June	0.68	580966
<i>Scorzonera cana</i> var. <i>jacquiniana</i> (W.Koch) D.F.Chamb	Tekesakalı, Bostanteke, Çayırıyemliği	YP	Raw, Dishes	May–June	0.66	581104
<i>Sonchus asper</i> (L.) Hill	Sütlüce, sütlü pancar	YSH, L	Dishes	April–May	0.96	580912
** <i>Scorzoneratomentosa</i> L.	Sakız otu, yapalak, Çıtlıksakızı	R	Gum	May–June	0.90	581001
<i>Scorzonera mollis</i> subsp. <i>mollis</i> M. Bieb	Kızır, Burçalık Pürçelik,	T, YSH	Raw, Dishes, Subter- ranean	May–June	0.48	580913
<i>Scorzonera suberosa</i> subsp. <i>suberosa</i> K.Koch	Kızır, Burçalık Pürçelik,	T, YL	Raw, Dishes, Subter- ranean	May–June	0.51	580991
<i>Scorzonera latifolia</i> (Fisch. & C. A. Mey.) DC	Yabani sakız, Yapalak, yapsalak, Çıtlıksakızı	SH, R	Gum	May–June	0.96	580990
<i>Echinops orientalis</i> Trautv	Top, topbid	F	Seed raw	July	0.72	580914
<i>Cirsium rhizocephalum</i> C.A Mey	Mecikkulağı	T, R	Cooked, raw	May–June	0.58	580401
<i>Onopordum acanthium</i> L.	Kangal, gelenk, Deve- diken, Kangaldiken	R, YSH	Raw	May–June	0.93	581305
<i>Carduus nutans</i> L.	Eşek Diken, At kengeri	SH, YL	Cooked, raw for peeling	May–June	0.42	580915
<i>Centaurea</i> sp.		YSH	Raw, medicinal	May–June	0.73	580916
<i>Gundelia tournefortii</i> L.	Kenger, Işgın	YL,SH	Dishes, Juice, Ker- nel, Gum	May–June	0.41	580701
<i>Taraxacum</i> sp.	Kedi Tırnağı	L	Dishes	April–May	0.29	580917
<i>Tragopogon buphthal- moides</i> var. <i>latifolius</i> Boiss	Yemlik spidak	YL, SH	Cooked, raw	May–June	0.43	580918
<i>Carduus pycnocephalus</i> L.	Dikencik, Karadiken	YL, SH	Dishes	April	0.95	580919
<i>Cirsium arvense</i> (L.) Scop	Dikence, Kregü, Köyğöçüren	YL	Dishes	April–May	0.87	580920
<i>Cichorium intybus</i> L.	Göğhanık, Cıncık, Kana- gug, Çıtlak	YL, SH	Dishes, raw salad	June–Septem- ber	0.83	580604

Table 1 (continued)

Species/family	Turkish local name	Edible parts	Preparation	Season	CI	Specimen code
<i>Lactuca serriola</i> L.	Keklikotu, Yağlıca	YL	Soups, raw	April–May	0.33	588106
<i>Arctium tomentosum</i> Mill	Kabalak	R, L	Raw	May–June	0.94	580921
Berberidaceae						
<i>Berberis vulgaris</i> L.	Garamuk	L, F	Dishes, raw, juice	April–Sept	0.31	581205
Boraginaceae						
<i>Anchusa leptophylla</i> Roem. & Schult	Sığır Dili Koyun Dili, Öküz Dili, Dana dili, Mıışık, Tortuotu	YP	Dishes	May–June	1.00	580922
<i>Echium vulgare</i> L.	Sığır Dili, Koyun Dili, Öküz Dili, Dana dili	YSH, L	Dishes	May–June	0.90	580923
<i>Echium italicum</i> L.	Sığır Dili, Koyun Dili, Öküz Dili, Dana dili	YSH, L	Dishes	April–May	0.89	580924
<i>Asperugo procumbens</i> L.	Gargakakülü, Akbuncuk	YSH	Dishes	May–June	0.58	580102
<i>Buglossoides arvensis</i> (L.) I.M. Johnst	Yünlüce	YSH, L	Dishes	April	0.31	580103
Brassicaceae						
<i>Capsella bursa-pastoris</i> (L.) Medik	Pancar, Kuşkuşotu, Kuşekmeği Geourtraşık, Ebesacı, Bulgurcuk	YP	Dishes	May–June	0.98	580925
<i>Sinapis arvensis</i> L.	Mandakulağı, Mananik, Mananik, Eşek turbu, İmanuk	YSH, L	Raw, dishes	May–June	0.47	580926
<i>Cerintho minor</i> L.	Cücegözü, Cücükgözü, Koyungözü, Küpeli, Koyungülü	YSH	Dishes	May–June	1.00	581381
<i>Cardamine uliginosa</i> Bieb	Gıcı, Acıgıcı, Yabanitere	YSH	Raw	May–June	0.70	580927
<i>Sinapis alba</i> L.	Hardal, Abdurrahman pancarı, Ağca pancarı, Çalıca	YSH, L	Dishes, raw	April–May	0.38	580928
<i>Bunias orientalis</i> L.	Eşek turbu, Mananik	YSH, L	Cooked like spinach	April–May	0.79	580929
<i>Brassica elongata</i> Ehrh	Hardal, Kırkbayır	YSH, L	Cooked like spinach	April–May	0.81	580930
<i>Sisymbrium loeselii</i> L.	Cıncık	YSH, L	Dishes	April–May	0.20	580603
Campanulaceae						
<i>Asyneuma virgatum</i> (Labill.) Bornm	Kuşekmeği	YSH, L	Cooked	May–June	0.21	580702
Caprifoliaceae						
<i>Cephalaria procera</i> Fish.&Ave-Lall.	Gülürçük	YSH, L	Dishes, raw, seeds	May–June	0.39	580606
Capparaceae						
<i>Capparis sicula</i> subsp. <i>herbacea</i> (Willd.) Ino- cencio, D.Rivera, Obón & Alcaraz	Keber	B	Pickle	May–June	0.42	581006
Caryophyllaceae						
<i>Silene vulgaris</i> var. <i>vul-</i> <i>garis</i> (Moench) Garcke	Gelin parmağı, Ağpancarı, Dubayrık	YSH	Dishes	May–June	1.00	580931

Table 1 (continued)

Species/family	Turkish local name	Edible parts	Preparation	Season	CI	Specimen code
<i>Stellaria media</i> (L.) Vill	Güvercin Bağırşağı, Karga Bağırşağı, İstanbul pancarı, Bul- gurluca, Cücebacak	YSH	Dishes	May–June	0.88	580932
<i>Stellaria holostea</i> L.	Eriştecik, Arpacık, Bul- gurcuk	YSH	Dishes	April–May	0.75	580933
<i>Cerastium perfoliatum</i> L.	Cücebağırşağı	YSH	Dishes		0.44	581002
<i>Agrostemma githago</i> L.	Pisik kuyruğu	YSH, L	Dishes	April–May	0.15	581003
Convolvulaceae						
<i>Convolvulus arvensis</i> L.	Sarmaşov, Çermişov, Termoşov, Sarmaşık	YSH, L	Dishes	April–May	1.00	580934
Fabaceae						
<i>Vicia cracca</i> L.	Yabani fiğ, Fiğciük	YL, SH	Cooked, raw, seeds	May–June	0.23	581007
<i>Lathyrus tuberosus</i> L.	Goşgöz, Gozgöç, Gül	YL, SH, R, F	Subterranean parts, raw	May–June	0.41	580935
<i>Pisum sativum</i> subsp. <i>ela- tius</i> (M.Bieb.) Aschers. & Graebn	Yabani Bezelye	SE	Raw, cooked		0.34	581101
<i>Vicia peregrina</i> L.	Yabani fiğ, Fiğciük	YSH	Dishes		0.37	581102
<i>Glycyrrhiza glabra</i> L.	Tatlı Biyam	YSH	Raw	May–June	0.59	580202
<i>Securigera orientalis</i> subsp. <i>Orientalis</i> (Mill.) Lassen	Sarıçiçek	F	Raw	June–July	0.87	580203
<i>Trifolium repens</i> L.	Yabaniüçgül	L, F	Raw, dishes	May–June	0.38	581321
<i>Medicago sativa</i> L.	Yonca	L, F	Dishes	May–June	0.73	581322
<i>Vicia narbonensis</i> L.	Baklacık, Pağlapanarı	F	Seeds raw	May–June	0.36	588101
Geraniaceae						
<i>Geranium tuberosum</i> L.	Gosguç, Tombul, Kehmut, Yerelması, Totnik	T	Subterranean parts, raw	May–June	1.00	580936
<i>Geranium pyrenaicum</i> Burm.f	Balpanarı	YL, SH	Cooked	May–June	0.66	580801
<i>Erodium cicutarium</i> (L.) L' Her	Danaalrı, Danakellesi, Halı panarı	BR, L	Cooked	May	0.90	581461
Hypericaceae						
<i>Hypericum perfoliatum</i> L.	Değnekçiçeği	YSH	Tea	During all year	0.99	581204
** <i>Hypericum thymopsis</i> Boiss		YSH	Tea, cleaning		0.89	581201
Iridaceae						
<i>Iris persica</i> L.	Nevruz	F, T	Subterranean parts, raw	March–April	0.26	581312
<i>Crocus biflorus</i> subsp. <i>tauri</i> (Maw) B.Mathew	Çiğdem	YL, T	Subterranean parts, raw, cooked	March–April	0.29	580270
Lamiaceae						
<i>Satureja hortensis</i> L.	Annuk	YL, SH	Raw, spice	During all year	0.58	580901
<i>Nepeta italica</i> L.	Nane	YL, SH	Raw, Spice, tea	During all year	0.57	580902
<i>Nepeta racemosa</i> Lam	Kedinanaesi	YL, SH	Raw, Spice, tea	During all year	0.36	580605
<i>Thymus sipyleus</i> Boiss	Kekik, Anuk	YL, SH	Raw, Spice, tea	During all year	0.68	580937

Table 1 (continued)

Species/family	Turkish local name	Edible parts	Preparation	Season	CI	Specimen code
<i>Thymus fallax</i> Fisch.& C.A. Mey	Kekik, Keklikotu, Nane	YL, SH	Raw, Spice, tea	During all year	0.69	580938
<i>Thymus leucotrichus</i> Hal	Kekik, Keklikotu, Zembur, Nane	YL, SH	Raw, Spice, tea	During all year	0.69	581291
<i>Lamium amplexicaule</i> L.	Pisikbıyığı	LB	Dishes, bulgur	April–May	0.85	580101
<i>Stachys lavandulifolia</i> Vahl	Pürçükçayı	YL, SH	Raw, Spice, tea	During all year	0.67	580501
<i>Mentha longifolia</i> L.	Yarpuz, Punk, Nane, Anuk	YL, LE	Raw, Spice, tea	During all year	0.67	580939
<i>Ziziphora clinopodioides</i> Lam	Kekik, Keklikotu, Zembur, Nane	YL, SH	Raw, Spice, tea	During all year	0.57	580940
<i>Salvia verticillata</i> subsp. <i>verticillata</i> L	Gazankarası, Yağlıca, Karayapışkan, Şipşipi, Kalba, Karayağlıca, Karabacak	YSH, L	Raw, Dishes, Dolma	May–June	0.53	580941
<i>Salvia multicaulis</i> Vahl	Yağlıca	YSH, L	Raw, tea	May–June	0.58	580601
<i>Salvia sclarea</i> L.	Gerenk, Gelenk	YSH, L	Raw, roasted	May–June	0.27	580942
<i>Salvia syriaca</i> L.	Kazangarası, Yağlıca, Şipşipi	YSH, L	Raw, dishes, dolma	May	0.31	580943
<i>Salvia virgata</i> Jacq	Gazankarası, Yağlıca, Karayapışkan, Şipşipi, Kalba, Karayağlıca, Karabacak	YSH, L	Raw, dishes, dolma	May–June	0.47	581008
** <i>Salvia hypargeia</i> Fisch.& C.A. Mey	Yapışkan yağlıca, Danakuyruğu	YSH	Raw, tea	May–June	0.23	581206
<i>Salvia microstegia</i> Boiss. & Balansa	Dağyağlıcası	YSH	Raw, tea	May–June	0.27	581207
<i>Salvia aethiopsis</i> L.	Şipşipi, Yapışkan Yağlıca	YSH	Raw	May–June	1.00	581112
** <i>Sideritis armeniaca</i> Bornm	Çay	YL, SH	Raw, tea, spice	During all year	0.65	581460
<i>Teucrium polium</i> L.	Keklik Otu, Çay	YSH	Raw, spice	During all year	0.29	580944
<i>Teucrium chamaedrys</i> L.	Nane	YL, SH	Raw salad, spice	During all year	0.40	580602
Malvaceae						
<i>Malva neglecta</i> Wallr	Ebenkömeci, Dollık Kömeç	YL, SH	Dishes, raw	April–June	0.52	580945
Orobanchaceae						
<i>Pedicularis comosa</i> L.	Emcek	F	Raw	May–June	0.22	580703
Papaveraceae						
<i>Papaver argemone</i> L.	Gelincik, Çinigiran, Haşhaş	F	Juice	May–June	0.33	580946
<i>Papaver rhoeas</i> L.	Gelincik, Çinigiran, Haşhaş	YSH	Cooked	May–June	1.00	580947
<i>Papaver dubium</i> L.	Gelincik, Çinigiran, Haşhaş	L, F	Cooked. Raw	April–May	1.00	580948

Table 1 (continued)

Species/family	Turkish local name	Edible parts	Preparation	Season	CI	Specimen code
Plantaginaceae						
<i>Veronica biloba</i> L.	Eriştecik	YL, SH	Dishes	May–July	0.84	588105
<i>Plantago major</i> L.	Bağa Yaprağı, Pelhevis, Kırsinirotu	YL	Dishes, dolma	May–July	0.90	580949
Polygonaceae						
<i>Rumex crispus</i> L.	Evelik, Tirşo Tirşoaga,	YL, SH, SE	Dishes, dolma	May–July	1.00	580950
<i>Rumex conglomeratus</i> Murray	Kızılkök Kızılpancar, Dağıspanağı, Tekirpancarı	YL, SH	Cooked like spinach	April–May	0.94	580951
<i>Rheum ribes</i> L.	Işgın	YF, ST	Raw	July	1.00	580920
<i>Rumex scutatus</i> L.	Oğlakkulağı, Ekşikulak	YL, SH	Raw, salad	May–July	1.00	580952
<i>Rumex tuberosus</i> subsp. <i>horizontalis</i> (K.Koch) Rech.f	Tirşo, Kuzukulağı, Ekşice	YL, SH	Raw, salad	May–June	1.00	580953
<i>Rumex alpinus</i> L.	Gariberk, Kedipatısı, Kersim Yaprağı	YL, SH	Dishes, dolma	May–June	0.12	580954
<i>Rumex obtusifolius</i> subsp. <i>subalpinus</i> (Schur) Celak	Yaprak, Çayır yaprağı	YL, SH	Dishes, dolma	May–June	0.79	580955
<i>Polygonum aviculare</i> L.	Madımak, Atmadımağı	YP	Dishes	May–June	0.87	580956
<i>Polygonum cognatum</i> Meissn	Kuşekmeği, Nanacüce, Kırmızı Madımak, Hasmadımak Mercimalak, Madımalak	YP	Dishes	May–June	1.00	580957
<i>Polygonum convolvulus</i> L.	Kavakpancarı	YSH	Dishes	April–May	0.10	581004
Portulacaceae						
<i>Portulaca oleracea</i> L.	Pirpirim	YL, SH	Dishes, raw salad	May–June	0.95	580958
Ranunculaceae						
<i>Consolida orientalis</i> (J. Gay.) Schrödinger	Menekşe	F	Spice	May–July	0.28	581203
Urticaceae						
<i>Urtica dioica</i> L.	Isırgan, Gezgez	YL, SH, SE	Dishes, tea	May–July	0.77	580959
<i>Urtica urens</i> L.	Isırgan	YSH	Dishes	May–July	0.67	580204
Xanthorrhoeaceae						
<i>Eremurus spectabilis</i> M. Bieb	Çiriş, Gullik, Kiriş, Hırşık	YP	Dishes	May–June	0.89	580960

Dolma, leaves of this vegetable are consumed in the way of stuffing leaves like stuffed eggplant or stuffed peppers; şerbet, the diluted form of mixed syrups produced with the addition of sugar is called sherbet. B, Bud BR, Branch F, Flower T, Tuber L, Leaves FR, Fruit O, Onion R, Root SH, Shoot LB, Leaf Branch YSH, Young Shoots SE, Seed YL, Young Leaves ST, Stem YP, Young Plant
 **Native to Turkey

its distinct taste, and *Polygonum cognatum* Meissn., known as Kuşekmeği, Nanacüce, Kırmızı Madımak, Hasmadımak Mercimalak, and Madımalak, added to the culinary diversity (Table 1 and Supplementary material 2).

In the realm of traditional nutrition and culinary practices, the past showcased a diverse range of plants that were consumed raw or used in salads, categorized as "Plants Consumed Raw or in Salads (Category 2)." Among these, *Rumex crispus* L., known locally as Evelik and Tirşo Tirşoaga, held a

significant place on people's plates. Additionally, the selection included *Rumex conglomeratus* Murray, which bore names like Kızılkök, Kızılpancar, Dağıspanağı, and Tekirpancarı, and *Rumex scutatus* L., locally referred to as Oğlakkulağı and Ekşikulağ. Furthermore, *Rumex tuberosus* subsp. *horizontalis* (K.Koch) Rech.f., with its aliases Tirşo, Kuzukulağı, and Ekşice, and *Portulaca oleracea*, commonly known as Pirpirim, offered a rich tapestry of flavors for those indulging in salads. *Urtica urens* L., fondly called Isırgan, also made its mark in these culinary traditions. In the realm of spices, the "Plants Used as Spices (Category 3)" unveiled a rich tapestry of flavors. *Scandix iberica* M. Bieb., referred to as Çemenpancarı, added its unique aromatic profile to various dishes. *Chaerophyllum bulbosum* L., with its local name Baldırgan Nazeyışgını, contributed its distinctive taste, while *Carum carvi* L., known as Çemen and Anason, added its aromatic essence to spice blends. *Anthriscus nemorosa* (M. Bieb) Spreng., locally referred to as Baldırgan and Nazeyışgın, enriched the culinary experience. *Heraclium pastinacifolium* K. Koch., with the local name yaryaprağı, offered its unique flavors. *Z. absinthifolia*, commonly known as Peynirotu, contributed its aromatic and taste qualities to various dishes. *Echinophora tenuifolia* subsp. *sibthorpiana* (Guss.) Tutin, referred to as Çördük, added its unique essence to spice blends. *Ferula orientalis* L., known as Çaşur, became a valuable source of flavor. *Eryngium billardiere* F. Delaroché, bearing names like Boğa diken, Yilandikeni, Kenger, and Şekerdikeni, found its place in various spice combinations. *Eryngium campestris* L., known as Boğa diken, Yilandikeni, Kenger, and Şekerdikeni, contributed to the aromatic diversity of traditional dishes. *Falcaria vulgaris* Bernh., recognized as Gazayağı, offered its unique taste to spice blends. *Arum rupicola* Boss., with its local names Kara Nivik Gavurpancarı, Livingç, and Liğaç, enriched the culinary landscape with its distinctive flavors. *Eminium rauwolfii* var. *rauwolfii* (Blume) Schott played a part in creating complex and flavorful spice combinations. *S. tomentosa*, known as Sakız otu, yapalak, and Çitlıksakızı, became a valued spice component. *Scorzonera mollis* subsp. *mollis* M. Bieb. and *S. suberosa* subsp. *suberosa* were also important additions to spice blends, known as Yabani sakız, Yapalak, yapsalak, and Çitlıksakızı, respectively. *E. orientalis*, bearing the local name "top, topbid",

contributed its unique aromatic qualities. *S. armenica*, known for its use in tea, brought a rich flavor to beverages. *Teucrium polium* L., with the local name Keklik Otu, found its place in the world of spices. *Teucrium chamaedrys* L., commonly known as Nane, became an essential element in spice blends. *Satureja hortensis* L., known as Annuk, added its unique taste to culinary creations. *Nepeta italic* L., recognized as Nane, enriched the spectrum of flavors. *Nepeta racemosa* Lam., known as Kedinanaesi, contributed to the aromatic diversity of spices. *Thymus sipyleus* Boiss., with its local names Kekik and Anuk, brought a rich and earthy flavor to dishes. *Thymus fallax* Fisch. & C.A. Mey. known as Kekik, Keklikotu, and Nane (Table 1).

Common names with different species

A considerable number of plant species names have been found. It was determined that out of 227 names of wild edible plants in local use, 189 were simple (e.g. arpacık, hosveren) and 38 were complex names (e.g. İstanbul pancarı, dollik kömeç). (Table 1). When the names of all Species were listed, the average number of names was calculated as 2.38. Additionally, species had one, two, three, four, five, or six names (48, 29, 24, 16, 5, and 6, species respectively). There were several plants in the list that shared common names with different species. One of the common names that recurred in different species was "Nane", "Yağlıca" and "Kekik" belonging to the Lamiaceae family and "Yemlik" belonging to Asteraceae family. *N. italica*, *T. fallax*, *Thymus leucotrichus* Hal., *Mentha longifolia* L., *Ziziphora clinopodioides* Lam. and *T. chamaedrys* were all referred to as "Nane" in Turkish. These plants were known for their flowers and had a variety of culinary uses, especially as spices. Also, the common name "Yağlıca", was used for *Salvia verticillata* subsp. *verticillata* L., *Salvia multicaulis* Vahl. *Salvia virgata* Jacq. and *Salvia syriaca* L. in the Lamiaceae family. They are consumed stuffed with leaves, raw and in the form of tea. Another common name that repeated was "Kekik" in the Lamiaceae family *T. sipyleus*, *T. fallax*, *T. leucotrichus* and *Z. clinopodioides* were all referred to as "Kekik" in Turkish. They were aromatic herbs, and their young leaves and shoots were used for flavoring dishes, as spices, or for making teas. Lastly another common name found across different species

was “Yemlik” in the Asteraceae family. *Tragopogon coloratus* C.A.Mey, *Tragopogon porrifolius* subsp. *Longirostris* (Sch. Bip.) Greuter, *Tragopogon buphthalmoides* var. *latifolius* Boiss. and *Tragopogon dubius* Scop. all shared this name. These plants were valued for their young leaves and shoots which were used raw and in dishes.

Cultural importance (CI) with different species

The study examined various plant use-categories and their respective subcategories, evaluating both the number of species within each category and their Cultural Importance (CI) values. In the “Vegetables” use-category, 128 plant species were identified, with a combined CI value of 80.87, averaging 0.68 CI per species. Among the subcategories within “Vegetables,” “Cooked” (VEGc) had the highest representation, comprising 85 species, with a substantial CI total of 51.00 and an average CI of 0.60 per species. “Raw” (VEGr) vegetables included 61 species, with a CI total of 26.66 and an average CI of 0.44. “Pickles” (VEGp) featured six species, collectively yielding a CI total of 3.20 and an average CI of 0.53. The “Beverage” use-category encompassed 18 species, with a CI total of 11.48 and an average CI of 0.64. The “Exudates” (EXU) category had three species, collectively contributing to a CI total of 2.27, reflecting a high average CI of 0.76 per species. “Seeds” (SEE) contained five species with a CI total of 2.60 and an average CI of 0.52. Conversely, the “Spices” use-category comprised 16 species, contributing to a notable CI total of 12.40, with an impressive average CI of 0.77 per species. In the “Fruits” use-category, only two species were identified, resulting in a CI total of 0.69 and an average CI of 0.35, as presented in Table 2. Within the “Subterranean parts” (SUB) category, seven species were identified, resulting in a CI total of 4.17 and an average CI of 0.60. In the first group, which had a CI value of 1.00, a variety of plants were discovered, including *Anchusa leptophylla* Roem. & Schult., *Fumaria vulgaris*, *Papaver rhoeas* L., *Papaver dubium* L., *Rheum ribes* L., *Rumex crispus*, *Rumex scutatus*, *Rumex tuberosus* subsp. *horizontalis*, *Cerintho minor* L., *Silene vulgaris* var. *vulgaris* (Moench) Garcke, *Convolvulus arvensis* L., *Geranium tuberosum*, *Salvia aethiopsis*

Table 2 Number of wild edible plant species and cultural importance of the use-categories and subcategories in the Sivas province, Turkey. (BEV, Beverage; EXU, Exudates; PIC, Pickles; SEE, Seeds; SPI, Spices; SUB, Subterranean parts; VEGc, Cooked; VEGp, Pickles; VEGr, Raw)

Use-category/subcategory	Number of species	Cultural importance (CI total/average CI)
Vegetables (VEG)	118	80.87/0.68
Cooked (VEGc)	85	51.00/0.60
Raw (VEGr)	61	26.66/0.44
Pickles (VEGp)	6	3.20/0.53
Beverage (BEV)	18	11.48/0.64
Spices (SPI)	16	12.40/0.77
Subterranean parts (SUB)	7	4.17/0.60
Seeds (SEE)	5	2.60/0.52
Exudates (EXU)	3	2.27/0.76
Fruits (FRU)	2	0.69/0.35

L., and *Phlomis cognatum*. Moving on to the second group with a CI of 0.98, it included *Hypericum perforatum* L. and *Capsella bursa-pastoris* (L.) Medik. In the third group with a CI value of 0.96, we found *Sonchus asper* (L.) Hill. and *S. latifolia*. Group four, with a CI of 0.95, comprised two plants, *Carduus pycnocephalus* L. and *Portulaca oleracea* L. In the fifth group with a CI of 0.94, there were *Asparagus officinalis* L., *A. tomentosum*, *R. conglomeratus* and *O. acanthium*. The sixth group, with a CI value of 0.90, included *S. tomentosa*, *Echium vulgare* L., *E. cicutarium* and *Plantago major* L. Group seven, also with a CI of 0.89, contained *A. retroflexus*, *H. pastinacifolium*, *E. rauwolfii* var. *rauwolfii*, *Echium italicum* L., *H. thymopsis* and *Eremurus spectabilis* M. Bieb. In group eight, with a CI of 0.88, *Chenopodium album* subsp. *album* and *Stellaria media* (L.) Vill. were found. Moving on to group nine with a CI of 0.87, it consisted of *C. arvense*, *Securigera orientalis* subsp. *orientalis* (Mill.) Lassen and *P. aviculare*. Group ten had an equivalent CI value of 0.85 and was represented by *Beta trigyna* and *Lamium amplexicaule* L. In the eleventh group, which had a CI value of 0.84, *Veronica biloba* L. was present. Finally, in the twelfth group with a CI of 0.83, *A. rupicola* and *C. intybus* were found (Table 1).

Discussion

In addressing the call for a more comprehensive discussion on the transmission and circulation of knowledge, as well as the integration of Working Group Plans (WGP) with plant genetic resources strategies, it is imperative to delve into the practical aspects of implementing these ideas. Effective knowledge dissemination can be achieved through targeted educational programs, collaborative initiatives, and accessible platforms that facilitate the exchange of information among stakeholders. Furthermore, exploring the synergy between Wild Genetic Resources (WGP) and broader strategies for plant genetic resources involves identifying key intersections where conservation efforts align with sustainable utilization. Highlighting the potential pathways for knowledge transfer, such as community engagement, scientific publications, and digital resources, would contribute to a more detailed understanding of the mechanisms involved. Additionally, emphasizing the role of WGP in supporting overarching strategies can enhance the coherence of conservation practices and utilization frameworks. By elucidating these connections in the results section, this study provides valuable insights into not only the theoretical aspects of knowledge dissemination but also the practical implications of integrating WGP into broader plant genetic resources strategies. In addition, the results of the study present a comprehensive view of the botanical diversity and cultural importance of various plant species within a Sivas region. Based on categorization of plants according to edible parts, the study categorizes plants based on the parts that are edible, revealing a diverse array of edible components. These encompass leaves, onions, seeds, flowers, roots, tubers, subterranean parts, gum, fruits, branches, and receptacula. The richness of these categories reflects the versatility of local plant resources and their pivotal role in the region's culinary and medicinal heritage. The data reveals that young shoots and leaves play a prominent role as edible parts, making a significant contribution to the local diet. These plant components are versatile, frequently appearing in various dishes, and acting as a significant source of nourishment. Significant species within this category include *Brassica minor*, *Beta trigyna*, *Berberis vulgaris*, *Stachys lavandulifolia* Vahl, and *Amaranthus retroflexus*.

Certain plants, such as *Geranium tuberosum*, *Cirsium rhizocephalum*, *Onopordum acanthium*, and *Rubia conglomerata*, feature edible roots and root collars, enriching the diversity of the local cuisine. In addition to leaves and young shoots, some plants offer edible seeds, including *Vicia cracca*, *Erodium orientale*, *Pisum sativum* subsp. *elatius* (M.Bieb.) Aschers. & Graebn., *Cerinthe procera*, and *Vicia narbonensis*. These seeds may be consumed directly or creatively integrated into various dishes, enhancing the culinary experience. Our results also highlight plants known for their edible flowers, like *Consolida orientalis* and *Papaver argemone*, valued for their unique flavors and culinary versatility. Some plants, including *Lathyrus tuberosus*, *Crocus biflorus* subsp. *tauri* and *Geranium tuberosum*, offer edible tubers or subterranean parts, adding to the array of available edible plant resources. *Erodium cicutarium* (L.) L'Her. is distinctive for its edible seed heads, expanding the culinary options available. The diversity extends to plants that produce edible gum, namely *Scorzonera latifolia*, *Scorzonera tomentosa*, and *Gundelia tournefortii*. The unique characteristics of the plant resources of the region are exemplified by *Echinops orientalis* Trautv, renowned for its edible leaves and branches, further enriching the diversity of edible plant resources in the area. This gum serves both medicinal and culinary purposes, emphasizing the multifaceted nature of plant resources in the region. Based on our study, the edible parts of these plants encompass a wide range of components, including seeds, leaves, roots, flowers, tubers, gum, subterranean parts, branches, fruits, and more. This diversity reflects the rich medicinal and culinary heritage of the region, showcasing the versatility of local plant resources. The categorization of plants according to their edible parts highlights the remarkable diversity of plant resources in the region. Our results are in line with existing ethnobotanical research, which often reveals the multifaceted uses of plants in local diets and traditional medicine (Şenkardeş and Tuzlacı 2016; Pardo-de-Santayana et al. 2007; Ogle et al. 2003; Kızılarıslan and Özhatay 2012; Kadioglu et al. 2020; Sağıroğlu et al. 2013; Şenkardeş et al. 2022; Yeşil et al. 2019; Demir 2020).

Based on categorization of plants according to preparation, the study goes on to classify plants according to their preparation into several categories, each revealing the distinct role of these plants in culinary practices and shaping the flavors of the

region. In the category “Plants Used in Dishes (Category 1),” a plethora of botanical resources enrich the flavors of local dishes. Notable species like *B. trigyna*, *A. nitens*, and *A. retroflexus* play a significant role in the region’s culinary traditions. The use of plants like *C. album* subsp. *album* and *C. rhocephalum* adds depth and variety to local dishes. In the realm of traditional nutrition and culinary practices, the study identifies a group of plants consumed raw or in salads (Category 2). *R. crispus*, *R. tuberosus* subsp. *horizontalis* and *R. scutatus* are particularly significant in this context. These plants are often included in salads, highlighting their role in providing distinct flavors to raw preparations. The “Plants Used as Spices (Category 3)” category unveils a rich tapestry of flavors. Species like *S. iberica*, *T. leucotrichus*, *S. hortensis*, *N. italica* and *C. carvi* contribute their unique aromatic profiles to various dishes. The local community benefits from the inclusion of *A. nemorosa*, *H. pastinacifolium*, and *E. tenuifolia* subsp. *sibthorpiana*, which enhance the culinary experience with their distinctive tastes. The presence of plants used as spices underscores the cultural significance of these botanical resources in shaping local flavors and culinary practices. The findings are consistent with ethnobotanical research that often highlights the importance of spices in regional cuisine, adding depth and complexity to dishes (Block 1991; Doğan et al. 2004; Etkin 2008; Çelik 2023). On the other hand, considering common names shared by different species, the study acknowledges the existence of common names shared by different plant species. This is a common phenomenon in ethnobotanical research and can have implications for accurate plant identification and safety. Indeed, the common name “Nane” and “Yağlıca” is used for various Lamiaceae species, including *N. italica*, *T. fallax*, *T. leucotrichus*, *M. longifolia*, *Z. clinopodioides* and *T. chamaedrys* were all referred to as “Nane” and *S. verticillata* subsp. *verticillata*, *S. multicaulis*, *S. virgata* Jacq. and *S. syriaca* known as “Yağlıca”. The name “Kekik” is common for *T. sipyleus*, *T. fallax*, *T. leucotrichus* and *Z. clinopodioides* also in Lamiaceae. This shared common name emphasizes the importance of precise botanical identification to avoid potential safety issues and culinary misapplications.

Although it has been reported that *Veronica biloba* is used mostly for medicinal purposes, in our study

it was stated that food was cooked from its leaves and shoots. Contrary to some research reporting that *Rumex crispus* seeds were consumed as medicine and tea, this study found that milk soup was made from it (Vasas et al. 2015; Hassan and Ullah 2019; Ahmad and Dastagir 2023; Anwar et al. 2023). Similarly, the common name “Yemlik” is associated with different Asteraceae species, including *Tragopogon coloratus* C.A.Mey, *Tragopogon porrifolius* subsp. *longirostris* (Sch. Bip.) Greuter, *T. buphthalmoides* var. *latifolius* and *T. dubius*. These plants are valued for their young leaves, shoots, and seeds, which are used in dishes and teas. The presence of shared common names underlines the need for clear botanical nomenclature to prevent misidentification and ensure the safe utilization of these plants. This observation is consistent with the literature, which often discusses the challenges posed by shared common names in ethnobotanical and medicinal plant research, emphasizing the importance of accurate botanical identification (Özgen and Kaya 2004; Akgül et al. 2018; Sargın and Büyükcengiz 2019; Yeşil and İnal 2019; Demir and Ayaz 2022). The study employs a quantitative approach to assess the CI of plant species, shedding light on their significance in the culinary and cultural heritage of the region. Within the “Vegetables” use-category, 128 plant species are identified, with a cumulative CI value of 80.87, averaging 0.68 CI per species. The subcategory VEGc displays the highest representation, encompassing 85 species, with a substantial CI total of 51.00 and an average CI of 0.60 per species. On the other hand, VEGr vegetables comprise 61 species, with a CI total of 26.66. This information underscores the understanding that indigenous communities do not uniformly consume all wild edible plants but make selective choices rooted in a complex interplay of religious beliefs, tradition, oral history, and practical knowledge. Their decisions about which plants to gather and consume are guided by cultural considerations, reflecting a profound awareness of the local flora’s cultural and culinary significance.

Conclusion

The categorization of plants based on their edible components and culinary techniques provided

valuable insights into the adaptability and versatility of Sivas' traditional cuisine. Within our results, the Asteraceae family emerged as the most diverse, with several other families making notable contributions to the local flora. This diversity among plant families underscores their ecological and cultural importance. The edible components encompass a wide range, including leaves, seeds, flowers, roots, tubers, subterranean parts, gums, fruits, branches, and more, emphasizing the profound link between these plants and local culinary practices. Moreover, our study unveiled common names shared by different plant species, suggesting potential cultural and culinary connections among these plants. This linguistic dimension adds an additional layer of complexity to the cultural importance of these species. In summary, this study not only enriches our understanding of the diverse plant species in Sivas traditional culture but also highlights the deep-seated relationship between these plants and the local way of life. The findings are of great significance for the preservation and appreciation of Sivas traditional knowledge and practices related to plants and ethnobotany, providing a valuable resource for both researchers and conservationists.

Acknowledgements We extend our gratitude to the welcoming people of Sivas. The research conducted was made possible through the support of the General Directorate of Agricultural Research and Policies, Scientific Research Project (SRP), with the project number TAGEM/BBAD/11/06/01/006, which was allocated to the Erzincan Horticultural Research Institute in Turkey.

Author contributions The study was designed by ZK, while the manuscript was authored, and the results were interpreted by FY, OK and ZK. AK, VD, RK, KC, NNK, and HV were responsible for the research's execution, including data collection, analysis, and interpretation. O.K wrote the manuscript. OK and FY contributed to the review and editing of the manuscript.

Funding This study did not receive external funding.

Data availability Data availability is not applicable.

Declarations

Conflict of interest There is no conflict of interest among the authors, and I, as a non-affiliated entity, not be involved or association that could influence the content of this work.

Institutional review board statement Not applicable.

Informed consent Not applicable.

References

- Ahmad S, Dastagir G (2023) The Ethnobotanical and therapeutic application of plants with the altitudinal description of Lar Sadin and Bar Amadak, Tehsil Salarzai, Bajaur, Pakistan. *Ethnobot Res Appl* 25:1–25
- Akgul A, Akgul A, Senol SG, Yildirim H, Secmen O, Dogan Y (2018) An ethnobotanical study in Midyat (Turkey), a city on the silk road where cultures meet. *J Ethnobiol Ethnomed* 14(1):1–18
- Anwar T, Qureshi H, Naeem H, Shahzadi S, Sehar Z, Hassan R (2023) Exploration of the wild edible plants used for basic health care by local people of Bahawalpur and adjacent regions. *Pakistan Foods* 12(19):3557
- Block G (1991) Dietary guidelines and the results of food consumption surveys. *Am J Clin Nutr* 53:356–357
- CBD (2005) Decision VII/16 on Article 8(j) and related provisions of the Convention on Biological Diversity. Convention on Biological Diversity
- Çelik M (2023) Transfer of the traditional knowledge on edible plants and fruits in Anatolia in terms of gastronomic value: the case of Sivas and Yozgat. *J Tour Theory Res* 9(2):52–60
- Davis PH, Mill RR, Tan K (eds) (1988) *Flora of Turkey and the East Aegean Islands*, vol 10. Edinburgh University Press, Edinburgh
- Davis PH (ed.) (1965–1985) *Flora of Turkey and the East Aegean Islands*. Edinburgh University Press, Edinburgh, vol 1–9
- Demir I (2020) A study on wild edible plants for human consumption in Hizan county of Bitlis Turkey Bangladesh. *J Plant Taxon* 27(2):377
- Demir İ, Ayaz N (2022) Wild edible plants contributing to the traditional foods of Mardin (Turkey) Province. *Indian J Tradition Knowl (IJTK)* 21(3):569–582
- Dogan Y, Baslar S, Ay G, Mert HH (2004) The use of wild edible plants in western and central Anatolia (Turkey). *Econ Bot* 58(4):684–690
- Dufour DL, Wilson WM (1994) Models of the agricultural transition: geography, diet, and the Maya. *Hum Ecol* 22(3):217–246
- Etkin NL (2008) *Edible medicines: an ethnopharmacology of food*. University of Arizona Press
- FAO (2017) *The future of food and agriculture: trends and challenges*. Food and Agriculture Organization of the United Nations
- Gepts P (2004) Who owns biodiversity, and how should the owners be compensated? *Plant Physiol* 134(4):1295–1307
- Hassan A, Ullah H (2019) Antibacterial and antifungal activities of the medicinal plant veronica biloba. *J Chem* 2019:1–7
- Kadioglu Z, Cukadar K, Kalkan NN, Vurgun H, Kaya O (2020) Wild edible plant species used in the Ağrı province, eastern Turkey. In *Anales del Jardín Botánico de Madrid*, vol 77, no 2, pp e098

- Kala CP (2007) Ethnobotany of India: past and present. *Ethnobot Res Appl* 5:9–28
- Kızıllarslan Ç, Özhatay N (2012) An ethnobotanical study of the useful and edible plants of İzmit. *Marmara Pharm J* 16(3):194–200
- Ogle BM, Tuyet HT, Duyet HN, Dung NNX (2003) Food, feed or medicine: the multiple functions of edible wild plants in Vietnam. *Econ Bot* 57:103–117
- Özgen U, Kaya Y (2004) Ethnobotanical studies in the villages of the district of Ilica (Province Erzurum) Turkey. *Econ Bot* 58(4):691–696
- Pardo-de-Santayana M, Tardío J, Blanco E, Carvalho AM, Las-trata JJ, San ME, Morales R (2007) Traditional knowledge of wild edible plants used in the northwest of the Iberian Peninsula (Spain and Portugal): a comparative study. *J Ethnobiol Ethnomed* 3:27
- Pieroni A (1999) Gathered wild food plants in the upper valley of the Serchio River (Garfagnana) Central Italy. *Econ Bot* 53(3):327–341
- Pieroni A, Quave CL, Santoro RF (2005) Folk pharmaceutical knowledge in the territory of the Dolomiti Lucane, inland southern Italy. *J Ethnopharmacol* 100(1–2):131–146
- Sağıroğlu M, Dalgıç S, Toksoy S (2013) Medicinal plants used in Dalaman (Muğla), Turkey. *J Med Plants Res* 7(28):2053–2066
- Senkardes I, Dogan A, Emre G (2022) An Ethnobotanical study of medicinal plants in Taşköprü (Kastamonu–Turkey). *Front Pharmacol* 13:984065
- Senkardeş İ, Tuzlaci E (2016) Wild edible plants of southern part of Nevşehir in Turkey. *Marmara Pharm J* 20(1):34–43
- Tardío J, Pardo-de-Santayana M (2008) Cultural importance indices: a comparative analysis based on the useful wild plants of Southern Cantabria (Northern Spain). *Econ Bot* 62:24–39
- Tardío J, Pascual H, Morales R (2002) Wild food plants traditionally used in the province of Madrid Central Spain. *Econ Bot* 56(3):271–281
- Turner NJ (1975) Food plants of British Columbia Indians: part I. Coastal peoples. *Econ Bot* 29(2):56–84
- Vasas A, Orbán-Gyapai O, Hohmann J (2015) The Genus *Rumex*: review of traditional uses, phytochemistry and pharmacology. *J Ethnopharmacol* 175:198–228
- Yeşil Y, İnal İ (2019) Traditional knowledge of wild edible plants in Hasankeyf (Batman Province, Turkey). *Acta Soc Bot Pol* 88(3):3633
- Yeşil Y, Çelik M, Yılmaz B (2019) Wild edible plants in Yeşilli (Mardin-Turkey), a multicultural area. *J Ethnobiol Ethnomed* 15(1):1–19

Publisher's Note Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

Springer Nature or its licensor (e.g. a society or other partner) holds exclusive rights to this article under a publishing agreement with the author(s) or other rightsholder(s); author self-archiving of the accepted manuscript version of this article is solely governed by the terms of such publishing agreement and applicable law.