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YY and İI carried out field work, collected the data, and identified the plants in 2017, after which YY carried out the remaining field work up to April; YY analyzed the data and wrote the manuscript

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ORIGINAL RESEARCH PAPER

Traditional knowledge of wild edible plants in Hasankeyf (Batman Province, Turkey)

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* Corresponding author. Email: yeteryesil@yahoo.com**Abstract**

Hasankeyf is an ancient city located on the shores of the Tigris River in Batman Province, southeast Turkey. The town and some of its surrounding villages will be soon submerged, due to the construction of İlisu Dam, which will force the residents to move to new settlements. The aim of the present study was to collect and record the traditional knowledge regarding the indigenous wild plants that will be submerged by this flooding. The study was carried out between March 2017 and April 2019. Interviews were conducted with 72 women and 53 men in the town center and 22 rural settlements, with a focus on the five villages that are due to be submerged. Information about a total of 86 wild edible plants belonging to 32 families was recorded. Interviewees reported that these were used as green vegetables (45 taxa), ripe fruits and seeds (25 taxa), seasoning and preservatives (16 taxa), beverages (nine taxa), and children's snacks (seven taxa). In addition, the data were analyzed on the basis of the cultural importance index to determine the cultural significance of these wild edible plants and the informants' knowledge about them. Culturally, the most significant species included *Mentha longifolia*, *Polygonum cognatum*, *Rosa canina*, *Chenopodium album*, *Urtica dioica*, *Amaranthus retroflexus*, and *Malva neglecta*. In addition, the data were compared with relevant data in the ethnobotanical literature of Turkey and its neighboring countries. Several uses mentioned here are documented here for the first time. Our research highlights the importance of wild edible plants in the daily lives of inhabitants and their potential for economic use. The present study also provides information for future archaeobotanical studies in this region.

Keywords

edible plants; ethnobotany; İlisu Dam; Mesopotamia

Introduction

Since ancient times, gathering wild plants has been a common practice all over the world, especially in times of famine [1]. Many species now considered weeds were used as food by different societies. Today, and particularly among urban residents, many of them have been forgotten, even though they have important nutritive value; in some countries, however, many wild plant species are still used [2].

The use of wild edible plants is typically not fixed. In many cases, ethnobotanical studies reveal either a dramatic or gradual loss of traditional knowledge and practices [3]. Changes in patterns of wild plant use differ by region and are associated with lifestyle changes, urbanization, large-scale farming, lesser contact with nature, and other reasons [4,5].

In Turkey, systematic ethnobotanical studies that include edible plants began in the mid-1990s [6]. In recent years, studies have been carried out to capture the disappearing traditions of wild edible plant use [7–75]. However, few ethnobotanical studies in Turkey have been conducted in Southeastern Anatolia [8–10,13,21,33,40], and in particular, there has only been one short-term ethnobotanical study [21] in Batman Province.

Hasankeyf is a town on the Tigris River in Batman Province, with an area of approximately 530 km² and a population of about 6,700. The town was founded in Roman times and is well known for its medieval architectural remains. It was also a strategic spot on the route from Upper Mesopotamia to Anatolia and a staging point on the Silk Road (Fig. 1) [76]. The district has a long history of occupation. There are many archaeological excavations on the left bank of the Tigris. About 2 km east of the town there is new evidence of a sedentary settlement dating to the tenth millennium cal. BC, at which time Hasankeyf Höyük appears to have been a hunter-gatherer settlement without the knowledge of pottery. There is little evidence that its people consumed cereals, such as wheat and barley, but many nuts were excavated [77]. All the excavations of this site and the town of Hasankeyf itself, along with much of its surrounding landscape, will soon be submerged after the construction of the Ilisu Dam, which is a part of the Southeast Anatolian project [Güneydoğu Anadolu Projesi (GAP)], one of Turkey's largest hydroelectric projects built on the Tigris River.



Fig. 1 Hasankeyf center, along with remains of historical construction and the cave houses, 2013.

The water level of the Tigris at Hasankeyf will be raised by 65 m, submerging more than 300 historical sites that have still not been explored. The inhabitants of the town center and five villages (of 22 in the area) will have to move to new settlements [76,77]. Many of them will lose their land and their livelihoods.

Hasankeyf and its surrounding area comprise a crucial part of key biodiversity areas in the region [78]. In a study about the flora of Ilisu (Hasankeyf) and its surroundings, 472 taxa belonging to 279 genera and 64 families were identified, of which 20 taxa are threatened by the dam project, as they are endemic and grow only in this region [79]. Moreover, the species *Onopordum hasankeyfense* Pinar & Behçet [80] and *Salvia hasankeyfensis* Dirmenci, Celep & O. Güner [81], which were recently described, are located in the area to be submerged; these species are threatened with extinction if protection measures are not taken. Therefore, the authors recommend that these species be placed in the category of critically endangered (CR) [80,81]. It is not only the plant life in the area to be submerged that is threatened; there is also a high risk that cultural knowledge will be lost as people move out of the area. The use of wild edible plants will be reduced, inevitably resulting in the erosion of knowledge on this subject. Thus, a systematic ethnobotanical study of the wild edible plants of Hasankeyf and its surrounding area is an urgent and a significant task.

Our research objectives for the present study were:

- To identify and document the wild edible plants and associated ethnobotanical knowledge of the local people.
- To visit the areas where intensive emigration will occur due to the expected flooding (Hasankeyf center and some villages) and to obtain more intensive ethnobotanical

information by spending time with the local people, thus reducing the loss of cultural information due to migration.

- To compare the data obtained with existing ethnobotanical data in the literature in Turkey.
- To compare the data with similar studies on wild foods conducted in neighboring countries in order to identify possible new or unusual plant culinary uses.

Material and methods

Study area

The Southeast Midyat Mountains are located to the south and the Raman Mountains are located to the north of Hasankeyf. There are 22 villages in the region (Akalin, Aksu, Bayırlı, Büyükdere, Çardaklı, Gaziler, Güneşli, Irmak, İncirli, Karaköy, Kayıklı, Keleşçi, Kumluca, Öğütlü, Palamut, Saklı, Soğucak, Tepebaşı, Uzundere, Üçyol, Yakaköy, Yolüstü) (Fig. 2). The altitude is between 520 and 1,200 m. The Tigris River has an impact on the climate of the region, contributing to the area's mild winters [82]. The average temperature is 25°C and the highest average temperature is 40–43°C, while the lowest average temperature is 6–8°C. On average, 90 days of the year are rainy and the average annual rainfall is about 542 mm [83].

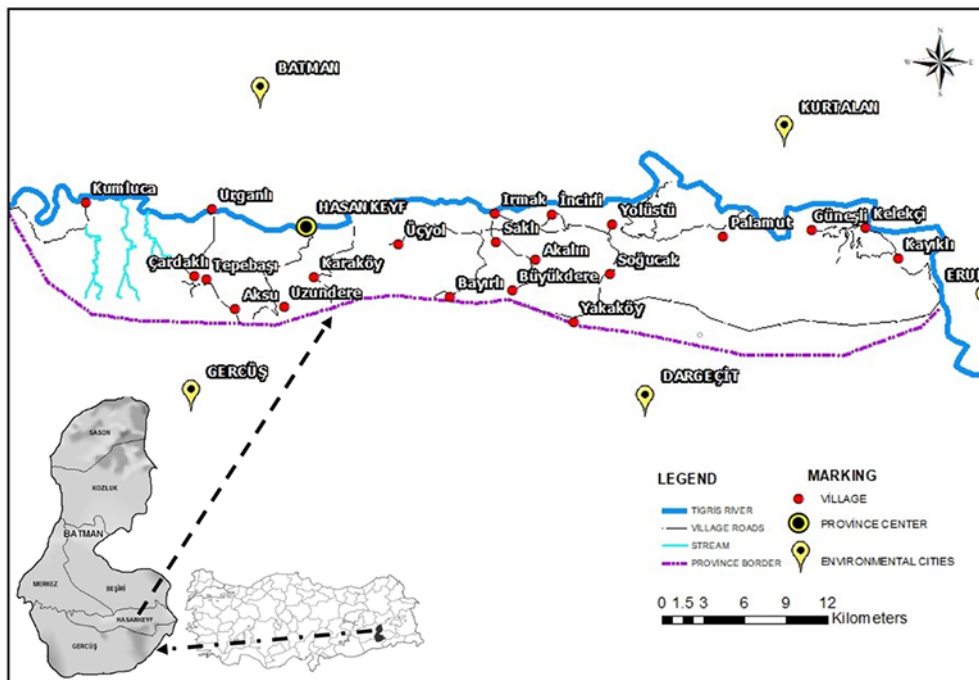


Fig. 2 Location map of the study area and its location in Batman Province and in Turkey.

The main livelihood is tourism in Hasankeyf center, along with agriculture and horticulture in the villages on the lowland, and livestock in mountain villages. Wheat is the main product of Hasankeyf town. Other crops include grape, almond, fig, lentil, and watermelon [82].

Plant material

An ethnobotanical study was carried out between March 2017 and April 2019. During this time, 148 plant specimens were collected and identified by the authors using the *Flora of Turkey* [84–86], A checklist of the flora of Turkey (vascular plants) [87], illustrated

flora of Turkey (vol. 1 [88] and vol. 2 [89]). Voucher specimens were deposited at the Herbarium of Istanbul University's Faculty of Pharmacy (ISTE). The scientific names of the plant taxa were identified according to the checklist of the flora of Turkey [87] and The Plant List website [90].

Interviews with local people

Information was collected using a questionnaire that was filled in during face-to-face interviews (Fig. 3). During the interviews, the date of the interview was recorded and the following personal and demographic information was collected:

- Name and surname;
- Age and sex;
- Educational level;
- Telephone number and address.

In addition, informants were asked the following questions:

- Can you show the plants you use in your region?
- Can you tell the local names of the plants you use in your region?
- Which parts of the plants do you use?
- How do you consume it?



Fig. 3 Interviews with local people.

The official language is Turkish, but most of the locals speak Arabic and Kurdish in Hasankeyf center, while the people who live in the villages generally speak Kurdish. Communication was not an issue, especially in the villages, as one author (İ. İ.) comes from a town near the research area. In the town center, we worked with a local guide and interviews were conducted in Arabic, Kurdish, and Turkish. In the villages, the interviews were conducted in Kurdish and the village headmen assisted us in obtaining information from local people. We interviewed 125 informants, including 72 females and 53 males. The mean age of the participants was 52 years (range of 14–98). The interviews were held with people in their homes, mosques, village squares, teahouses, gardens, or fields. The Code of Ethics of the International Society of Ethnobiology was followed [91]. The purpose of the research was explained to all participants and they gave their consent to participate. Local plant names were given in the Latin alphabet, following the rules of Arabic and Kurdish language.

Data analysis

The cultural importance (CI) index was calculated for each species using the following formula:

$$CI = \sum_{i=1}^{i=NU} \frac{UR_i}{N}$$

where UR = number of use reports, or the total number of uses recorded for each species, i , varying from only one use to the total number of uses, NU , and N = the total number of respondents participating in the research. The CI index is a quantitative index that provides a method of measuring the cultural value of useful plants, allowing different hypotheses to be tested statistically [92].

Results

The data gathered during the present study showed that the knowledge of traditional plant uses in Hasankeyf and its nearby areas is still viable and continues to be an integral part of culture. As a result of the study, 148 plant samples were identified. Among these were 86 wild edible plant taxa belonging to 32 families that were consumed locally. These included 62 taxa of herbs (72%), 14 taxa of shrubs (16%), and nine taxa of trees (11%). Details including botanical family and local name, herbarium number, life form, part(s) used, and utilization method are summarized in Tab. 1. The CI index of all species was calculated and the uses were compared with the previously reported ethnobotanical data collected in Turkey and neighboring countries (Tab. 1). The highest number of taxa recorded belonged to the Asteraceae family (11), followed by Lamiaceae (eight), Rosaceae (eight), Fabaceae (seven), Brassicaceae (six), Boraginaceae (four), Iridaceae (four), Amaryllidaceae (three), and Polygonaceae (three) (Fig. 4).

The plants were categorized into various groups on the basis of their use. These uses included as green vegetables, ripe fruits, seasonings and preservatives, beverages, and children's snacks. The largest category was green vegetables with 45 taxa, followed by ripe fruits and seeds with 24 taxa, seasonings and preservatives with 16 taxa, and beverages and children's snacks with nine and seven taxa (Fig. 5).

Green vegetables

The largest category of wild edible plants used by locals belonged to green vegetables (45 taxa). Among these, the major families that were utilized included Asteraceae (11 taxa), Brassicaceae (six taxa), Amaryllidaceae (four taxa), Polygonaceae (three taxa), and Boraginaceae (three taxa). Green vegetables included plants whose green parts such as leaves, aerial parts, stems, receptacles, bulbs, corms, roots, and tubers are either consumed raw or involve special preparation (e.g., cooking, frying). Interestingly, most of these are collected in early spring (Fig. 6).

These plants are usually grown in the fields in grasslands, meadows, rocky terrain, and wetlands. Most of these green vegetables are herbs and are eaten raw or cooked in various ways. The cooking methods include preparation as a soup with yogurt and bulgur, frying (cooking the plants the way spinach would be cooked) (Fig. 7A,B), making pancakes or pastries, preparing a dish called *pilav* (boiling bulgur and plant parts and then adding fried butter) (Fig. 7C), and preparing sarma, a dish of leaves rolled around a filling made of rice or bulgur and minced meat. Vegetables and seasoning plants may also be added (especially onion). The dish is gently cooked (stewed or boiled) in a pot and consumed warm.

Tab. 1 Wild edible plants used as food in Hasankeyf.

Botanical name (family name); ISTE number	Local name	Life form	Used part	Utilization method	CI	Previous ethnobotanical studies in Turkey
<i>Allium ampeloprasum</i> L. (Amaryllidaceae); ISTE116272	Sirik, sirim, sirika penir (K)	Herb	Leaves	Eaten raw as salad, dried then added to cooking in winter, added into cheese	0.24	[26,33,40,50,61]
<i>Allium kharputens</i> Freyn & Sint. (Amaryllidaceae); ISTE115344	Surim, soyask, sorelask (K)	Herb	Leaves	Eaten raw as salad, dried then used in winter, boiled with bulgur and prepared pilav, added into cheese	0.72	[15,33,75]
<i>Allium scorodoprassum</i> L. (Amaryllidaceae); ISTE116125	Sirik, sirim, sirimapenir (K)	Herb	Leaves	Eaten raw as salad, dried added to cooking in winter, added into cheese	0.28	[9,10,13,36,38,46,50,54]
<i>Amaranthus retroflexus</i> L. (Amaranthaceae); ISTE116152	Sermask (K)	Herb	Aerial parts	Boiled and added to yogurt, fried with onion	0.06	[14,15,19,22-24,30,31,49,60-62,75,95]
<i>Amygdalus orientalis</i> Mill. (Rosaceae); ISTE116185	Behîva eşk (K)	Shrub	Fruit	Eaten raw as a snack	0.11	Not reported
<i>Anchusa azurea</i> Mill. (Boraginaceae); ISTE115383	Gûzîr (A, K)	Herb	Aerial parts, lowers	Eaten raw as salad, fried with onion and added eggs, boiled then fried, burned and the ash used for drying grape, its nectar sucked	0.79	[8,14,15,22-24,33,39,40,42,50,52,61,62]
<i>Anchusa strigosa</i> Banks & Sol. (Boraginaceae); ISTE115371	Gûzîr (A, K)	Herb	Aerial parts, lowers	Eaten raw as salad, fried with onion and added eggs, boiled then fried, burned and the ash used for drying grape, its nectar sucked	0.86	[8,75]
<i>Arum ruficola</i> Boiss. (Araceae); ISTE115336	Kardî (K), nubê (A)	Herb	Leaves	Boiled with sumac and then cooked, dried then eaten in winter, as a wrapping material for sarma	0.84	[24,36,40,50,52,75,97]
<i>Bryonia alba</i> L. (Cucurbitaceae); ISTE116145	Xezîrvîk, xezrowîk (K)	Herb	Fresh aerial parts	Fried or boiled then fried with onion and egg	0.36	Not reported
<i>Capparis sicula</i> Veill. (Capparaceae); ISTE115419	Kemberok, kember, inok (K), welleh (A)	Shrub	Flower buds	Pickled	0.69	[8-10,12,19,20,23,33,37,39,45,69]
<i>Capsella bursa-pastoris</i> (L.) Medik. (Brassicaceae); ISTE115406	Pîrxalaçk, îrêqereçê (K)	Herb	Aerial parts	Eaten raw as a snack, fried with onion and egg	0.68	[8,12-15,20,23,24,31,33,39,41,42,45,46,55-60,62,69,75,95]
<i>Carduus pycnocephalus</i> L. (Asteraceae); ISTE116273	Kerbeş (K)	Herb	Fresh stem	Eaten after peeling off the outer part as a snack	0.80	[9,22,42]
<i>Celtis tournefortii</i> Lam. (Cannabaceae); ISTE116195	Gengeres (A) taew, taav (K),	Tree	Fruit	Eaten raw as a snack	0.35	[10,22,30,61,62]
<i>Centaurea lyalolepis</i> Boiss. (Asteraceae); ISTE115432	Sûriyezerk, tîrzerk sîrzerk (K)	Herb	Leaves	Boiled then fried with onion	0.31	Not reported
<i>Centaurea solstitialis</i> L. (Asteraceae); ISTE116123	Sûriyezerk, tîrzerk, tîrzerk (K)	Herb	Leaves	Boiled then fried with onion	0.86	[9,19,20,24,31,38,39]

Tab. 1 Continued

Botanical name, (Family name); ISTE number	Local name	Life form	Used part	Utilization method	CI	Previous ethnobotanical studies in Turkey
<i>Cerasus microcarpa</i> (C. A. Mey.) Boiss. (Rosaceae); ISTE116179	Belaluk, belalok (K)	Shrub	Fruit	Eaten raw as a snack	0.50	[30,40,75,97]
<i>Cerinthe minor</i> L. (Boraginaceae); ISTE115395	Gobelk (K)	Herb	Aerial parts	Boiled then fried with onion	0.21	[14,22,52]
<i>Chenopodium album</i> L. (Amaranthaceae); ISTE116153	Sermast (K)	Herb	Fresh aerial parts	Fried with onion, added to pancake with fried onion	0.33	[12,14,15,17,19,20,22,24,25,30,34,35,41,43,45,49,51,52,54,58-62,64,68,69,73-75,95]
<i>Chondrilla juncea</i> L. (Asteraceae); ISTE 116120	Gayeki benuşte (K)	Herb	Leaves	Eaten raw as salad	0.32	[19,20,22,24,30,31,45,55,58-60,75]
** <i>Cicer echinospermum</i> P. H. Davis (Fabaceae); ISTE116274	Noka beşk, noka bej (K), hamis beş (A)	Herb	Fresh seeds	Eaten raw as a snack	0.42	Not reported
<i>Cirsium arvense</i> (L.) Scop. (Asteraceae); ISTE115448	Kerbeş (K)	Herb	Leaves, aerial parts, stem	Eaten raw as salad, eaten raw as a snack, after peeling off the outer part, boiled then fried	0.66, 0.78	[9,14,23,33,38,40,43,45,54,55,58,69,73,75]
<i>Crataegus azarolus</i> L. var. <i>aronia</i> L. (Rosaceae); ISTE116182	Guhij, guhije sor, gıvıj, gıvije sor (K), izaran (A)	Tree	Fruits	Eaten raw as a snack	0.90	[13-15,19,23,33,62]
<i>Crataegus azarolus</i> var. <i>azarolus</i> L. (Rosaceae); ISTE115509	Guhij, guhije zer, guhije spi, gıvıj, gıvije zer, gıvije spi (K), izaran (A)	Tree	Fruits	Eaten raw as a snack	0.90	[94]
<i>Crataegus monogyna</i> Jacq. (Rosaceae); ISTE116131	Guhij, gıvıj (K), izaran (A)	Tree	Fruits	Eaten raw as a snack	0.89	[8,10,11,20,22,31,38,39,42,45,46,50,55,56,61]
<i>Crocus cancellatus</i> Herb. subsp. <i>damascenus</i> (Herb.) B. Mathew (Iridaceae); ISTE116275	Pivok, pivon (K)	Herb	Cormus	Eaten raw as a snack	0.90	[8-10,59,75]
<i>Crocus pallasi</i> Goldb. subsp. <i>turcicus</i> B. Mathew (Iridaceae); ISTE115942	Pivok (K)	Herb	Cormus	Eaten raw as a snack	0.57	[8]
<i>Cyclothrium leucotrichum</i> (Stapf ex Rech. Fil.) Leblebici (Lamiaceae); ISTE116166	Rehana rebel (A)	Herb	Leaves	As spices	0.11	Not reported
<i>Dioscorea communis</i> L. (Dioscoreaceae); ISTE115421	Darhablelek, derheblenek (K)	Herb	Aerial parts, leaves	Boiled and then fried, as a wrapping material for sarma	0.21	[55]

Tab. 1 Continued

Botanical name, (Family name); ISTE number	Local name	Life form	Used part	Utilization method	CI	Previous ethnobotanical studies in Turkey
<i>Echinops orientalis</i> Trautv. (Asteraceae); ISTE116276		Herb	Receptacle	Eaten raw as a snack	0.16	[9,22,40,50,58]
<i>Elaeagnus angustifolia</i> L. (Elaeagnaceae); ISTE116277	Sinc (A, K)	Shrub	Fruit	Eaten raw as a snack	0.33	[14,19,30,33,49,58,59,74,75]
<i>Erodium cicutarium</i> (L.) L'Herit. (Geraniaceae); ISTE116278	Piréxalaçe, pırxalaç (K)	Herb	Fruit, leaves	Eaten raw as a snack, fried with onion	0.24	[9,13,23,24,31,38,39,45,53,55,69,98]
<i>Eryngium campestre</i> L. var. <i>virens</i> Link (Apiaceae); ISTE115387	Navçurk (K)	Herb	Fresh stems	Eaten raw as a snack after peeling off the outer part	0.46	[13,15,21-24,31,33,38,41,45,46,56,60]
<i>Euphorbia craspedia</i> Boiss. (Euphorbiaceae); ISTE115411	Xulişirik (K)	Herb	All parts	Burned and the ash used for drying grape	0.35	Not reported
<i>Euphorbia macroclada</i> Boiss. (Euphorbiaceae); ISTE116165	Xulişirik (K)	Herb	All parts	Burned and the ash used for drying grape	0.35	Not reported
<i>Ficus carica</i> subsp. <i>carica</i> L. (Moraceae); ISTE116199	Hêjür, hejür (K), tinê (A)	Tree	Fruits	Eaten raw as a snack	0.97	[8,16,19,22,24,31,33,36-38,41,43,52,55,62,63,66,73,94]
<i>Ficus carica</i> L. subsp. <i>rupestris</i> (Hausskn.) Browicz (Moraceae); ISTE116200	Hejira sâ, kerik hejür, rijik (K), rijikê (A)	Shrub	Fruits	Eaten raw as a snack	0.72	[75]
<i>Glycyrrhiza glabra</i> L. (Fabaceae); ISTE115667	Sûs, sus (A,K)	Herb	Roots	Prepared ava süse	0.78	[8,9,14,23,33,58,60-62,74]
<i>Gundelia tournefortii</i> L. (Asteraceae); ISTE115369	Kereng (K)	Herb	Fresh aerial parts, stem	Eaten raw as a snack, fried with onion and egg, boiled with bulgur and prepared pilav, boiled with bulgur and prepared a cold soap with yogurt, pickled, eaten raw as a snack after peeling off the outer part	0.82, 0.83	[8,9,13,21-24,33,36,40,45,50,52,58,60-62,64,66,69,75,94,97,98]
<i>Gypsophila pallida</i> Stapf (Caryophyllaceae); ISTE116119	Giyayekî helavê (K)	Herb	Roots	Prepared a dessert	0.14	[54,71]
<i>Iris persica</i> L. (Iridaceae); ISTE116201	Pispizik, pırpizik (K)	Herb	Flowers	Eaten raw as a snack	0.81	[75]
* <i>Iris reticulata</i> M. Bieb. var. <i>kurdica</i> Rukşans (Iridaceae); ISTE116202	Pispizik, pırpizik (K)	Herb	Flowers	Eaten raw as a snack	0.81	[13,62]
<i>Ixolirion tataricum</i> Herbert subsp. <i>montanum</i> Frey and Sint. (Amaryllidaceae); ISTE115398	Sirik (K)	Herb	Aerial parts	Eaten raw as salad, added to cheese	0.30	[10,13,50]

Tab. 1 Continued

Botanical name, (Family name); ISTE number	Local name	Life form	Used part	Utilization method	CI	Previous ethnobotanical studies in Turkey
<i>Juglans regia</i> L. (Juglandaceae); ISTE116203	Cevz (A), güz (K)	Tree	Seeds	Eaten raw as a snack	0.90	[10,18,21-23,30,36,38, 40,42,44,46,48,50-52, 73,75]
<i>Lathyrus laxiflorus</i> (Desf.) O. Kuntze subsp. <i>angustifolia</i> (Post ex Dinsm.) Davis (Fabaceae); ISTE115443	Şoqil (K)	Herb	Seeds	Eaten raw as a snack	0.29	Not reported
<i>Lathyrus sativus</i> L. (Fabaceae); ISTE116280	Şoqila çukan (K)	Herb	Seeds	Eaten raw as a snack	0.12	[9]
<i>Lepidium draba</i> L. (Brassicaceae); ISTE115376	Xardal, qinêbêr, qunêberk (K), xerdil (A)	Herb	Aerial parts	Eaten raw as salad, boiled then fried with onion added sumac	0.94	[8,9,13,14,21,22,24,34, 36,39,49,61,63,64,69,74]
<i>Lycium depressum</i> Stocks. (Solanaceae); ISTE115335	Hadhad, hathat, had- hadk (A, K)	Shrub	Leaves	Boiled and then fried, or boiled then added yogurt and bulgur soap	0.41	Not reported
<i>Malva neglecta</i> Wallr. (Malvaceae); ISTE115390	Tolik, tolik (K), tolikê (A)	Herb	Aerial parts	Eaten raw as salad, boiled and then fried	0.88	[8,10,12-14,17,20,22,26, 29,30,32-36,41,45,53, 56,58-62,64,68,69,75, 95,97,98]
<i>Melissa officinalis</i> L. (Lamiaceae); ISTE116136	Giyakî çolê, giyaye tirş (K)	Herb	Leaves	As tea	0.24	[31,41,94,96]
<i>Mentha longifolia</i> (L.) L. subsp. <i>typhoides</i> (Briq.) Harley (Lamiaceae); ISTE116164	Pûng (K), pûnge (A)	Herb	Leaves	As spices	0.89	[14,15,17,20-22,29,30, 32-35,38,40,43,45,49, 50,52,53,55,56,58,60-62, 64-67,69,75,95,97,98]
<i>Nasturtium officinale</i> R. Br. (Brassicaceae); ISTE115417	Tüzük (K)	Herb	Aerial parts	Eaten raw as a snack	0.88	[20,21,23,24,32,36,41,44, 51,54,56,58,60,62,97,98]
<i>Notobasis syriaca</i> (L.) Cass. (Asteraceae); ISTE116281	Kerbeşe karan (K)	Herb	Fresh stem	Eaten raw as a snack after peeling off the outer part	0.75	[9,10,31,94]
<i>Onopordum carduchorum</i> Bornm. & Beauverd (Asteraceae); ISTE116356	Kerbeş (K)	Herb	Fresh stem	Eaten raw as a snack after peeling off the outer part	0.75	[10,13,36]
<i>Onosma alborosea</i> Fisch. & C. A. Mey. (Boraginaceae); ISTE116282	Mijmijok (K), mısmısok (A)	Herb	Flowers	Its nectar sucked	0.35	Not reported
<i>Onosma orientalis</i> (L.) L. (Boraginaceae); ISTE115348	Mijmijok (K), mısmısok (A)	Herb	Flowers	Its nectar sucked	0.35	Not reported

Tab. 1 Continued

Botanical name, (Family name); ISTE number	Local name	Life form	Used part	Utilization method	CI	Previous ethnobotanical studies in Turkey
<i>Origanum vulgare</i> L. subsp. <i>gracile</i> (C. Koch) Letsw. (Lamiaceae); ISTE116162	Rehana rebel (A), rehan (K)	Herb	Fresh aerial parts	As spice, boiled then prepared pastry and pancake	0.49	[22,23,36,61,62,69]
<i>Papaver glaucum</i> Boiss. & Hausskn. Ex Boiss. (Papaveraceae); ISTE115386	Xixicok, xacxacok, xecxecoka şehika (K)	Herb	Leaves	Boiled then fried, added onion and spices	0.84	Not reported
<i>Papaver macrostomum</i> Boiss. & Huet ex Boiss. (Papaveraceae); ISTE115382	Xixicok, xacxacok, xecxecoka pırçika (K)	Herb	Leaves	Boiled then fried, added onion and spices	0.55	[45,58,75,98]
<i>Pistacia terebinthus</i> L. susp. <i>palaestina</i> (Boiss.) Engler (Anacardiaceae); ISTE115361	Bittim (A), kızwan (K)	Shrub	Fruits	Eaten raw as a snack, prepared coffee	0.64	[12,20,23-25,31,37,41,45,55,58,61,66]
<i>Polygonum cognatum</i> Meissn. (Polygonaceae); ISTE116204	Castürük (K)	Herb	Aerial parts	Fried with onion and egg	0.36	[14,15,17,18,22-25,30,33,35,36,38,41,45,50,53,55,56,58,60,61,64,68,69,74,75]
<i>Portulaca oleracea</i> L. (Portulacaceae); ISTE116209	Parparık pırpar (K), pırperê (A)	Herb	Aerial parts	Eaten raw as salad, fried or boiled and then fried with onion and egg	0.86	[13,15,20,21,36,41,50,53,55,62,94,97]
<i>Punica granatum</i> L. (Lythraceae); ISTE116133	Hınar (K), rumman (A)	Shrub	Fruit	Eaten raw as a snack, prepared syrup	0.87	[10,17,19,31,33,37,58,66,73,94]
<i>Pyrus syriaca</i> Boiss. (Rosaceae); ISTE116184	Şekok (K)	Tree	Fruits	Eaten raw as a snack	0.73	[17,22,40,50,75]
<i>Quercus libani</i> Oliv. (Fagaceae); ISTE115422	Balot (A), beru (K)	Tree	Fruits, stems, or branches	Roasted in embers, burned and the ash used for drying grape	0.78, 0.13	[22]
<i>Quercus brantii</i> Lindl. (Fagaceae); ISTE115415	Balot (A), beru (K)	Tree	Fruit, stems, or branches	Roasted in embers, burned and the ash used for drying grape	0.78, 0.13	[13,22,33]
<i>Ranunculus cornutus</i> DC. (Ranunculaceae); ISTE115416	Kumamella (K)	Herb	Leaves	Eaten raw as salad with lemon, fried	0.08	Not reported
<i>Rhus coriaria</i> L. (Anacardiaceae); ISTE116167	Sumaq, sımraq (A, K)	Shrub	Fruit	As spices	0.93	[10,13,17,20,21,23,33,40,45,46,51,55,58,61,62,66,73]
<i>Rosa canina</i> L., (Rosaceae); ISTE116128	Gulşıan (K)	Shrub	Mature fruits, flowers	Eaten raw as a snack, prepared as marmalade, prepared as jam	0.58, 0.17	[14,17,18,20,22,23,29,30,32-34,36,40,41,43,45,46,49-52,54,55,58,61,62,66,74,75]

Tab. 1 Continued

Botanical name, (Family name); ISTE number	Local name	Life form	Used part	Utilization method	CI	Previous ethnobotanical studies in Turkey
<i>Rubus sanctus</i> Schreb. (Rosaceae); ISTE115378	Awsâç (A) dirireşk, dirireşk, turêşk (K)	Shrub	Fruit	Eaten raw as a snack or prepared molasses	0.72	[9,13,19,20,22,30,31,36, 40,43,46,51,55,61,62,73]
<i>Rumex crispus</i> L. (Polygonaceae); ISTE116207	Himayv (A), tiršo (K)	Herb	Leaves	As a wrapping material for sarma	0.65	[14,15,19,20,23–26,30, 33–35,38,40,45,49,51,55, 56,58,60,64,68,94,95,97]
<i>Rumex tuberosus</i> L. subsp. <i>horizontalis</i> (Koch) Rech. (Polygonaceae); ISTE116208	Himayv (A), tiršo (K)	Herb	Leaves	Eaten raw as a snack, as a wrapping material for sarma	0.60	[12,14,22,29,34,40,41,50, 52,54,56,75]
<i>Salvia multicaulis</i> Vahl. (Lamiaceae); ISTE115347	Rihan, giya çaye (K)	Herb	Leaves	As tea	0.34	[9,15,22,33,36]
<i>Scorzonera incisa</i> D. C. (Asteraceae); ISTE116283	Lovik (K)	Herb	Tubers	Eaten raw as a snack	0.34	Not reported
<i>Scorzonera pseudolanata</i> Grossh. (Asteraceae); ISTE116284	Pirêpind (K)	Herb	Tubers	Eaten raw as a snack	0.30	Not reported
<i>Sinapis alba</i> L. (Brassicaceae); ISTE115371	Xerdel, xerdal (K)	Herb	Aerial parts, leaves	Eaten raw as salad, boiled and then fried with onion and sumac, as a wrapping material for sarma	0.89	[8,10,23,24,73,98]
<i>Sinapis arvensis</i> L. (Brassicaceae); ISTE116285	Xerdel, xerdal (K)	Herb	Aerial parts, leaves	Eaten raw as salad, boiled and then fried with onion and sumac, as a wrapping material for sarma	0.78	[8–10,12,15,23,24,31, 39,51,56,61,97,98]
<i>Sisymbrium loeselii</i> L. (Brassicaceae); ISTE116350	Xerdel (K)	Herb	Aerial parts, leaves	Eaten raw as a snack, boiled and then fried with onion and sumac	0.64	Not reported
<i>Thymbra sintenisii</i> Bornm. & Aznav. (Lamiaceae); ISTE116194	Cahter, catir (K), zahter (A)	Shrub	Aerial parts	As spice	0.71	[13,21]
<i>Thymbra spicata</i> L. (Lamiaceae); ISTE116206	Cahter (K), zahter (A)	Shrub	Aerial parts	As spice, as tea	0.79	[11–13,20,25,31,36,45, 54]
<i>Thymus kotschyanus</i> Boiss. & Hohen. (Lamiaceae); ISTE116205	Cahter (K)	Herb	Leaves	As spice	0.36	[14,21,22,40,50,54,58,61, 62,95]
<i>Trigonella sprunertiana</i> Boiss. (Faba- ceae); ISTE115447	Endako (K)	Herb	Aerial parts	As spice	0.13	Not reported
<i>Urtica pilulifera</i> L. (Urticaceae); ISTE115339	Gezgezok, gezo, gezgezok (K), qirrez (A)	Herb	Aerial parts	Boiled then fried added spices	0.78	[12,15,19,36]

Tab. 1 Continued

Botanical name, (Family name); ISTE number	Local name	Life form	Used part	Utilization method	CI	Previous ethnobotanical studies in Turkey
<i>Urtica dioica</i> L. (Urticaceae); ISTE115408	Gegezok, gezgezk (K), qurrez (A)	Herb	Aerial parts	Boiled then fried added spices	0.85	[8,10,12-17,22,24,26,27, 30,31,33-36,38,40-45, 49-52,54-62,66,68,69, 73,75,95,97]
<i>Vicia anatolica</i> Turrill (Fabaceae); ISTE115450	Şoqil (A, K), soqila cukan (K)	Herb	Seeds	Eaten raw as a snack	0.26	Not reported
<i>Vicia sativa</i> L. (Fabaceae); ISTE115455	Şoqil (A, K), soqila mara (K)	Herb	Seeds	Eaten raw as a snack	0.31	[30,33,43]
<i>Vitis vinifera</i> L. (Vitaceae); ISTE115381	Anup (A), mēw, tirî (K)	Dwarf shrub	Fruits, leaves	Immature fruit as salad, mature fruit eaten raw as a snack, As a wrapping material for sarma	0.88	[8,10,13,19,20,22,26,27, 30,31,40]

* Endemic species.

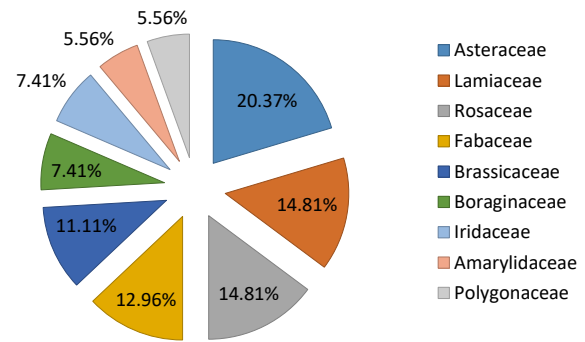


Fig. 4 The percentages of the most used plant families in Hasankeyf.

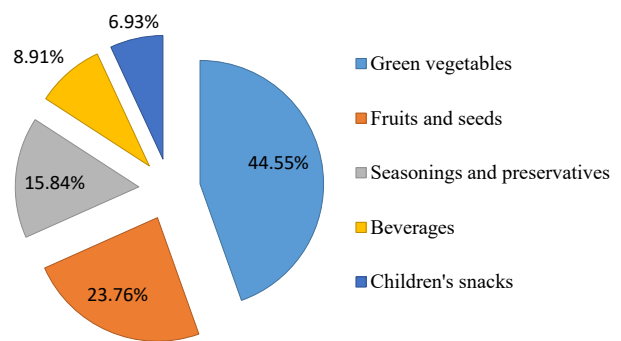


Fig. 5 The percentages of wild edible plants in various use categories.

Consumption of raw vegetables

Green vegetables are typically eaten raw (about 60% of the time). These plants can grow around houses, gardens, or fields as well as in the mountains, away from human habitats. The local people usually collect them in spring and use them as salads or snacks. Favorite salad plants include the aerial parts of *Anchusa azurea*, *A. strigosa*, *Cirsium arvense*, *Ixiolirion tataricum* subsp. *montanum*, *Lepidium draba*, *Malva neglecta*, *Portulaca oleracea*, *Sinapis alba*, and *S. arvensis* and the leaves of *Allium kharputens*, *A. ampeloprasum*, *A. scorodoprassum*, *C. arvense*, and *Chondrilla juncea*. Snacks included the aerial parts of *Capsella bursa-pastoris*, *Gundelia tournefortii*, and *Nasturtium officinale* species, leaves of *Rumex tuberosum* subsp. *horizontalis*, and both aerial parts and leaves of *Sisymbrium loeselii*. In addition, the leaves of *S. alba* and *Ranunculus cornutus* are consumed raw as salad after squeezing lemon on them.

Some green vegetables are commonly eaten as snacks after peeling off the stems. These species included *Carduus pycnocephalus*, *Cirsium arvense*, *Eryngium campestre*, *Gundelia tournefortii*, *Notobasis syriaca*, and *Onopordum carduchorum*.

The corms of *Crocus cancellatus* subsp. *damascenus* and *C. pallasii* subsp. *turcicus* are collected during the mid to end of April. Their fibrous tunics are peeled off and the internal fleshy parts are eaten directly. Similarly, tubers of *Scorzonera incisa* and *S. pseudolanata* are collected from the end of March to mid-April and consumed raw after the skins are peeled off.



Fig. 6 At the beginning of April, local people collect wild edible plants in Hasankeyf.



Fig. 7 Dishes prepared from wild edible plants. (A) Fried aerial parts of *Gundelia tournefortii*; (B) the fried leaves of *Sinapis arvensis*; (C) Pilav of *Allium kharputens*; (D) the brined leaves of *Arum rupicola*.

Consumption of fried vegetables

Frying of green vegetables basically involves two methods: frying them directly or boiling the vegetables first and then frying them with onions, with the occasional addition of eggs. The fresh leaves of *Lycium depressum* and *R. cornutus* and the aerial parts of *Amaranthus retroflexus*, *C. bursa-pastoris*, *Erodium cicutarium*, *G. tournefortii* (Fig. 7A), and *Polygonum cognatum* are fried before consumption. In comparison, the aerial parts of *A. azurea*, *A. strigosa*, *Dioscorea communis*, *Bryonia alba*, and *Portulaca oleracea* are boiled and then fried or just fried. The leaves of *Centaurea hyalolepis*, *C. solstitialis*, *Papaver glaucum*, *P. orientale*, and the aerial parts of *Cerithe minor*, *L. draba*, *M. neglecta*, *S. alba*, *S. arvensis*, *Urtica pilulifera*, and *U. dioica* are first boiled and then fried with onions (Fig. 7B).

Pilav and soup

Soup is prepared from the fresh leaves of *L. depressum* from the Solanaceae family. The recipe involves boiling the leaves, followed by the addition of boiled bulgur and yogurt. The aerial parts of *A. retroflexus*, *A. azurea*, and *A. strigosa* can be consumed fried or boiled. When they are boiled, they are made into a soup with bulgur and yogurt. Some informants also stated that when they are frying or boiling the aerial parts of *A. azurea* and *A. strigosa*, they add lemon juice to prevent the plants from scattering. The fresh stems of *G. tournefortii* and the leaves of *A. kharputens* (Fig. 7C) are used in the preparation of pilav.

Pancakes or pastry

The fresh aerial parts of *Chenopodium album* are directly added to pancakes with fried onions, whereas samples of *A. retroflexus* are first fried with onions and then added to pancakes. The fresh aerial parts of *Origanum vulgare* subsp. *gracile* are boiled and then used in the preparation of pastry and pancakes.

Sarma

The leaves from seven species (*Arum rupicola*, *D. communis*, *Rumex crispus*, *R. tuberosum* subsp. *horizontalis*, *S. alba*, *S. arvensis*, and *Vitis vinifera*) are used in sarma (Fig. 7D). The leaves are stored in salt brine. During the winter, they are used in the preparation of sarma and consumed warm.

Ripe fruits and seeds

The second major category of edible plants belonged to fruits (19 taxa) and seeds (six taxa), which were consumed raw or cooked. Among the fruits, eight taxa belonged to the Rosaceae family, which are collected from the wild and eaten raw: *Amygdalus orientalis*, *Cerasus microcarpa*, *Crataegus azarolus* var. *azarolus*, *C. azarolus* var. *aronia*, *C. monogyna*, *Pyrus syriaca*, *Rosa canina*, and *Rubus sanctus*. The fruits of *Crataegus* species, *Quercus* species, and *R. canina* are in fact collected for sale in the central markets or open-air markets.

The fruits of *Ficus carica* subsp. *carica* and *F. carica* subsp. *rupestris* are eaten raw or dried for the winter. In comparison, the fruits *Quercus brantii* and *Q. libani* are first roasted whole in embers, after which the shells are removed and only the inner parts are consumed. A similar preparation method was previously reported in a study conducted in southeast Turkey [93].

Culturally, grape has a lot of value in the research area and is described by myriad local names: *beyveri*, *binetati*, *drejik*, *misabq*, *triye raşe payızı*, *triye pırpizeki*, *triye raşe deyvanî*, *triye rowi*, *tortork*, *tayf*, *tayfi*, *kerkuş*, *sincerî*, *koxur*, *haseni*, *mezronî*, and *mezrumî*. As these names were provided by different people interviewed during the study, it is quite possible that some of them describe the same variety of grapes. The fruits of *triye heseni* and *koxur* are eaten raw, while *kerkuş* fruits are dried before consumption. *Mezronî* and *mezrumî* are used in the preparation of molasses, and *sincerî* is used in wine preparation. In addition to these uses, records in the literature show that roots, stems, or branches of some of the plants (*A. azurea*, *A. strigosa*, *Euphorbia craspedia*, *E. macroclada*, *Quercus brantii*, and *Q. libani*) are burned and the resulting ashes are used to dry the fruits of grapes. The ash is added to water and bunches of grapes are immersed in the water, removed, and allowed to dry. This process quickens the drying of grapes without causing any change in color.

Syrup from the fruits of *Punica granatum* is called *tırş*. Pomegranate fruits are squeezed and the secreted liquid is heated at low heat to achieve the required consistency. Finally, the resulting syrup is allowed to cool down.

The seeds of five taxa belonging to Fabaceae family (*Cicer echinospermum*, *Lathyrus laxiflorus*, *L. sativus*, *Vicia anatolica*, and *V. sativa*) are consumed raw. Among these, *C. echinospermum* is a rare endemic species.

Seasoning and preservatives

Among the 86 edible plants reported in the present study, eight aromatic wild taxa are used as seasoning. *Mentha longifolia*, *Rhus coriaria*, *Thymbra sintenisii*, and *T. spicata* are the most common spices used in meat dishes and soups. *Trigonella spruneriana* is also used in meat dishes, owing to its strong odor. Spices are also added to a traditional yogurt soup called *lebeni*.

As in the Eastern and Southeastern Anatolia regions of Turkey, herbal cheese is commonly prepared in the Hasankeyf area. *Allium kharputens*, *A. ampeloprasum*, *A. scorodoprassum*, and *I. tataricum* subsp. *montanum* are used in herbal cheese preparation. The use of these plants not only makes cheese aromatic and appetizing but also keeps it fresh and increases its nutritional value by adding vitamins. These plants are collected before flowering time and washed with cold water, chopped, placed in a jar, submerged in salty water, and left undisturbed for the next two weeks (Fig. 8A). They are further dredged with previously fermented milk (Fig. 8B). Finally, the resulting cheese is allowed to drain and is salted (Fig. 8C,D). Sometimes the leaves are boiled and the resulting water is added to cheese for flavoring. In addition, the leaves



Fig. 8 The preparation of herbal cheese using *Allium* sp.

of *Allium* species can be dried and used as flavoring for cooking during the winter; however, chopping the leaves and adding them directly to cheese can make it bitter.

Gundelia tournefortii is a culturally important species that can be consumed in different ways, including frying. The fresh aerial parts of *G. tournefortii* are collected in the spring, and the spines on the margin of the leaves are carefully chopped off. The remaining parts are boiled for a short time and then stored in water with a small amount of salt for future use. Before consumption, the parts are submerged in a mixture prepared from eggs and cheese or flour and then fried (Fig. 9).



Fig. 9 The cooking of brined parts of *Gundelia tournefortii*.

Pickling is the most practical and common method to store plants for consumption during the winter. In the research area, the flower buds of *Capparis sicula* and the fresh stems of *G. tournefortii* are treated with salt and vinegar and prepared as a pickle.

Cooking molasses is very popular among the inhabitants of Hasankeyf. Local people stated that they add the ash of some plants as a thickener to the molasses. These species include *A. azurea*, *A. strigosa*, *E. craspedia*, *E. macroclada*, *Q. brantii*, and *Q. libani*. In addition, the roots of *Gypsophilla pallida* are boiled in water and the extract is added to molasses to prepare a sweet dessert called *helva*.

Beverages

Nine taxa are used to make beverages (types of tea and coffee). *Melissa officinalis*, *Salvia multicaulis*, and *T. spicata* are consumed as herbal tea (infusions). *Pistacia terebinthus* subsp. *palaestina* is used for making a coffee-like beverage. To prepare it, the fruits are dried in the sun, roasted at a low temperature until their color turns to dark brown, and finally crushed to a molasses-like consistency. The product is called *kizvan* or *bittim* coffee. This coffee is optionally cooked by the addition of either milk or water.

The roots of *Glycyrrhiza glabra* are collected, cleaned, crushed until the fibers separate from each other, and finally placed in cold water in the evening. Next morning, the roots are squeezed and the remaining dark-colored liquid is drained two–three times. If the roots are kept in water for a long period, the resulting liquid is piquant. This drink holds an important place in the folk culture of this region and is called *ava sûse* in Kurdish. Since *ava sûse* is a refreshing drink, it is consumed during the summer, from May until late fall in Southeastern Anatolia. It is known for providing three different flavors as it is consumed: the first taste gives a feeling of coolness, the second taste is bitter, and the third leaves a sweet taste in the mouth after swallowing. Therefore, swift, all-at-once consumption is recommended over slow drinking to avoid the bitter taste.

Children's snacks

Children preferred the sweet-tasting plants. The elders mentioned that children consumed the flowers of *Iris reticulata* and *I. persica*. In fact, generally flowers were eaten more commonly by children. Children also obtained nectar from the flowers of *A. azurea*, *A. strigosa*, *Onosma alborosea*, and *O. orientalis* and consumed the fresh fruits of *E. cicutarium*.

Discussion

The obtained data were compared with the previously reported ethnobotanical and wild edible plant studies [7–75] conducted in Turkey and its neighboring countries [94–98]. The results of this comparison are shown in Tab. 1. *Urtica dioica* (43 references), *M. longifolia* (34 references), *M. neglecta* (31 references), *C. album* (30 references), *R. canina* (29 references), *P. cognatum* (27 references), *R. crispus* (25 references), *G. tournefortii* (24 references), *C. bursa-pastoris* (24 references), *F. carica* subsp. *carica* (19 references), *Juglans regia* (18 references), *Rhus coriaria* (17 references), *Nasturtium officinale* (16), *Rubus sanctus* (16), *Lepidium draba* (16 references), *Crataegus monogyna* (15 references), *A. azurea* (14 references), *C. arvense* (14 references), *Eryngium campestre* var. *virens* (14 references), *Sinapis arvensis* (14 references), *A. retroflexus* (13 references), *Capparis sicula* (12 references), *Chondrilla juncea* (12 references), *Erodium cicutarium* (12 references), *Portulaca oleracea* (12 references), *Rumex tuberosus* subsp. *horizontalis* (12 references) showed a common distribution and usage pattern in Hasankeyf that was similar to the ones reported in previous studies in Turkey and neighboring countries [94–98].

The comparison of present data with the previous studies showed that the following were the most common taxa, in order: Pertek (Tunceli) (28 taxa) [22], Cizre (Şırnak) (23 taxa) [33], Kürecik (Malatya) (23 taxa) [75], Bingöl (20 taxa) [62], Elazığ (20 taxa) [61], Midyat (Mardin) (19 taxa) [13], Geçitli (Hakkari) (18 taxa) [40], and Iğdır (18 taxa) [14]. The existence of many common plants between the present study and older studies is mainly attributed to the study areas being in the same phytogeographic location (Iran-Turan phytogeographic region) and to the similar cultural structure in the eastern and Southeastern Anatolian regions. The comparison of studies suggested that there were 12 common taxa between Hasankeyf and the Hawraman region [94,97], as well as 10 common taxa between the area close to the Hawraman region and Armenia [95,98]. In fact, these common taxa were also used in similar ways; for example, the use of *G. tournefortii* in raw as well as cooked form has been reported in these regions, as in Hasankeyf. *Arum*, *Cerasus*, *Gundelia*, *Malva*, *Mentha*, *Rumex*, and *Sinapis* taxa also share similar local names owing to their geographic proximity and the use of common languages (mostly Kurdish and sometimes Arabic) in both areas.

A comparative study focusing on the use of traditional plants as food, as reported in the literature [7–75,94–98], revealed that the present study was the first report of the use of *A. orientalis*, *B. alba*, *C. hyalolepis*, *C. echinospermum*, *Cyclotrichium leucotrichum*, *E. craspedia*, *E. macroclada*, *L. laxiflorus*, *L. depressum*, *O. alborosea*, *O. orientalis*, *P. glaucum*, *R. cornutus*, *S. incisa*, *S. pseudolanata*, *S. loeselii*, *T. spruneriana*, and *V. anatolica* in Turkey.

In fact, the present study may be one of the most significant studies of this topic in terms of the variety of wild food plants collected and consumed in southeast Turkey [8–10,13,21,33,40], compared with previously conducted ethnobotanical and edible plant studies.

Culturally, 23 species were found to be most significant in Hasankeyf according to their CI index values (Fig. 10). Among these, *F. carica* subsp. *carica* and *A. retroflexus* showed the highest and lowest CI values, respectively. Interestingly, certain species (*C. azarolus* var. *azarolus*, *C. azarolus* var. *aronia*, *Crocus cancellatus* subsp. *damascenus*, *C. solstitialis*, *I. persica*, and *I. reticulata*) that were previously reported only in a few studies in Turkey and neighboring countries showed the highest CI index in Hasankeyf (Tab. 1). *Iris persica* was only reported in Kürecik (Malatya) [75], whereas *I. reticulata* was only reported in Midyat (Mardin) [13] and in Bingöl [62]. *Papaver glaucum*, another plant with one of the highest CI index values, was not mentioned in any of the previous studies.

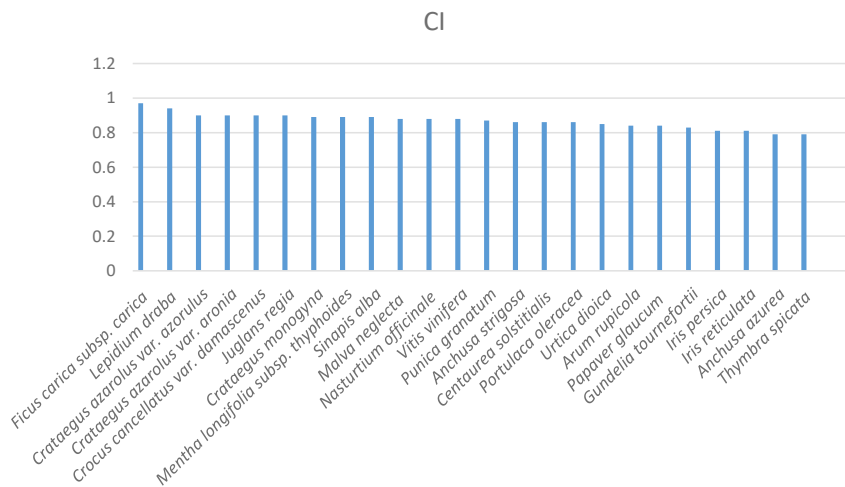


Fig. 10 The highest cultural importance (CI) index of the 24 most relevant taxa.

Arum rupicola, *E. craspedia*, *E. macroclada*, and *R. cornutus* are consumed despite being poisonous. *Arum rupicola* is known for its poisonous nature in the research area, so the local people use an obligatory detoxification process before consuming it. The leaves are boiled and sumac and sometimes salt are added to the boiling water to remove excess oxalates and eliminate the pungent taste. After cooking, the water is removed and the boiled leaves can be further cooked like spinach or used to prepare sarma. The plant can also be dried and consumed during the winter. This detoxification process has been previously reported in ethnobotanical studies conducted near this area [75,97,98]. An ethnobotanical study in a nearby region [33] reported the consumption of *Ranunculus fenzlii* Boiss.; however, there are no reports on the consumption of *R. cornutus*. *Ranunculus* species contain protoanemonine, which can be broken down by long periods of boiling or drying, but the culinary use of these species has been reported only in a few locations in Eurasia (e.g., Georgia [99], Croatia [100,101]). In addition to this, *T. spruneriana* [33] and *Vicia anatolica* [9] were reported by a previous study to be used as fodder. Similarly, *C. leucotrichum* was reported to be hung on walls for fragrance, but not eaten [13]. The consumption of these plants by local inhabitants is reported here for the first time.

The use of the ashes of *Euphorbia* species during the preparation of molasses has been previously reported [9]. However, there is no report on the use of *E. craspedia*, *E. macroclada*, *A. strigosa*, *A. azurea*, *Q. brantii*, or *Q. libani* as ash during the grape drying process. In the present study, we also reported the use of leaves of *Dioscorea communis* and *Sinapis alba* for sarma in Hasankeyf; however, these species have not been reported in any of the previous studies [26,27].

Wild edible plants, shrubs, and trees were ranked after the herbaceous plants in cultural importance in the present study, owing to the location of the study area in

the Iran-Turan phytogeographical region, which lacks dense forest [79]. Most of the women and children interviewed had knowledge of herbaceous edible plants. Further, we found that herbaceous plants are consumed only until the beginning of July, after which they dry out in the summer heat and local people shift to consuming the fruits of shrubs and trees instead. People living in rural areas consume 50% more plants than those inhabiting the town center. However, as the town center is small and horticulture, livestock and agriculture remain integral to daily life, these plants are still consumed extensively in the town center as well.

As in previously conducted ethnobotanical studies in Turkey and adjacent countries, we found evidence of the widespread use of wild plants as food by the inhabitants of Hasankeyf and its adjoining areas. The present study reported for the first time the use of some plants and mentioned others that were previously recorded only rarely, thus highlighting the importance of ethnobotanical recording to avoid the loss of cultural knowledge about wild edible plants. Our results also can inform the interpretation of future archaeobotanical studies in the region. We strongly believe and hope that this study will inspire more field surveys in the villages near the Ilisu Dam project before the flooding occurs and they are lost forever. We also recommend that small-scale rural development projects and cooperatives be established to help displaced people adapt to the new settlements (especially women), and the cultivation of natural food plants should be encouraged. The use of wild edible plants in local restaurants as an element of ecotourism may help to preserve this valuable knowledge and sustain local livelihoods.

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