

## Survey of wild food plants for human consumption in Karaisalı (Adana-Turkey)

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This study identified not only the wild plants collected for food purposes by local people of Karaisalı County in the Mediterranean Region, but also the uses and local names of these plants. Field study was carried out over a period of approximately 2 years (2008–2010). During this period, 76 vascular plant specimens were collected. Demographic characteristics of participants, vernacular plant names, edible parts and utilization methods of the plants were investigated and recorded. In the scope of the study, the plant species were collected; herbarium materials were prepared; and the specimens were entitled. In addition, the use-value of the species was determined and was calculated for the food plants included in the study. A total of 76 food plants belonging to 30 families were identified in the region. The most common families are: Asteraceae (12 plants), Lamiaceae (10 plants), Rosaceae (9 plants), Polygonaceae (5 plants), Apiaceae (4 plants). The study showed that the plants used are either eaten raw or ripe, cooked as vegetable dish, consumed as jam, consumed as coffee, as spice, frying in oil or baked to be served as dishes such as stew, pie made by roasting the leaves, prepared sour souce is added to food. During this ethnobotanical research, it was verified that wild edible plants play an important role in diet in Karaisalı. We examined whether the plants used had literature records or not. Varied usages of a number of plants have been recorded for the first time by us. Tree of those plant are endemic. The plant flora of Karaisalı is threatened by such factors as grazing, expansion of new agricultural lands, and unsustainable picking of plants to generate income. Steps should be taken immediately to ensure the inclusion of relevant flora within conservation designations.

**Keywords:** Wild food plants, Ethnobotany, Karaisalı, Adana, Turkey

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Plants and products of plants have always had meaning in many aspects of human life<sup>1</sup>. Traditional knowledge of plants and their properties has always been transmitted from generation to generation through the natural course of everyday life. However, the continuation of this knowledge is endangered when transmission between the older and younger generation is no longer assured<sup>2</sup>. It is known that wild plants are richer in minerals compared to cultivated ones. The study of nutrient composition of such plants has become common in different parts of world<sup>3</sup>. Wild edible flora did not play a major role in the population's survival in ancient times. Wild edible plants may satisfy the daily human need for elementary nutrition sources, particularly those of vitamins C&A, and for some minerals, according to WHO regulations<sup>4</sup>. The use of wild plants by the population reflects the social structure of society and,

therefore, the social differentiations in nutrition. Along with cultural and socio-economic development, attitudes toward wild food sources are changing. For a long period after the sixties of the last century, the use of wild edible plants was considered a sign of poverty and low social status<sup>5</sup>.

Turkey hosts more than 3000 endemic plant species, have high diversity of other taxa, and is almost entirely covered by three of the world's 34 biodiversity hotspots<sup>6</sup>. During the past decade, several studies have systematically analyzed the consumption and gathering of wild edible plants and medicinal plants in Turkey<sup>7-16</sup>.

Such research is crucial because documentation of the indigenous knowledge through ethnobotanical studies is important for the conservation and utilization of biological resources<sup>17</sup>. The majority of Turkish people living in rural areas traditionally use plants for nourishment and medical purposes<sup>18</sup>. This study identified not only the wild collected for food

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purposes by local people of Karaisalı County in the Mediterranean Region, but also conducted to serve as a source for scientists for the purpose of determining the nutritional value of edible wild plants by comparing information obtained in ethnobotany studies, and researching the safety of the use of these plants. No previous floristic and wild food plants studies are reported to have been conducted in Karaisalı.

## Materials and methods

### Study area

The study area is located of West of Anatolian diagonal of the Mediterranean Region. Karaisalı (Fig. 1) is included in Mediterranean Plant Geography Region and falls within the C5 grid square according to the Grid classification system used in the Flora of Turkey<sup>19</sup>.

According to the data obtained from the website of Wikipedia (<https://tr.wikipedia.org/wiki/Karaisalı>) the county has a surface area of 1517 km<sup>2</sup> and an elevation of 250 m. Karaisalı is a district of Adana province above the Taurus Mountains in the Mediterranean region. The locality hosted communities of different cultures throughout the history. It became a district in 1835. It is surrounded by İmamoğlu in the

East, Yüreğir and Seyhan in the South, Tarsus and Pozantı in the West and Aladağ districts in the North. Karaisalı County is located between 37° 13.8' North latitudes and 35° 3.0' East longitudes. While a part of the district terrain is very mountainy and woody, another part is a little rough or flat. Especially Akdağ, Cilgürliz Mountain, Susuz Mountain, Köpek Mountain and Barak Mountain are among the important hills above the Taurus mountains. There are also plateaus between these mountains like Kızıldağ, Kaltak and Tereli. In the district which mainly comprises of mountainous and woody terrains, the community is generally engaged in agriculture, stockbreeding and forestry. Karaisalı has chromium, iron, copper, lead, and rich lignite deposits.

### Interviews with local people

Interviews were made on the busy hours of the common areas (bazaars, gardens, tea houses, etc.) visited by the citizens of Karaisalı County and its villages. 55 persons above the age of 27 were interviewed. The experiences of the local people were recorded with a voice recorder during the interviews. The respondents of the questionnaire are Turkish citizens. Mean age of the respondents was 53 yrs. A questionnaire was administered to the local people, through face-to-face interviews (Appendix A) (Fig. 2). During the interviews, demographic characteristics of the study participants, and local names, edible parts and utilization methods of the plants were recorded. The people who participated in the study were requested to indicate the wild plants they used.

### Plant materials

A field study was carried out over a period of approximately 2 yrs (2008–2010). During this period,



Fig. 1—Geographical location of the study area



Fig. 2(a-f)—Interviews with native people; (a), *Smyrniium connatum*; (b), *Arum dioscoridis*; (c), *Echinops ritro*; (d), *Sideritis bilgerana*; (e), *Potentilla speciosa*; f, *Cerasus avium*

information about food use of 76 wild plants was collected. The plants were pressed in the field and prepared for identification. The plants collected within the scope of the study were identified by the authors (Savran and Paksoy, Ph.D). Plants were identified using the standard text, "Flora of Turkey and the East Aegean Islands"<sup>19,20</sup> and were compared with the specimens in Nigde University Herbarium (NH). The plant samples were stored in NH. The names of plant families were listed in alphabetic order. Scientific names of plant species were identified according to the International Plant Name Index (<http://www.ipni.org>). In addition, the medical uses of these plants were compiled from the literature. We examined whether the plants used in had literature records or not (<https://www.ncbi.nlm.nih.gov/pubmed/> and <https://www.google.com.tr/>).

#### Calculations of surveyed plants

The use value<sup>21</sup>, a quantitative method that demonstrates the relative importance of species known locally, was also calculated according to the following formula:

$$UV = U/N,$$

where UV refers to the use value of a species; U to the number of citations per species; and N to the number of informants.

Usage value is a criterion that is intensely used in medical plant studies<sup>22,23</sup>. It might be useful to know the usage value of wild nourishment plants (UV) in determining the food safety.

Relative frequency citation index (RFC)<sup>24</sup> was done (Tardio and Pardo-de Santayana, 2008) by using the following formula:

$$RFC = FC/N(0 < RFC < 1)$$

This index is obtained by dividing the number of informants mentioning a useful species FC or frequency of citation by the total number of informants in the survey (N). RFC value varies from 0 (when no body refers to a plant as a useful one), to 1 (when all the informants mention it as useful). RFC index, which does not consider the use-category (UR or use-reportis a single record for use of a plant mentioned by an individual).

## Results and discussion

#### Use of wild plants as food

The list of species is presented in alphabetical order by family, scientific name, vernacular name(s), edible

parts, and utilization methods and use-value of the food plants used in Karaisalı are given in Table 1. Interviews with the local people living in Karaisalı Country and villages indicated that 76 plants were used for food purposes in the study area. According to the results, the largest 5 plants families are: Asteraceae (12 plants), Lamiaceae (10 plants), Rosaceae (9 plants), Polygonaceae (5 plants), Apiaceae (4 plants). Aerial parts, bulb, flowers, fruits, leaves, rhizome, roots, seeds and stems are used as food. Local people were recorded to make food preparations by using wild plants for nutrition purposes via simple methods. The utilization methods included eaten raw, eaten ripened, cooked vegetable dish, consumed as jam, consumed as coffee, as spice, frying in oil or baked to be served as dishes such as stew, pie made by roasting the leaves, prepared sour souce is added to food. In general, wild food plants are used uncooked and without any processing, by preparing *salads* from them.

In a study carried out in Çatak (Van), it was found out that plants belonging to the families of Apiaceae (15 plants), Asteraceae (13 plants), Rosaceae (10 plants), Amaryllidaceae (4 plants), Fabaceae (4 plants), Polygonaceae (4 plants)<sup>25</sup>, and Fabaceae (10), Asteraceae (9), Rosaceae (6), Salicaceae (4) Brassicaceae, Poaceae, and Liliaceae (3) in Üzümlü<sup>26</sup> are widely used by local people living in the region.

Aerial parts stem and leaves are most often used in food preparation as leafy vegetables. Some of these plants parts gathered mainly during the spring and used as vegetables (*Anethum graveolens* L., *Mentha aquatica* L. and *Mentha spicata* L., *Physalis alkengi* L., *Lactuca serriola* L., *Taraxacum farinosum* Hausskn. et Bornm., *Tragopogon longirostris* Bisch. exSchultz var. *longirostris*). Some of them consumed as cooked vegetable dish (*Arum ruplicola* Boiss., *Arum dioscoridis* Sm., *Malva neglecta* Wallr., *Malva sylvestris* L., *Polygonum cognatum* Meissn, *Portulaca oleracea* L., *Urtica dioica* L., *Urtica pilulifera* L.).

Among the various gathered parts of wild edible plants, fruits (20 plants) are gathered most by consumers of these communities and are usually eaten raw. Fruits were obtained, mostly from Rosaceae (8 plants). They can be consumed fresh (*Crataegus* sp., *Mespilus germanica*, *Prunus spinosa*, *Rubus sanctus*, *Pyrus eleagnifolia*, *Sorbus umbellata*) and dried (*Rosa canina*). Fresh or dried fruit may be cooked in water until tender and used to make jams, marmalade (*Crataegus orientalis*, *Crataegus monogyna*, *Rosa canina*, *Rubus sanctus*). The fruits

Table 1—Wild food plants in Karaisalı

Family, Plant species, voucher specimen	Vernacular name of Karaisalı	Edible parts <sup>a</sup>	Utilization methods	Medicinal use	UV	RFC
<b>Amaryllidaceae</b>						
<i>Allium scorodoprasum</i> L. subsp. <i>Rotundum</i> (L.) Stearn G664	<i>Körmen</i>	Bl	Used like garlic, as spice, eaten fresh	No usage report (Nur)	0.24	0.03
<i>Ornithogalum oligophyllum</i> E.D.Clarke G202	<i>Bızalak</i>	Fl	Eaten flowers for nectar	Nur	0.02	0.05
<b>Anacardiaceae</b>						
<i>Pistacia terebinthus</i> L. subsp. <i>palaestina</i> (Boiss.) Engler G455	<i>Çıtırnak</i>	Fr	Consumed as coffee	Nur	0.08	0.07
<i>Rhus coriaria</i> L. G503	<i>Sumak</i>	Fr	As spice, prepared sour souce is added to food, stuffed vegetables and salads	Aphthae, wound healing	0.22	0.11
<b>Apiaceae</b>						
<i>Anethum graveolens</i> L. G668	<i>Dereotu</i>	St, Lv	Leaves and stem eaten in salads and dishes	Kidney stones	0.17	0.03
<i>Cuminum cyminum</i> L. G102	<i>Kimyon</i>	Sd	As spice in meat dishes	Common cold	0.19	0.09
<i>Laser trilobum</i> (L.) Borkh. G731	<i>Sıraotu</i>	Sd	As spice in meat dishes	Diabetic disease, blood pressure therapy	0.03	0.04
<i>Smyrniun connatum</i> Boiss. & Kotschy G771	<i>Baldıran</i>	St, Rt	Eaten fresh like cucumbers, roots grilled and eaten	Infertility, diabetic disease	0.02	0.1
<b>Araceae</b>						
<i>Arum rupicola</i> Boiss.G456	<i>Yılan otu</i>	Lv	Leaves cooked as vegetable, pie made by roasting the leaves	Headache	0.02	0.11
<i>A. dioscoridis</i> Sm. G647	<i>Yılan bıçağı</i>	Lv	Leaves cooked as vegetable, pie made by roasting the leaves	Hemorrhoids	0.02	0.06
<b>Asteraceae</b>						
<i>Anthemis cotula</i> L. G487	<i>Papatya</i>	Fl	As herbal tea	Bronchitis, common cold	0.07	0.04
<i>Carduus nutans</i> L. G469	<i>Kangal diken</i>	St	Eaten fresh like cucumbers	Cholesterol management	0.05	0.02
<i>Echinops ritro</i> L. G680	<i>Çırpma kenger</i>	St	Eaten fresh like cucumbers	Nur	0.03	0.08
<i>Gundelia tournefortii</i> L. var. <i>tournefortii</i> G475	<i>Kenger</i>	Sd	Consumed as coffee	Nur	0.23	0.04
<i>Helichrysum plicatum</i> DC. subsp. <i>plicatum</i> G700	<i>Altın otu</i>	Fl	As herbal tea	Cholesterol management, cancer	0.20	0.11
<i>H. pallasii</i> (Sprengel) Ledeb. G600	<i>Ölmez çiçek</i>	Fl	As herbal tea	Urinary infection	0.15	0.09
<i>H. tuberosus</i> L. G114	<i>Yerelması</i>	Rh	Eaten fresh	Kidney stones, diabetic disease	0.08	0.05
<i>Lactuca serriola</i> L. G589	<i>Keklik otu</i>	Lv	Leaves eaten in salads	Nur	0.05	0.04
<i>Onopordum carduchorum</i> Bornm. & Beauverd G578	<i>Akkız</i>	St	Eaten fresh like cucumbers	Nur	0.02	0.06
<i>Taraxacum farinosum</i> Hausskn. & Bornm. G642, End	<i>Hindiba</i>	Lv	Leaves eaten in salads	Diarrhoea, diabetic disease	0.07	0.11
<i>Silybum marianum</i> (L.) Gaertn. G600	<i>Kangal</i>	St	Eaten fresh like cucumbers	Nur	0.05	0.06
<i>Tragopogon longirostris</i> Bisch. ex Schultz var. <i>longirostris</i> G464	<i>Yemlik</i>	Lv	Leaves eaten in salads	Nur	0.10	0.03
<b>Boraginaceae</b>						
<i>Onosma stenolobum</i> Hausskn ex H.Riedl,G641, End	<i>Somurcak</i>	Fl	Eaten flowers for nectar	Nur	0.03	0.02
<b>Brassicaceae</b>						

(Contd.)

Table 1—Wild food plants in Karaisalı (Contd.)

Family, Plant species, voucher specimen	Vernacular name of Karaisalı	Edible parts <sup>a</sup>	Utilization methods	Medicinal use	UV	RFC
<i>Brassica nigra</i> (L.) W.D.J. Koch G458	<i>Eşek turpu</i>	St, Lv	Pie made by roasting the leaves and stem	Dyspepsia	0.03	0.11
<i>Cardaria draba</i> (L.) Desv. G459	<i>Toklubaş</i>	St, Lv	Pie made by roasting the leaves and stem	Nur	0.04	0.07
<i>Nasturtium officinale</i> R. Br. G579	<i>Su teresi</i>	St, Lv	Pie made by roasting the leaves and stem	Cholesterol management	0.11	0.04
<b>Cactaceae</b>						
<i>Opuntia ficus-indica</i> (L.) Miller G462	<i>Lap inciri</i>	Fr	Softened ice and eaten fresh	Bronchitis, rheumatism	0.14	0.03
<b>Caesalpinaceae</b>						
<i>Ceratonia siliqua</i> L. G728	<i>Harnup</i>	Fr	Eaten dried fruit	Measles, diabetic disease	0.22	0.09
<b>Caryophyllaceae</b>						
<i>Stellaria media</i> (L.) Vill subsp. <i>postii</i> Holmboe G712	<i>Tellice</i>	Lv	Pie made by roasting the leaves	Nur	0.02	0.05
<i>Silene dichotoma</i> Ehrh. G493	<i>İnşalak</i>	Lv	Pie made by roasting the leaves	Nur	0.03	0.13
<i>S. vulgaris</i> (Moench) Garcke G607	<i>Gıvışgan</i>	Lv	Pie made by roasting the leaves	Nur	0.04	0.06
<b>Cornaceae</b>						
<i>Cornus mas</i> L. G608	<i>Kızılçık</i>	Fr	Consumed as compote	Blood pressure therapy	0.14	0.09
<b>Cupressaceae</b>						
<i>Juniperus drupacea</i> Lab. G650	<i>Andız</i>	Con	Consumed as molasses	Asthma, bronchitis	0.03	0.16
<b>Fagaceae</b>						
<i>Quercus coccifera</i> L. G649	<i>Pıynar</i>	Fr, Sd	Fruits grilled and seeds eaten	Diabetic disease, hemorrhoids	0.06	0.12
<b>Juglandaceae</b>						
<i>Juglans regia</i> L. G101	<i>Ceviz</i>	Sd	Added into pie and cakes, eaten fresh	Bronchitis, diabetic disease	0.38	0.01
<b>Lamiaceae</b>						
<i>Mentha aquatica</i> L. G617	<i>Dağ nanesi</i>	Lv	As spice, leaves eaten in salads	Stomach ache	0.26	0.07
<i>M. spicata</i> L. G747	<i>Nane</i>	Lv	As spice, leaves eaten in salads	Flu	0.34	0.16
<i>Ocimum basilicum</i> L. G149	<i>Reyhan</i>	Lv	As spice in fish food	Sedative, earache	0.25	0.05
<i>Origanum syriacum</i> L. G505	<i>Dağ nanesi</i>	Ar	As herbal tea, as spice	Stomach ache	0.11	0.04
<i>O. minutiflorum</i> L. G755	<i>Merdoş</i>	Ar	As herbal tea, as spice	Nur	0.09	0.05
<i>O. vulgare</i> L. G504	<i>Boz çay</i>	Ar	As herbal tea	Nur	0.21	0.09
<i>Salvia multicaulis</i> Vahl. G704	<i>Ada çayı</i>	Ar	As herbal tea	Asthma	0.13	0.04
<i>Sideritis bilgeriana</i> P.H. Davis G619, End	<i>Dağ çayı</i>	Ar	As herbal tea	Stomach ache	0.20	0.07
<i>Thymbra spicata</i> L. var. <i>spicata</i> G483	<i>Seyil kekiği</i>	Ar	As herbal tea, as spice	Headache, toothache, chest pain	0.14	0.11
<i>Thymus sipyleus</i> Boiss. subsp. <i>sipyleus</i> var. <i>sipyleus</i> G654	<i>Yayla kekiği</i>	Lv, Sd	As herbal tea, as spice in meat dishes	Nur	0.32	0.1
<i>Laurus nobilis</i> L. G495	<i>Tenyel</i>	Tb	As spice in fish and meat dishes	Constipation, rheumatism	0.16	0.032
<b>Malvaceae</b>						
<i>Malva neglecta</i> Wallr. G482	<i>Ebegümeçi</i>	Lv	Cooked vegetable dish, pie made by roasting the leaves	Blood pressure therapy	0.31	0.09
<i>M. sylvestris</i> L. G400	<i>Gömeç</i>	Lv	Cooked vegetable dish, pie made by roasting the leaves	Stomach ache	0.24	0.07
<b>Moraceae</b>						
<i>Ficus carica</i> L. G602	<i>İncir</i>	Fr	Eaten fresh, consumed as jam	Toothache, headache	0.26	0.27

(Contd.)

Table 1—Wild food plants in Karaisalı (*Contd.*)

Family, Plant species, voucher specimen	Vernacular name of Karaisalı	Edible parts <sup>a</sup>	Utilization methods	Medicinal use	UV	RFC
<i>Morus alba</i> L. G141	<i>Dut</i>	Fr	Eaten fresh	Abscess healing, enteritis	0.20	0.03
<i>M. nigra</i> L. G142	<i>Karadut</i>	Fr	Eaten fresh	Aphthae	0.14	0.07
<b>Myrtaceae</b>						
<i>Myrtus communis</i> L. G471	<i>Murt</i>	Fr	Eaten fresh	Diabetic disease, diarrhoea	0.17	0.03
<b>Polygonaceae</b>						
<i>Rumex acetosella</i> L. G390	<i>Kuzukulağı</i>	Lv	Stuffed sorrel, pie made by roasting the leaves	Blood pressure	0.21	0.08
<i>R. conglomeratus</i> Murray G310	<i>Ekşimek</i>	Lv	Stuffed sorrel, pie made by roasting the leaves	Nur	0.10	0.1
<i>R. crispus</i> L. G319	<i>Labada</i>	Lv	Stuffed sorrel, pie made by roasting the leaves	Nur	0.27	0.02
<i>R. hydrolapathum</i> Huds. G208	<i>Ekşi ot</i>	Lv	Stuffed sorrel, pie made by roasting the leaves	Nur	0.04	0.08
<i>Polygonum cognatum</i> Meissn. G534	<i>Madımak</i>	Lv	Cooked vegetable dish	Nur	0.28	0.013
<b>Portulacaceae</b>						
<i>Portulaca oleracea</i> L. G481	<i>Semizotu</i>	Lv	Cooked vegetable dish	Nur	0.30	0.05
<b>Primulaceae</b>						
<i>Primula vulgaris</i> L. G461	<i>Ak menekşe</i>	Lv	Cooked sorrel	Nur	0.08	0.03
<b>Rhamnaceae</b>						
<i>Zizyphus jujuba</i> Miller. G130	<i>Hırnap</i>	Fr	Eaten dried fruit	Blood pressure therapy	0.17	0.08
<b>Rosaceae</b>						
<i>Craetegus monogyna</i> Jacq. subsp. <i>monogyna</i> G546	<i>Kırmızı aliç</i>	Fr	Eaten fresh	Diabetic disease, cholesterol management	0.13	0.09
<i>C. orientalis</i> Pall. ex M. Bieb. var. <i>orientalis</i> G38	<i>Sarı aliç</i>	Fr	Eaten fresh	Lung diseases, hepatitis	0.09	0.03
<i>Mespilus germanica</i> L. G528	<i>Muşmula</i>	Fr	Eaten fresh	Asthma, hepatitis	0.11	0.016
<i>Potentilla speciosa</i> Willd. var. <i>speciosa</i> G620	<i>Kök çayı</i>	Rt	As herbal tea	Flu	0.03	0.1
<i>Prunus spinosa</i> L. G553	<i>Erik</i>	Fr	Eaten fresh	Tonsillitis	0.08	0.02
<i>Rosa canina</i> L. G535	<i>Kuşburnu</i>	Fr	As herbal tea, consumed as jam	Diabetic disease, flu, diarrhoea	0.36	0.09
<i>Rubus sanctus</i> Schreber G508	<i>Böğürtlen</i>	Fr	Eaten fresh, consumed as jam	Common cold, miscarriage	0.31	0.08
<i>Pyrus eleagnifolia</i> Pallas G733	<i>Taşarmutu</i>	Fr	Eaten fresh	Nur	0.12	0.04
<i>Sorbus umbellata</i> (Desf.) Fritsch var. <i>umbellata</i> G235	<i>Üvez</i>	Fr	Eaten ripened	Nur	0.06	0.04
<b>Rutaceae</b>						
<i>Citrus aurantium</i> L. G132	<i>Turunç</i>	Fr	Prepared sour souce is added to food, stuffed vegetables and salads	Tonsillitis	0.10	0.07
<b>Solanaceae</b>						
<i>Physalis alkekengi</i> L. G709	<i>Teleme otu</i>	Lv	Cheese-making	Nur	0.05	0.21
<b>Styracaceae</b>						
<i>Styrax officinalis</i> L. G556	<i>Günlük</i>	Fl	Consumed as jam	Diabetic disease, blood pressure therapy	0.09	0.03
<b>Thymelaeaceae</b>						
<i>Daphne sericea</i> Vahl. G486	<i>Develik</i>	Lv	As spice in fish and meat dishes	Menstruation	0.27	0.06

*(Contd.)*

Table 1—Wild food plants in Karaisalı (Contd.)

Family, Plant species, voucher specimen	Vernacular name of Karaisalı	Edible parts <sup>a</sup>	Utilization methods	Medicinal use	UV	RFC
<b>Ulmaceae</b>						
<i>Celtis australis</i> L. G750	Dardağan	Fr	Eaten ripened	Nur	0.13	0.02
<b>Urticaceae</b>						
<i>Urtica dioica</i> L. G506	Isırgan	Lv	Cooked vegetable dish	Bronchitis, asthma, blood pressure	0.40	0.09
<i>U. pilulifera</i> L. G550	Isırgan	Lv	Cooked vegetable dish	Kidney stones	0.25	0.03

<sup>a</sup>Edible part(s): Ar, aerial parts; Bl; bulb; Fl, flowers; Fr, fruits; Lv, leaves; Rh, rhizome; Rt, root; Sd, seeds; St, stems; Tb, tuber

gathered during the summer or autumn (*Prunus spinosa*, *Pyrus eleagnifolia*, *Mespilus germanica*) are cut in slices and dried. They are consumed directly or stewed and sweetened in the winter.

Flowers, aerial parts and leaves are most used as herbal tea (12 plants) or as spice (9 plants). Species of *Allium scorodoprasum*, *Daphne sericea*, *Cuminum cyminum*, *Laurus nobilis*, *Lasertrilobum*, *Mentha aquatica*, *Mentha spicata*, *Ocimum basilicum*, *Origanum syriacum*, *Origanum minutiflorum*, *Rhus coriaria*, *Thymbra spicata*, and *Thymus sipyleus* are used as spice in Karaisalı. It is very common to consume wild plants as tea. Species of *Anthemis cotula*, *Helichrysum plicatum*, *Helichrysum pallasii*, *Origanum syriacum*, *Origanum minutiflorum*, *Origanum vulgare*, *Salvia multicaulis*, *Sideritis bilgeriana*, *Thymbra spicata*, *Potentilla speciosa*, *Rosa canina* are consumed as herbal tea in Karaisalı. In Ulukışla a garnish of *Rhus coriaria* L. is used to give a bitter taste in salads<sup>27</sup>.

Taxa such as, *Physalis alkekengi* L., *Primula vulgaris* L. etc., whose edible use has been documented, but have not been recorded in the nearby areas. Varied usages of a number of plants have been recorded for the first time by us. Furthermore, during our study *Onosma stenolobum* Hausskn ex H.Riedl, *Sideritis bilgeriana* P.H. Davis, and *Taraxacum farinosum* Hausskn. & Bornm. were found to be the endemic plants used for food purposes in Karaisalı.

It was observed that some wild food plant taxa were extensively used for commercial purposes in Karaisalı. *Anethum graveolens* L., *Cerantonia siliqua* L., *Cuminum cyminum* L., *Ficus carica* L., *Helichrysum* ssp., *Rosa canina* L., *Rhus coriaria* L., *Gundelia tournefortii* L., *Crataegus* ssp., *Juglans regia* L., *Mentha spicata* L., *Morus* ssp., *Portulaca oleracea* L., *Ocimum basilicum* L., and *Urtica dioica* L. are among the herbs extensively collected and

traded in the area. Hititçe çivi yazılı metinlerde baharat kullanımına kimyon, susam, keten tohumu kullanıldığına dair bilgiler yer almaktadır.

In Turkey, local plant names display differences especially due to local dialects<sup>28</sup>. The plants used in Karaisalı are known by the same or different local names in various parts of Anatolia. For example, the local names of *Rumex tuberosus* L. (*tırsoka kera*), *Plantago major* L. (*belghevizar*), *Malva neglecta* Wallr. (*tolga küvi*)<sup>29</sup> are different from the local names used in Karaisalı.

We record *Silybum marianum* (L.) Gaertn., *Onosma stenolobum* Hausskn ex H.Riedl, *Stellaria media* (L.) Vill subsp. *postii* Holmboe as being used for food purposes, which we found out during the interviews in the present study. There is no detailed information within the literature on the food use of brevipes.

#### Data analysis

According to the calculation made on the basis of the use-value UV<sup>21</sup>; *Urtica dioica* L. (0.40), *Juglans regia* L. (0.38), *Rosa canina* L. (0.36), *Mentha spicata* L. (0.34), *Malva neglecta* Wallr. (0.31), *Rubus sanctus* Schreber (0.31), *Portulaca oleracea* L. (0.30), *Thymus sipyleus* Boiss. subsp. *sipyleus* var. *Sipyleus* (0.30), *Polygonum cognatum* Meissn. (0.28), were reported to be of the highest use value (Table 1). As calculated by the use-value UV<sup>30</sup>, *Malva neglecta* Wallr. (0.62), *Urtica dioica* L. (0.62), *Plantago major* L. (0.60), *Rosa canina* L. (0.51), *Anchusa azurea* Mill. (0.44), *Gundelia tournefortii* L. (0.42), *Eremurus spectabilis* Bieb. (0.40), *Rheum ribes* L. (0.38), *Crataegus* spp. were reported to be of the highest use value.

#### Medicinal used plants and associated knowledge

Traditional treatment methods formed as a result of a cultural accumulation. It is possible to see some



signs from Anatolia in the 2<sup>nd</sup> millenium BC about the past of the traditional herbal treatment methods which is known to have a long history in Anatolia<sup>31</sup>.

The majority of wild plants used in Karaisalı for nutritional purposes are also used in Karaisalı for medicinal purposes<sup>8</sup>. Local people were recorded to make medicinal preparations by using wild plants for curative purposes via simple methods. The preparation methods included decoction, infusion, mash, eaten raw or cooked, molasses, oil removed, powdered, sap, sitz bath or wrung out. The most common of the preparation methods were decoction, infusion and mash. Local people used medical plants most frequently for the treatment of abscess healing, treating inappropriate blood pressure, upper respiratory tract infections, diabetic disease, kidney stones, stomachache, and wound healing. Medicinal plants and associated knowledge are presented in Table 1.

### Conclusion

In the research area, local people were found to use 76 plants from 59 families for food purposes. Varied usages of a number of plants have been recorded for the by us. The most commonly used plants were *Daphne sericea*, *Juglans regia*, *Malva neglecta*, *Mentha spicata*, *Polygonum cognatum*, *Portulaca oleracea*, *Rosa canina*, *Rumex crispus*, *Rubus sanctus* Schreber, *Thymus sipyleus*, *Urtica dioica*. The most commonly used parts of the plants were the aerial parts, bulb, flowers, fruits, leaves, rhizome, roots, seeds and stems. *Onosma stenolobum* Hausskn ex H.Riedl, *Sideritis bilgeriana* P.H. Davis, and *Taraxacum farinosum* Hausskn. et Bornm. has been recorded as endemic wild food plant taxa from Karaisalı.

In the study, it is observed that uses of some of wild food plants used are as indicated in literature while some of them are new records. In literature research, there were no findings that 3 of those taxa are used as food plant.

The plant flora of Karaisalı is threatened by such factors as grazing, expansion of new agricultural lands and unsustainable picking of plants to generate income. Steps should be taken immediately to ensure the inclusion of relevant flora within conservation designations.

### References

- 1 Heinrich M, Ethnopharmacology in the 21<sup>st</sup> century-Grand challenges, *Frontiers Pharmacol*,1(2010) 8.
- 2 Kargoğlu M, Cenkeci S, Serteser A, Evliyaoğlu N, Konuk M,

- Kök MŞ & Bağcı Y, An ethnobotanical survey of inner-West Anatolia, Turkey, *Hum Ecol*, 36 (2008) 763-77.
- 3 Doğan Y, Başlar S, Ay G & Mert HH, The use of wild edible plants in western and central Anatolia (Turkey), *Econ Bot*, 58 (4) (2003) 684-690.
- 4 Kaval İ, Behçet L & Çakılcıoğlu U, Survey of wild food plants for human consumption in Geçitli (Hakkari/Turkey), *Indian J Tradit Knowle*, 14 (2) (2015) 183-190.
- 5 Luczaj L, Kohler P, Piroznikow E, Graniszewska M, Pieroni A& Gervasi T, Wild edible plants of Belarus: from Rostafinski's questionnaire of 1883 to the present, *J Ethnobiol Ethnomed*, 9 (2013) 21.
- 6 Mittermeier RA, Gil PR, Hoffman M, Pilgrim J, Brooks T, Mittermeier J C, Lamoreux J & da Fonseca G AB, Hotspots Revisited: Earth's biologically richest and most endangered terrestrial ecoregions, (Amsterdam University Press, Amsterdam), 2005.
- 7 Akgül G, Yılmaz N, Celep A, Celep F & Çakılcıoğlu U, Ethnobotanical purposes of plants sold by herbalists and folk bazaars in the center of Cappadocia (Nevşehir, Turkey), *Indian J Tradit Knowle*,15 (2016) 103-108.
- 8 Güneş S, Savran A, Paksoy MY, Koşar M & Çakılcıoğlu U, Ethnopharmacological survey of medicinal plants in Karaisalı and its surrounding (Adana-Turkey), *J Herbal Med*, 8(2017) 68-75.
- 9 Polat R, Çakılcıoğlu U, Ulusan M D & Paksoy MY, Survey of wild food plants for human consumption in Elazığ (Turkey), *Indian J Tradit Knowle*, 1 (1) (2015) 69-75.
- 10 Cakilcioglu U & Turkoglu I, Plants used for hemorrhoid treatment in Elazığ central district, *Acta Hort*, 826 (2007) 89-96.
- 11 Erdem F, Dogan G, Kiran Y & Evren H, Morphological, anatomical, palynological and karyological characters of endemic *Sideritis vulcanica* (Lamiaceae) from Turkey, *Int J Nature Life Sci*, 1 (2017) 1-11.
- 12 Polat R, Çakılcıoğlu U, Ertuğ F & Satıl F, An evaluation of ethnobotanical studies in Eastern Anatolia, *Biol Diver Conserv*, 5 (2) (2012) 23-40.
- 13 Polat R, Satıl F & Cakilcioglu U, Medicinal plants and their use properties of sold in herbal market in Bingöl district, *Biol Divers Conserv*,4 (2011) 25-35.
- 14 Polat R, Selvi S, Çakılcıoğlu U & Açar M, Investigations of ethnobotanical aspect of wild plants sold in Bingöl local markets, *Biol Diver Conserv*, 5(2012) 155-161.
- 15 Yüce BE & Bağcı E, Essential oil composition of *Hypericum uniglandulosum* Hausskn. ex Bornm. and *Hypericum lydium* Boiss. from Turkey, *Int J Nature Life Sci*, 1(1) (2017) 12-18.
- 16 Tetik F, Civelek S & Cakilcioglu U, Traditional uses of some medicinal plants in Malatya (Turkey), *J Ethnopharmacol*, 146 (2013) 331-346.
- 17 Muthu C, Ayyanar M, Raja N & Ignacimuthu S, Medicinal plants used by traditional healers in Kancheepuram district of Tamil Nadu, India, *J Ethnobiol Ethnomed*, 2 (2006) 43.
- 18 Cakilcioglu U, Khatun S, Turkoglu I & Hayta S, Ethnopharmacological survey of medicinal plants in Maden (Elazığ-Turkey), *J Ethnopharmacol*, 137 (2011) 469-486.
- 19 Davis P H, *Flora of Turkey and the East Aegean Islands*, Vol 1-9, (Edinburgh: Edinburgh University Press), 1965-1985.
- 20 Davis P H, Mill R R & Tan K, *Flora of Turkey and the East Aegean Islands*, Vol 10, (Edinburgh: Edinburgh University Press), 1988.



- 21 Trotter RT & Logan MH, Informant consensus: a new approach for identifying potentially effective medicinal plants, In: *Plants in Indigenous Medicine and Diet, Behavioural Approaches*, edited by Etkin N L, (Redgrave Publishing Company, Bredford Hills, NY), 1986.
- 22 Çakılcıoğlu U, Khatun S, Türkoğlu İ & Hayta S, Ethnopharmacological survey of medicinal plants in Maden (Elazığ-Turkey), *J Ethnopharmacol*, 137 (2011) 469-486.
- 23 Polat R, Çakılcıoğlu U, Kaltalıoğlu K, Ulusan MD & Türkmen Z, An ethnobotanical study on medicinal plants in Espiye and its surrounding (Giresun-Turkey), *J Ethnopharmacol*, 163 (2015) 1-11.
- 24 Mükemre M, Behçet L & Çakılcıoğlu U, Survey of wild food plants for human consumption in villages of Çatak (Van-Turkey), *Indian J Tradit Knowle*, 15 (2) (2016) 181-191.
- 25 Tardio J & Pardo-deSantayana M, Cultural importance indices: a comparative analysis based on the useful wild plants of southern Cantabria (Northern Spain), *Econ Bot*, 62 (2008) 24-39.
- 26 Korkmaz M, Karakuş S, Selvi S & Çakılcıoğlu U, Traditional knowledge on wild plants in Üzümlü (Erzincan-Turkey), *Indian J Tradit Knowle*, 15 (2016) 538-545.
- 27 Paksoy MY, Selvi S & Savran A, Ethnopharmacological survey of medicinal plants in Ulukışla (Niğde-Turkey), *J Herbal Med*, 6 (2016) 42-48.
- 28 Polat R, Cakilcioglu U & Satıl F, Traditional uses of medicinal plants in Solhan (Bingöl-Turkey), *J Ethnopharmacol*, 148 (2013) 951-963.
- 29 Kaval I, Behçet L & Cakilcioglu U, Ethnobotanical study on medicinal plants in Geçitli and its surrounding (Hakkari-Turkey), *J Ethnopharmacol*, 155 (2014) 171-184.
- 30 Polat R, Güner B, Yüce BE & Çakılcıoğlu U, Survey of wild food plants for human consumption in Bingöl (Turkey), *Indian J Tradit Knowle*, 16 (3) (2017) 378-384.
- 31 Demirel S & Çakılcıoğlu U, Identification of medicinal plants in Hittite cuneiform scripts, *Bulleten*, 81 (2017) 305-328.