



Ethnobotanical Analysis of Cultivated and Indigenous Plants in Duhok Province in Iraq

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ARTICLE INFO

Research Article

Received 01 May 2018

Accepted 10 June 2018

Keywords:

Medicinal plants
Alternative medicine
Ethnobotanics
Duhok
Iraq

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ABSTRACT

The present study was conducted in the province of Duhok (Northern Iraq) between 2011-2012. The study attempted to determine the use of certain indigenous and cultivated plants in Duhok province in alternative medicine and place of these plants in systematics. Thus, 49 taxa in 27 genera and 46 species were identified. Two taxa belonged to Coniferophyta, one belonged to Pteridophyta and 46 belonged to Magnoliophyta divisions. It was determined that the family with the most numerous taxa in the region was Rosaceae with 5 taxa, followed by the Fabaceae and Lamiaceae family with 4 taxa and Apiaceae, Asteraceae, Cucurbitaceae and Poaceae family with 3 taxa each. Certain ethnobotanical features of the identified taxa, such as systematics, habitats, flowering times, local names and alternative uses in medicine were presented.

DOI: <https://doi.org/10.24925/turjaf.v6i9.1191-1195.1994>

Introduction

According to the World Health Organization (WHO) data, 80% of the population in developing countries supply their basic medical needs with traditional herbal medicines. At least 25% of pharmacological medicine are of vegetable origins (Selamoglu and Ozgen, 2016; Sevindik et al., 2017; Sevindik, 2018). Throughout history, individuals have utilized the plants in their natural environment for nutritional needs, as spices or medicines and improved their knowledge base on these resources. However, industrialization, destruction of the habitat, urban migration and cultural transformation affected the transfer of this knowledge negatively (Mulei et al., 2014; Pehlivan and Sevindik, 2018). In this context, determination of the regional use of the plants is significant in transferring ethnobotanical knowledge to new generations.

Duhok region, located on the north-western section in Iraq and includes large districts such as Zaho, Amidye, Akre, Semel, and Shikan, is a big province with 821 villages. The surface area is 9755 km², and the population was 913.716 based on the 2004 census (Duhok University, 2018). General Duhok province map is presented in Figure 1 (Duhok Governorate, 2014).

Examination of the flora of Iraq demonstrated that there are 4000 plant species in 150 (141 flowering plants) genera. These plants (25-3000 m) grow in deserts, saline soils, and in northern mountains. Most plants indigenous to the Iraqi flora are also found in the flora of Turkey, Iran and Syria. About 20% of the plants in the region are

similar to Mediterranean vegetation, while the number of trees is low (200 species), the number of herbaceous plants is high and most plants grow in the northern part of the region (Shahbaz 2010).

The present aimed to conduct an ethnobotanical analysis on the previously unexamined cultivated and gathered and naturally utilized plants in the Duhok (Iraq) region.

Material and Method

The indigenous plants that grow naturally in the province and its vicinity and used by the people for nutritional purposes, as spices or for medicinal purposes were investigated based on floristic and folkloric knowledge. For this purpose, a total of 183 individuals (114 females and 69 males) in different occupations were interviewed. The majority of interviewees were women occupied as plant pickers. Between 2011-2012, the markets in Duhok center and Zaho, Amidye, Akre, Semel and Shikan districts were visited every week to collect these plants and information about these plants. The information on the location of the plant collection, the prevalence on the location of the plant collection, and purpose of sale were collected and the plants were collected from their natural habitat. Plants that are not indigenous to the region were excluded from the study. The collected plants were dried and transformed into herbarium specimens and identified.

Flora of Iraq was used for description and distribution of the taxa identified in the study (Townsend and Guest (1966-1985)). Herbarium specimens of the collected plants were stored at Zaho University, Faculty of Arts and Sciences, Biology Department herbarium.

Findings and Discussion

The number and distribution of the interviewed individuals in the study are presented in Table 1. Furthermore, the plants collected in Duhok province and sold in the markets for nutritional and medicinal purposes

and as spices are listed in Table 2a and 2b, and local uses for these plants are presented in Table 3.

Table 1 Gender distribution by research areas

Research Areas	Male	Female	Total
Duhok Center	17	15	32
Zaho	13	21	34
Amidye	12	26	38
Akre	7	18	25
Şemel	9	19	28
Shikan	11	15	26
Total	69	114	183

Table 2a Plants collected from Duhok and sold in markets

Family	Scientific Name	Local Name	Used Part	M	Gathering Place	
					Coordinate	Date
Alliaceae	<i>Allium sativum</i> L.	Seer	Stem, Leaf	1	Duhok-Zakho-Sharansh 37°23'83"N-42°85'14"E 2013-04-20	
Anacardiaceae	<i>Pistacia vera</i> L.	Festaq	Leaf, Gum	2	Duhok-Bamerne 37°7'15"N-43°16'14"E 2013-08-15	
Anacardiaceae	<i>Pistacia terebinthus</i> L.	Gezwan	Leaf, Gum, Fruit	2	Duhok-Bamerne 37°7'15"N-43°16'14"E 2013-08-15	
Apiaceae	<i>Anethum graveolens</i> L.	Sebet	Fruit	3	Duhok-Sarsenk-Gara Mountain 37°09'25"N-43°48'72"E, 2013-05-20	
Apiaceae	<i>Apium graveolens</i> L.	Kerfs	Root, Leaf	4	Duhok-Semel 36°53'15"N-43°00'34"E 2013-09-24	
Apiaceae	<i>Foeniculum vulgare</i> Mill.	Rezyank	Root, Stem	3	Duhok-Qadesh 37°09'25"N-43°48'72"E 2013-05-01	
Asteraceae	<i>Calendula officinalis</i> L.	Gul Buhar	Leaf, Flower, Seed	5	Duhok-Zawita-Bablo 36°54'21"N-43°8'47"E 2013-05-01	
Asteraceae	<i>Carduus marianus</i> L.	Kereng – Kenger	Fruit	4	Duhok-Bamarne 37°7'15"N-43°16'14"E 2013-04-15	
Asteraceae	<i>Matricaria chamomilla</i> L.	Gul Baeben	Flower	3	Duhok-Zawita-Bablo 36°54'21"N-43°8'47"E 2013-05-01	
Brassicaceae	<i>Brassica rapa subsp. rapa</i> L.	Şelm	Root	6	Duhok-Semel 36°54'21"N-43°8'47"E 2013-09-24	
Brassicaceae	<i>Raphanus sativus</i> L.	Tever	Root	7	Duhok-Semel 36°53'15"N-43°00'34"E 2013-09-27	
Capparaceae	<i>Capparis spinosa</i> L.	Kapar	Flower, Fruit, Root	7	Duhok-Bamarne 37°7'15"N-43°16'14"E 2013-06-15	
Cucurbitaceae	<i>Cucumis sativus</i> L.	Xeyar	Fruit	7	Duhok-Semel 36°53'15"N,43°00'34"E 2013-06-15	
Cucurbitaceae	<i>Citrullus lanatus</i> (Thunb.) Matsum. & Nakai	Zebes – Şety	Fruit, Seed	8	Duhok-Semel 36°53'15"N-43°00'34"E 2013-09-15	
Cucurbitaceae	<i>Cucurbita pepo</i> L.	Kolend zer	Fruit	9	Duhok-Semel 36°53'15"N-43°16'14"E 2013-06-24	
Cupressaceae	<i>Juniperus communis</i> L.	Hevrest – qaç	Fruit	4	Duhok-Zawita 36°54'21"N-43°8'47"E 2013-05-01	
Fabaceae	<i>Trigonella foenum-graecum</i> L.	Feonum – Helba	Seed	10	Duhok-Qasara 36°86'67"N-43°00'00"E 2013-07-15	
Fabaceae	<i>Lens culinaris</i> Medik.	Neesk	Seed	11	Duhok-Semel 36°53'15"N-43°00'34"E 2013-05-05	
Fabaceae	<i>Glycyrrhiza glabra</i> L.	Reha suse	Root	12	Duhok-Mangish 37°06'39"N-43°09'65"E 2013-08-15	
Juglandaceae	<i>Juglans regia</i> L.	Geez	Leaf, Fruit, Stem, Seed	13	Duhok-Sarsenk-Gara Mountain 37°09'25"N-43°48'72"E 2013-05-01	
Lamiaceae	<i>Ocimum basilicum</i> L.	Gul Rehan	Leaf	14	Duhok-Semel 36°53'15"N-43°00'34"E 2013-05-01	
Lamiaceae	<i>Rosmarinus officinalis</i> L.	Jaterk	Leaf, Flower	15	Duhok-Semel 36°53'15"N-43°00'34"E 2013-06-24	
Lamiaceae	<i>Mentha piperita</i> L.	Peeng	Leaf	16	Duhok-Qasara 36°86'67"N-43°00'00"E 2013-06-15	
Lamiaceae	<i>Hyssopus officinalis</i> L.	Qesel mehmeed	Stem, Leaf	4	Duhok-Zawita-Bablo 36°54'21"N,43°8'47"E 2013-05-01	
Lythraceae	<i>Punica granatum</i> L.	Henar	Root, Fruit	13	Duhok-Zakho-Armeshthe 37°15'00"N,42°68'33"E 2013-09-05	

Table 2b Plants collected from Duhok and sold in markets

Family	Scientific Name	Local Name	Used Part	M	Gathering Place	
					Coordinate	Date
Moraceae	<i>Morus alba</i> L.	Tee Spee	Leaf, Fruit	13	Duhok-Qasara 36°86'67"N-43°00'00"E	2013-06-15
Moraceae	<i>Morus nigra</i> L.	Tee reş	Leaf, Fruit	17	Duhok-Qasara 36°86'67"N-43°00'00"E	2013-06-15
Myrtaceae	<i>Eucalyptus globulus</i> Labill.	Behuk	Leaf	4	Duhok-Zawita 36°54'21"N-43°8'47"E	2013-05-01
Oleaceae	<i>Olea europaea</i> L.	Zeeton	Fruit, Leaf, Seed	18	Duhok-Basheqa 36°21'38"N,45°4'23"E	2013-09-15
Papaveraceae	<i>Papaver rhoeas</i> L.	Gul Nessian	Flower, Fruit, Seed	19	Duhok-Zawita-Bablo 36°54'21"N-43°8'47"E	2013-05-01
Pinaceae	<i>Pinus brutia</i> Ten.	Kaj	Gum	20	Duhok-Zawita 36°54'21"N-43°8'47"E	2013-05-01
Moraceae	<i>Morus nigra</i> L.	Tee reş	Leaf, Fruit	17	Duhok-Qasara 36°86'67"N-43°00'00"E	2013-06-15
Myrtaceae	<i>Eucalyptus globulus</i> Labill.	Behuk	Leaf	4	Duhok-Zawita 36°54'21"N-43°8'47"E	2013-05-01
Oleaceae	<i>Olea europaea</i> L.	Zeeton	Fruit, Leaf, Seed	18	Duhok-Basheqa 36°21'38"N-45°4'23"E	2013-09-15
Papaveraceae	<i>Papaver rhoeas</i> L.	Gul Nessian	Flower, Fruit, Seed	19	Duhok-Zawita-Bablo 36°54'21"N-43°8'47"E	2013-05-01
Pinaceae	<i>Pinus brutia</i> Ten.	Kaj	Gum	20	Duhok-Zawita 36°54'21"N-43°8'47"E	2013-05-01
Plantaginaceae	<i>Plantago major</i> L.	Barheng	Leaf	3	Duhok-Sarsenk-Gara Mountain 37°09'25"N-43°48'72"E	2013-05-01
Poaceae	<i>Zea mays</i> L.	Genem şam	Fruit, Seed	7	Duhok-Mangish 37°06'39"N-43°09'65"E	2013-08-15
Poaceae	<i>Oryza sativa</i> L.	Bernj	Seed	7	Duhok-Bamerne 37°7'15"N-43°16'14"E	2013-09-15
Poaceae	<i>Avena sativa</i> L.	Jeh Dasee	Seed	7	Duhok-Zawita-Bablo 36°54'21"N-43°8'47"E	2013-05-01
Polygonaceae	<i>Rheum rhabarbarum</i> L.	Revaz	Root	21	Duhok-Sarsenk-Gara Mountain 37°09'25"N-43°48'72"E	2013-04-01
Pteridaceae	<i>Adiantum capillus-veneris</i> L.	Gia zava	Leaf	3	Duhok-Semel 36°53'15"N-43°00'34"E	2013-06-24
Rosaceae	<i>Rubus idaeus</i> L.	Dree Sork	Fruit	22	Duhok-Qasara 36°86'67"N-43°00'00"E	2013-07-15
Rosaceae	<i>Prunus dulcis</i> (Mill.) D.A. Webb	Bahev	Seed, Fruit	23	Duhok-Sarsenk-Gara Mountain 37°09'25"N-43°48'72"E	2013-05-01
Rosaceae	<i>Fragaria vesca</i> L.	Ferwla	Root, Leaf, Fruit	24	Duhok-Semel 36°53'15"N-43°00'34"E	2013-06-24
Rosaceae	<i>Malus sylvestris</i> Mill.	Sev	Fruit	25	Duhok-Zakho-BarwariBala 37°23'83"N-42°85'14"E	2013-08-05
Rosaceae	<i>Crataegus monogyna</i> Jacq.	Guheşk	Fruit, Leaf	24	Duhok-Sarsenk-Gara Mountain 37°09'25"N-43°48'72"E	2013-05-01
Rutaceae	<i>Citrus limon</i> (L.) Burm. f.	Lemon	Fruit	26	Duhok-Basheqa 36°21'38"N-45°4'23"E	2013-09-28
Salicaceae	<i>Salix alba</i> L.	Beşang	Leaf	4	Duhok-Zawita-Bablo 36°54'21"N-43°8'47"E	2013-05-01
Solanaceae	<i>Solanum lycopersicum</i> Lam.	Bajan Sork	Fruit	7	Duhok-Semel 36°53'15"N-43°00'34"E	2013-06-24
Solanaceae	<i>Solanum tuberosum</i> L.	Petat	Stem	7	Duhok-Semel 36°53'15"N-43°00'34"E	2013-05-01
Thymelaeaceae	<i>Daphne mezereum</i> L.	Reel	Leaf, Fruit, Seed	4	Duhok-Semel 36°53'15"N-43°00'34"E	2013-06-24
Urticaceae	<i>Urtica dioica</i> L.	Gaz gizenk	Leaf, Seed, Stem	24	Duhok-Qasara 36°86'67"N-43°00'00"E	2013-07-15
Vitaceae	<i>Vitis vinifera</i> L.	Mewa Tree	Leaf, Fruit	7	Duhok-Mangish 37°06'39"N-43°09'56"E	2013-08-06

M: Intended Use and Method, 1: Medicinal Drug (Internally), Food (Internally and Spice), 2: Medicinal Drug (Decoction, Internally), 3: Medicinal Drug (Infusion), 4: Medicinal Drug (Decoction), 5: Medicinal Drug (Internally), 6: Medicinal Drug (Water), Food (Internally), 7: Food (Internally), 8: Medicinal Drug and Food (Internally), 9: Medicinal Drug and Food (Externally and Internally), 10: Medicinal Drug (Externally), 11: Food (Soup), 12: Medicinal Drug (Syrup and Decoction), 13: Medicinal Drug (Decoction), Food (Internally), 14: Medicinal Drug (Decoction Mouthwash), 15: Medicinal Drug (Infusion, Externally), 16: Medicinal Drug (Infusion), Food (Spice), 17: Medicinal Drug (Decoction and Jam), Food (Internally), 18: Medicinal Drug (infusion and oil), Food (Internally), 19: Medicinal Drug (Syrup and Internally), 20: Medicinal Drug (Externally and Internally), 21: Medicinal Drug (Syrup), 22: Food (Jam), 23: Cosmetic (Externally), Food (Internally), 24: Medicinal Drug (Infusion), Food (Internally), 25: Medicinal Drug (Infusion, Food (Internally)), 26: Medicinal Drug (Infusion), Food (Water and Internally)

Table 3 Local use of plants

Scientific Name	Local Use
<i>A. sativum</i>	Stem and leaves are used as appetizer and germicide. It is also used as a spice.
<i>P. vera</i> and <i>P. terebinthus</i>	After the leaves are boiled, they are placed on the chest and used in bronchitis treatment. It is also used in the morning to drink stomach ache by drinking on an empty stomach. Gum is used for stomach discomfort.
<i>Anethum graveolens</i>	The fruit is used as an infusion, sedative and digestive.
<i>Apium graveolens</i>	The roots and leaves are boiled, used in abdominal bloating, constipation and urinary excretion.
<i>F. vulgare</i>	Root and trunk parts are used in the treatment of low back pain and liver in the form of infusion.
<i>C. officinalis</i>	Leaves, flowers and seeds are used for indigestion and stomach ailments.
<i>C. marianus</i>	Decoction prepared from fruit is used for liver poisoning and gallstones removal.
<i>M. chamomilla</i>	The flowers are used as infusion, sedative, and getter.
<i>B. rapa</i> subsp. <i>rapa</i>	The juices of root parts are used for appetite, stomach and liver disorders. It is also consumed as food.
<i>R. sativus</i>	Root parts are used as diuretic, constipation reliever and appetite opener. It is also consumed as food.
<i>C. spinosa</i>	It is used as a diuretic, an antiseptic and a force exerting a flower, fruit and root bark. Leaves are used for salad. Fruits are used as aphrodisiacs by being made directly or by pickling and defeating.
<i>C. sativus</i>	Fruit is consumed as food.
<i>C. lanatus</i>	Fruit is consumed as food, while the kernel is consumed against intestinal parasites.
<i>C. pepo</i>	Fruit is consumed in eczema treatment and as food.
<i>J. communis</i>	Fruits are used for medicinal purposes in colds.
<i>T. foenum-graecum</i>	Seeds are dried and crushed to powder and used for wound healing.
<i>L. culinaris</i>	Seeds are used as food by making soup.
<i>G. glabra</i>	Syrup prepared from roots is used in the treatment of bronchitis, asthma and cough. Root decoction is used for stomach pain, abdominal pain and intestinal disorders.
<i>J. regia</i>	The decoy prepared from the fruit is used as a cholesterol regulator and against atherosclerosis. Decoction, prepared from body shells, is used as a blood sugar lowering agent. After the decongestion of young shoots is absorbed into a cloth, the cloth is wrapped around the painful area and used to relieve rheumatic pain. After the fruit shells are dried and powdered, they are mixed with henna and used in skin diseases. Seeds are used as food.
<i>O. basilicum</i>	Leaves are used as gargle by boiling in mouth and throat inflammation.
<i>R. officinalis</i>	The tea of the flowers is used as vitality and strength in the body. Leaves are used externally as simple healing remedies.
<i>M. piperita</i>	Leaf tea is used in colds and influenza-like illnesses. It is also used as a spice.
<i>H. officinalis</i>	Decoction prepared from the body and leaves is used against extender and perspiration.
<i>P. granatum</i>	Decoction of roots is used against diarrhea. Fruits are consumed as food.
<i>M. alba</i>	The leaves dextrose is used as an antipyretic and diuretic. Fruits are consumed as food.
<i>M. nigra</i>	Decoction prepared from leaves, in the morning on an empty stomach to drink a cupful of blood sugar is used to reduce. It is used against anemia by making a jam.
<i>E. globulus</i>	Decoction, prepared from leaves, is used in asthma, cold and cough.
<i>O. europaea</i>	Leaves are used as cholesterol regulator in tea form. Fruity rubella is used in the treatment of rheumatism, eye diseases and liver diseases. Fruit is used as an analgesic, seeds against rheumatism. It is also consumed as food.
<i>P. rhoeas</i>	Flower parts are made by syrup, cough cutter and breast softener, cold and bronchitis. Fruit and seeds are used as painkillers and tranquilizers.
<i>P. brutia</i>	Pine Gum is used as a germicide in the microbial diseases of respiratory and urinary tracts. It is used externally for wound care by bringing cream into shape.
<i>P. majör</i>	Leaves are made of tea and used as wound healing, diuretic, phlegm removal.
<i>Z. mays</i>	Fruits and seeds are used as food.
<i>O. sativa</i>	Seeds are used as food.
<i>A. sativa</i>	Seeds are used as food.
<i>R. rhabarbarum</i>	Root parts are used for stomach and intestinal disorders by making syrup. In addition, the use of the laxative effects, though rare, are also available.
<i>A. capillus-veneris</i>	Leaves are made of tea and used as expectorant and cough cutter.
<i>R. idaeus</i>	Fruits are consumed as food by making jam.
<i>P. dulcis</i>	The seeds are used for exfoliating skin by extracting oil and the seeds and fruits are consumed as food.
<i>F. vesca</i>	Roots and leaves are consumed as tea as appetizing, constipating and diuretic, as fruit food.
<i>M. sylvestris</i>	Fruit is consumed as tea and food.
<i>C. monogyna</i>	Leaves are made of tea, heart disease and blood pressure lowering is consumed. Fruits are used as food.
<i>C. limon</i>	The fruit is consumed directly as a food in the form of tea by squeezing the water. Tea is used for infections of the intestine.
<i>S. alba</i>	Decoction prepared from the leaves in the treatment of rheumatism, kidney is used to lower the sand and to lower blood sugar.
<i>S. lycopersicum</i>	Fruit is consumed as food.
<i>S. tuberosum</i>	Stem is consumed as food.
<i>D. mezereum</i>	The mixture of leaves, fruits and seeds is used as a decoction and laxative.
<i>U. dioica</i>	It is used to make tea leaves of the leaves and body, to excrete the diuretic, the kidneys. Seeds are used to strengthen the immune system. It is also consumed as food.
<i>V. vinifera</i>	Leaves and fruit are consumed as food.

