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An ethnobotanical study on medicinal plants in Erzincan, Turkey

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Indigenous people living in eastern regions of Turkey are, still using traditional treatment methods with medicinal plants. The region is important both in terms of plant diversity and traditional uses of medicinal plants.Traditional use is decreasing day to day, but traditional treatment methods still comes before modern treatment methods. The present study carried out during April to September 2010 in Erzincan (Turkey) by interviewing medicinal plant holders and the people to determine the most used medicinal plants reveals. Latin names, local names, used parts and preparation methods of 49 species from 29 families. The largest families are: Asteraceae (8 taxa), Lamiaceae and Rosaceae (6 taxa) and Fabaceae, Lauraceae and Zingiberaceae (2 taxa). The number of medicinal plant taxa that were used to treat the diseases are diuretic (11), sedative (11), liver (9), stomach (8), skin (7), gastrointestinal (7), cardiovascular (6), blood pressure (5), diabetics (4) and cholesterol (4). Single uses of the medicinal plants are generally preferred for treatments.

Keywords: Ethnobotany, Erzincan, herbal markets, medicinal plants, Turkey

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Plants are an important source of drugs and play significant role in the survival of the tribal and ethnic communities. It is estimated that about 20,000-70,000 medicinal plant species are useful for treatment of various diseases[1]. Turkey is very rich in medicinal and aromatic plants. Local people collect many medicinal plant samples and materials from natural habitats in Turkey. In total, 347 species have commercial values in Turkey. 30% of these are exported abroad for a volume of about 30,000 ton/year. Turkey ranks third in the world for exporting medical and aromatic plants[2,3]. Medicinal plants are vital, inexpensive and main source of vitamins, antioxidants, fiber, minerals and other nutrients. They have high nutraceutical value and are used for wide range of ailments and have the potential to protect human body from cancer, diabetes, inflammatory and cardiovascular diseases[4]. In the country the number of plants used for treatment is estimated to be at least around 500[5]. Because a significant number of the Turkish population live in rural areas, there is constant interest in the natural plants. These people use large part of natural plants as medicine, food, vegetable, cosmetic, scent, spices and dyestuff[6]. Today, the application of synthetic chemicals takes an important role in treatment of illnesses. However, because of synthetic substances have a lot of side effects, researchers are in search of medicine which is safe, effective and has fewer side effects. Using whole plant as a medicine has become popular idea during recent years. The reason behind the usage of the plant as a whole is that some harmful substances neutralizing each other degrade the possibility of side effects to minimum rate[7]. For this reason, the researches on folk medicines will enable the discovery of new medicinal plants. Although Turkey has the richest flora in Europe, more than 70 % of the raw materials needed for pharmaceutical industry are imported. Most of the exported drugs are directly collected from nature. These plants which exist in the flora are not used properly. First we need to know them and how they are named in different regions of the country and their areas of usages. Some of the drugs lose their value in modern medicine and pharmaceutics, and the others are used as source of active substance[8-10]. Erzincan province, which has a

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transition feature among Eastern Black Sea, Eastern Anatolia and Central Anatolia regions, is one of the most important gene and endemism centers of Turkey. According to Davis[11,12], totally 795 species belonging to 87 families have been recorded from Erzincan out of which 276 species were considered endemics. This number has reached to 437 with the studies that have recently been completed[13]. Erzincan contains 2 of the 13 endemic plant sites and 6 important plant sites of Turkey[14]. Geographical map of the area has been given in the Fig. 1. Erzincan province was the one that has been studied the least in Eastern Anatolian region in Turkey according to ethnobotanical aspects[15-22]. In our study, scientific and local names of the medicinal plants used frequently for treatment, their used parts and use methods were determined. These informations are obtained from directly interviews with plant knowledge holders and people using these plants in Erzincan. Some significant points in the usage of plants are stated. The educational background of the plant knowledge holders and how they gather the information about the plants they sell are also stated in the study.

Methodology

This study was performed in 2010. To obtain the informations, plant holders who are named as Yöre Baharat, Şifa Baharat, Aktariye and Zekeriya Önler Baharat in the province of Erzincan were approached[23](Fig. 2). The necessary information was obtained by interviewing face to face with the plant holders and the local people using the plants for medicinal purposes. It was inquired that which plants are used for what purpose, how they are resolved in drug forms, their uses and benefits. The dry samples of these plants were obtained from the plant holders and living samples of those plants were also tried to collect from their natural habitats. For this purpose 13 plant taxa were collected from environs of Erzincan and identified. The informations about their localities and habitats are given in Table 1. Scientific name of each plant sample was identified and controlled with the help of relevant literature[3,5,6,7,11,12,24-28]. Plant samples have been numbered and stored in Erzincan University Herbarium. English names of the plants were determined from the literature[5]. Local names, used parts, using aims and using methods of the plants are obtained from herbalists, as well as from the public. Each plant sample was pictured and the information about each plant was noted. In addition, some informations from the literature are given and the results are compared with them. Comparisons have been especially done with two related studies[29-30].

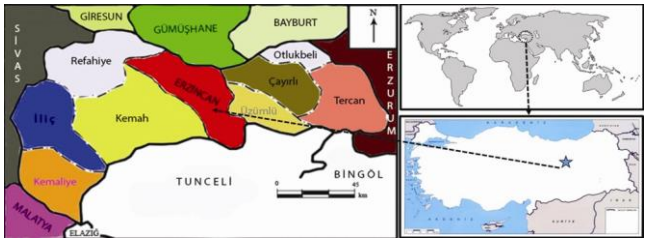

Fig. 1—Location map of Erzincan (Şahin, 2009)

Results

During this study, 49 plant species belonging to 29 families used for different medicinal purposes by local people have been determined (Table 2). Out of 49 plant taxa, totally 39 taxa naturally grow in Turkey (indicated in the table with*). Some of them are not natural and originated from foreign countries or directly imported. The total number of these are 10 taxa. Only one taxon (*Alcea calvertii* (Boiss.) Boiss. is endemic to Turkey. Also we have collected the samples of these taxa naturally growing in the environs of Erzincan and presented in Table 1. The total number of these plants is 13 (26.5%). Herbal markets sold a wide variety of plants, extracts and mixtures for different medicinal purposes. Some of them are hand-made; others can be manufactured products.

Fig. 2—Some herbal product and herbal markets in the region; A) Sifa Market Aktar & Baharat, B) Slimming packet of tea from Sifa Market, C) Outer appearance of Zekeriya Önler Baharat, D) Indoor appearance of Zekeriya Önler Baharat, E) *Tilia rubra* from Zekeriya Önler Baharat, F) *Punica* flowers from Zekeriya Önler Baharat, G) Outer appearance of Yöre Baharat, H) Indoor appearance of Yöre Baharat.

Table 1—Plants collected from environs of Erzincan and sold in the local herbal markets

Taxa	Family	Locality and habitat information
Achillea millefolium L. subsp *millefolium*	Asteraceae	Erzincan: Çayırlı, Between Yukarı Kartallı and Aşağı Kartallı villages, steppe, 25.06.2012, Korkmaz 3199.
Glycyrrhiza glabra L.	Fabaceae	Erzincan: Üzümlü, Pişkidağ village, field, 13.06.2010; Büyük Kadağan village, 20.06.2010.
Hypericum perforatum L.	Hypericaceae	Erzincan: Üzümlü, Pınarlıkaya village, 27.06.2010.
Alcea calvertii (Boiss.) Boiss.	Malvaceae	Erzincan: Binkoç village, road side, 2360 m, 02.07.2011; Korkmaz, Alpaslan and Turgut 346.
Malva sylvestris L.	Malvaceae	Erzincan: Yaylabaşı town, field, 29.07.2011, Korkmaz, Alpaslan and Turgut 244.
Plantago media L.	Plantaginaceae	Erzincan: Çayırlı, Harmantepe village. 24.06.2012, Korkmaz 3160; Üzümlü, Göller village, 06.06.2010.
Agropyrum repens L.	Poaceae	Erzincan: Üzümlü, Pişkidağ village, field, 06.06.2010.
Crataegus monogyna Jacq. subsp. *monogyna*	Rosaceae	Erzincan: Oğulcuk village, slopes, 1854 m, 18.06.2011, Korkmaz, Alpaslan and Turgut 243.
Cydonia oblonga Miller	Rosaceae	Erzincan: Üzümlü, Yaylabaşı town, 29.07.2011, Korkmaz, Alpaslan and Turgut 538.
Cerasus avium (L.) Moench	Rosaceae	Erzincan: Yaylabaşı town, 29.07.2011, 535; Üzümlü, Çadırtepe village, 25.04.2010.
Rosa canina L.	Rosaceae	Erzincan: Çayırlı, Yaylakent village, road side 2561 m. 24.06.2012, Korkmaz 3134.
Tilia rubra DC.	Tiliaceae	Erzincan: Üzümlü, Karakaya town, 22.05.2011.
Urtica dioica L.	Urticaceae	Erzincan: Oğulcuk village, slopes, 2162 m, 18.06.2011, 242; Çayırlı, Esendoruk village, road side 28.06.2011, Korkmaz 2806.

Discussion

As a result of the study, 49 species belonging to 29 families were identified (Table 2). Among these, 8 species belonging to Asteraceae take the first place, 6 species belonging to Lamiaceae take the second place and 6 species belonging to Rosaceae; 2 species belonging to Fabaceae take the third place; 2 species belonging to Lauraceae, and 2 species belonging to Zingiberacaeae as seen in the Figure 3. According to the medicinal usage of some plants sold in Tekirdağ[29], some of the plants frequently used for treatment were obtained from plant holders and local people of the three villages. In the study the most used 40 plants were determined. Çömlekçioğlu & Karaman[30] searches the information for the usage of medicinal plants of the herbalists of Kahramanmaraş city center. According to this study, Asteraceae, Fabaceae, Lamiaceae, Rosaceae and Apiaceae are the biggest families used. Lamiaceae and Rosaceae families take the third and fourth places in this study but, they take the second place in our study (Fig. 3). It was determined in the study that 11 taxa (22,44%) of 49 species are used as diuretic, 11 taxa (22,44%) are used in the treatment of neurotic illnesses (as sedative), 9 taxa(18,36%) are used in the treatment of liver problems and 8 taxa (16,32%) are used in the treatment of stomach disorders. In our study, it is determined that the most widely used parts are leaves, flowers and branches (Table 3). As a result of the continuous picking of these plants, there is a danger of extinction in the nature. According to the information obtained during the study the mixture recepies which are widely used for seven illnesses in the area are given in Table 4. As this is the first study carried on the plant holders of Erzincan, it will be a lead case for the other studies. Original information obtained is thought to be useful for people interested in the subject and the younger generations. Some suggestions are given below on the topic:

1) It is determined that people working in the plant holders graduated from primary or secondary schools. These employees in the plant holders make sales according to the information obtained from internet and books. Hence it will be more useful for the public health if the employees are trained. 2) For a good absorption in the body usually a hot drink on an empty stomach is recommended. If the plant whose tea contains a bitter substance, it can be sweetened with honey or syrup. Teas should be taken for a period of 3-4 weeks and after a break of 1-2 months if any side effects should not start, it can be taken again. 3) Some plants are sold in herbal markets by mixing with the other relative species. *Equisetum*, *Alcea* and *Hypericum* species are mixed with the others. 4) *Eremurus spectabilis* and *Rheum ribes* are popularly used in the area. Many people consume their fresh parts in the spring for different purposes. *Eremurus spectabilis* is generally used as medicine and food. *Rheum ribes* is mostly preferred for diabetes to decrease blood glucose level. 5) There is not adequate

Table 2—The information about medicinal plants sold in the herbal markets of Erzincan

Scientific name	Family	Local name	English name	Using parts	Uses	Administration and dosage
Achillea millefolium L. subsp *millefolium**	Asteraceae	*Civanperçemi*	Yarrow herb	Branch with flowers and leaves	Stomach cramps, anemia, cough, diarrhea, appetite, cancer.	In 1 glass of boiled water 1 teaspoon full of foalfoot brewed for 3 min. Drink as 2-3 glass daily.
Arttemisia absinthium L.*	Asteraceae	*Acı yavşan*	Roman camomile	Seeds, roots, aerial parts	Ulcer, gastritis, heartburn.	When stomach discomforts begin, chew and swallow 1 teaspoon.
Calendula arvensis L.*	Asteraceae	*Aynısefa.*	Field marigold	Flowers	Hepatoprotective, germicide, fungusit.	Half dessertspoon full of the plant is boiled in 1 glass of boiled water, is brewed 8-10 min veiled then filtered. 3 glasses are enough daily.
Cynara scolymus L.**	Asteraceae	*Enginar*	Artichoke	Leaves	Hepatoprotective, prostate, itching.	In 1 glass of boiled water 1 pinch is put then left for 15 min for infiltrate, can be drunk 3 times.
Echinacea purpurea L.**	Asteraceae	*Ekinezya*	Coneflower, sunflower	Leaves and flowers	Strengthen the immune system, influenza.	In 1 glass of boiled water 1 teaspoon is put and brewed, can be drunk 3 times.
Helianthemum nummularium (L.) Miller*.	Asteraceae	*Altınotu*	Common rock-rose	Aerial parts	Diuretic.	In 1 glass of boiled water, 10–20 gm plant is put, wait 10 min, drink 2-3 glasses.
Matricaria chamomilla L.*	Asteraceae	*Papatya*	Chamomilla, chamomile	Flowers	Enteritis, ulcer, menopause, migraine, carminative, insomia, liver diseases.	Half dessertspoon full of the plant is boiled in 1 glass of boiled water, is brewed 8-10 min veiled then filtered. 3 glasses are enough daily.
Taraxacum crepidiforme DC.*	Asteraceae	*Karahindiba*	Witloof chicory	Leaves and flowers	Good for potassium, the fat in liver, appetite.	In 1 L water handfull leave and flower is boiled for 2 min then is brewed for 10 min. Drink 3 cups, before meals.
Ilex aquifolium L.*	Aquifoliaceae	*Mate, Işılgan*	Hervae, ılex	Leaves	Obesity, edema.	Hot water is poured on the leaves and is left for 1-2 min. Drink 3cups daily .
Cassia angustifolia L.**	Caesalpiniaceae	*Sinameki*	Senna	Leaves	Strong laxative.	Two coffee spoon leaves are put in a teapot then 2 glasses of water are poured left for 5-10 min for infiltrate. Drink 1 glass in 3 days because it is addictive.
Humulus lupulus L. *	Cannabaceae	*Şerbetçiotu*	Hops	Leaves	Neuroleptic, insomia, headache and migraine.	In 1 glass of boiled water, 2–4 gm flower are put and left for 10 min. Drink 2-3 glasses daily.
Calluna vulgaris (L.) Hull*	Ericaceae	*Funda*	Ling heather	Leaves	Diuretic, fat burning, accelerate metabolism.	Hot water is poured on the leaves and brewed for 1-2 min, drink 1 glass to help fat burning after meals.

(*Contd*.)

Table 2—The information about medicinal plants sold in the herbal markets of Erzincan (*Contd*.)

Scientific name	Family	Local name	English name	Using parts	Uses	Administration and dosage
Equisetum arvense L.*	Equisetaceae	*Kırkkilitotu*	Common horsetail	Leaves and branches	Rheumatism pains, strengthen immune system, pass kidney stone, prostate.	In 1 glass of boiled water 1 dessert spoon fourty-knuckle grass is put, then is boiled for 2 min on low fire. Drink 1-2 glasses daily.
Ceratonia siliqua L.*	Fabaceae	*Keçiboynuzu*	Locust tree	Fruits	Chest pain, cough. expectorator, sedative, aphrodisiac.	Furits can be eaten fresh or dried. Also molasses is made from Locust.
Glycyrrhiza glabra L.*	Fabaceae	*Meyankökü, Piyan, Biyan*	Liquorice root	Roots	Cold, cough, chest relief, ulcer.	On half coffeespoon minced licerice, a cup of boiled water is poured then brewed for 5 min then filtered to drink. Drink 1 time daily.
Fumaria officinalis L.*	Papaveraceae	*Şahtere*	Fumitory herb	Branches with flowers	High blood pressure, stomach ache, psoriasis, eczema, hepatoprotective.	In 1 glass of boiled water 1 top full teaspoon plant is brewed. Apply a cup of as cold every 4 hrs to itchy places. Wait 1-2 hrs.
Ginkgo biloba L.**	Ginkgoaceae	*Mabet ağacı*	Maldenhair tree	Leaves	Amnesia	It is brewed like tea and drunk 2 glasses daily.
Agropyrum repens L.**	Poaceae	*Ayrıkotu*	Couch grass	Roots	Expel kidney and bladder stone. Rheumatism pains, urethritis, prostatitis.	In 1 glass of boiled water, 1 dessert spoon full of the plant is boiled then brewed 8-10 min veiled then filtered. 3 glasses are enough daily. Also the tea can be applied to aching parts.
Hypericum perforatum L.*	Hypericaceae	*Kantaron*	St. John's wort	Flowers, Upper parts	Ulser, gastritis, cough, malaria, halitosis, depression.	In 1 glass of water, a dessertspoon of the plant is heated tilll boiling temperature then is brewed for 5 min veiled.
Crocus sativus L.*	Iridaceae	*Safran*	Saffron	Flowers	Cough, bronchitis and astma, stimulative, savory.	In 1 glass of water 1 dessert spoon saffron grass is put and then boiled for 2 min on low fire. 1 or 2 glasses can be consumed daily.
Lavandula angustifolia Miller subsp. *angustifolia* *	Lamiaceae	*Lavanta*	Lavender	Flowers	Migraine, hepatoprotective, hepatitis B and C.	In 1 glass of water 1 or 2 teaspoon flowers are boiled then is brewed for 10 min then drunk after infiltered.
Lavandula stoechas L.*	Lamiaceae	*Karabaşotu*	Lavender	Leaves and flowers	Infarction, tachycardia, blood pressure, headache, diabetics.	In boiled water some flos lavandulae romanae is put then brewed for 2 min veiled. Drink 2-3 times daily.
Melissa officinalis L. subsp. *officinalis**	Lamiaceae	*Melisa*	Balm	Leaves	Cardiovascular diseases, asthma, carminative, digestive, hiccup.	In boiled water some leaves are brewed. It can be drunk for a couple of times daily.

(*Contd*.)

Table 2—The information about medicinal plants sold in the herbal markets of Erzincan (*Contd*.)

Scientific name	Family	Local name	English name	Using parts	Uses	Administration and dosage
Ocimum basilicum L.*	Lamiaceae	*Reyhan, Fesleğen*	Basil herb	Aerial parts	Digestive, expectorant, carminative diuretic.	In 1 full glass of boiled water, half or 1 dessertspoon basil is boiled and brewed for 10-15 min veiled. Drink 2-3 glasses daily.
Salvia officinalis L.*	Lamiaceae	*Adaçayı,*	Carpet, Sage	Branches with flowers and leaves	Anti-inflammatory, bronchitis, troat ache, cold, diuretic, diet tea, kidney diseases.	In 1 full glass of boiled water, 1 dessert spoon sage is poached and brewed for 5 min then infiltered. (Sage should never be boiled) 1–2 cups are advised for daily consumption.
Thymbra spicata L. var. *spicata**	Lamiaceae	*Dağ Kekiği, Zahter*	Spiked thyme	Leaves and flowers	Digestive, tachycardia, strenghten nerves, intestine kidney, germicidal.	In 1 glass of boiled water, 1 dessert spoon thyme is waited for 10 min. Thyme is used as spice also.
Laurus nobilis L.*	Lauraceae	*Defne*	Sweet bay, Bay Laurel	Leaves	Rheumatism, anti-inflammatory,anti-dandruff, psoriasis.	On 1-2 dessert spoon dried leaves, 4 glasses of boiled water is poured then is brewed for 10-15 min. Applied to parts with psoriasis ve eczema.
Persea gratissima L.**	Lauraceae	*Avokado*	Avacado pear	Leaves	Pass kidney stone, diuretic, anti-inflammatory, calm blood pressure.	In a glass of water approximately 1 pinch of avocado leaves is boiled for 8–10 min, consume when it gets warm.
Viscum album L.*	Loranthaceae	*Ökseotu, Burç, Ökse, Gövelek*	Common mistletoe	Leaves and branches	Equalize blood pressure and diabetic.	In a glass of water, 1 dessert spoon plant is put and is waited for 10 hrs then filtered. Drink 1 glass daily.
Alcea calvertii (Boiss.) Boiss.*[E]	Malvaceae	*Hatmi*	Marshmallow	Flowers	Bronchitis, cough, anti-inflammatory.	In 1 glass of boiled water , a couple of dried hibiscus leaves are put and waited then drunk after filtered.
Malva sylvestris L.*	Malvaceae	*Ebegümeci*	Mallow	Leaves and flowers	Throat infection, rheumatism, eczema, cold, stomach diseases, hemorrhoid treatment.	In 250 ml cold water, 2 teaspoon flowers and leaves are brewed in the water and is mixed occasionally. The ixture is waited for 8 – 10 hrs to be brewed then filtered. It should be heated before drinking (Maceration).
Myrtus communis L.*	Myrtaceae	*Mersin*	Myrtle	Leaves	Urinary tract infection, strengthen immune system.	On 1 dessert spoon folium myrti, 4 glasses of boiled water is poured then brewed for 10–15 min. It is drunk 2 times daily.

(*Contd*.)

Table 2—The information about medicinal plants sold in the herbal markets of Erzincan (*Contd*.)

Scientific name	Family	Local name	English name	Using parts	Uses	Administration and dosage
Epilobium angustifolium L.*	Onagraceae	*Yakıotu*	Fireweed	Flowers and branches	Prostate diseases.	2 dessert spoon hairy willowherb is put to teapot 2 glasses of boiled water is poured then ket 5–10 min to brew then filtered to drink.
Plantago media L.*	Plantaginaceae	*Sinirotu, sinirli ot*	Plantain	Leaves	Skin diseases, respiratory disorder, hemorrhoid..	It is made paste with little water and applied to skin then is waited 5 days. 1 dessert spoon plantago is poached in 1glass of water then filtered.
Zea mays L. subsp. *mays**	Poaceae	*Mısır*	Corn	Tassels	Sedative , rheumatism, diuretic, treatment of infection of prostate gland.	One dessert spoon full corn tassel is poached with 1 glass of boiled water, is brewed 3–5 min then filtered . Drink 3 glasses without sugar daily.
Punica granatum L.*	Punicaceae	*Nar*	Pomegranate	Flowers	lower cholestrol and diabetics, clean blood, digestive.	In 1 glass of water, 1,5 spoon garnet is put and boiled for 5 min ıt should be drunk once only.
Crataegus monogyna Jacq. subsp. *monogyna* *	Rosaceae	*Alıç*	Common Hawthorn	Leaves and fruits	Sedative, lower blood pressure, diuretic, laxative,defibrilator, varicosis.	One dessert spoon thornapple is poached in 1 glass of boiled water then brewed 10 min then filtered. Drink 2-3 glasses daily.
Cydonia oblonga Miller*	Rosaceae	*Ayva*	Quince	Leaves	Strengthen neural system, laxative, bronchitis,respirat ory system, aphthae.	Quince leaves can be brewed to drink.
Alchemilla pseudocartalinica Juz.*	Rosaceae	*Aslanpençesi*	-	Leaves	Prevent and protect against breast, uterus, adenoid and prostate cancers.	Half spoon foalfoot is poached in 1 glass of boiled water and left 5-6 min then brewed. 2-3 glasses can be drunk daily.
Cerasus avium (L.) Moench*	Rosaceae	*Kiraz*	Cherry	Fruits, stalks	Diuretic, strengthen immune system, anticoagulant.	In 1 L water, a handfull cherry stem is put then boiled for 10 min. 3-4 cups can be drink daily.
Rosa canina L.*	Rosaceae	*Kuşburnu*	Dog rose	Fruits	Bronchitis, troath and tonsilla infection, cold, pass kidney gravel, jettison.	In 1 glass of boiled water 1 dessertspoon rosehip is put, brewed for 15 min then filtered to drik. Drink 3 glasses daily.
Sorbus domestica L.*	Rosaceae	*Üvez*	Sorbi	Leaves	Diuretic, lower blood pressure and diabetics, equate cholestrol.	In 1 glass of water, 1,5 spoon rowan leaf is put then boiled for 5 min.

(*Contd*.)

Table 2—The information about medicinal plants sold in the herbal markets of Erzincan

Scientific name	Family	Local name	English name	Using parts	Uses	Administration and dosage
Aesculus hippocastanum L.**	Sapindaceae	*Atkestanesi*	Horse chestnut	Seeds	Support circulation system and veins, digestive, clear intestine infection, respiratory disorders.	On 1 -2 dessertspoon dried seeds, 1 glass of boiled water is put. It is brewed for 10-15 min then the mixture is ready. This mixture can be drunk 3 times daily with sugar. Or in the cases of hemoroids, vascular inflammation, varicose veins, skin ulcers the mixture can be applied via massage.
Camellia sinensis (L.) O. Kuntze**	Theaceae	*Yeşil Çay*	Tea plant	Leaves	Strengthen immune system, equalize cholesterol, antioxidant and anti-aging.	After brewed 3-4 min, it is advised to be drunk without sugar.
Tilia rubra DC.*	Tiliaceae	*Ihlamur*	Lime	Flowers and bracts	Tachycardia, liver diseases, digestive, sedative.	After brewed 3-4 min it is advised to be drunk without sugar.
Urtica dioica L.*	Urticaceae	*Isırgan*	Nettle	Leaves	Cancer, diuretic, clean liver and blood, blood and circulation system diseases.	Nettle leaves are put in a bowl tthen 1 glass of boiled water is poured continue to boil 3 – 4 min then leave it brew for 10 min.
Curcuma longa L.**	Zingiberaceae	*Zerdeçal*	Turmeric-finger	Root	Hepatoprotective, accelerative metabolism, clear enterozoa.	Half coffeespoon of the roots and powder is put in 2 glasses of boiled water then left for 8-10 min to brew. Drink after filter.
Zingiber officinale L.**	Zingiberaceae	*Zencefil*	Ginger	Root	Cold, cholesterol, weight lose, rheumatism.	In 1 glass of boiled water 1 ginger is sliced then left to brew.
Peganum harmala L.*	Zygophyllaceae	*Üzerlik Otu*	Peganum	Root and seed	Neuroexcitatory, expectorant, stomach ache.	Boiled water is put on the seeds then left to brew. Every 2 days it is boiled to stay in the steam.

* Medicinal plants naturally grown in Turkey (39 plants)
** Medicinal plants originated from foreign countries (10 plants)
[E] Endemic plants to Turkey (1 plant)

experience in the public especially about the products exported from abroad. Uses of these products are done according to information given by the seller country. Side effects of the products can vary between societies and life styles. 6) Traditional medicine and modern medicine are not alternative to each other, but complementary to each other. But people generally prefer one of these methods and not interested to another. Each method has advantages and disadvantages. Modern medicine does not give any importance to traditional treatment that can be considered as preventive medicine. Modern treatment is very expensive in contrast to the traditional medicine. 7) Because of the poisonous affects majority of the medicinal plants could not be used for medical purposes internally at random way. During the use dose, the gender, age, frequency of use and weight are needed maximum care. As denoted by Shad *et al.*[4] there are many anti-nutritional substances such as oxalate, tannins, lignins, saponins, alkaloids, cyanogens and enzyme inhibitors. Presence of these chemicals disrupt the digestion of nutrients, reduces

the nutritional value and utilization of the plants as food[31-36]. 8) Chemical structure of a herbal drug may changes according to the habitat condition, collection season, phenology, collection period, the plant type, variety, age, and used part. Immune system of a user is also effective in this regard. In internal use, the points above need to be very careful. The best methods of using drug are using them with full of stomach and single use.

There are various methods of preparation and application for different types of ailments and they have various preparation forms like infusion, decoction, raw, mash, oinment tincture. Infusion (56%) and decoction (28%) are the methods mostly

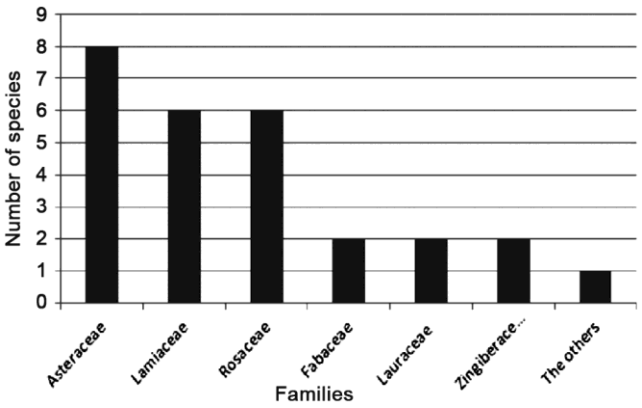

Fig. 3—Order of the families according to the number of species

Table 3—The used parts of the medicinal plants and number of the taxa

Used parts of the plants	Number of the taxa
Leaves	24
Flowers	11
Branches with flowers and leaves	9
Roots	5
Seeds and tubers	3
Fruits	2
Tassels	1

Table 4—The medicinal plants used in mixture and their preparation

Scientific name	Local name(s)	Disease(s)	Preparation
Zingiber officinale L. *Urtica dioica* L. *Crataegus monogyna* Jacq. subsp. *monogyna* *Lavandula stoechas* L.	*Zencefil* *Isırgan* *Alıç* *Karabaş otu*	Heart, vascular congestion	Fifty gm *Zingiber officinale*, a pinch of *Urtica dioica*, *Lavandula stoechas* seeds and *Crataegus monogyna* subsp. *monogyna* or *C. pseudoheterophylla* are boiled in 5 L of water for 15 min. Drink a cup of tea every morning and evening on empty stomach.
Ilex paraguariensis L. *Calluna vulgaris* (L.) Hull *Thymbra spicata* var. *spicata* *Camellia sinensis* (L.) O. Kuntze**	*Mate* *Funda* *Dağ kekiği* *Yeşil çay*	Slimming	In a liter of boiled water 1 teaspoon of *Ilex paraguariensis* leaves, 1 teaspoon of *Calluna vulgaris* leaves, 1 teaspoon of *Thymbra spicata* var. *spicata* and 2 teaspoons of green leaves of *Camellia sinensis* are brewed and filtered. Drink twice daily on empty stomach and twice on full stomach.
Cerasus avium (L.) Moench *Zea mays* L. subsp. *mays* *Persea gratissima* Mill. *Equisetum arvense* L. *Glycyrrhiza glabra* *Elymus repens* (L.) Gould	*Kiraz* *Mısır* *Avakado* *Kırkkilit otu* *Meyan kökü* *Ayrıkotu*	Kidney stone	In a half liter of water, a pinch of *Cerasus avium* stem, *Zea mays* subsp. *mays* tassel, *Persea gratissima* leaf, *Equisetum arvense*, *Glycyrrhiza glabra*, *Elymus repens* and *Hordeum* spp. are brewed. Drink the tea twice daily.
Achillea millefolium L. subsp. *millefolium* *Alchemilla pseudocartalinica* Juz. *Helianthemum nummularium* (L.) Miller *Salvia officinalis* L. *Matricaria chamomilla* L *Cerasus avium* (L.) Moench	*Civan perçemi* *Aslan pençesi* *Altın out* *Ada çayı* *Papatya* *Kiraz*	Women diseases (miyom, cyst and pieces of a diuretic)	In a half liter of water, a pinch of *Achillea millefolium* subsp. *millefolium*, *Alchemilla pseudocartalinica*, *Helianthemum nummularium*, *Salvia officinalis*, *Matricaria chamomilla*, *Cerasus avium* stem are brewed. Drink a cup of tea in the morning and evening.
Hypericum perforatum L. *Lavandula angustifolia* Miller subsp. *angustifolia* *Humulus lupulus* L. *Tilia rubra* DC. *Salvia officinalis* L. *Camellia sinensis* (L.) Kuntze	*Kantaron* *Lavanta* *Şerbetçi out* *Ihlamur* *Ada çayı* *Yeşil çay*	Mid-grade Depression	In a half liter of water, a pinch of *Hypericum perforatum*, a pinch of *Lavandula angustifolia* subsp. *angustifolia*, a pinch of *Humulus lupulus*, a pinch of *Tilia rubra* a pinch of *Salvia officinalis* and a pinch of *Camellia sinensis* green *leaves* are brewed over a low fire for 5 min. Drink a cup of tea in morning and evening.

used for the preparation of the remedies. The traditional medicinal plants have been mostly used for the treatment of respiratory tract diseases (14 %), cardiovascular diseases (14%), gastro-intestinal diseases (11%), diuretic (9%), kidney-bladder problems (8%), skin diseases (8%), hepatic (7%), sedative (6%), diabetes (5%), prostate (5%) and cancer (4%).

New findings of the study area

With this ethnobotanical reseach, 49 plant species were determined to be used for different medicinal purposes by local people. Totally 39 taxa are grown naturally in Turkey and some of them are imported from foreign countries. This study is the first on determination of the most popularly used traditional medicinal plants in Erzincan city center. So, it is very important for conservation of tradiditional culture on folk medicines and survive it for future genereations.

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