

Full Length Research Paper

An ethnobotanical survey of medicinal plants of Yazikonak and Yurtbaşı districts of Elazığ province, Turkey

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This study, conducted between 2008 - 2009, analyzed the medicinal plant species traditionally used in Yazikonak and Yurtbaşı districts of Elazığ province, Turkey and the local names of these plants. Within the scope of the study, the plant species were collected; herbarium materials were prepared; and the specimens were nomenclatured. A total of 41 medical plants belonging to 17 families were identified in the region. The most common medicinal plant families were Asteraceae (>29% of use - reports), Rosaceae (>15%), Lamiaceae (>12%); the most common preparations were infusion and decoction. The plant species *Thymus haussknechtii* Velen, *Anthemis wiedemanniana* Fisch. and Mey. are endemic to the study area, and are used for treating various diseases. Since they are also used in other parts of the world for treating similar diseases, they can be considered as pharmacologically effective. This type of ethno-botanic study enables proper transfer of knowledge of plant - based treatments (our natural inheritance) to future generations.

Key words: Ethnobotany, medicinal plants, Endemic, Yazikonak, Yurtbaşı (Elazığ-Turkey).

INTRODUCTION

Throughout history, humans have derived many uses and benefits from the plants found in their own region. Initially, wild plants were collected from their natural habitat, followed by the cultivation of those that were used most commonly (Akan et al., 2008). East Anatolia has a rich flora, due to its variable climate and high number of ecological zones. This diversity in flora provides a rich source of medicinal plants, which has long been utilized by Anatolian cultures, and hence accounts for the accumulation of remarkable medicinal folk knowledge in the region (Ozgekce and Ozcelik, 2004). Turkey is one of the richest countries in the world in terms of plant diversity (Davis, 1965 -1988; Guner et al., 2001). Turkish people are quite interested in wild plants, due to the high proportion of people living in rural areas, and also for economic reasons. Local plants are used for nourishment, dyeing and medical purposes (Baytop, 1999). Like in the other

countries of the world, in recent years, the plants - used traditionally for curative purposes - have attracted attention of the researchers (Yesilada et al., 1999; Tuzlaci and Tolon, 2000; Simsek et al., 2004; Kargiöđlu et al., 2008; Ozgen et al, 2004; Everest and Ozturk, 2005; Satil et al., 2008; Ugurlu and Secmen, 2008; Uzun et al., 2004). Questionnaire method is commonly used in these kinds of researches (Dafni et al., 1984; Giron et al., 1991; Ignacimuthu et al., 1998; Jouad et al., 2001; Macia et al., 2005; Diallo et al., 1999; Aburjai et al., 2007; De Wet and Van Wyk, 2008; Pattanaik et al., 2008; Van Wyk et al., 2008; Reddy, et al., 2009; Focho et al., 2009).

Local plant names are closely related to the local language used by the people of that area. Local Turkish names for plants vary from one region to another (Baytop, 1994). This variation is closely related to culture and, due to the cultural richness of the Anatolia region, local names may vary even from one town or one village to another (Akgul, 2008). Documentation of the indigenous knowledge through ethno botanical studies is important for the conservation and utilization of biological resources (Muthu et al., 2006). Therefore, determining

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Figure 1. Study area.

the local names and indigenous uses of plants has significant potential societal benefits (Bagci, 2000). The present study investigated the plants traditionally used in the treatment of specific diseases, and the local names of these plants.

MATERIAL AND METHOD

Study area

Study area was located on the east of Anatolian diagonal, in the skirts of South -Eastern Taurus Mountains (Cakilcioglu et al., 2008), in the Upper Euphrates Region of the Eastern Anatolia Region (Sengun, 2007). Yurtbaşı and Yazıkönak (Figure 1) belong to the Irano -Turani Plant Geography Region and falls within the B7 grid square according to the Grid classification system developed by Davis (Davis, 1965 -1985).

Interviews with local people

A questionnaire was administered to the local people, through face to face interviews (Appendix A). Mean age of the respondents was 57 years (in 29 - 85 years range). The questionnaire was administered only to people who had knowledge of medical plants. During the interviews, demographic characteristics of the participants, and local names, used parts and preparation methods of the plants were recorded. In addition, the participants were asked to show the researchers these wild plants in the field. Then specimens of these plants were collected.

Plant materials

Field study was carried out over a period of approximately two years (2008 - 2009). During this period, a total of 103 vascular plant specimens were collected. The plants were pressed in the field and prepared for identification. Plants were identified using the standard text, "Flora of Turkey and the East Aegean Islands" (Davis, 1965 - 1985; Davis et al., 1988) and were compared with the specimens in Fırat University Herbarium (FUH). Identified plants were retained in FUH. The names of plant families were listed in alphabetic order. After the taxon names were identified, instances of endemism and hazard categories (Ekim et al., 2000) were specified.

RESULTS AND DISCUSSION

The medical uses of plant species found in the study area include the following:

Anacardiaceae

Pistacia terebinthus L. subsp. *palaestina* (Boiss.) Engler. (C - 20) (Çedene): *P. terebinthus* is consumed as a coffee to treat urinary inflammations.

Rhus coriaria L. (C-4) (Sumak): An infusion used to disinfect wounds.

Asteraceae

Achillea millefolium L. (C-13) (Civanperçemi): *A. millefolium* decoction is used to treat stomach-ache.

Achillea wilhemsii C. Koch. (C-17) (Civanperçemi): An Infusion of its leaves (5%) is used externally for hemorrhoids.

Anthemis tinctoria L. (C-2) (Sarı papatya): Its decoction is used as a gargle to treat throat ache.

Anthemis wiedemanniana Fisch. and Mey. (C -11) (Papatya) Endemic, Lower risk (least concern): A decoction is used as a painkiller in babies.

Bellis perennis L. (C - 32) (Papatya): Its capitulum's decoction is used to treat cold.

Cichorium intybus L. (C - 6) (Hindibağ): Fresh branches of *C. intybus* are used to treat dermatitis.

Crepis foetida L. subsp. *rhoeadifolia* (Bieb.) Celak. (C - 24) (Yürek otu): A decoction (5%) is used for heart diseases.

Gundelia tournefortii L. var. *tournefortii* (C -14) (Kenger): A decoction of its root is used for diabetes.

Helichrysum plicatum DC. subsp. *plicatum* (C - 38) (Solmaz çiçek): *H. plicatum* decoction is used in diabetes.

Onopordum tauricum Willd. (C - 40) (Kenger): Its decoction is used to treat diabetes.

Tragopogon pterocarpus DC. (C - 29) (Yemlik): It is consumed raw (uncooked) in the morning on an empty stomach to treat worms.

Tussilago farfara L. (C -18) (Öksürük otu): A decoction is used as an expectorant and for coughs.

Cupressaceae

Juniperus oxycedrus L. subsp. *oxycedrus* (C-9) (Ardıç): A decoction is used externally for rheumatic diseases.

Euphorbiaceae

Euphorbia macroclada Boiss. (C-22) (Sütleğen): The latex is applied on warts.

Fabaceae

Astragalus gummifer Lab. (C-41) (Geven): A decoction of its root is used for diabetes.

Melilotus officinalis (L.) Desr. (C - 1) (Yonca): Its infusion is used externally to alleviate rheumatism pain.

Hypericaceae

Hypericum perforatum L. (C-28) (Bibbirdelik otu): Its decoction is used as a sedative.

Juglandaceae

Juglans regia L. (C-5) (Ceviz): Decoction made with its green leaves is drunk in the morning on an empty stomach to treat worms.

Lamiaceae

Mentha longifolia (L.) Hudson subsp. *typhoides* (Briq.) Harley var. *typhoides* (C - 8) (Yarpuz): Its infusion is used as gargle to treat throat diseases.

Mentha spicata L. subsp. *spicata* (C - 19) (Nane): Its infusion is used to treat cold.

Salvia multicaulis Vahl. (C -15) (Adaçayı): Its decoction is used to treat cold.

Teucrium polium L. (C-27) (Ürper): Infusion prepared by using its above-the-soil parts is used to treat diabetes.

Thymus haussknechtii Velen. (C - 3) (Kekik) Endemic, Lower risk (near threatened): Its decoction is used to treat cold and coughing.

Liliaceae

Allium sativum L. (C-26) (Sarımsak): Consumed uncooked or mixed with yogurt for hypertension.

Malvaceae

Malva neglecta Wallr. (C - 25) (Ebegümeçi): Decoction made from above - the - soil parts of *M. neglecta* plant is used to treat stomachache.

Moraceae

Ficus carica L. subsp. *rupestris* (Hauskn.) Browicz (C-37) (İncir): *F. carica* is consumed raw (uncooked) to treat constipation.

Morus nigra L. (C-31) (Dut): A decoction is applied externally on oral wounds.

Papaveraceae

Papaver dubium L. (C - 10) (Gelincik): Its infusion is used to treat cold.

Papaver rhoeas L. (C - 7) (Gelincik): Its decoction is used as a sedative.

Polygonaceae

Rumex tuberosus L. subsp. *tuberosus* (C-21) (Kuzukulağı): The plant is consumed uncooked for constipation.

Portulacaceae

Portulaca oleracea L. (C-39) (Semizotu): Its decoction is used to treat stomachache.

Resedaceae

Reseda lutea L. (C-35) (Eşek turpu): Its decoction is used to treat stomach diseases.

Rosaceae

Amygdalus communis L. (C - 30) (Badem): The seed is consumed to lower cholesterol.

Crataegus monogyna Jacq. subsp. *monogyna* (C-16) (Alıç): A decoction (5%) is used for heart diseases.

Cerasus mahaleb (L.) Miller var. *mahaleb* (C - 33) (Mahaleb): An infusion (5%) is used for kidney stones.

Pyrus elaeagnifolia Pallas subsp. *elaeagnifolia* (C - 23) (Yaban armudu): An Infusion of its fruit (5%) is used as a diuretic.

Rosa canina L. (C - 36) (Kuşburnu): Decoction of *R. canina* leaves is used in diabetes.

Rubus sanctus Schreber (C -12) (Böğürtlen): Its infusion is used to treat cold.

Urticaceae

Urtica dioica L. (C - 34) (Isırgan): *U. dioica* decoction and infusion is used to treat throat diseases, as painkiller and to reduce blood sugar level.

The most common medicinal plant families in the study area were Asteraceae (>29% of use - reports), Rosaceae (>15%), Lamiaceae (>12%); the most common preparations were infusion and decoction. Local people

were found to make medicinal preparations using wild plants for curative purposes via simple methods. People living in the districts of Yazıkonak and Yurtbaşı generally consume plants fresh and do not mix them with other plants. Moreover, curative plants are available in every season, due to the use of drying techniques. *Thymus haussknechtii* Velen and *Anthemis wiedemanniana* Fisch. and Mey. are endemic plant species used in the region for medical purposes.

Literate people in the study area were found to be less knowledgeable on the use of medicinal plants when compared to illiterate ones as they were more familiar with these plants before modernization. Similar results were reported in the studies conducted in Ethiopia (Gedif and Hahn, 2003; Giday et al., 2009) and Thailand (Wester and Yongvanit, 1995).

Literature review of local plant

Plants used in Yazıkonak and Yurtbaşı are also used in other parts of the world for treating similar diseases. Moreover, various laboratory studies point out to the effectiveness of the plants used in the present study area. These are: *A. millefolium* which is traditionally used by people as a digestive and to treat hemorrhoids (Pieroni and Giusti 2009; Vitalini et al., 2009). A previous study demonstrated *in vivo* antispasmodic activity of aqueous-methanol extract of *A. millefolium* (Yaesh et al., 2006). *A. tinctoria* was reported to have an antibacterial activity (Akgul and Saglikoglu, 2005). *B. perennis* infusion is used to treat coughing (Genc and Ozhatay, 2006). *C. intybus* was reported to have a potential antifungal and antibacterial activity (Petrovic et al., 2004; Mares et al., 2005). *F. carica* is also used to heal sore throats, bronchitis and insect bites and as intestinal depurative and anti-warts (Pieroni and Quave, 2005). *H. plicatum* was reported to be a potential anti-diabetic (Aslan et al., 2007). *J. regia* was reported to be used also in Italy for the same purpose (Guarrera, 1999). *J. regia* is also used to treat wounds, diabetes and kidney diseases (Genc and Ozhatay, 2006). *M. neglecta* was reported to have anti ulcerogenic activity (Gurbuz et al., 2005). *M. neglecta* is used as an expectorant, laxative and anti-inflammatory and for the maturation of abscesses, stomach ache, menstrual disorder, abdominal pain, sore throat, vaginitis and constipation (Al-Qura'n, 2009; Ezer and Arisan, 2006; Ozgokce and Ozcelik, 2004; Kahraman and Tatli, 2004; Pieroni and Giusti, 2009; Vitalini et al., 2009).

M. officinalis is also used traditionally in wound healing (Vitalini et al., 2009). The essential oils of *M. longifolia* subsp. *typhoides* was reported to have *in vitro* antimicrobial activities (Sarac and Ugur, 2009). *M. longifolia* is also used as a digestive and to treat coughing (Vitalini et al., 2009). *P. rhoeas* was reported to be used as a mild sedative for children and for treating diabetes (Pieroni oils of *Pistacia* species were proved to have antimicrobial,

anti-inflammatory effects and trigger gastric and duodenal antiulcer activity (Alma et al., 2004; Al-Said et al., 1986; Giner-Larza et al., 2001; Magiatis et al., 1999). *R. lutea* was reported to have antibacterial activity (Kumarasamy et al., 2002). *R. coriaria* extracts were reported to have heavy antimicrobial effect and antibacterial activity (Digrak et al., 2001; Nimri et al., 1999). *R. canina* was reported to have an anti-diabetic activity (Orhan et al., 2009). *R. canina* is also used to treat coughing, bronchitis, stomach ache, insect bites and as antidepressant and diuretic (Genc and Ozhatay, 2006; Pieroni and Quave, 2005; Sarper et al., 2009). *R. sanctus* was also reported to be used to treat hemorrhoids and diabetes mellitus (Ezer and Arisan, 2006). *S. multicaulis* is also used to treat respiratory and urinary track diseases (Yapici et al., 2009). *T. polium* is used by people to treat gastrointestinal disorders, liver disorders and diabetes and is used as a stomach and anti-inflammatory (Al-Qura'n, 2009; Ghorbani, 2005; Shakhanbeh and Atrouse, 2001). Its extract was shown to induce hypoglycemic, antipyretic and intestinal motility activities (Autore et al., 1984; Gharaibeh et al., 1988; Suleiman et al., 1988; Yaniv et al., 1987). The preparations containing thyme extract alleviate cough caused by common cold (Buechi et al., 2005), decrease the bronchitis symptoms and duration (Gruenwald et al., 2005). In addition, it is used to reduce high cholesterol (Cakilcioglu and Turkoglu, 2007). *U. dioica* is used in many regions as an analgesic for liver diseases, as anti-rheumatic, anti-diabetic, intestinal regulator, depurative, sciatic; and to treat cancer, stomach problems, ulcer, piles and hypertension; and for hair preservation (Akan et al., 2008; Akcicek and Vural, 2003; Akgul, 2008; Cornara et al., 2009; Ezer and Arisan, 2006; Kahraman and Tatli, 2004; Keskin, 2008; Kultur, 2007; Leporatti and Impieri, 2007; Ozturk and Dinc, 2005; Vitalini et al., 2009; Ziyat et al., 1997). Studies conducted on *U. dioica* showed that this plant has analgesic and antimicrobial and antihyperglycaemic activity (Bnouham et al., 2003; Gulcin et al., 2004).

Conclusions

Within the scope of the study, plant species were collected; herbarium materials were prepared; and the specimens were nomenclatured. A total of 41 medical plants belonging to 17 families were identified in the area. The data obtained in the present study based on the plants growing in Yazıkonak and Yurtbaşı districts was compared with the experimental data obtained in previous laboratory studies. The comparisons proved most of the ethno botanical uses. Plants used in Yazıkonak and Yurtbaşı were found to be used in different parts of the world for treating similar diseases. They can therefore be considered as pharmacologically effective.

Many plant species are used in the treatment of many diseases, including diabetes, hypertension, gastrointesti-

nal diseases, respiratory diseases and hemorrhoids. Therefore, this type of work may assist ethno botanical studies and also pharmaceutical research into new drugs and treatments. Such ethno botanical studies enable the transfer of knowledge on plant-based treatments (our natural inheritance) to future generations.

Appendix A

Name and surname of the participant
 Age of the participant
 Educational level of the participant
 Date of interview
 What is the local name of the plant used?
 For which diseases do you use the plant?
 Which parts of the plant do you use?
 How do you prepare the plant for use?

REFERENCES

- Aburjai T, Hudaib M, Tayyem R, Yousef M, Qishawi M (2007). Ethnopharmacological survey of medicinal herbs in Jordan, the Ajloun Heights region. *J. Ethnopharmacol.* 110: 294-304.
- Akan H, Korkut MM, Balos MM (2008). An ethnobotanical study around Arat Mountain and its surroundings (Birecik, Sanliurfa). *Firat University J. Sci. Eng.* 20: 67-81.
- Akcicek E, Vural M (2003). Local names and ethnobotanical features of some plants in Kumalar Mountain (Afyon) and its vicinity. *Herb J. Syst. Bot.* 10: 151-162.
- Akgul G (2008). Local names and ethnobotanical features of some wild plants of Çıldır (Ardahan) and its vicinity. *Herb J. Syst. Bot.* 14: 75-88.
- Akgul C, Sağlıkoglu G (2005). Antibacterial activity of crude methanolic extract and its fractions of aerial parts of *Anthemis tinctoria*. *Indian J. Biochem. Biophys.* 42: 395-397.
- Alma MH, Nitz S, Kollmannsberger H, Digrak M, Efe FT, Yilmaz N (2004). Chemical composition and antimicrobial activity of the essential oils from the gum of Turkish pistachio (*Pistacia vera* L.). *J. Agr. Food Chem.* 52: 3911-3904.
- Al-Qura'n S (2009). Ethnopharmacological survey of wild medicinal plants in Showbak, Jordan. *J. Ethnopharmacol.* 123: 45-50.
- Aslan M, Orhan DD, Orhan N, Sezik E, Yesilada E (2007). *In vivo* antidiabetic and antioxidant potential of *Helichrysum plicatum* ssp. *plicatum* capitulum in streptozotocin- induced-diabetic rats. *J. Ethnopharmacol.* 109: 54-59.
- Autore G, Capasso F, De Fusco R, Fasulo MP, Lembo M, Mascolo N, Menghini A (1984). Antipyretic and antibacterial actions of *Teucrium polium* (L.). *Pharmacol. Res. Comm.* 16: 21-29.
- Bagci Y (2000). Ethnobotanical features of Aladağlar (Yahyalı, Kayseri) and its vicinity. *Herb J. Syst. Bot.* 7: 89-94.
- Baytop T (1994). A dictionary of vernacular names of wild plants of Turkey. Publication of the Turkish Language Society, No: 578, Ankara.
- Baytop T (1999). Therapy with medicinal plants in Turkey. (Past and Present). Nobel Medical Publish, İstanbul.
- Bnouham M, Merfour FM, Ziyat A, Mekhfi H, Aziz M, Legssyer A (2003). Antihyperglycemic activity of the aqueous extract of *Urtica dioica*. *Fitoterapia.* 74: 677-681.
- Buechi S, Vogel R, Von Eiff MM, Ramos M, Melzer J (2005). Open trial to assess aspects of safety and efficacy of a combined herbal cough syrup with ivy and thyme. *Forsch Kompl. Klass Nat.* 12: 328-332.
- Cornara L, La Rocca A, Marsili S, Mariotti MG (2009). Traditional uses of plants in the Eastern Riviera (Liguria, Italy). *J. Ethnopharmacol.* 125: 16-30.
- Çakılcıoğlu U, Türkoglu I (2007). Plants used for cholesterol treatment by the folk in Elazığ. *Phytol. Balcan.* 13: 239-245.
- Çakılcıoğlu U, Türkoglu I, Kursat M (2008). The flora of Çitli Lowland (Elazığ). *J. New World Sci. Acad. (NWSA)* 3: 232-249.
- Dafni A, Yaniv Z, Palevitch D (1984). Ethnobotanical survey of medicinal plants in Northern Israel. *J. Ethnopharmacol.* 10: 295-310.
- Davis PH (Ed.) (1965-1985). Flora of Turkey and the East Aegean Islands. Vol. 1-9, Edinburgh University Press, Edinburgh.
- Davis PH, Mill RR, Tan K (Eds.) (1988). Flora of Turkey and the East Aegean Islands. Vol. 10 (Supplement 1), Edinburgh University Press, Edinburgh.
- De Wet H, Van Wyk BE (2008). An ethnobotanical survey of southern African Menispermaceae. *S. Afr. J. Bot.* 74: 2-9.
- Digrak M, Alma MH, Ilcim A (2001). Antibacterial and antifungal activities of Turkish medicinal plants. *Pharmaceut. Biol.* 39: 346-350.
- Diallo D, Hveem B, Mahmoud MA, Berge G, Paulsen BS, Maiga A (1999). An ethnobotanical survey of herbal drugs of Gourma district, Mali. *Pharmaceut. Biol.* 37: 80-91.
- Ekim T, Koyuncu M, Vural M, Duman H, Aytac Z, Adiguzel N (2000). Red Data Book of Turkish Plants (Pteridophyta and Spermatophyta). Turkish. Association for the Conservation of Nature, Ankara.
- Everest A, Ozturk E (2005). Focusing on the ethnobotanical uses of plants in Mersin and Adana provinces (Turkey). *J. Ethnobiol. Ethnomed.* 1: 6.
- Ezer N, Arisan OM (2006). Folk medicines in Merzifon (Amasya, Turkey). *Turk. J. Bot.* 30: 223-230.
- Focho DA, Nkeng EAP, Lucha CF, Ndam WT, Afegeni A (2009). Ethnobotanical survey of plants used to treat diseases of the reproductive system and preliminary phytochemical screening of some species of malvaceae in Ndog Central Sub-division, Cameroon. *J. Med. Plants Res.* 3: 301-314.
- Gedif T, Hahn H (2003). The use of medicinal plants in self-care in rural central Ethiopia. *J. Ethnopharmacol.* 87: 155-161.
- Genc GE, Ozhatay N (2006). An ethnobotanical study in Çatalca (European part of İstanbul) II. *Turk. J. Pharm. Sci.* 3: 73-89.
- Gharaibeh MN, Elayan HH, Salhab AS (1988). Hypoglycemic effects of *Teucrium polium*. *J. Ethnopharmacol.* 24: 93-99.
- Ghorbani A (2005). Studies on pharmaceutical ethnobotany in the region of Turkmen Sahra, north of Iran: (Part 1): General results. *J. Ethnopharmacol.* 102: 58-68.
- Giday M, Asfaw Z, Woldu Z (2009). Medicinal plants of the Meinit ethnic group of Ethiopia: An ethnobotanical study. *J. Ethnopharmacol.* 124: 513-521.
- Giner-Larza EM, Manz S, Recio MC, Giner RM, Prieto JM, Cerdan-Nicolas M, Rios JL (2001). Oleanonic acid, a 3-oxotriterpene from *Pistacia*, inhibits leukotriene synthesis and has anti-inflammatory activity. *Eur. J. Pharmacol.* 428: 137-143.
- Giron LM, Freire V, Alonzo A, Caceres A (1991). Ethnobotanical survey of the medicinal flora used by the Caribs of Guatemala. *J. Ethnopharmacol.* 34: 173-187.
- Gruenwald J, Graubaum HJ, Busch R (2005). Efficacy and tolerability of a fixed combination of thyme and primrose root in patients with acute bronchitis. A double-blind, randomized, placebo-controlled clinical trial. *Arzneimittelforschung* 55: 669-676.
- Guarrera PM (1999). Traditional antihelminthic, antiparasitic and repellent uses of plants in Central Italy. *J. Ethnopharmacol.* 68: 183-192.
- Gulcin I, Kufrevioglu OI, Oktay M, Buyukokuroglu ME (2004). Antioxidant, antimicrobial, antiulcer and analgesic activities of nettle (*Urtica dioica* L.). *J. Ethnopharmacol.* 90: 205-215.
- Guner A, Ozhatay N, Ekim T, Baser KHC (Eds.) (2000). Flora of Turkey and the East Aegean Islands. Vol. 11 (Supplement 2), Edinburgh University Press, Edinburgh.
- Gurbuz I, Ozkan AM, Yesilada E, Kutsal O (2005). Anti-ulcerogenic activity of some plants used in folk medicine of Pinarbasi (Kayseri, Turkey). *J. Ethnopharmacol.* 101: 313-318.
- Ignacimuthu S, Sankarasivaraman K, Kesavan L (1998). Medico-ethnobotanical survey among Kanikar tribals of Mundanthurai sanctuary. *Fitoterapia.* 69: 409-414.
- Joad H, Haloui M, Rhiouani H, El Hilaly J, Eddouks M (2001). Ethnobotanical survey of medicinal plants used for the treatment of diabetes, cardiac and renal diseases in the North centre region of Morocco (Fez-Boulemane). *J. Ethnopharmacol.* 77: 175-182.

- Kahraman A, Tatli A (2004). Local names and ethnobotanical features of some plants in Umurbaba Mountain (Eşme-Uşak) and its vicinity. *Herb J. Syst. Bot.* 11: 147-154.
- Kargioglu M, Cenkci S, Serteser A, Evliyaoglu N, Konuk M, Kok MS, Bağcı Y (2008). An ethnobotanical survey of inner-West Anatolia, Turkey. *Hum. Ecol.* 36: 763-777.
- Keskin M (2008). A research on ethnobotany belonging to some village of Kavak (Samsun) district. *Herb J. Syst. Bot.* 15: 141-150.
- Kumarasamy Y, Cox PJ, Jaspars M, Nahar L, Sarker SD (2002). Screening seeds of Scottish plants for antibacterial activity. *J. Ethnopharmacol.* 83: 73-77.
- Kultur S (2007). Medicinal plants used in Kırklareli province (Turkey). *J. Ethnopharmacol.* 111: 341-364.
- Leporatti ML, Impieri M (2007). Ethnobotanical notes about some uses of medicinal plants in Alto Tirreno Cosentino area (Calabria, Southern Italy). *J. Ethnobiol. Ethnomed.* 3: 34.
- Macia MJ, Garcia E, Vidaurre PJ (2005). An ethnobotanical survey of medicinal plants commercialized in the markets of La Paz and El Alto, Bolivia. *J. Ethnopharmacol.* 97: 337-350.
- Magiatis P, Melliou E, Shaltsounis AL, Chinou IB, Mitaku S (1999). Chemical composition and antimicrobial activity of the essential oils of *Pistacia lentiscus* var. *chiaio*. *Planta Med.* 65: 749-752.
- Muthu C, Ayyanar M, Raja N, Ignacimuthu S (2006). Medicinal plants used by traditional healers in Kancheepuram district of Tamil Nadu, India. *J. Ethnobiol. Ethnomed.* 2: 43.
- Nimri LF, Meqdam MM, Alkofahi A (1999). Antibacterial activity of Jordanian medicinal plants. *Pharmaceut. Biol.* 37: 196-201.
- Orhan N, Aslan M, Hosbas S, Deliorman OD (2009). Antidiabetic effect and antioxidant potential of *Rosa canina* fruits. *Phcog. Mag.* 5: 309-315.
- Ozgen U, Kaya Y, Coskun M (2004). Ethnobotanical studies in the villages of the district of Ilica (Province Erzurum), Turkey. *Econ. Bot.* 58: 691-696.
- Ozgokce F, Ozcelik H (2004). Ethnobotanical aspects of some taxa in East Anatolia (Turkey). *Econ. Bot.* 58: 697-704.
- Ozturk M, Dinc M (2005). Ethnobotanical features of Nizip (Aksaray) district. *The Herb J. Syst. Bot.* 12: 93-102.
- Pattanaik C, Reddy CS, Murthy MSR (2008). An ethnobotanical survey of medicinal plants used by the Didayi tribe of Malkangiri district of Orissa, India. *Fitoterapia.* 79: 67-71.
- Petrovic J, Stanojkovic A, Comic L, Curcic S (2004). Antibacterial activity of *Cichorium intybus*. *Fitoterapia.* 75: 737-739.
- Pieroni A, Quave CL (2005). Traditional pharmacopoeias and medicines among Albanians and Italians in southern Italy: A comparison. *J. Ethnopharmacol.* 101: 258-270.
- Pieroni A, Giusti ME (2009). Alpine ethnobotany in Italy: traditional knowledge of gastronomic and medicinal plants among the Occitans of the upper Varaita valley, Piedmont. *J. Ethnobiol. Ethnomed.* 5: 32.
- Reddy CS, Reddy KN, Murthy EN, Raju VS (2009). Traditional medicinal plants in Seshachalam hills, Andhra Pradesh, India. *J. Med. Plants Res.* 3: 408-412.
- Sarac N, Ugur A (2009). The in vitro antimicrobial activities of the essential oils of some Lamiaceae species from Turkey. *J. Med. Food.* 12: 902-907.
- Sarper F, Akaydin G, Simsek I, Yesilada E (2009). An ethnobotanical field survey in the Haymana district of Ankara province in Turkey. *Turk. J. Biol.* 33: 79-88.
- Shakhanbeh J, Atrouse O (2001). *Teucrium polium* inhibits nerve conduction and carrageenan induced inflammation in the rat skin. *Turk. J. Med. Sci.* 31: 15-21.
- Suleiman MS, Abdul-Ghani AS, Al-Khalil S, Amin R (1988). Effect of *Teucrium polium* boiled leaf extract on intestinal motility and blood pressure. *J. Ethnopharmacol.* 22: 111-116.
- Sengun MT (2007). The effect of Keban Dam Lake to Elaziğ climate under the last valuations light. *J. Res. East. Anatol. Reg. (DAUM)* 5: 116-121.
- Simsek I, Aytekin F, Yesilada E, Yildirimli S (2004). An ethnobotanical survey of the Beypazarı, Ayaş, and Gündül district towns of Ankara province (Turkey). *Econ. Bot.* 58: 705-720.
- Tuzlaci E, Tolon E (2000). Turkish folk medicinal plants, part III: Şile (İstanbul). *Fitoterapia.* 71: 673-685.
- Ugurlu E, Secmen O (2008). Medicinal plants popularly used in the villages of Yunt Mountain (Manisa-Turkey). *Fitoterapia.* 79: 126-131.
- Uzun E, Sariyar G, Adsersen A, Karakoc B, Otuk G, Oktayoglu E, Piriidar S (2004). Traditional medicine in Sakarya province (Turkey) and antimicrobial activities of selected species. *J. Ethnopharmacol.* 95: 287-296.
- Van Wyk BE, De Wet H, Van Heerden FR (2008). An ethnobotanical survey of medicinal plants in the southeastern Karoo, South Africa. *S. Afr. J. Bot.* 74: 696-704.
- Vitalini S, Tome F, Fico G (2009). Traditional uses of medicinal plants in Valvestino (Italy). *J. Ethnopharmacol.* 121: 106-116.
- Wester L, Yongvanit S (1995). Biological diversity and community lore in northeastern Thailand. *J. Ethnobiol.* 15: 71-87.
- Yaesh S, Jamal Q, Khan AU, Gilani AH (2006). Studies on hepatoprotective, antispasmodic and calcium antagonist activities of the aqueous-methanol extract of *Achillea millefolium*. *Phytother. Res.* 20: 546-551.
- Yaniv Z, Dafni A, Friedman J, Palevitch D (1987). Plants used for the treatment of diabetes in Israel. *J. Ethnopharmacol.* 19: 145-151.
- Yapici IU, Hosgoren H, Saya O (2009). Ethnobotanical features of Kurtalan (Siirt) District. *Dicle University, Ziya Gökalp J. Fac. Educ.* 12: 191-196.
- Yesilada E, Sezik E, Honda G, Takaishi Y, Takeda Y, Tanaka T (1999). Traditional medicine in Turkey IX. Folk medicine in north-west Anatolia. *J. Ethnopharmacol.* 64: 195-210.
- Ziyyat A, Legssyer A, Mekhfi H, Dassouli A, Serhrouchni M, Benjelloun W (1997). Phytotherapy of hypertension and diabetes in oriental Morocco. *J. Ethnopharmacol.* 58: 45-54.