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# Commercial and Ethnic Uses of *Satureja* (Sivri Kekik) Species in Turkey

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## Abstract

The aim of this study was to determine the commercial *Satureja* (Sivri kekik) species, gathered amounts, social networks in trade, gathering style, their vernacular names, and local usages in Turkey. The survey was carried out in 17 provinces, 20 towns and 40 villages where the *Satureja* species have large population. Commercial *Satureja* was collected from the mentioned fields, along with the information regarding local names, usage, sorting and grading methods obtained questioning the local people. The amount of total commercial *Satureja* species gathered from Anatolia is around 700-800 tones in a year. The Aegean and Mediterranean regions are the main areas of *Satureja* collection in Turkey. *S. cuneifolia*, *S. thymbra*, *S. hortensis* and *S. spicigera* are gathered for trade. Also, *S. boissieri*, *S. coerulea*, *S. pilosa*, *S. icarica*, *S. wiedemanniana*, and *S. cilicica* are gathered only as spices and herbal tea for the local people. Trade of *Satureja* is an important source of income for people in local region. *Satureja* species are gathered directly by the local villagers, especially, unemployed people with financial difficulties. Local middlemen coordinate the *Satureja* collection and then sell the material to companies in the province, and from there it is processed and distributed throughout the country and abroad. Also, threat factors and solution for long term conservation of the commercial *Satureja* species were determined in this study. Prohibitions or restrictions on their collection are needed.

**Keywords:** *Kekik*, *plant trading*, *Satureja*, *Turkey*.

## Türkiye'deki *Satureja* (Sivri Kekik) Türlerinin Ticaret ve Yerel Kullanımı

### Özet

Bu çalışmanın amacı, Türkiye'de ticareti yapılan *Satureja* (Sivri kekik) türlerini, toplanma miktarlarını, ticaretindeki sosyal ağı, toplanma şekillerini, yöresel adlarını ve yöresel kullanımlarını belirlemektir. Araştırma *Satureja* türlerinin geniş yayılışa sahip olduğu 17 il, 20 kasaba ve 40 köyde yapılmıştır. Bu alanlardan toplanan ticari *Satureja*'ların yöresel adları, kullanımları, toplama ve depolama metodları ile ilgili bilgiler yerel halkla yapılan görüşmelerle belirlenmiştir. Türkiye'de ticari amaçla yılda yaklaşık 700-800 ton *Satureja* toplanmaktadır. *Satureja* türlerinin en yoğun toplanma alanları Akdeniz ve Ege Bölgeleridir. Ticari amaçla toplanan türler: *S. cuneifolia*, *S. thymbra*, *S. hortensis* ve *S. spicigera*'dır. Ayrıca, *S. boissieri*, *S. coerulea*, *S. pilosa*, *S. icarica*, *S. wiedemanniana* ve *S. cilicica* türleri ise yerel halk tarafından sadece bitki çayı ve baharat olarak kullanılmaktadır. *Satureja* türlerinin ticareti yöre insanları için önemli bir gelir kaynağıdır. Toplama işi genellikle gelir düzeyi düşük yöre köylüleri tarafından yapılır. Bu işi yöredeki aracı kişiler koordine ederler, daha sonra bu aracı kişiler topladıkları bitkileri şehirdeki fabrikalara satarlar. Fabrikada işlenen türler yurt içine ve yurt dışına dağıtılır. Bu çalışmada ayrıca ticareti yapılan *Satureja* türlerini tehdit eden faktörler belirlenerek sürdürülebilir kullanımı için koruma yöntemleri ortaya konmuştur. Türlerin toplanması konusunda yasaklama ya da sınırlandırmalara ihtiyaç vardır.

**Anahtar Kelimeler:** *Bitki ticareti*, *kekik*, *Satureja*, *Türkiye*.

## INTRODUCTION

The use of medicinal and aromatic plants has very long history in the World. According to World Health Organization (WHO), 20 000 plants have

been used for medicinal proposes, 4 000 of them have been used commonly and 10% of those are commercial. Turkey is very rich in medical and aromatic plants. Local peoples of Turkey are

collected from natural resources. 347 species have commercial values. 30 percent of these plants are exported abroad about 30 000 ton/year. Turkey ranks third in the world for exporting medical and aromatic plants (Gul and Acar 2000).

*Origanum* species, exported medicinal and aromatic plants, are collected in Turkey, Greece, Italy, and other Mediterranean countries, and especially in Mexico (Hammer and Junghanns 1998, Kitiki 1996, Skoula and Kamenopoulos 1998). Also, the main countries supplying thyme are Spain and Turkey. France, Hungary and Poland are other countries which still harvest huge amounts of *Thymus* and *Origanum* from the wild (Lange 1998).

"Kekik" is one of the chief exports of medicinal and aromatic plant material from Turkey. The main production of kekik exports from Turkey includes *Origanum* species. Kekik trade is an important economic resource in West and South of Anatolia (Baser 1995). Turkey exports average 8000 tones dried kekik every year (Anonymous 2005). Additionally, 1000 tones of Kekik are consumed as condiments/culinary herbs and herbal tea and also around 1500 tone of them are used in essential oil production within Turkey (Baser 2001, Kirimer et al. 2003). Five species of Lamiaceae are traded in Turkey under the name kekik. Kekik is a collective term given in Turkish to plants smelling like thyme such as *Origanum*, *Satureja*, *Thymbra*, *Thymus* and *Corydorthymus* (Baytop and Baser 1995). Once dried and powdered, it is impossible to identify individual species.

Also *Satureja* (Lamiaceae), an important kekik genus, is traded under the Turkish name of "Sivri kekik". The *Satureja* genus is represented by 15 species in Turkey (Davis 1982, Tumen et al. 2000). There is not any detailed information about the usage and commercial capacity of *Satureja* species as herbal tea and condiments. However, there are some reports regarding the usage of *S. hortensis* L., *S. thymbra* L., *S. cuneifolia* Ten. and *S. spicigera* (C. Koch) Boiss. as condiments (Ozhatay et al. 1997, Tumen et al. 1997, 1998, Baytop 1999). It has been known that, between the above species only the *S. hortensis* is cultured for local usage in some parts of Turkey (Baser 2002). But, *Satureja*'s commercial capacity, the amount of gathered, local usage, incomes for rural and urban people involved in *Satureja* trade in Turkey were not known until now.

## MATERIALS AND METHODS

The research was conducted through collecting the sample plants in Balikesir, Izmir, Canakkale, Manisa, Denizli, Isparta, Burdur, Antalya, Karaman, Icel, Osmaniye, Adiyaman, Kirklareli, Amasya, Samsun, Giresun, and Ordu provinces of Turkey during April 2002-April 2004.

Commercial species of *Satureja* were collected, along with information on local names, usage, sorting, and grading methods, commerce and resources at various trade centers and local street marketplaces in 17 provinces of Turkey (Fig. 1). We met local people, traders and factory owners for determining especially the usage purposes of *Satureja* and its economical contribution. This information has been confirmed with 40 plant gathered, 11 brokers, 15 trader, 8 export company authorities, and other related people on the usage of *Satureja*. However, the most satisfactory way to collect information about the plants was to accompany and question the local people while they were gathering, harvesting and transporting.

The collected samples were identified from "Flora of Turkey and the East Aegean Islands" (Davis 1982). The identified specimens have been placed in the herbarium of the Arts and Science Faculty, Balikesir University.

## RESULTS

### Commercial *Satureja* (Sivri kekik) Species and Approximate Gathered Amounts

The study was prepared in 17 provinces, 20 towns and 40 villages where the *Satureja* species have large populations, during an ethnobotanical survey from 2002 to 2004. We have determined that *S. cuneifolia*, *S. hortensis*, *S. thymbra* and *S. spicigera* are gathered for trade, but *S. wiedemanniana* (Lallem.) Velen, *S. icarica* P.H. Davis, *S. coerulea* Janka, *S. cilicica* P.H. Davis, *S. boissieri* Hausskn. ex Boiss., and *S. pilosa* Velen are collected to be consumed as spices and herbal tea for the local people (Table 1). *S. cilicica* and *S. wiedemanniana* are endemics for Turkey.

An estimated 90% of *Satureja* species are gathered from Izmir and Denizli province in the Aegean region and Icel, Antalya province in the Mediterranean region of Turkey (Fig. 1). Although the total amount of *Satureja* gathered may change in each year depending on average annual precipitation, amount of total commercial *Satureja* species collected from Turkey is around 700-800 tones. 90% of collected *Satureja* consists of *S. cuneifolia* (600-700

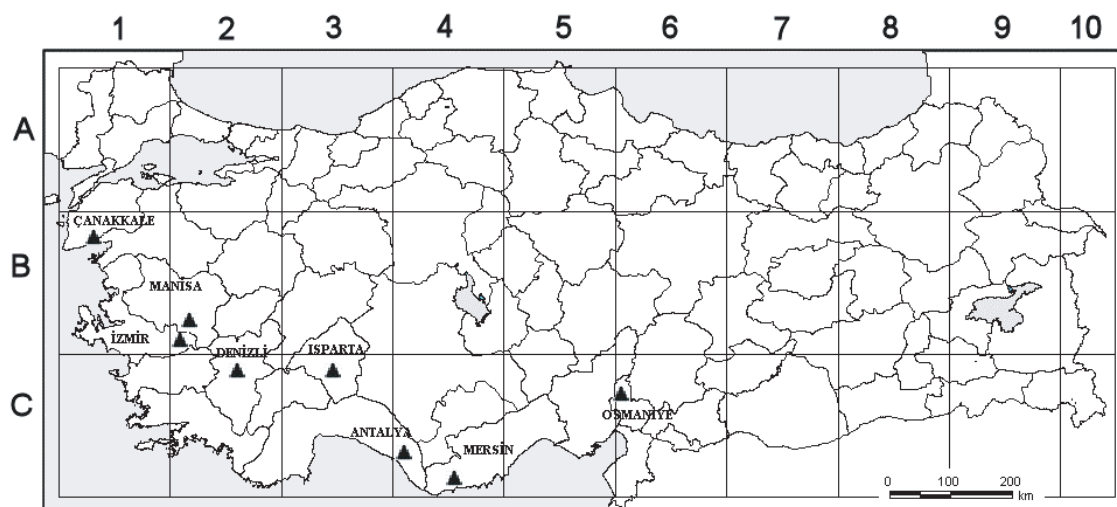


Fig. 1. The main collecting areas of commercial *Satureja* in Turkey (▲).

tones). Since its population is poor in natural growing area, the gathered *S. thymbra*, *S. hortensis*, *S. spicigera* are quite lower than *S. cuneifolia* (Table 1).

*S. hortensis*, second of the most intensively gathered species, is only annual species of the genus in Turkey. The growing area of this species is considerably wide. Also, it has been observed that the culture of this species is made, by the people called "muhacir" (emigrant) living in Thrace and Marmara regions, just for their own use.

#### Gathering of *Satureja* and Social Networks in Production

Gathering period of *Satureja* may change in each district depending on the climate and/or on the preference such as before or after flowering. Generally, gathering period of *Satureja* is between June and September. These species are gathered directly by the local people, especially, unemployed people with financial difficulties. However, the gathering of plants was exclusively women's work. They gather in groups and women are accompanied by their children, sometimes all the members of the family join this work. They use either a sickle (reaping hook) or a big knife with wooden handhold for gathering the aerial parts of plant, and carry in baskets made by *Phragmites* (reed) or nylon sacks to carry the plant. Although the people are not very careful for collecting only one *Satureja* species, mainly the *S. cuneifolia* is gathered. However the other *Satureja* species may be collected in neglectable amounts and thus they are not separated in harvesting fields. The plants are transported to

drying fields by trailers and horses (Fig. 2A). The plants with leaves and branches in flowers are spread over nylon on a suitable field for drying a few days. Bottom parts of the heaps are moved to upper side with harvesting fork a few times in a day for better drying of plants. One kg dry plant material is obtained from around four kg fresh plant. After drying, stems are separated and the other parts are sifted with a wire made sieve to remove useless parts. Dried and cleaned plant parts are put in an huge sacks and stored in shadow haylofts (Fig. 2B).

Sometimes local management hires out the naturally *Satureja* growing field to a person or a group by putting out to tender. The renter might be a local person or a foreigner, but the gatherers are usually chosen from local people.

We determined that rent about 500 ha field by paying 4 000 YTL (2 758 \$) per year and gathered around 100 tones from *S. cuneifolia*. After gathering of the plant, the renter pays around 70 Ykr per kg of plant to Environmental and Forestry Management.

The renters usually hire the workers daily and pay their wages around 15 YTL (10.3 \$) at the end of the day (or they pay certain amount between 150-250 Ykr per kg of the dried plant). Since the gathering period is generally about 30 days from August to September, a worker may earn 450 YTL (310 \$). A family with 5 members may gather around 10 tone in a season if the field is rich in *Satureja* plants, otherwise, this amount may decrease to 5 tone.

The gathered *Satureja* plants are sold to the



**Fig. 2.** A, B) *Satureja* collected from Izmir-Bozdag; C) A local street market places in Karaman (Photo F. Satil); D) Kekik water production and essential oil distillation by "imbik" in Denizli (Photo F. Ertug).

middlemen. They pack them in huge sacks and ship to the companies by trucks. Some villagers established a cooperative association, such as in Isparta-Sütcüler region, and sell their plants to the authorized person of the companies who offers the best price (Fig. 3).

In the factory, the plant is cleaned, packed in 10 kg bags, labeled, and then distributed throughout the country and abroad. The trading centers are located in Izmir, Denizli, Antalya and Istanbul.

Also, some villagers sell fresh/dried *Satureja* plants or their water in local street marketplaces in region (Fig. 2C).

#### **Vernacular Names and the Usage of *Satureja* Species by Local People**

*Satureja* species are mostly named as "Kekik", "Sivri kekik" and "Kilic kekik" by people in Turkey, since its lanceolat shaped leaves. However, these species are known with different names in various regions (Table 1). For example the word "Limon kekik" is addressed because of its specific lemon smell. Also, the name "cubriza", Bulgarian word, is called by the emigrants from Bulgaria.

We determined that *S. cuneifolia* and *S. hortensis* are extensively used as digestive, diuretic and throat curative during cold. Also, *S. cuneifolia*, *S. thymbra*, *S. cilicica*, *S. spicigera*, *S. wiedemanniana*, *S. boissieri*, *S. coerulea*, *S. pilosa*, and *S. icarica* are found as herbal tea and spices in the kitchen of local people (Table 1). *S. cuneifolia* is not only used as spice and medical purposes but also used for "kekik water" preparation. Kekik water is usually prepared by using the basic mechanism, which was invented and established by

the local people. This mechanism (basic equipment; still) is locally named as "imbik" (Fig. 2D).

#### **Traditional Procedure for Kekik Water Production and Essential Oil Distillation**

The apparatus "still" is used in villages in especially West Anatolia for small amount of distillations. The still consists of two copper vessels on the top of the other. The bottom vessel of about 9 L capacity contains plant material and water, the other vessel with approximately 2 L capacity on the top is filled with cold water and functions as a condenser. Its bottom is in concave shape. Essential oil is condensed in this concave part and is let out through a trough and a copper pipe. For efficient cooling, the water in the above vessel is frequently changed with cold water (Baytop and Baser 1995)

The produced kekik water is bottled in a liter bottles and sold in local street marketplaces approximately 2 YTL (1.4 \$) per liter (Fig. 2C). A family may produce around 1000 bottles of kekik water and this is quite important source of income for local people.

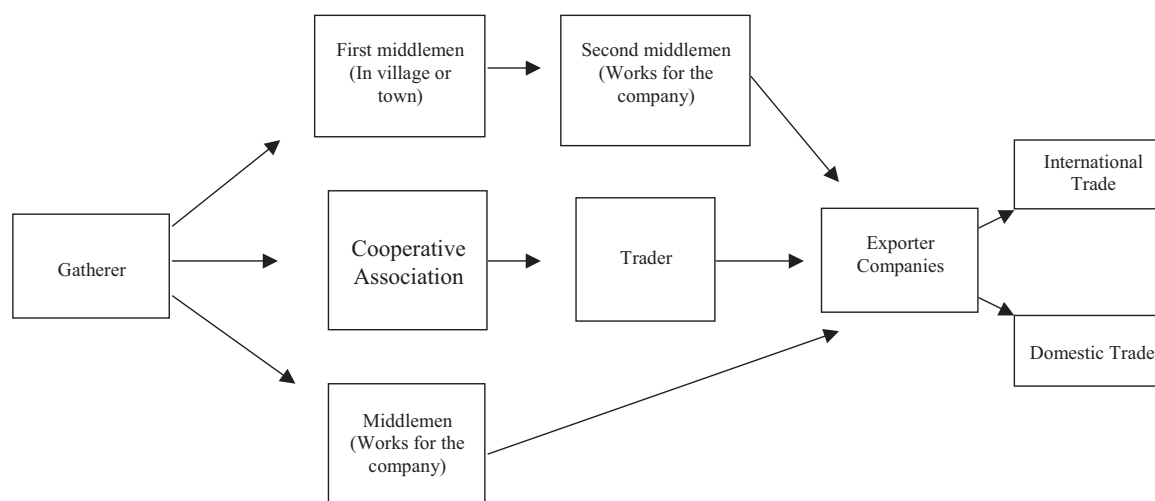
Kekik water is widely used after dilution for especially stomach and intestine discomforts in almost every district of Turkey (Baser 1995). It has been observed during interviews that the kekik water is believed to decrease cholesterol, blood sugar level and blood pressure.

#### **DISCUSSION**

There is not any detailed information about the usage and trade of *Satureja* in Turkey. To the best of our knowledge this is the first study on the trade and local usage of Turkish *Satureja*. There are some reports regarding the usage of *S. hortensis*, *S. thymbra*, *S. cuneifolia* and *S. spicigera* as condiments (Baytop 1999, Ozhatay et al. 1997). But, there are some study on traded plants smelling like thyme such as *Origanum* and *Thymus* species in the European countries. France, Hungary and Poland are other countries which still harvest huge amounts of *Thymus* and *Origanum* from the wild, although large-scale cultivation programmes are in progress (Lange 1998). *Origanum* species are collected in Turkey, Greece, Italy, and other Mediterranean countries (Hammer and Junghanns 1998, Kitiki 1996, Skoula and Kamenopoulos 1998). The main countries supplying thyme are Spain and Turkey. Unofficially, it is estimated that between two and three million kg of thyme are distilled annually for essential oils in Spain (Lange 1998).

**Table 1.** *Satureja* species gathered for commercial and traditional use purposes in Turkey.

<i>Satureja</i> species	Vernacular name	Locality	Estiamted Amount (Tone)	Use		
				Commercial	Medicinal	Spice
<i>S. cuneifolia</i>	Kekik, sivri kekik, klc kekik, yayla kekigi, dag kekigi, ar kekigi, seytan kekik	Balkesir, Canakkale, Manisa, Izmir, Denizli, Isparta, Burdur, Antalya, Karaman, Icel, Osmaniye	600-700	X	X	X
<i>S. wiedemanniana</i>	Kekik, sivri kekik, klc kekik, yayla kekigi	Amasya	-	-	X	-
<i>S. thymbra</i>	Sahil sivrisi, kara kekik, girit sateri	Izmir, Icel	50	X	X	X
<i>S. hortensis</i>	Kekik, supurge kekigi, cibriska, cubriza	Osmaniye	50	X	X	X
<i>S. cilicica</i>	Kekik, sivri kekik	Osmaniye	-	-	X	X
<i>S. spicigera</i>	Kekik, Trabzon kekigi	Ordu, Samsun, Giresun	10	X		X
<i>S. pilosa</i>	Limon kekik, kekik	Balikesir	-	-	X	-
<i>S. boissierii</i>	Catli, kekik	Adiyaman	-	-	-	X
<i>S. icarica</i>	Kekik	Canakkale	-	-	-	X
<i>S. coerulea</i>	Kekik, keklik otu	Kirklareli	-	-	X	-

**Fig. 3.** Social networks in trade of *Satureja*.

The Aegean and Mediterranean regions are the main areas of *Satureja* collection in Turkey (Fig. 1). *S. cuneifolia*, *S. thymbra*, *S. hortensis* and *S. spicigera* are gathered for trade. The amount of total commercial *Satureja* species gathered from Anatolia is around 700-800 tones per year. Also, *S. boissieri*, *S. coerulea*, *S. pilosa*, *S. icarica*, *S. wiedemanniana*, and *S. cilicica* are only gathered as spices and herbal tea for the local people (Table 1).

Trade of *Satureja* is an important source of income for people in local region. *Satureja* species are gathered directly by unemployed people with financial difficulties. Although, the number of middlemen between the gatherer and the companies affect the income of local people. The rate of profit decreases when more than one middlemen is in charge in *Satureja* trade network. Unless local people

organize and establish cooperative associations, the middlemen and companies will carry on taking the advantage of having the biggest portion of the profit.

Commercial *Satureja* species are not listed in the CITES Appendices and EC Habitats Directive. But, according to IUCN, the endemic *S. cilicica* and *S. wiedemanniana*, which is not gathered for commercial reasons and only used by the local people. *S. cilicica* takes part in NT (Near Threatened) category. However, *S. wiedemanniana* takes part in LC (Least Concern) category. Also, *S. boissieri* and *S. coerulea*, which are not endemic plants, take part in VU (Vulnerable) and EN (Endangered) categories, respectively (Ekim et al. 2000, Anonymous 2001, Satil et al. 2003). Although *S. wiedemanniana* are under the low risk, *S. coerulea*, *S. boissieri* and *S. cilicica* face to high risk factors.



Authorities must educate and warn the local people, regarding to protect the mentioned plants under the risk.

Threats to *Satureja* species in Turkey include over-exploitation, destructive harvesting techniques such as pulling out whole plant from root, habitat loss, and decrease in genetic diversity. It has been observed that, there is not a serious threat factors for *Satureja* populations in near future. However, particularly in last decade, since most of the *Satureja* species are intensively collected for trade during flowering period, the seed production of the plant is prevented. Therefore, regeneration of the population is negatively affected, and the generations of the plants may be under risk in long period. Prohibitions or restrictions on their collection are needed. As a precaution; the natural growing area of *Satureja* are must be divided into 2 parts and each year alternately by local management. For example *Thymus loscosii*, *T. albicans* and *T. carnosus* receive legal protection in Spain, but others which are considered rare, such as *T. antoninae*, *T. herbarbarona* subsp. *bivalens* and *T. richardii*, are not (Blanco et al. 1999). Collection and trade of several species of thyme is subject to authorisation in Andalucia and Valencia (Lange 1998).

The other risky matter is collection of the *Satureja* species before flowering period. In case of earlier reap, both the product and the essential oil amounts will be less than the flowered plants. The

best gathering period is flowering period (July-September). Therefore, the middleman, local management and companies may determine the best gathering period for *Satureja* species. Also, most of the gatherer should pay attention to this reasonable decision.

The natural growing fields of *Satureja* are converted to arable fields in some regions. *S. cuneifolia* is under serious threat in some plateaus such as Icel-Anamur and Abanoz, since these plateaus are opened to build constructions and converted to arable fields.

Culturing of the *Satureja* species must be encouraged and supported by related institutions. Only *S. hortensis* is cultivated for local usage in some provinces of Turkey. Preferred essential oil amount in the plant by companies is minimum 2.5%. Also, the carvacrol, which is the main component of essential oil, ratio must be minimum 60% (Baser 2001). Therefore, *S. cuneifolia* must be suggested for cultivation by the people, because it has the highest carvacrol ratio among *Satureja* species (Baser et al. 2000). By culturing the *Satureja* species, it has been planned that, the production amount, the quality and standardization will be increased, the only one species will be separately produced in each field, and the product will be purer and cleaner.

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