

PAPER DETAILS

TITLE: OUTER AND INNER MORPHOLOGICAL CHARACTERISTICS OF SATUREJA &
THYMBRA TAXA EXPORTED AS OREGANO FROM TURKEY II

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Outer and inner morphological characteristics of *Saturea* and *Thymbra* taxa exported as Oregano from Turkey II

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Abstract

Oregano, a collective name of a group of taxa that has been used as spice. Different genera and species of the family Lamiaceae that contain thymol and carvacrol are being used as oregano. In Turkey, there are 9 taxa that belong to 3 genera which are being exported as oregano. In the outer and inner morphological characteristics of the taxa *Satureja thymbra* L., *Satureja cuneifolia* Ten., *Thymbra capitata* (L.) Cav. and *Thymbra spicata* L. subsp. *spicata* which are exported as oregano have been reported. Distribution maps of the four taxa have been presented based on the examined specimens kept in the 15 herbaria. The specimens are listed in the appendix and local usage and vernacular names are shown as tables.

Keywords

Anatomy, morphology, oregano, *Satureja*, *Thymbra*, Turkey.

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INTRODUCTION

Oregano is a collective name of a group of taxa in which different genera and species of the family *Lamiaceae* that contain thymol and carvacrol are present. These taxa are used as spice and known as “kekik” in Turkish and are very important exported plants in Turkey. Oregano has been used in Anatolia since the 7th century BC as a spice and for medical treatment (Sadikoglu and Ozhatay 2015). Various studies observed the position of these plants in nature and the place of oregano in the trade (Kirimer *et al.* 2003; Duzenli and Karaomeroglu 2003; Tumen *et al.* 2003; Gemici 2003). Oregano species are collected in Turkey and their trade is an important source of income.

In Turkey, 9 taxa are being exported as oregano. These are: *Origanum minutiflorum* O. Schwarz & P.H. Davis, *O. majorana* L., *O. onites* L., *O. syriacum* L. subsp. *bevanii* (Holmes) Greuter & Burdet, *O. vulgare* L. subsp. *hirtum* (Link) Ietsw., *Satureja thymbra* L., *S. cuneifolia* Ten., *Thymbra capitata* (L.) Cav. (Syn. *Coridothymus capitatus* (L.) Rchb.f.) and *T. spicata* L. subsp. *spicata*. The taxa that belong to the genus *Origanum* are round-leaved where as those that belong to *Satureja* and *Thymbra* are acute-leaved. The major genus *Origanum* taxa have recently been published (Sadikoglu and Ozhatay 2015). In this paper, outer and inner morphological characteristics of exported

Satureja and *Thymbra* taxa have been presented together with their local name, usage and distribution in Turkey. *Coridothymus* was represented by only one taxon in Turkey. It was a monotypic genus but according to the latest systematic changes *Coridothymus capitatus* (L.) Rchb.f. is called as *Thymbra capitata* (L.) Cav. (Güner *et al.* 2012). Flavonoid analysis supports the close relationships of a taxon, such as the *Coridothymus capitatus* taxa, also known as *Thymus capitatus* (L.) Hoffm. & Link and *Thymbra capitata* (L.) Griseb. According to micro-morphological and caryological data, it has been suggested to be named as *Thymbra capitata*. The presence of flavonoid aglycones in this taxon is the same as those of other *Thymbra* species, but different from those of the *Thymus* species (Barberan and Gil 1992). According to another study that investigates difference between *Thymus* and *Thymbra* species, it was determined that the naming as *Thymbra capitata* was not accurate because of the convexity of the calyx and the absence of the 13-veins in the calyx (Tanker and Ilisulu 1981). In Turkey, the genus *Satureja* is represented by 15 taxa and 5 of them are endemic. The genus *Thymbra* is represented by 5 taxa and 1 of them is endemic (Güner *et al.* 2012). Endemic or rare taxa are also sold in the open markets for various usages.

MATERIALS AND METHODS

Flowering and fruiting specimens were collected in Adana, Antalya, Balıkesir, Burdur, Canakkale, Hatay, Isparta, Izmir, Kırklareli, Malatya, Mersin, Mugla, Van and Yalova provinces during June-September periods in 2001-2004. Specimens were identified by Narin Sadikoglu and kept in the Herbarium of Istanbul University Faculty of Pharmacy (ISTE).

ADA, AEF, ANK, EGE, ESSE, GAZI, HUB, ISTE, ISTF, IZEF, MARA, MARE, MUFE, VANF and INU herbaria were visited. The taxa that are exported and used as oregano in Turkey were investigated in detail. All examined specimens were presented in the appendix. Oregano specimens collected and fixed in 70% ethanol since 1996 were the material of the anatomical part which are housed in ISTE. Morphological drawings were made by Olympus SZH10 stereomicroscope. Anatomical drawings were made by Leitz SM-LUX binocular microscope with Leitz Weitzler drawing tube. Photographs were taken by Olympus BH2 trinocular

photomicroscope. Anatomical sections were taken by hand from the leaves of the plants. Leaves are cleared by using 15% sodium hypochlorite for 15 minutes. Sections were stained in 1% safranin and mounted in chloral hydrate: glycerol: water (8:2:1). For transverse sections, leaves were placed in Jeffrey's solution (10% aqueous nitric acid and 10% aqueous chromic acid [1:1]) for 1 week at room temperature until the epidermis began to separate (Berlyn and Miksch 1976). Segments of epidermis with the attached outermost cell layer of cortical parenchyma were collected, washed in water and the tissue is mounted.

Stomata amount per mm² were established and stomata index both upper and lower surfaces were calculated for using the formula of $SI = (\text{Stomata amount} / \text{Epiderm cell} + \text{Stomata amount}) \times 100$. Averages of the counts were determined for 10 specimens obtained from 10 plants for 10 views of each. Palisade ratio and areoles per mm² were also established for the preparations of powdered oregano (Sener *et al.* 1985).

RESULTS

According to our observations, the exported *Satureja* and *Thymbra* taxa were distributed in the west, south and north of Turkey and they are used as spice, herbal tea and remedies. Local usages of each taxa are listed in the Table 1.

Table 1: Local names and usage of *Satureja* and *Thymbra* taxa that are exported as oregano.

Scientific name	Local name	Local usage
<i>Satureja thymbra</i>	Sahil sivrisi, kılıç kekiği, sivri kekik, taş kekiği	Spice
<i>S.cuneifolia</i>	Sivri kekik, kılıç kekik, yayla kekiği, dağ kekiği, aş kekiği, taş kekiği, kaya kekiği, çorba kekiği, yabani kekik	Oil, spice, herbal tea
<i>Thymbra capitata</i>	Timari, sivri kekik	Spice, herbal tea
<i>T. spicata</i> subsp. <i>spicata</i>	Zahter, sivri kekik, at kekiği, mor kekik, aş kekiği	Skin disorders, sedative, analgesic, cold, antitussive, antirheumatismal, hyperglisemia, antihypertansive, hypercholesterolemia, gastrointestinal disorders, fuel, spice, herbal tea

Outer morphological characteristics and distribution

1. *Satureja thymbra* L.

Type: Described from Crete (Hb. Linn. 723/2 photo!).

Main diagnostic morphological characteristics are:

Bracteoles ovate, acuminate-aristate, long-ciliate; leaves linear- to ovate-spathulate; calyx actinomorphic; corolla mauve or purple, 8-12 mm (Figure 1). The distribution of *Satureja thymbra* is shown in Map 1.

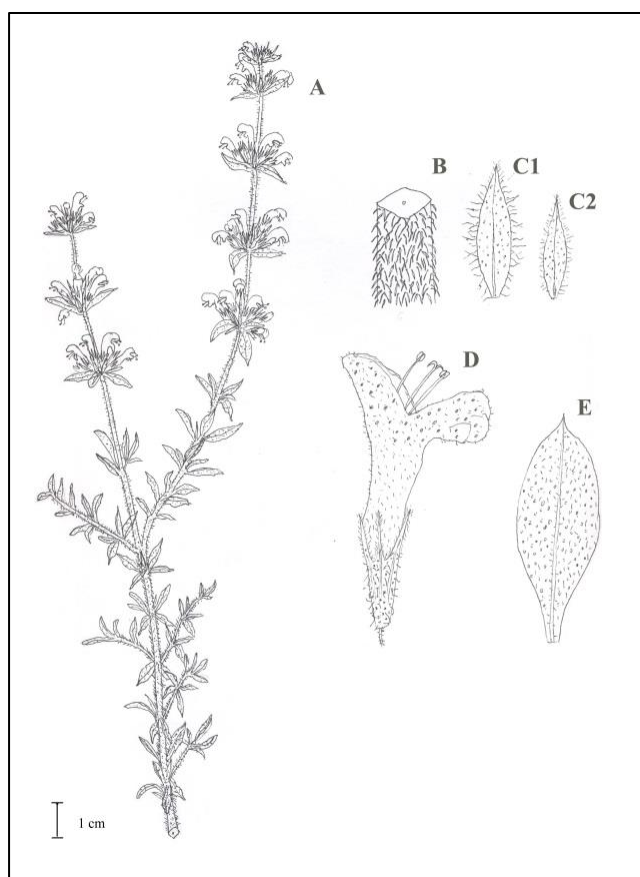
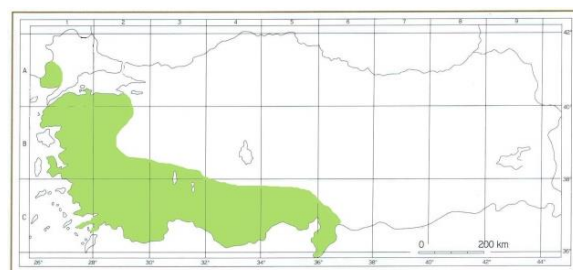


Figure 1: *Satureja thymbra* (ISTE 19137). A. general view, B. stem, C. bract, D. flower, E. leaf.



Map 1: Distribution of *Satureja thymbra* in Turkey.

Flowering period: April-July

Habitat: Dry scrub, especially calcareous phrygana, sl.-400 m.

Distribution in Turkey: West and South Turkey (Map 1)

General distribution: Sardinia, Greece, Aegean, W. Syria, Cyprus, Cyrenaica. East Mediterranean element.

2. *Saturea cuneifolia* Ten.

Type: Described from Italy (holo. NAP).

Main diagnostic morphological characteristics are:

Bracteoles linear, not ciliate; leaves cuneate towards base, broadest towards apex; calyx sub-bilabiate nearly to middle; corolla mostly white, 6-8 mm (Figure 2). The distribution of *Satureja cuneifolia* is shown in Map 2.

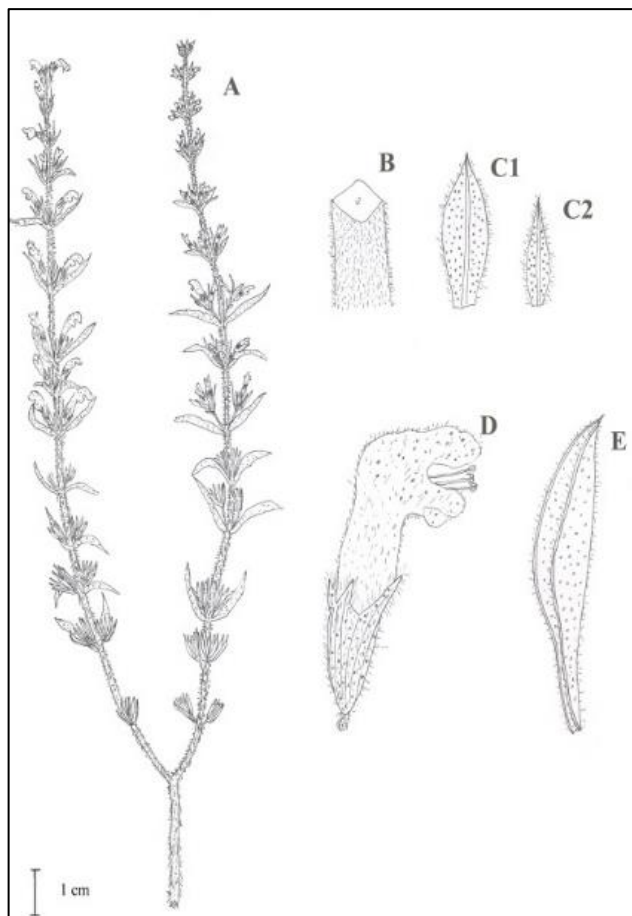
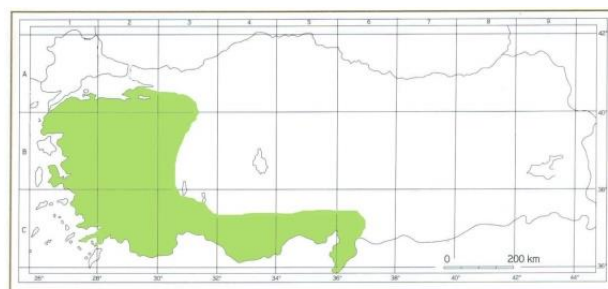


Figure 2: *Satureja cuneifolia* (ISTE 52634). A. general view, B. stem, C. bract, D. flower, E. leaf.



Map 2: Distribution of *Satureja cuneifolia* in Turkey.

Flowering period: July-August

Habitat: Rocky slopes, on schist and limestone, cliffs, 300-2000 m.

Distribution in Turkey: West and South Turkey (Map 2)

General distribution: Spain, Italy, Yugoslavia, Albania, Greece, Lebanon, N. Iraq, Turkey. Mediterranean element.

3. *Thymbra capitata* (L.) Cav. Syn. *Coridothymus capitatus* Rchb.f.

Type: Described from Baetica (Andalucia), Crete, Hispalis (Seville) and Greece (Hb. Linn. 723/11 photo!).

Main diagnostic morphological characteristics are:

Calyx tube dorsally compressed, with two ciliate flanges. Inflorescence capitate; calyx 20-22-veined; leaves 4-10 mm, subtriquetrous (Figure 3). The distribution of *Thymbra capitata* is shown in Map 3.

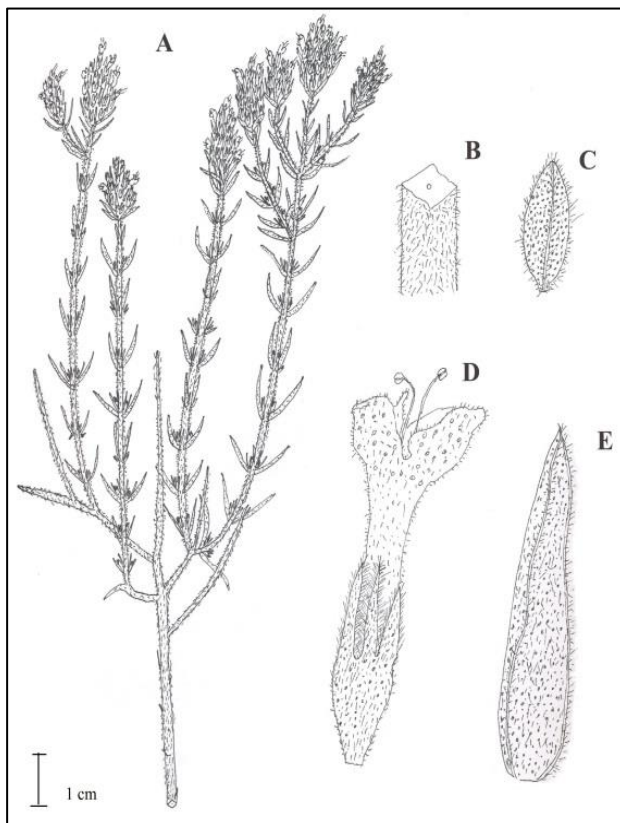
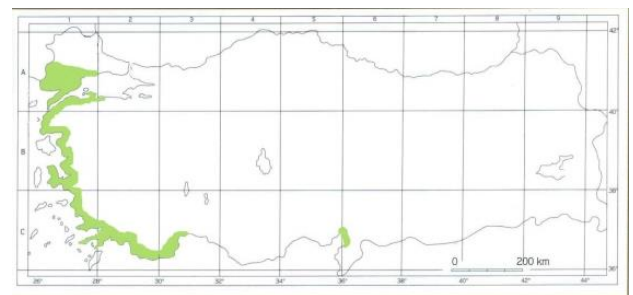


Figure 3: *Thymbra capitata* (L.) Cav. (ISTE 81671).
A. general view, B. stem, C. bract, D. flower, E. leaf.



Map 3: Distribution of *Thymbra capitata* in Turkey.

Flowering period: May-October

Habitat: Costal phrygana, open macchie, s.l.-1400 m.

Distribution in Turkey: West Turkey, South Anatolia (Map 3)

General distribution: Greece, Italy, Turkey.
Mediterranean element.

4. *Thymbra spicata* L. subsp. *spicata*

Type: Described from Macedonia: Libano (Hb. Linn. 724/1 photo!).

Main diagnostic morphological characteristics are:

Calyx tube dorsally compressed, with two ciliolate flanges. Inflorescence spicate; calyx 13-veined; leaves to 20 mm, conduplicate (Figure 4). The distribution of *Thymbra spicata* is shown in Map 4.

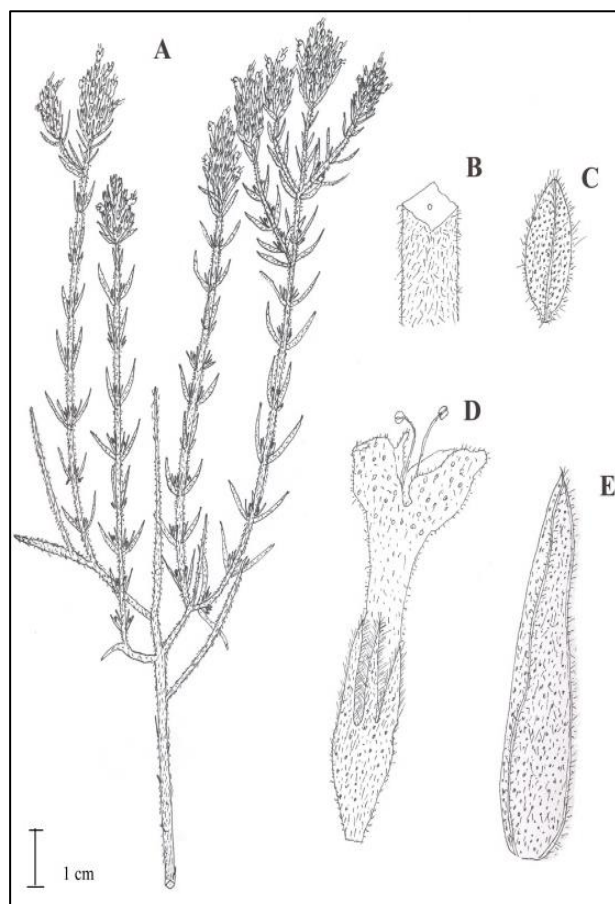
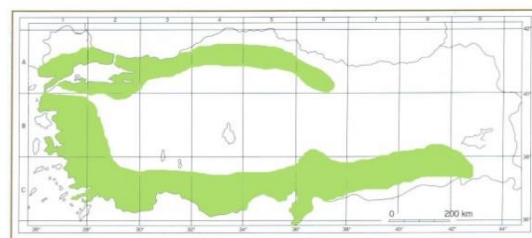


Figure 4: *Thymbra capitata* (L.) Cav. (ISTE 81671). A. general view, B. stem, C. bract, D. flower, E. leaf.



Map 4: Distribution of *Thymbra spicata* subsp. *spicata* in Turkey.

Flowering period: June-July

Habitat: Dry often rocky places (usually calcareous), in scrub, phrygana, steppe, s.l.-1000 m.

Distribution in Turkey: North, West and South Turkey, SE Anatolia (Map 4)

General distribution: Greece, Aegean, Cyprus, W. Syria, N. Iraq.
East Mediterranean element.

Inner morphological characteristics of leaves

1. *Satureja thymbra* L.

On the superficial section, both upper and lower epidermal cells are straight. Hairs have cuticular patterns, 1-2 celled, contain crystals very densely. Labiatae type glandular hairs per cm^2 are 400-(630)-1200 on epidermis. Stomata occur on both upper and lower epidermis (amphistomatic) that are usually in same density. Stomata amount is established per mm^2 as 800-(1090)-1500 on the lower surface and as 500-(850)-1500 on

the upper surface. On the cross-section, guard cells are on the same level with the epidermis cells (mesomorphic stomata). Subsidiary cells are 2. Stomata index is established 95.11 for the lower surface and 94.33 for the upper surface. Palisade ratio in powdered specimens is established 4.5, areoles per mm^2 is 7. Under the upper epidermis 4-5 layered collenchyma tissue is present (Figure 5).

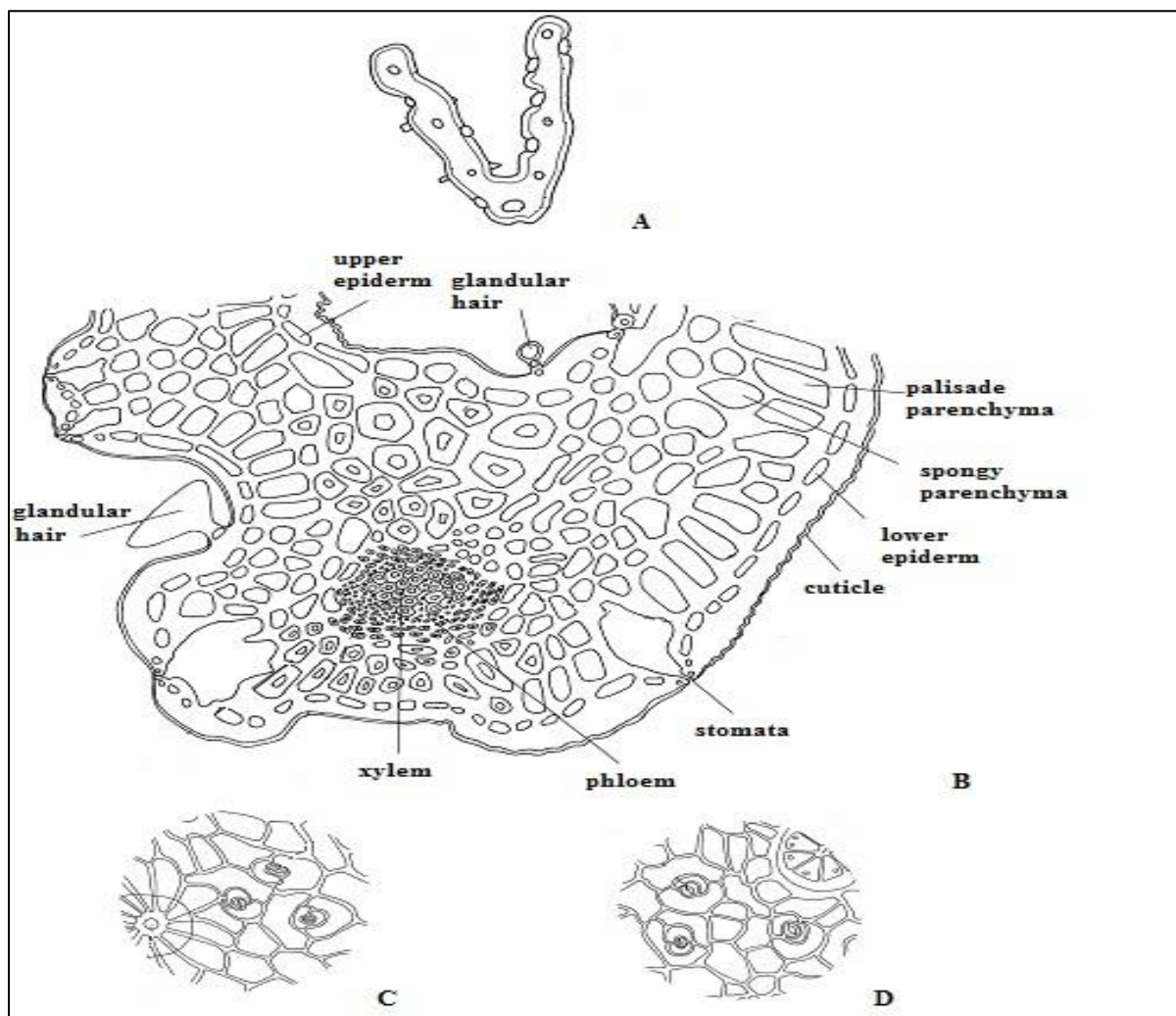


Figure 5: *Satureja thymbra* (Narin/kekik/051). A. Cross-section of leaf (x80), B. Middle vessel (x450), C. Lower surface of epidermis (x225), D. Upper surface of epidermis (x225).

2. *Satureja cuneifolia* Ten.

On the superficial section upper epidermal cells are straight, lower ones are slightly undulate. Hairs are 1-4 celled, contain crystals very densely. Labiatae type glandular hairs per cm² are 400-(710)-1000 on epidermis. Stomata occur on both upper and lower epidermis (amphistomatic) and are denser on the upper surface. Stomata amount is established per mm²: 600-(1030)-

1700 on the lower surface and, 1300-(2120)-3200 on the upper one. On the cross-section, guard cells are on the same level with the epidermis cells (mesomorphic stomata). Subsidiary cells are 2, rarely 3, very rarely 4. Stomata index is established 92.29 for the lower surface and as 96.14 for the uppers. Palisade ratio in powdered specimens is established as 3.35 and areoles per mm² is 5.17 (Figure 6).

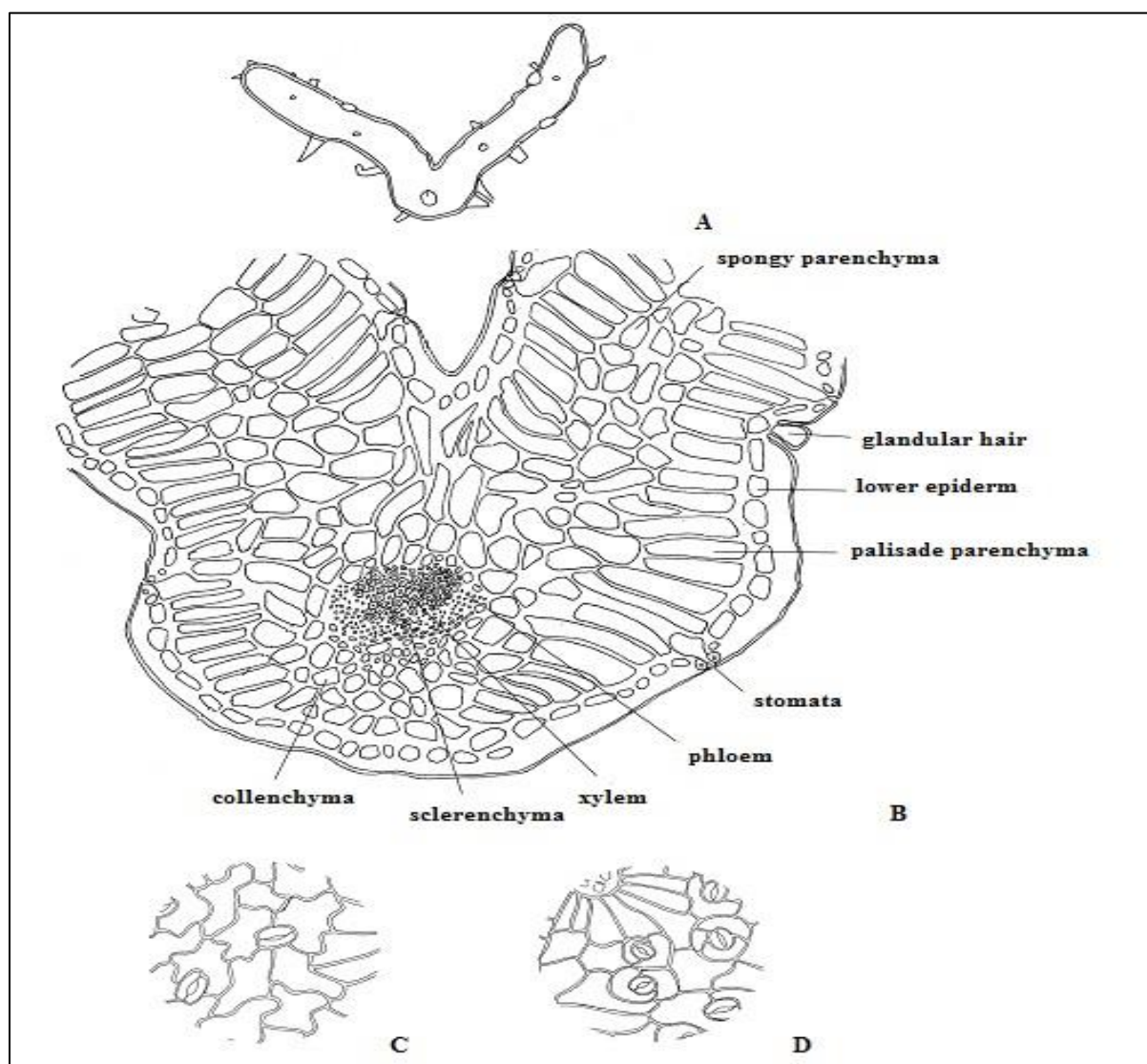


Figure 6: *Satureja cuneifolia* (Narin/kekik/051). A. Cross-section of leaf (x80), B. Middle vessel (x450), C. Lower surface of epidermis (x225), D. Upper surface of epidermis (x225).

3. *Thymbra capitata* (L.) Cav.

On the superficial section both upper and lower epidermal cells have straight walls. Epidermis cells of the upper surface are slightly bigger than those of the lower surface. Hairs have cuticular patterns, are 1-3 celled, and contain crystals very densely. Labiate type glandular hairs per cm² are 400-(590)-1200 on epidermis. Stomata occur on both upper and lower epidermis (amphistomatic) and are denser on the upper surface. Stomata amount is established per mm² as 300-(1070)-1600 on the lower surface and as 600-(1230)-1700 on the upper surface. On the cross-section,

guard cells are on the same level with the epidermis cells (mesomorphic stomata). Subsidiary cells are 2. Stomata index is established as 92.48 for the lower surface and 92.76 for the uppers. Palisade parenchyma is 1-layered and spongy parenchyma is 1-3 layered. Palisade ratio in powdered specimens is established as 3.8, areoles per mm² is 4.25. Below the lower and upper epidermis, 1-layered palisade parenchyma and 1-3 layered irregular parenchyma cells are present. A few collenchyma cells were observed on the lower surface (Figure 7).

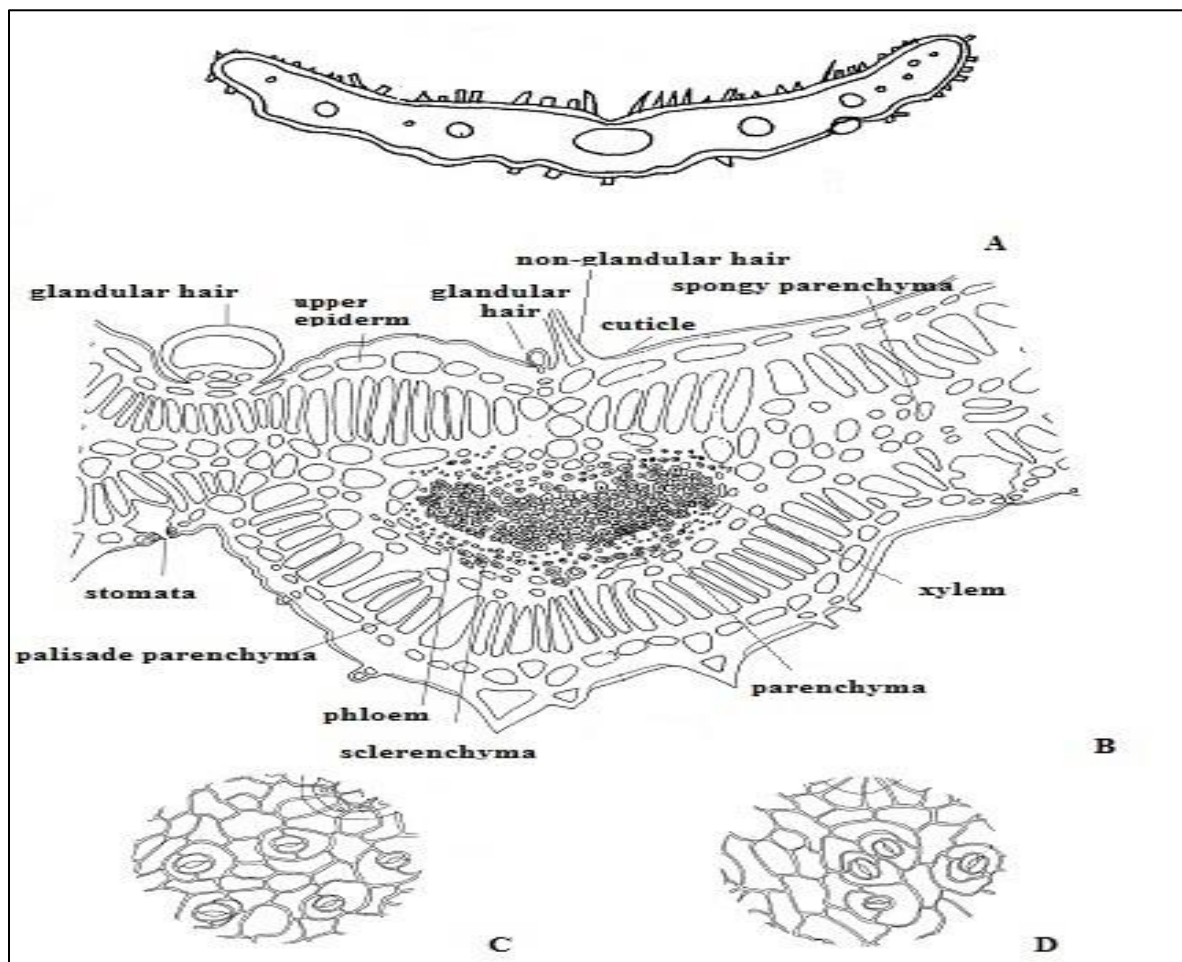


Figure 7: *Thymbra capitata* (Narin/kekik/097). A. Cross-section of leaf (x60), B. Middle vessel (x450), C. Lower surface of epidermis (x225), D. Upper surface of epidermis (x225).

4. *Thymbra spicata* L. subsp. *spicata*

On the superficial section, the walls of the upper epidermal cells are thicker than those of lower epidermal cells and both of them are straight. Epidermis cells of the upper surface are bigger than the lowers. Hairs have cuticular patterns, are 1-3 celled, and contain crystals very densely. Labiatae type glandular hairs per cm² are 1600-(2150)-2700 on epidermis. Stomata occur on both upper and lower epidermis (amphistomatic) that are denser on the upper surface. Stomata amount is established per mm² as 700-(1190)-1700 on the lower surface and, 400-(1180)-2100 on the upper one. On the cross-section, guard cells are upper than

the epidermis cells (higromorphic stomata). Subsidiary cells are 2. Stomata space is evident. Stomata index is established as 95.35 for the lower surface and as 94.93 for the uppers. Palisade parenchyma is 1-layered, spongy parenchyma is 1-2 layered. Palisade ratio in powdered specimens is established as 4.8, areoles per mm² is 3.85. Below the lower and upper epidermis, 1-layered palisade parenchyma and 1-3 layered irregular parenchyma cells are present. Less sclerenchymatous tissue occur on the upper and lower of midrib. Tracheary elements and thin walled parenchyma cells between them are on the xylem (Figure 8).

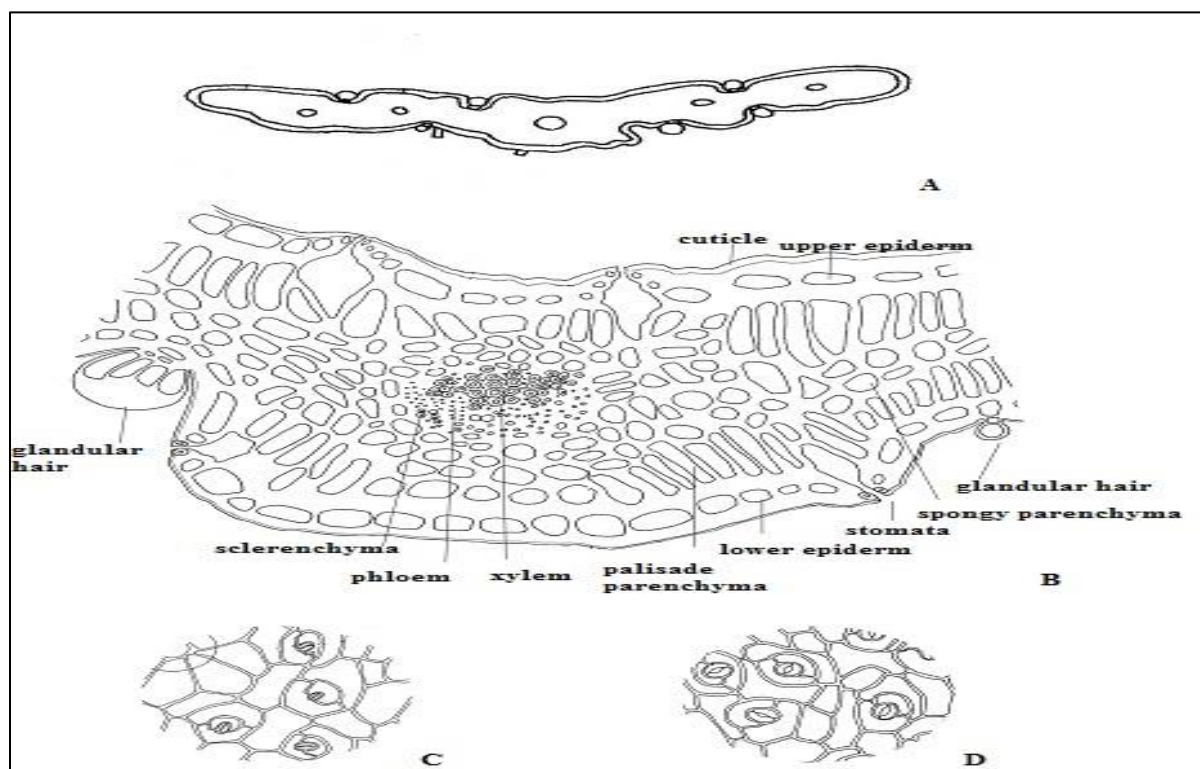


Figure 8: *Thymbra spicata* L. subsp. *spicata* (Narin/kekik/053). A. Cross-section of leaf (x75), B. Middle vessel (x450), C. Lower surface of epidermis (x225), D. Upper surface of epidermis (x225).

DISCUSSION

The findings of studied taxa are in compatible with the literature (Kaya *et al.* 1994; Tanker and Ilisulu 1981; Erken 2001). The *Thymbra spicata* subsp. *spicata* taxa collected from many populations were shown to reveal high morphological polymorphism. It is determined that these are not local. The differences of these taxa would be clarified by biosystematical investigations. Leaves are isobilateral. In all species lateral veins are not prominent. Anatomically, the lateral veins have the same structure with the midrib but the vascular bundles are reduced. *S. thymbra* has thick walls, 1-3 celled hairs and much prominent cuticular patterns. In *S. cuneifolia*, hairs are 1-3 celled and has thick walls, there are no cuticular patterns, and subsidiary cells are 2-3 or 4. In *T. capitata*, hairs are 1-3 celled and prickly hairs are

dense and the outlines of the anticlinal walls are straight. Differences in morphological characteristics of examined *Satureja*, and *Thymbra* taxa are summarised in the Table 2. *T. spicata* subsp. *spicata* has sparsely hairs and straight anticlinal walls, subsidiary cells are smaller on the lower surface. *T. spicata* subsp. *spicata* is the species which has the densest glandular hairs and the sparsest non-glandular hairs. *T. capitata*, has sparse glandular hairs. The glandular hairs are smallest in both *S. thymbra* and *T. capitata* species. *S. thymbra* has the densest cuticular patterns. *S. cuneifolia*, has the densest stomata amount on the upper surface. The crystals are densest in *T. spicata* subsp. *spicata* and *T. capitata* species. The differences of anatomical characteristics are summarised in the Table 3.

Table 2: Morphological differences of examined *Satureja* and *Thymbra* taxa.

	<i>Satureja thymbra</i>	<i>Satureja cuneifolia</i>	<i>Thymbra capitata</i>	<i>Thymbra spicata</i> subsp. <i>spicata</i>
Colour (dried and powdered)	 Brownish green	 Dark green	 Light green	 Green-purple
Hairs	Minutely recurved	Minutely recurved	Canescent	Minutely recurved on two opposite sides
Leaves	9-9.5×2.8-5.5 mm; cuneate-oblongate; apex acute, mucronate; entire, conduplicate; lateral veins not prominent	3-15×1-8 mm; cuneate-oblongate; apex acute, mucronate, subobtus; entire, conduplicate; lateral veins not prominent	6-10×1-1.2 mm; triangular-linear; apex acute, entire, deltoid, lateral veins not prominent	3-15×1-3 mm; linear, linear-lanceolate; apex acute, entire, conduplicate; lateral veins not prominent
Inflorescence	Distant verticillate	Spicate	Capitate	Spicate
Bracts	Oblong-elliptic	Linear-lanceolate	Ovate	Elliptic-lanceolate
Calyx	Tubular-campanulate, 2-lipped	Tubular-turbinate, slightly 2-lipped	Dorsally flattened, 2-lipped	Dorsally compressed, 2-lipped

Table 3: Anatomical differences of leaves of *Satureja* and *Thymbra* taxa.

Characteristics	<i>Satureja thymbra</i>	<i>S.cuneifolia</i>	<i>Thymbra capitata</i>	<i>T.spicata</i> subsp. <i>spicata</i>
Palisade ratio	4.5	3.35	3.8	4.8
Areoles per mm ²	7	5.17	4.25	3.85
Stomata amount per mm ² (L/U)*	1090/850	1030/2120	1070/1230	1190/1180
Stomata index (L/U)*	95.11/94.33	92.29/96.14	92.48/92.76	95.35/94.93
Glandular hairs (no stalk) per mm ²	630	710	590	2150
Subsidiary cells	2	2-4	2	2
Collenchyma (lower epidermis)	2	2	Several cells one by one	-
Collenchyma (upper epidermis)	4-5	4-5	Several cells one by one	-
Palisade parenchyma	2-layered	2	1	1
Spongy parenchyma	1-2	1-2	1-2	1-2
Hairs	1-2	1-4	1-3	1-3
Glandular hairs	Head 1, stalk 1-celled	Head 1, stalk 1-celled	Head 1, stalk 1-celled	Head 1, stalk 1-celled
Sclerenchyma	1	2-3	1	1
Collenchyma (corner)	8	5-7	5-6	6-7
Collenchyma	1-3	1-3	2-3	2-3
Floem	3-5	8	5-6	3-4
Cuticle (L/U)*	Smooth, slightly undulate / smooth	Slightly undulate / smooth	Smooth / smooth	Smooth / smooth
Epidermis cells (L/U)*	Big / small	Big / small	Small / big	Small / big

* (L/U) : Lower/upper

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Appendix

Examined specimens;

Satureja thymbra L.

A1(E) Edirne: Kaya kö., Kınak mevkii, 26.v.1996, G. Tümen (ESSE 12805)! **B1 Balıkesir:** Edremit-Avcılar kö, 250 m, 9.v.1966, (EGE 5291)! Alibey adası, Alibey Tepe batısı, 180 m, 26.v.1997, K. Alpınar (ISTE 74190)! **İzmir:** Makilik, Sığacık, Seferihisar, 15.v.1993, E. Saver (IZEF 1150)! d. Seferihisar, Sığacık-Teos, 15.v.1993, N. Zeybek (IZEF 1233)! Bergama, 26.vi.1977, İ. Akbulut (IZEF 2172)! Kemalpaşa, Kızılüzüm kö., 200 m, 27.v.1996, E. Saver (IZEF 4061)! Seferihisar-Terkos, ca. 0-50 m, 16.v.1986, (EGE 21800)! Çimentaş, 15.iv.1966, (EGE 5085)! Hills N of Bornova, 2.v.1969, (EGE 7884)! Hills NE of Bornova, 15.v.1969, (EGE 4305)! Çeşme, 7.iv.1968, (EGE 3336)! Balıklıova-Mordoğan, 5.i.1966, (EGE 5431)! **Manisa:** Üçpınar-Gediz, Muhtarlık özel alanı, 06.v.1995, U. Zeybek (IZEF 3296)! Soma, orta istasyondan 200 m yukarısı, ca. 400 m, 12.v.1977, (EGE 26032)! **C1 Aydın:** Ortaklar-Çamlık, 300 m, 12.v.1967, (EGE 6359)! Kuşadası yolu üzeri, 6.xi.1967, (EGE 4690)! Kuşadası, Kalamaki deresi, c. 200 m, 12.v.1968, (EGE 6109)! Paşa yaylası, c. 250 m, 27.ix.1965, (EGE 6051)! Samsundağı, above Güzelçamlı, 29.v.1969, (EGE 4407)! Akköy, Söke-Didim, Yenihisar'a 5 km kala, 3.iv.1995, (EGE 18996)! Germencik-Ortaklar kasabası, Öğretmen Lisesi çevresi, 27.v.1993, G. Tümen (ESSE 10479, 10487)! Kuşadası-Davutlar Milli parkı, kanyan bölgesi, 13.v.1995, N. Öztürk (ESSE 11701)! Kuşadası yolu, Kuşadası yakını, kayalık sırtlar, 9.iv.1971, A. ve T. Baytop (ISTE 19137)! Didim yolu, Didim'e 10 km kala, maki arası, 10.iv.1971, A. ve T. Baytop (ISTE 19192)! Dilek Yarımadası, 100 m, 11.vi.1982, M. Miski, E. Bütün (ISTE 48944)! **İzmir:** d. Selçuk, 3-4 km N Yoncaköy, 250 m, 26.v.1993, U. Zeybek (IZEF 1219)! Samsun D., Güzel çamlı üstleri, 520 m, 5.vii.1989, E. Tuzlacı (MARE 1970)! **Muğla:** Bodrum-Mumcular, 01.i.1950, M. Polat (IZEF 1757)! Datça, 19.vii.1966, (EGE 6034)! Bodrum, Gököy yakını, Cennet koyu çevresi, E. Tuzlacı (MARE 8540)! Yalıkavak-Bodrum yolu 3. km, yol kenarı, 10.v.1995, N. Öztürk (ESSE 11699)! Datça, Bozdağ (Kocadağ), Mesudiye kö. üstleri, 600 m, 3.vii.1983, E. Tuzlacı (ISTE 51504)! Datça- Marmaris, Datça'dan 13 km, Gebekum mevkii, d.s. kumullarda, 5.vii.1983, E. Tuzlacı (ISTE 51589)! Datça, Kocadağ kuzey etekleri, Karaköy yakını, d.s., 12.v.1984, E. Tuzlacı (ISTE 53318)! Datça-Knidos, Datça'dan 10 km, kireçtaşlı sırtlar ve tepelerin rutubetli kuzey yüzü, 5.iv.1995, A.J. Byfield, D. Pearman B 1501 (ISTE 68850)! **C2 Antalya:** Kaş 5 km, 26.vii.1960, Khan et all. 188 (ANK)! **Burdur:** Dirmil-Fethiye, 51 km S Dirmil, 1000 m, 20.vi.1981, Max Nydegger 16330 (HUB 22691)! Kaş, 22.v.1967, T. Baytop (ISTE 12280)! Kaş Fethiye yolu, Fethiye'ye 90 km, 22.iv.1978, A. ve T. Baytop (ISTE 39063)! Kalkan Kaş yolu, Kalkan yakını, Kalkan'a 3 km, 120 m, 5.v.1980, A. ve T. Baytop, A. Attila, N. Sütlüpinar (ISTE 44163)! **Muğla:** d. Marmaris, 6 km W Reşadiye, 15.v.1997, E. Saver, N. Zeybek (IZEF 4929)! Fethiye, Kemer bucağı, Dereçatı kö., Bayaslar mevkii, c. 300 m, 15.vi.1967, (EGE 5812)! Fethiye, Bayaslar-Dereçatı, 15.vi.1967, (EGE 4913)! Fethiye, Hisarönü kö., Belceğiz mevkii, 250 m, 11.v.1967, (EGE 4959, 4935)! Fethiye, Kemer-Taşocağı, 10.vii.1966, (EGE 6073, 6061, 6004)! Köyceğiz, Ekincik-Marina, 20 m, kızılçam ormanı, metamorfik kalkerli arazi, 17.iv.1991, A. Güner 8785, M. Vural, H. Duman, AA. Dönmez, B. Mutlu (HUB 2293)! Köyceğiz, Yangı kö., Yangı de., 100-200 m, sarp ve derin vadi, kalkerli kayalıklar, 18.iv.1991, A. Güner 8888, M. Vural, H. Duman, AA. Dönmez, B. Mutlu (HUB 2292)! Marmaris, M. Milli Parkı, 150 m, serpentin, 29.vi.1997, H. Şağban 1868 (HUB 22381)! Marmaris-Datça yolu, yamaçlar, 16.v.1987, K.H.C. Başer (ESSE 8183)! Gökova inişi, yol kenarı, yamaçlar, 15.v.1987, K.H.C. Başer (ESSE 7809)! Fethiye, Akbel, Çöğmen kö., 15.xi.1992, G. Tümen (ESSE 9984)! Fethiye, 10.vi.1990, G. Tümen (ESSE 8949)! Marmaris-Datça, Çubucak orman kampı çevresi, viii.1992, G. Tümen (ESSE 9820)! Fethiye, Söğütödere kö., 29.viii.1995, G. Tümen (ESSE 12250)! Muğla, 23.vii.1949, T. Baytop (ISTE 2429, 2435)! Marmaris'e 30 km, yol kenarı, 320 m, 20.vi.1980, N. ve E. Özhatay, E. Tuzlacı (ISTE 44877)! Sandras da., Akköprü orman işletmesi-Armutveren, 700 m, N. ve E. Özhatay (ISTE 44932)! Fethiye, Kemer yakını, ulualan ağaçlandırma sahası, 400 m, 1.vii.1983, E. Tuzlacı (ISTE 51462)! Fethiye, Baba da., batı etekleri, Gıdırak, Belceğiz arasındaki yamaçlar, 30 m, E. Tuzlacı (ISTE 53130)! Köyceğiz, Sandras da., Ağla sırtları, orman altı, 900 m, 22.vi.1980, N. ve E. Özhatay (MUFE 4302)! **C3 Antalya:** Antalya, 140 m, 14.v.1971, R. Çetik 3760 (ANK)! Maki zonu, 2.iv.1984, Y. Akman 13638 (ANK)! Antalya'nın 12 km güneybatısı, Karadağ, 40 m, 22.iv.1954, Nijhoff et all. 612 (ANK)! Antalya, Plaj ve kayalar, H. Birand 17 (ANK)! Alanya-Manavgat, 23.vi.1977, İ. Akbulut (IZEF 2178)! Kemer, Faselis koyu ve çevresi, 0-150 m, 23.vi.1978, H. Peşmen 4036, B. Yıldız, Ş. Kaplan (HUB 22690)! Kemer, Beldibi köyü üstü, kalkerli derin vadi, 30-100 m, 20.vii.1978, H. Peşmen 3897, A. Güner (HUB 22687)! Side çevresi, 5.vi.1970, A. Pamukçuoğlu, Quezel (HUB 22688)! Kemer yolu, karayolu tüneli çevresi, masif kalker kayalığı, 23.iii.1978, H. Peşmen 3617, B. Yıldız (HUB 22689)! Antalya-Kurşunlu şelalesi, Barış parkı, 2.vi.1989, K.H.C. Başer, N. Kurtar (ESSE 8764)! Antalya-Muğla karayolu, Tekirova mevkii, 1.vi.1989, K.H.C. Başer, N. Kurtar (ESSE 8763)! Antalya-Kemer karayolu 15 km, 14.iv.1991, K.H.C. Başer, N. Öztürk (ESSE 9378)! Antalya- Konaklı kö., 1991, K.H.C. Başer (ESSE 9697)! Alanya, Konaklı kö., viii.1991, G. Tümen (ESSE 9735)! *ibid.*, 19.ix.1992, G. Tümen (ESSE 10497)! *ibid.*, 20.viii.1994, K.H.C. Başer (ESSE 11857)! Hisarçanlı TV kulesi, 21.vii.1989, K.H.C. Başer, N. Kurtar (ESSE 10123)! Alanya, Altes, 18.ix.1995, K.H.C. Başer (ESSE 11038)! Manavgat-Alanya, Çavuşköyü

yol ayrımı, kumluk yer, 28.v.1966, A. ve T. Baytop, B. Çubukçu (ISTE 9789)! Konyaaltı, 12 Eylül ormanı, 20 m, 15.vi.1983, H. ve G. Çakırer (ISTE 50913)! **Burdur:** pazardan satın alındı, 8.vii.1986, A. ve C. Mat (ISTE 56962)! **C4 Antalya:** Gazipaşa, 29.iv.1996, G. Tümen (ESSE 12251)! Alanya, 7.viii.2000, s.n. (ESSE 14025)! Alanya kalesi içi, 21.iv.1974, G. Dökmeci, E. Tuzlacı, Y. Doğan (ISTE 27515)! Güzelbağ-Gündoğmuş, 520 m, 5.viii.1980, E. Tuzlacı, B. Çubukçu, A. Meriçli (ISTE 45678)! **Mersin:** Anamur, Gazipaşa, 15.vi.1976, Y. Akman-Quézel 7677 (ANK)! Anamur, Kaledıran kö., 300-400 m, 15.viii.1984, U. Temel (MARE 4561)! Gülnar çevresi, 10.vi.1995, G. Tümen (ESSE 11941)! *ibid.*, 5.v.1995 (ESSE 11486)! Mut çevresi, v.1996, G. Tümen (ESSE 12118, 12175)! Anamur-Silifke, Silifke'ye 88 km, deniz kıyısındaki yamaçlar, 20 m, 6.viii.1980, E. Tuzlacı, A. Meriçli (ISTE 45697)! **C4/5 Mersin:** Silifke, Göksu deltası, Kum M.-Akgöl, 0-5 m, 30.iv.1993, Düzenli, Çakan, Türkmen (ADA 2777!, 4408)! **C5 Adana:** Obaçayı vadisi, viii.1995, N. Mumcuoğlu (ESSE 11974)! **Mersin:** Bayburun, Harabe, *Pinus brutia* ormanı, 750 m, 27.v.1970, T. Uslu 160 (ANK)! Mersin Gözne yolu, Buluklu kö. üstü, 420 m, 5.vi.1981, E. Tuzlacı (ISTE 46364)! **C6 Hatay:** Amik Gölü, 150 m, 25.iv.1957, Davis et Hedge 27133 (ANK)! Antakya, Arsuz, 21.iv.1981, M. Miski (ISTE 46262)! Antakya, Habibneccar da., 28.vi.2004, N. Sadıkoğlu (ISTE 81695)! Belen Y., Sirken

***Satureja cuneifolia* Ten.**

A1(E) Çanakkale: Lapseki, Eçialan kö. civarı, 22.viii.1995, G. Tümen (ESSE 12029)! Gökçeada, Araz tepesi doğusu, ca. 300 m, 28.vii.1975, (EGE 15921)! Gökçeada, Demirkaya te., ca. 672 m, 10.viii.1976, (EGE 15923)! Gökçeada, Ulukaya te., ca. 630 m, 21.v.1975, (EGE 15922)! Gökçeada, Rıhı tepesi doğusu, ca. 350 m, 11.viii.1976, (EGE 15924)! **A2 Bilecik:** Dinger, (ANK)! **A4 Zonguldak:** Safranbolu, 29.viii.1995, G. Tümen (ESSE 11675)! **A5 Amasya:** kayalıklar, 1.viii.1994, N. Ermin (ESSE 10666)! **B1 Balıkesir:** Balıkesir-Kazdağ, Babadağ yöresi, Kapıkule zirve, 17.vii.1991, G. Tümen, H. Çakır (ESSE 10440)! Ayvalık yolu üzerindeki denize bakan yamaçlar, 10.viii.1989, G. Tümen (ESSE 8461)! Edremit, Ayvacık yolu üzerinde, Küçükkuyu'ya 10 km, 100-150 m, 5.viii.1989, G. Tümen (ISTE 62546)! **Çanakkale:** Balıkesir-Çanakkale, Ayvacık'a varmadan, karayolları dinlenme tesisi, 50-100 m, kayalık yamaçlar, 28.ix.1995, G. Tümen (ESSE 12021)! Küçükkuyu, Subaşı-Ayı kayası mevki, 24.ix.2001, N. Sadıkoğlu (ISTE 81653)! **İzmir:** Ödemiş, Bozdağ, 1050 m, 24.iii.1962, K. Karamanoğlu 890 (ANK)! Ödemiş-Bozdağ, 5.x.1992, G. Tümen (ESSE 10112)! Ödemiş, Birgi, G. Tümen (ESSE 10081)! Ödemiş, Bozdağ, vi.1993, G. Tümen (ESSE 10203)! *ibid.*, 1991, G. Tümen (ESSE 9559)! *ibid.*, vii.1994, G. Tümen (ESSE 10992)! *ibid.*, 20.viii.1995, G. Tümen (ESSE 11670)! Bozdağ, Büyükçavdar Y. sırtları, 1400 m, 9.x.1980, A. Baytop (ISTE 45905)! **Manisa:** Alaşehir-Bozdağ, Azitepe kö., 20.viii.1993, G. Tümen (ESSE 10170)! **B2 İzmir:** Bozdağ, Yayla, ca. 1100 m, 05.x.1994, E. Saver, U. Zeybek (IZEF 3058)! Kiraz, Küçük Menderes kenarı, x.1992, G. Tümen (ESSE 9867)! Kiraz çevresi, 25.ix.1995, G. Tümen (ESSE 11656)! Kiraz-Küçükmenderes ırmağı çevresi, 320 m, 21.ix.1995, F. Yılmaz (ESSE 11672)! Ödemiş, Gölcük, 21.x.1980, E. Tuzlacı, N. Sütlüpinar, A. Meriçli, Y. Kalav (ISTE 45944)! **Denizli:** Çivril-Akdağ, 6.x.1983, (EGE 25943)! **Manisa:** Alaşehir, Azitepe kö., Bozdağ, 20.ix.1994 (ESSE 10954)! Kula, Azitepe, 20.viii.1995, İ. Çınar, G. Tümen (ESSE 12129)! Salihli, Bozdağ, 2.x.1997, G. Tümen (ESSE 12474)! **B3 Eskişehir:** Eskişehir-Seyitgazi yolu 10-15 km, sol taraftaki araziden 1 km, 1972, K.H.C. Başer, (ESSE 179)! Kanlıpınar göleti, kayalıklar, 6.ix.1991, K.H.C. Başer (ESSE 9591)! Mayıslar-Eskişehir 2 km, 12.vi.1991, K.H.C. Başer, A. Kaya (ESSE 8452)! Dağköplü-Mayıslar, 9 km, 14.vi.1994, K.H.C. Başer, A. Kaya (ESSE 11147)! Mayıslar yakını, viii.1992, G. Tümen (ESSE 10031)! Mayıslar-Dağköplü 1 km, 28.v.1994, G. Tümen (ESSE 10481)! Şöförler çeşmesinden sonra 8. km, kayalıklar, 20.viii.1991, A. Kaya, N. Ermin, T. Özek (ESSE 9200)! Gökçekaya barajı, viii.1994 (ESSE 10726)! Gökçekaya barajı, Hidrofilik santralinin çevresi, Doğu Savak bölgesi, 25.ix.1998, N. Tabanca, A. Altıntaş (ESSE 12754)! Kanlıpınar göleti, 6.ix.1991, K.H.C. Başer, A. Kaya (ISTE 63602)! **C1 Muğla:** Bodrum, Bitez kö. çevresi, d.s. 6.x.2002, E. Tuzlacı (MARE 8545)! *ibid.*, bahçelerin üzerindeki sırtlarda, 13.xi.1976, E. Tuzlacı (ISTE 36290)! **C2 Antalya:** Altes bahçesinden, viii.1995, N. Mumcuoğlu (ESSE 11973)! **Aydın:** Karacasu, Türer Tarım Orman Ürünleri İthalat İhracat Sanayi, 30.viii.2000 (ESSE 13287)! **Denizli:** Bozdağ, 14.7.1947, P.H. Davis 13333 (ANK)! Babadağ-Başaran yaylası, 1200 m, 7.ix.1994, (EGE 18904)! Babadağ, 900-1000 m, 23.viii.1950, (EGE 27252)! Babadağ yaylasından kooperatif evlerinin başlangıcı, 26.ix.1997, G. Tümen (ESSE 12484)! Olukbaşı-Geyran Y., Koyunini de. üstü, 1540 m, 11.vii.1999, K.H.C. Başer 1618, H. Duman, A. Altıntaş (ESSE 12859)! Babadağ, Türer Tarım Orman Ürünleri İthalat İhracat Sanayi, 30.viii.2000 (ESSE 13290)! Babadağ, 900-1000 m, 23.viii.1950, P.H. Davis 18425 (ISTE 52321)! **Muğla:** Fethiye, Kemer, Çayan kö., Gavır mevki, x.1993, G. Tümen (ESSE 10466)! Ortaca, Çövenli Y., dağlık yerler, viii.1997, G. Tümen (ESSE 12790)! **C3 Antalya:** Kemer, 2000-2200 m, 10.viii.1947, P.H. Davis 14190 (ANK)! Kemer, Tahtalı dağ, Çukur Y.-Ağla Y., kalkerli kuzey yamaç, *Cedrus libani* ormanı, 1100-1650 m, 23.viii.1978, H. Peşmen-A. Güner, P.H. Davis 4074 (ANK)! *ibid.*, H. Peşmen 4100, A. Güner (HUB 22657)! *ibid.*, H. Peşmen 4074, A. Güner (HUB 22660)! Elmalı civarı, Kayalar, 1968, Quézel et all. 29 (ANK)! Elmalı, Beydağ, 2000 m, 28.vii.1960, Khan et all. 288 (ANK)! Göynük, 50 m, 6.vii.1949, P.H. Davis 15026 (ANK)! Han Boğazı, 2.ix.1947, P.H. Davis 14722 (ANK)! Tahtalı Da., W Yukarı Beycik, 2000-2350, 1.vii.1984, (EGE 31175)! Çalbalı Da., SE Bakırlı Dağ, 1550-1650 m, 18.vii.1984, (EGE 31174)! Kemer, Beycik kö., Tahtalı Da., ca. 1250-2100 m, 26.vii.1980, (EGE 32352)! Kemer, Yaylabuz dere-Çukur Y. *Cedrus libani* ormanı, 1200-1500 m, 28.vii.1979, H. Peşmen 4448, A. Güner, Ş. Kaplan

(HUB 22661, ISTE 52634)! Kemer, Beycik kö. üstü, kalkerli kayalık arazi, *P. brutia*-*C. libani* ormanı ve alpinik step, 800-1900 m, 19.vii.1978, H. Peşmen 3891, A. Güner (HUB 22652)! Antalya-Burdur karayolu, 17.ix.1994, K.H.C. Başer (ESSE 11035)! Akseki, Sadıklar kö., 14.vii.1974, A. Alpaslan (ISTE 30778)! Çalbalı da., Fesleğen Y. yakını, 1850 m, 4.viii.1980, N. Özhatay, E. Tuzlacı, B. Çubukçu, A. Meriçli (ISTE 45631)! **Burdur:** 11.vi.1993, G. Tümen (ESSE 10082)! **Isparta:** Eğridir, Barla Dağı, 2000 m, 1.viii.1960, Khan et al. 396 (ANK)! Ş. Karaağaç, Kızıldağ Milli Parkı, Kızıldağ kuzey yamacı, 1300 m, 24.vii.1994, B. Mutlu 1078 (HUB 22662)! Eğirdir, Anamas, Yaka kö., Kapız de., kalkerli sap ve derin vadi, 1250-1450 m, 5.viii.1974, H. Peşmen, A. Güner 1881 (HUB 22653)! Sütçüler, Çandır-Akçay, yangın gözetleme kulesi civarı, vii.1995, K.H.C. Başer, H. Duman, A. Altıntaş (ESSE 11830)! Sütçüler, Çandır, 1800 m, ix.1999, S. Oflaz (ESSE 13357)! Sütçüler, Darıbüyük, N37°34' E31°11', 12.viii.2001, N. Sadıkoğlu (ISTE 81648)! **C4 Antalya:** Alanya, Gönül dere, 1000 m, K. Karamanoğlu, 27.viii.1947, P.H. Davis 14293 (ANK)! Gazipaşa, Sugözü kö., Maha Y., 450 m, 5.viii.1983, H. Sümbül 2382 (HUB 22655)! Alanya, Köprübaşı mevkii, Arpalık Y., kuzey sırtları, 1600-2000 m, 10.viii.1994, H. Duman (ESSE 10731)! Alanya, Gökbel yolu, Bucak Çökelek Y., Alanya'dan 32. km, 1330 m, 17.vii.1995, K.H.C. Başer 1172, H. Duman, A. Altıntaş (ESSE 11506)! **Karaman:** Ermenek, 1300 m, 10.viii.1947, P.H. Davis 16156 (ANK)! Ermenek, Göktepe nahiyesi, Dumlugöze (Muzvadi) kö., Aşakbel tepesi, 1900 m, 13.ix.1983, H. Sümbül 2405 (HUB 22656)! Ermenek, 1300-1400 m, 13.viii.1949, P.H. Davis 16156 (ISTE 52320)! Ermenek Yellibel yolu, Tekeçatı, yol kenarı, 26.vii.1991, F. ve A.H. Meriçli (ISTE 63770)! **Konya:** Bozkır, Dikilitaş Y., R. Çetikt. T. Ekim-E. Yurdakulol, 6.viii.1967, Huber-Morath 12 (ANK)! Bozkır, 1000 m, 7.ix.1969, P.H. Davis 16610 (ANK)! Bozkır, Yılanlı kaya mevkii, kaya üzeri, 1550 m, 11.vii.1989, H. Sümbül 3389 (HUB 22650)! **Mersin:** Anamur, Hamitseydi Boğazı, Ermenek, 1500-1700 m, P.H. Davis 16241 (ANK)! Gülnar-Silifke, 1000 m, 28.ix.1994, kayalıklar, M. Vural 7236, M. Koyuncu, M. Ekici (HUB 24382)! Gülnar çevresinden, vii.1991, G. Tümen (ESSE 9558)! Silifke-Ardıçkuyusu Y., viii.1992, G. Tümen (ESSE 10027)! Gülnar çevresi, 20.viii.1995, G. Tümen (ESSE 12116)! Silifke, Sarıaydın kö., 1750 m, 4.v.1995, T. Baytop (ISTE 71374)! **C5 Adana:** Dildil Dağ, Başkonur Y., Hüseyin oluk çeşmesi, 1800 m, 27.viii.1949, P.H. Davis 16400 (ANK)! Bahçe (Amanus), Dildil dağ between Başkonur Y. and Hüseyin Oluk Y., 1800 m, 27.viii.1949, P.H. Davis 16400 (ISTE 52319)! **Konya:** Ereğli, Aydos Da., Delimahmutlu-Çakıllar, meşe ormanı, kalker anakaya, 1600 m, 29.viii.1977, S. Erik 2652 (HUB)! Ereğli, Aydos Da., Delimahmutlu, otlak tepe, kalker anakaya, bozkır, 1600 m, 19.viii.1978, S. Erik 3054 (HUB 22658)! Ereğli, Aydos Da., Kayasaray, mermer anakaya, 1700 m, 15.vii.1977, S. Erik 2589 (HUB 22659)! Halkapınar-İvriz, Karacasır dağı yamacı, 1200 m, 13.vii.1998, Y. Yaman (MUFE 115)! **Mersin:** Mersin-Aslanköy Y., viii.1990, G. Tümen (ESSE 9557)! Silifke-Sulama Y., Karadedeli kö., G. Tümen (ESSE 10174)! Erdemli, Büyüksorgun Ziyaret da., 950 m, yamaçlar, 8.vi.1996, G. Tümen (ESSE 12249)! Bolkar da., Aslanköy, Kazangöl pınarı, kayaların üstünde, 1600 m, 12.viii.1976, K. Alpınar (ISTE 35832)! **C6 Hatay:** Altınözü, Yanıkpınar kö., Kayacık mevkii, kayaların üzerinden, 22.x.1995, B. İshakoğlu (ESSE 12028)! Hassa, taşlık arazi, 21.x.1996, G. Tümen (ESSE 12271)!

Thymra capitata (L.) Cav.

A1(E) Çanakkale: Eceabat-Abide yolu, 17.vi.1986, N. Zeybek (IZEF 2284)! Bozcaada, Sulubahçe güneyi, ca. 25 m, 7.viii.1976, (EGE 20491)! Bozcaada, Göztepe batısı, çayır, ca. 80 m, 14.vi.1976, (EGE 20487)! Eceabat, Kabatepe sırtları, 50 m, 24.ix.1984, A. Çırpıcı, T. Ekim, H. Malyer (ESSE 7516)! Eceabat, Kilitbahir, Havuzlar, Şarlayandere yolu, 14 m, 24.ix.1984, A. Çırpıcı, H. Malyer (ESSE 8044)! Eceabat-Kabatepe mevkii, Saroz körfezi, yamaçlar, 16.vii.1991, G. Tümen (ESSE 10009)! Gelibolu-Burhanlı köyünün hemen üstü, denize bakan yamaçlar, 29.viii.1991, G. Tümen (ESSE 10023)! Eceabat-Gelibolu yolu, 10.vii.1960, A. Baytop (ISTE 6091)! Gelibolu-Eceabat, Gelibolu'dan 25 km ileride, Galata ovası, sırtlarda, 29.vii.1971, A. Baytop (ISTE 20729)! İmroz adası, Dereköy, 19.vii. 1974, Y. Saviç (ISTE 30519)! Eceabat, Şeddülbahir civarı, 21.vii.1975, N. ve E. Özhatay (ISTE 32999)! **Tekirdağ:** Gelibolu, Buharlı köyü 10 km sonra, maki, K. Karamanoğlu, 617 (ANK)! **B1 Balıkesir:** Marmara adası, viii.1991, G. Tümen (ESSE 9818)! Marmara adası-Çınarlı kö., koylardan biri, 25.viii.1991, G. Tümen (ESSE 10219)! **Çanakkale:** Bozcaada, batı burnu, adanın en batı ucu, c. 30 m, açık kireçli kayalıkların bulunduğu tepeler, 28.viii.1994, A.J. Byfield, S. Atay B 1271 (ISTE 67526)! **İzmir:** Urla-Kalabak, 25.viii.1977, İ. Akbulut (IZEF 339)! Urla İskelesi, 12.vi.1977, İ. Akbulut (IZEF 357)! Bornova, Sabuncubeli, 150 m, 11.vii.1982, N. Zeybek (IZEF 665)! Bornova, askeriye çıkışı, 24.vi.1977, İ. Akbulut (IZEF 2176)! Bornova-Papaz tepesi, 20.x.1995, E. Saver (IZEF 3638)! Hills NE of Bornova, 1.vii.1969, (EGE 8094)! Eski İzmir'in çıkışı, çatalkayaya doğru, ca. 250 m, 28.vii.1982, (EGE 26499)! Çeşme, 1.x.1967, (EGE 4614)! Çeşme, Çiftlik kö., 10.vi.1971, (EGE 7612)! Karaburun, Saip dağ, 4.viii.1965, (EGE 6052)! Mordoğan, Ziraat Fak. Kampı üstü, kalkerli toprak, c. 100 m, 6.viii.1978, Ş. Yıldırım 1055 (HUB 22961)! Çeşme, Askeri lojmanların arkası, 100 m, 28.vii.1997, B. Mutlu 1917 (HUB 22964)! Mordoğan, 28.vii.1995, S., M. ve H. Alan (ESSE 11845)! Çeşme, Dalyan, 24.vii.1997, G. Tümen (ESSE 12810)! Seferihisar, 11.x.2000, (ESSE 13298)! Çeşme, Çiftlik kö. ilerisi, deniz kenarı, 1.vii.1969, T. Avcıgil (ISTE 15929)! **C1 Aydın:** Kuşadası-Aydın yolu, İ. 18.vi.1977, İ. Akbulut (IZEF 381)! Kuşadası, 21.vi.1964, (EGE 2328!, 2332!, 8721)! Didim-Söke, c. 10 m, 5.viii.1984, B. Dinçtürk 1006 (HUB 22950)! Germencik, 10.vii.1993, G. Tümen (ESSE 10098)! Kuşadası, 25.vi.1996, G. Tümen (ESSE 12182)! **İzmir:** Selçuk, Pamucak belı, 27.vii.1965, (EGE 6060)! Selçuk, Meryemana, 15.vii.1966, (EGE 5349)!

Muğla: Datça, Karaköy civarı, Maki açıklıklarında, 200 m, 14.viii.1985, M. Demirörs 2058 (ANK)! Datça, 19.vii.1996, (EGE 5342)! Datça, (EGE 5978)! Bodrum, Geriş kö. güneyindeki yamaçlar, 250 m, 14.vi.2001, E. Tuzlacı (MARE 6793)! Bodrum, Bitez kö. kuzeyindeki dağ yamaçları, 100 m, 15.vi.2001, E. Tuzlacı (MARE 6813)! Bodrum: Bodrum-Çamlık kö., 280 m, 5.v.2002, E. Tuzlacı (MARE 7536)! Datça, Gebekum, 6.ix.2001, E. Tuzlacı (MARE 7157)! Bodrum, Kadı kalesi çevresi, 20.vii.1994, G. Tümen (ESSE 10975)! Datça, Bozdağ (Kocadağ), Mesudiye kö. üstleri, 600 m, 3.vii.1983, E. Tuzlacı (ISTE 51503)! Datça-Marmaris, Datça'dan 13 km, Gebekum mevki, kumullarda, d.s., 5.vii.1983, E. Tuzlacı (ISTE 51590)! Bodrum, Bitez kö. çevresi, 30 m, 7.vii.1983, E. Tuzlacı (ISTE 51609)! Datça, Kocadağ kuzey etekleri, Karaköy yakını, d.s., 12.v.1984, E. Tuzlacı (ISTE 53290)! Bodrum, Gököy, Eski Gököy Lisesi sırtları, 11.vi.2003, N. Sadıkoğlu (ISTE 81672)! **C2 Antalya:** Elmalı-Akdağ yolu, 18.vi.1968, A. Pamukçuoğlu, Quezel (HUB 22962)! Kaş-Fethiye karayolu 32. km, 150 m, yol kenarı, yamaçlar, 20.vi.1995, K.H.C. Başer 1039, H. Duman, A. Altıntaş (ESSE 11359)! **Muğla:** Marmaris-Datça, 17.vii.1960, Khan et al, 79 (ANK)! Köyceğiz, 03.vii.1977, İ. Akbulut (IZEF 2171)! Marmaris, Hisarönü kö., 10.xi.1984, N.Zeybek (IZEF 2912)! Köyceğiz, Dalyan, Sülüngür gölü, 27.vii.1981, (EGE 32468)! Fethiye-Tersakan, 9.vii.1966, (EGE 5443)! *ibid.*, (EGE 5981)! Marmaris, Pamucum orman dinlenme kampı yakını, yamaçlar, G. Tümen (ESSE 9816)! Marmaris-Kadıkale, viii.1993, G. Tümen (ESSE 10202)! Marmaris'e 30 km, 320 m, yol kenarı, 20.vi.1980, E. Tuzlacı, N. ve E. Özhatay (ISTE 44877a)! **C3 Antalya:** Kemer-Göynük, 5 km, kumul, 29.vii.1980, H. Peşmen 4915 (HUB 22963)! Beycik kö., İkiağızlar mevki, 31.v.1990, K.H.C. Başer (ESSE 8786)! Konyaaltı, 10 m, kumullar, N. Özhatay, E. Tuzlacı, B. Çubukçu, A. Meriçli (ISTE 45665a)! **C6 Hatay:** İskenderun, Soğukoluk, Maki çalılığı boşluklarında, 25.vi.1944, B. Kasaplıgil 69 Kew (ANK)! İskenderun, Soğukoluk, Maki zonu, 350 m, 25.vi.1967, Y. Akman 7722 (ANK)!

Thymra spicata L. subsp. *spicata*

A1(A) Balıkesir: Gönen, Taşocağı sırtları, 40 m, 30.vi.1996, P. Eryaşar (MARE 5107)! **Çanakkale:** Ezine, Pazarköy, 150 m, 25.vi.2002, G. Emre (MARE 8392)! Ezine, Akköy, 170 m, 13.iv.2002, G. Emre (MARE 8253)! **A1(E) Çanakkale:** Gelibolu-Eceabat, Eceabat'a 10 km kala, 9.xi.1968, A. Baytop, B. Çubukçu (ISTE 14713)! Havuzlu-Behramlı, 9.xi.1968, A. Baytop, B. Çubukçu (ISTE 14732)! **Tekirdağ:** Kumbağ sahil yolu, 13.viii.1983, N. Zeybek (IZEF 2972)! Tekirdağ-Barbaros, 25.iii.1968, A. Baytop, G. Atila (ISTE 12432)! Ganosdağ, Gaziköye inerken, 100 m, 14.vii.1968, A. Baytop (ISTE 13577a)! Keşan-Malkara, il hududu, 1.viii.1971, A. Baytop (ISTE 20858)! Tekirdağ-Kumbağ yolu, Barbaros'a 1 km kala, çeşme üstündeki sırtlarda, 16.vii.1974, N. ve E. Özhatay (ISTE 30432)! Karıştıran-Şarköy, Çınarlıdere kö. ayrımı, 19.vii.1992, E. Akalın (ISTE 64511)! Merkez, Dedecik kö. çıkışı, yol kenarları, 30.vii.1994, E. Akalın (ISTE 67409)! **A2(A) Bursa:** İznik yol ayrımı, maki, 50 m, E. Yurdakulol-M. Kılınç-M. Aydoğdu (ANK)! Bursa'nın 25 km kuzeyi, Mudanya'nın 5 km batısı, ca. 20 m, 21.vi.1973, (EGE 15463)! Mudanya'nın 5 km batısı, Mudanya-Zeytinbağı (Tirilye), 20 m, 21.vi.1973, (EGE 23422)! **İstanbul:** Şile, Akçakese kö., 80 m, 30.v.1996, E.T. Fenercioğlu (MARE 4835)! *ibid.*, 5.vi.1995, E.T. Fenercioğlu (MARE 4677)! Şile, İmrenli kö., 30 m, 8.vi.1995, E.T. Fenercioğlu (MARE 4665)! **A2(E) İstanbul:** Küçükçekmece gölünün kuzey ucu-Hoşdere, kuru tepeler, 17.vii.1969, A. Baytop (ISTE 15686)! Büyük Halkalı köyünden dönüştü, 3.vii.1970, N. Özocak, E. Özhatay (ISTE 18148)! Halkalı batısındaki kireçli yamaçlar, 5.vii.1976, E. Tuzlacı (ISTE 40293)! İzmir'den getirilen ve Maltepe'de bahçede yetiştirilen numunelerden, 25.vi.1967, A. ve T. Baytop (ISTE 12060)! **A3 Adapazarı:** Pamukova'dan Sapanca'ya doğru dört yol ayrımı, ca. 40 m, 31.vii.1984 (EGE 17883)! Geyve-İznik, Osmaneli yol ayrımından 5-6 km, Mekece kö.-İznik, 20.vi.190, E. Tuzlacı, M. Öksüz, F. Hırlak (MARE 2607)! **Bolu:** Abant gö. civarı, vii.1956, Ş. Tercan (ISTE 4637)! **A4 Karabük:** Kum ocakları karşısı, 700 m, 21.vi.1985, M. Demirörs 1558 (ANK)! **Kastamonu:** Araç, *P.nigra*, 900 m, 24.vii.1981, M. Demirörs 414 (ANK)! **A5 Amasya:** Amasya civarı, 13.vii.1956, T. Baytop (ISTE 4648)! **A6 Tokat:** Reşadiye, 10 km batısı, Kelkit vadisi, Taşlı yerler, 10.vii.1955, R. Çetik 1047/548 (ANK)! **B1 Balıkesir:** Akçay-Edremit, ix.1986, K. Sır (MARE 678)! **Çanakkale:** Çanakkale-Ezine'nin 4 km kuzeyi, 8.viii.78, 160 m, (VANF 664)!, **İzmir:** İzmir, 8.vi.1931 Krause 337 (ANK)! 12.vi.1935, Gassner 70 (ANK)! Çeşme, 16.vi.1976, F. Şekerci (IZEF 323)! Urla İskelesi, 12.vi.1977, İ. Akbulut (IZEF 327)! Gümüldür-Karacadağ, Değirmendere, ca. 100 m, 16.vi.1986, (EGE 21792)! Bornova, Hacılar kırı, Naldöken'in kuzeydoğusu, 25 m, 1.vi.1967, (EGE 6369)! Hills NE of Bornova, 1.vii.1969, (EGE 8089)! *ibid.*, 26.v.1969, (EGE 4210)! Ödemiş, Gölcük-Bozdağ, 4.vii.1966, (EGE 6033)! İnciraltı-Urla, 20.ix.1962, (EGE 873)! Selçuk, Meryemana, 18.vi.1971, A. Pamukçuoğlu (HUB 22971)! Kemalpaşa, piknik yeri, Nif D. Etekleri, 280 m, 23.vi.1990, E. Tuzlacı (MARE 2747)! İzmir Çeşme yolu, İçmeler'e varmadan, 21.iii.1967, A. ve T. Baytop (ISTE 10690)! **Manisa:** Bozdağ, 16.viii.1984, Ş. Yıldırım 7486 (HUB 22972)! Akhisar, Yel değirmeni, H. Bağda 460 (ANK)! Akhisar, Yel değirmeni, 9.vi.1942, H. Bağda (ISTE 1362)! Manisa da., 3.v.1961, T. Baytop (ISTE 6415)! **B6 Adana:** Saimbeyli, Himmetli köyü güneyi, Mermer kayalık, 900 m, 20.vi.1978, T. Ekim 3513 (ANK)! Sasak, Hacin, Manissadjian 1012 (ANK)! **B8 Diyarbakır:** Hani-Dicle, Hani'den 14 km, 900 m, kıraç yerler, killi topraklar, 11.vi.1979, E. Tuzlacı, M. Saraçoğlu (ISTE 42188)! **Siirt:** Silvan-Kurtalan, 1000 m, 24.vi.1954, Davis 22176 (ANK)! **B8/9 Siirt:** Şirvan, Cevizlik Siirt yol ayrımı çevresi, bozuk meşelik, kuru yamaçlar, kalkerli arazi, 1000 m, 13.iv.1980, A. Güner 2349, M. Koyuncu (HUB 22974)! **C1 Aydın:** Kuşadası, 250 m, 18.vi.1977, İ. Akbulut (IZEF 341)! Kuşadası, 01.i.1950, M. Polat (IZEF 1759)! Söke-Kuşadası, ca. 300 m, 21.vi.1977, İ. Akbulut (IZEF 2165)! Kuşadası, 7.xi.1967, (EGE 4692)!

C2 Antalya: Kaş, Elmalı, 27.vii.1960, Khan et al 226 (ANK)! Fethiye-Kemer, 02.vii.1977, (IZEF 344)! Kumluca, Mavikent, Yenice kö., 8.iv.1998, B. Sadak (MARE 5813)! **Aydın:** Sultanhisar, 01.i.1950, M. Polat (IZEF 1769)! **Denizli:** Tavas'dan 10 km sonra, Kızılçam açıklıklarında, 9.vii.1962, 840 (ANK)! Tavas-Denizli, Tavas'tan 7 km, yol kenarındaki killi yamaçlar, 1100 m, 7.vii.1989, E. Tuzlacı (MARE 2019)! Denizli, 7.vii.1905, St. Lager (ISTE 1361)! Honaz da., Karatepe kö. üstü, 730 m, orman yolu kenarı, 1.vii.1972, E. Tuzlacı (ISTE 22899)! Denizli Kazıkbeli yolu, Karatepe Gökkaya ağaçlandırma sahası, 750 m, 7.vi.1973, A. Baytop, E. Tuzlacı (ISTE 25505)! Honaz'ın 4-5 km kuzeydoğusu, 500 m, dere kenarı, 13.vi.1973, E. Tuzlacı (ISTE 25917)! Denizli kuzeyi 4 km kala (Aydın yönünden), 8.vii.1973, E. Tuzlacı (ISTE 26267)! **Muğla:** Fethiye, S of Kestep, Kaş, 11.vi.1969, (EGE 7815)! Fethiye, Kemerbucağı, Dereçatı kö., Bayaslar mevkii, c. 300 m, 15.vi.1967, (EGE 5800)! Fethiye, Bayaslar, Dereçatı, 15.vi.1967, (EGE 4914)! Muğla, 23.viii. 1949, T. Baytop 1363 (HUB 22976)! Köyceğiz çevresi, 60 m, yol kenarı, 22.v.1991, A. Güner 9250, M. Vural, H. Şağban (HUB 2966)! Köyceğiz, Çandır kö., 360 m, kızılçam ormanı, 19.vi.1991, A. Güner 9516, M. Vural, H. Duman, A. Dönmez, H. Şağban (HUB 22965)! Muğla, 23.viii.1949, T. Baytop (ISTE 1363)! Fethiye, Baba da. yolu, Fethiye'ye 4 km, kaya üstü, 120 m, 1.vii.1983, E. Tuzlacı (ISTE 51428)! Fethiye-Kemer, Kemer yakını, 100 m, 1.vii.1983, E. Tuzlacı (ISTE 51430)! Muğla-Tavas, 2-3 km from Muğla, 150 m, D. 35506 (ISTE 51819)! **C3 Afyon:** Başmakçı, 27.vi.1995, U. Zeybek (IZEF 3417)! **Antalya:** Alanya, Davis 14486 (ANK)! Göynük, 50 m, Davis 15032 (ANK)! Kemer, Kumluca, marnlı topraklar, 250 m, 26.v.1984, Y. Akman 13643 (ANK)! Lara, 29.vi.1938, Gassner 1173 (ANK)! Kargı çayı, 24.viii.1947, Davis 14417 (ANK)! Alanya, Alarahan, 23.iv.1978 (EGE 15295)! Alanya'nın 5 km batısı, 80 m, 17.vi.1966, (EGE 6379)! Side çevresi, 5.vi.1970, A. Pamukçuoğlu-Quezel (HUB 22970)! Akseki, 18.vii.1967, H. Küçük (ISTE 12006)! Çakırlar, Akdamlar kö. üstleri, Fesleğen Y. yolu, 200 m, 4.viii.1980, N. Özhatay, E. Tuzlacı, B. Çubukçu, A. Meriçli (ISTE 45662)! Manavgat üstleri, Beşkonak-Olukköprü, 100 m, 3.vii.1982, G. Çakırer, A. Öztekin (ISTE 49125)! Manavgat'tan 21 km ileride, Oymapınar barajı civarı, 100 m, 19.vi.1983, H. ve G. Çakırer (ISTE 51086)! Finike-Elmalı yolu, Arif köyüne gelmeden Aygır suyu mevkii, Arycandra Lokantası civarı yamaçlar, 13.viii.1990, A.H. ve F. Meriçli (ISTE 62458)! **Isparta:** Sütçüler, Darıbüğü, N37°34' E31°11', 12.viii.2001, N. Sadıkoğlu (ISTE 81647)! **C4 Antalya:** Gazipaşa, Sugözü kö., *P. brutia* ormanı, 1600 m, 12.vii.1982, H. Sümbül 2983 (HUB 22967)! Kumluca, Andrasan koyu kuzeyi, serpentin arazi, *P. brutia* ormanı, 0-120 m, 8.vi.1979, H. Peşmen 4384 et Güner (HUB 22969)! Alanya-Gazipaşa 35. km, 9.viii.1965, N. ve M. Tanker, E. Sezik (ISTE 8280)! Alanya, Emirgan civarı, yol kenarları, 21.viii.1965, E. Sezik, M. Tanker (ISTE 8316)! Alanya, Deretürkenaz yolu, Bektaş çeşmesi, 325 m, 24.ii.1966, A. ve T. Baytop, N. Tanker, E. Sezik (ISTE 8529)! Alanya kalesi, 26.v.1966, A. ve T. Baytop, B. Çubukçu (ISTE 9670)! Güzelbağ-Gündoğmuş, 520 m, 5.viii.1980, E. Tuzlacı, B. Çubukçu, A. Meriçli (ISTE 45675)! **Karaman:** Ermenek, Kazancı kasabası civarı, 650-850 m, 21.vi.1984, H. Sümbül 2983 (ANK)! Ermenek-Kazancı kasabası civarı, 650-850 m, 21.vi.1984, H. Sümbül 2983 (HUB 22968)! Bucakkışla, Kuru dere içleri, 450 m, 30.v.1979, M. Vural 1795 (ANK)! **Mersin:** Mut-Silifke, Göksu nehrinin vadisi, vadinin sırtlarında kumlu topraklar, vi.1994, A.J. Byfield B 1212 (ISTE 67467)! Anamur-Silifke, Anamur'un 40 km doğusu, 210 m, 23.iv.1985, M. Nydegger (ISTE 74762)! **C5 Adana:** Karsantı, Ortaca köprüsü civarı, 1000 m, 26.vi.1973, E. Yurdakulol 1542 (ANK)! Süphan de., Belen köy, 900-1000 m, 2.vii.1952, Davis 19570 (ANK)! Feke Bakırdağ arasındaki orman yolu, Feke'den 15 km (Feke'nin kuzeybatısı), 820 m, maki arası, 31.vii.1979, E. Tuzlacı, M. Saraçoğlu (ISTE 43388)! Kozan, Akçalı Orman İşletmesi, istif sahası civarı, 16.vii.1985, İ. Saracoğlu, T. Ersöz 3010 (ISTE 55628)! **Hatay:** Tekepınar aşığı, Musa da. etekleri, 330 m, maki arası, 17.vi.1979, E. Tuzlacı, M. Saraçoğlu (ISTE 42305)! **Mersin:** Bahçe, Paslıkale, *P. brutia* ormanı, 450 m, 22.vi.1972, T. Uslu (ANK)! Mersin Gözne yolu, Buluklu kö. üstü, 420 m, 5.vi.1981, E. Tuzlacı (ISTE 46365)! Gülnar-Aydıncık, Gülnar'a 15 km, Ezkiyörük kö. çevresi, 850 m, 15.vi.1981, E. Tuzlacı (ISTE 46509)! **Niğde:** Ulukışla, Aydos Da., Ali hoca yakınları, kalkerli yamaç, 1200 m, 28.vii.1977, S. Erik 2989 (HUB 22973)! **C6 Gaziantep:** Besni, v.1936, Gleisberg 110 (ANK)! **Hatay:** Hatay-Hassa, L. Behçet s.n. (VANF)! Harbiye'nin güneyi, kurak, 18.x.97, 100-130 m, L. Behçet 9 (VANF)! Antakya, Habibineccar da., Taş ocağı yanı, 24.vi.1974, A.H. Meriçli (ISTE 29970)! Altınözü, 3.vii.1975, M. Miski (ISTE 32979)! Belen sırtları, 20.viii.1976, M. Miski (ISTE 35959)! Reyhanlı, Harran (Kavalcık) kö., Suriye sınırı bölgesindeki ekilmemiş kıraç bölgeler, 26.v.1977, E. Tuzlacı (ISTE 37181)! Antakya yakınları, 25.vi.1982, M. Miski (ISTE 49934)! İskenderun, pazardan satın alındı, 6.iv.1989, T. Baytop (ISTE 60150)! Antakya, Habibineccar da., 28.vi.2004, N. Sadıkoğlu (ISTE 81696)! Yayladağ, Sebenoba kö, tarla kenarı, 29.vi.2004, N. Sadıkoğlu (ISTE 81648)! **Maraş:** Maraş Göksun yolu, Ceyhan köprüsü çevresi, 700 m, 13.vi.1981, E. Tuzlacı (ISTE 46494)! **Osmaniye:** Sorkun yaylası, Amanos da., 400 m, 21.vi.1967, Y. Akman 7721 (ANK)! **C7 Adıyaman:** Kahta-Sincik, Cendere köprüsünün 1 km ilerisi, Kahta'ya 22 km, 680 m, killi tepeler, 15.vi.1979, E. Tuzlacı, M. Saraçoğlu (ISTE 42247)! **C8 Mardin:** Mardin-Deyrulzafaran kilisesi, kilise yakınındaki kıraç yamaçlar, 880 m, 9.vi.1979, E. Tuzlacı, M. Saraçoğlu (ISTE 42127)! **C9 Siirt:** Erüh-Şırnak, Erüh'a 12 km, Yanılmaz kö. yakınları, 1200 m, 18.vii.1981, E. Tuzlacı (ISTE 47387)!