



Cultivated *Salvia* species in Turkey

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Abstract

Seven species and three cultivars of *Salvia* have been added to *Salvia* of Turkey. These are as follows *S. coccinea*, *S. farinacea*, *S. microphylla*, *S. officinalis*, *S. officinalis* 'Incterina', *S. officinalis* 'Purpurascens', *S. officinalis* 'Tricolor', *S. splendens*, *S. x superba* and *S. transylvanica*. These taxa were described morphological and cultivation properties, and created a identification key.

Key words: Lamiaceae, *Salvia*, Turkey, Culture, Sage

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Türkiye'de yetiştirilen *Salvia* türleri

Özet

Türkiye *Salvia* florasına yedi tür ve 3 kültür formu eklenmiştir. Bunlar sırasıyla *S. coccinea*, *S. farinacea*, *S. microphylla*, *S. officinalis*, *S. officinalis* 'Incterina', *S. officinalis* 'Purpurascens', *S. officinalis* 'Tricolor', *S. splendens*, *S. x superba* ve *S. transylvanica*. Bu taksonların morfolojik ve kültür özellikleri tanımlanmış ve bir tayin anahtarı oluşturulmuştur.

Anahtar kelimeler: Lamiaceae, *Salvia*, Türkiye, Kültür, Adaçayı

1. Introduction

The genus *Salvia* has been especially popular since 1970s with those who garden for pleasure in Europe and North America. *Salvia* specimens have been chosen to grow because they have found them handsome and dependable plants that are, by and large, easy to grow (Clebsch, 2003). Salvias have been frequently planted in public and private gardens and refuges as ornamental in Turkey for the last decade. Garden sages are most widely known as aromatic plants, possessing many culinary and medicinal properties. In fact, these apply mainly to the garden or common sage (adaçayı, in Turkish), *Salvia officinalis*, whereas most species, while perhaps having fragrant leaves, are grown purely as private garden ornamentals throughout Turkey.

The Roman scientist and historian Pliny the Elder was the first to use the Latin name *Salvia*. The name derives from *salvare*, to heal or save, and *salvus*, uninjured or whole, referring to the several species of *Salvia* with medicinal properties (Clebsch, 2003).

The largest genus of the mint family, *Salvia* (tribe Mentheae, Lamiaceae) consists of nearly 1000 taxa of annuals, perennials, and soft-wooded shrubs, distributed through most parts of the world except very cold regions and tropical rainforests (Walker et al., 2004).

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The first revision of *Salvia* L. in Turkey was made by Hedge (1982), who recognized 86 species, 1 hybrid, and 1 doubtful species. Since then, 6 more new species, *S. nydeggeri* Hub.-Mor. (1982), *S. aytachii* Vural & Adıgüzel (1996), *S. hedgeana* Dönmez (2001), *S. anatolica* Hamzaoğlu & A.Duran (2005), *S. marashica* A.İlçim, F.Celep & Doğan (2009) and *S. ekimiana* F.Celep & Doğan (2009), and 2 new records, namely *S. macrosiphon* Boiss. (Kahraman et al., 2009) and *S. aristata* Auch. ex Benth. (Behçet & Avlamaz, 2009), have been described from Turkey. The total has now reached 95 except culture salvias.

Since 2005, as part of a revisional study of the genus *Salvia* in Turkey, the authors have carried out extensive field studies and collected a large number of nature and cultivar specimens. During the project, collected specimens have been working to cultivation in Çanakkale Onsekiz Mart University Rock Garden. Eighteen taxa of *Salvia* are grown in the garden.

2. Materials and methods

Nature and cultivated *Salvia* species and/or cultivars were generated by repeated visits between 2005 and 2008. The specimens collected were dried according to known herbarium techniques and processes. During the identification of the *Salvia* specimens, “Flora of Turkey and the East Aegean Islands” (Hedge, 1982), and “Flora Europaea” (Hedge, 1972) were used as the main reference sources. Doubtful identifications were cross-checked with “Botanica” (Burnie et al., 1999), and “A Book of Salvias” (Clebsch, 2003). All the herbarium specimens are kept in the Herbarium Center of Çanakkale Onsekiz Mart University (CNH). Also, plant and seed sellers were searched, and the available materials were determined. Authors of plant names are abbreviated according to Brummitt and Powell (1992), and its improved version in the internet (IPNI: <http://www.ipni.org>). All *Salvia* taxa were determined morphological and cultivation properties.

Cultivated *Salvia* species in the botanical gardens has been excepted for the research. The *Salvia* taxa are listed alphabetically.

3. Results

Key for the Cultivated Species

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|---|--------------------------|
| 1. Calyces densely white- or lilac-lanate | 2. <i>farinacea</i> |
| 1. Calyces not white- or lilac-lanate | |
| 2. Corolla reddish to scarlet, rarely yellow or white | |
| 3. Floral leaves shorter than calyces, not enveloping the young inflorescence buds | |
| 4. Calyx tubular-campanulate; stem with sessile glandular | 3. <i>microphylla</i> |
| 4. Calyx tubular; stem rarely glandular | 1. <i>coccinea</i> |
| 3. Floral leaves larger than calyces, coloured, enveloping the young inflorescence buds | 5. <i>splendens</i> |
| 2. Corolla blue, lilac or purplish blue | |
| 4. Bracts as long as or longer than calyx, reddish-blue or violet | 6. x <i>superba</i> |
| 4. Bracts less than ½ as long as calyx, green | |
| 5. Staminal connective longer than filament; arms unequal | 7. <i>transsylvanica</i> |
| 5. Staminal connective shorter than or equalling the filament; arms subequal | 4. <i>officinalis</i> |

- 1) *S. coccinea* Juss. ex Murr. -- Commentat. Soc. Regiae Sci. Gott. 1: 86. t. 1 (1778) – Figure 1A
Syn. *S. pseudococcinea* Jacq. -- Collectanea [Jacquin] 2: 302 (1789).

Annual, sometimes perennial herbs. *Stems*, 10-130 cm having many branches, erect, eglandular-pubescent with long spreading eglandular hairs, rarely glandular-pubescent. *Leaves* simple, ± triangular or deltoid, up to 4 x 3 cm, petiolate, usually cordate at base, almost glabrous to densely glandular-pubescent, occasionally also with oil globules. *Verticils* 6-10(-14)-flowered. *Calyx* tubular, c. 10 mm, glandular-pubescent. *Corolla* scarlet, rarely yellow, pink or white, up to 24 mm long; upper lip fairly short, ± straight; lower lip broad, longer than upper; tube c 2/3 of corolla. *Stamens* and style clearly exerted.

Widely distributed throughout tropical South America, *Salvia coccinea* is commonly called tropical sage (tropikal adaçayı). A self-sowing, reliable, and handsome annual (sometimes perennial) it has been carried and commended all over the world. In Turkey, it is not commonly cultivated.

Propagation is by seed. Seed sown in early spring will produce blooming plants by August. Cultural requirements include full sun, good garden soil enriched with humus and grid, and weakly watering.

Coccinea comes from the Latin for scarlet and refers to the typical flower color for this species. However, flowers come in many shades-orange-red, red, scarlet, pink, salmon, and white-including bicolors, when the upper lip differs from the lower lip. 'Lactea' is a particularly nice white flowering form; 'Brenthust' is a fine pink form.

2) *S. farinacea* Benth. -- Labiat. Gen. Spec. 274 (1833) – Figure 1B

Perennial herbs. *Stems* up to 130 cm, eglandular-pubescent or puberrulous below, densely pubescent, to lanate, rarely glandular-pubescent above, with oil globules above and below. *Leaves* ovate to narrow linear-elliptic, up to 2.5 x 7-10 cm, often clustered at the nodes, rounded or acute at apex, attenuate at base; eglandular-pubescent, with numerous oil globules. Inflorescence terminal, 15 cm long, tightly packed with verticils. *Verticils* 10-26-flowered. Floral leaves inconspicuous, deciduous. *Calyx* shortly tubular, 5-8 mm long, densely white- or lilac-lanate. *Corolla* white, lavender, blue, purple or lilac, 10-15 mm; tube 6-9 mm; lower lip longer than upper.

The herbaceous perennial *Salvia farinacea* occurs in a wide variety of habitats in central and eastern Texas into New Mexico and neighboring Mexican province of Coahuila. It is called mealy sage (unlu adaçayı, mavi adaçayı). In Turkey, it is not commonly cultivated.

Propagation is by seed or cuttings. Full sun and fast-draining soil enriched with humus are required, along with ample water. It has a long blooming period beginning in April or May and flowering continues until cold weather and frost stop display.

The calyx is actually densely covered with mat-like woolly hairs that are tinged with white, blue, or purple. It is for this character that the plant is named. A number of cultivars are offered by and seed catalogs in foreign countries. Some of the favorites are 'Alba' and 'White Porcelain', which have white inflorescences; 'Blue Bedder', which has darker blue flowers than typical species; and 'Victoria', which has violet-blue flowers and calyces.

3) *S. microphylla* Kunth -- Nov. Gen. Sp. 2: 294 (1818) – Figure 1C

Syn. *Salvia grahamii* Benth. -- Edwards's Bot. Reg. 16: t. 1370 (1830).

Herbaceous perennial, woody at the base,. *Stems* up to 130 cm, eglandular pubescent with oil globules, rarely glandular pubescent. *Leaves* petiolate, up to 5.5 x 3.8 cm, elliptik to ± triangular-ovate, truncate, cordate or attenuate at base, sometimes attenuate at apex, margin ± entire to crenulate or serrulate, ± glabrous or eglandular-pubescent, always with oil globules. *Verticils* 2(-4)-flowered. Floral leaves coloured, soon deciduous. *Calyx* tubular-campanulate, to 13 mm long, tinged purple, glandular pubescent. *Corolla* pale pink to deep red, c. 30 mm long; tube c. 20 mm; lower lip broad, usually longer than upper; fairly dense, coloured, multicellular hairs on upper lip, the rest usually glabrous.

Covering an immense geographical area, *Salvia microphylla* may be found in the wild in southeastern Arizona and in the mountains of eastern, western, and southern Mexico. It is called cherry sage (kiraz adaçayı). This bushy sage is commonly cultivated in the private gardens and lanscape in Turkey.

It may be propagated by seed or cuttings. Cultural requirements for the cherry sage are full sun, good dranaige, ordinary garden soil with some humus, and weakly water. It has a long blooming period all of the year.

The specific epithet *microphylla* is from the Greek and means small leaved. The cherry sage has some cultivars as 'Rosita', a bright candy-pink flowered; 'San Carlos Festival', with rich magenta-pink flowers, and 'Oxford', with deep magenta-crimson flowers and small deltoid leaves.

4) *S. officinalis* L. -- Sp. Pl. 1: 23 (1753) – Figure 1D, E, F, G

Aromatic shrub. *Stems* white, up to 150 cm, eglandular pubescent, with oil globules. *Leaves* petiolate, up to 8 x 2.5 cm, oblong to elliptic, entire or with a pair of small lobes at base, eglandular pubescent with oil globules; margine crenulate. *Verticils* 4-8-flowered. *Calyx* campanulate, eglandular pubescent, with oil globules. *Corolla* purplish-blue, up

to 2.5 cm long; tube c. 1.5 cm; upper lip more or less straight, lower lip broad, slightly longer than upper; in tube, with a ring of hairs inside. *Stamens* both-fertile type.

Found in the wild on the central and northern Mediterranean Region. It is called sage or garden sage (adaçayı). The sage is cultivated for centuries throughout the temperate world as a handsome and well tested garden subject. In Turkey, it is the most cultivated herb plant, possessing many culinary and medicinal properties.

Propagation is by cuttings or divisions in late spring or early autumn. Seed germinate readily, but because of the plant's variability, vegetative propagation is advised. Quick-draining garden soil and full sun are necessities for these sages. Flowering occurs in late spring or summer.

The specific epithet *officinalis* is from the Latin and means medicine in the sense of used in practice of medicine. Varied characteristics have given rise to many different cultivars. These are 'Aurea' has golden leaves; 'Compacta' is a narrow leaved and compact form; 'Icterina' has green leaves with a wide golden margin; 'Purpurascens' has purple-red leaves, and 'Tricolor' has gray-green leaves that zoned creamy yellow and rose. *Salvia officinalis* native form (Figure 1E), 'Icterina' (Figure 1F), 'Purpurascens' (Figure 1G), and 'Tricolor' (Figure 1H) are grown in Turkey.

5) *S. splendens* Ker Gawl. -- Bot. Reg. 8: t. 687 (1823) – Figure 1H

Herbaceous perennial, woody at base, *Stems* erect, up to 120 cm, puberulous. *Leaves* petiolate, ovate, attenuate at apex, margin serrulate to crenate, with oil globules, puberulous or not. *Verticils* 2(-5)-flowered. Floral leaves larger than calyces, coloured, deciduous. *Calyx* tubular-campanulate, red, up to 22 mm, with red multicellular eglandular hairs, also present on pedicels. *Corolla* tubular, red to scarlet, 40-50 mm long, tube c. 35 mm, not invaginated; lower lip shorter than upper, minutely pubescent. *Stamens* and *style* ± exerted.

Found in the wild only Brazil at high altitudes. It is called scarlet sage (ateş çiçeği). A popular ornamental sage plant is frequently planted in public and private gardens, and road refuges in Turkey.

The plant is perennial, but it is annual in culture. It may be propagated by seed or cuttings. Partly shade and sun are a necessity for scarlet sage in garden, along with drainage and friable soil that has been amended with humus, regular water is needed. Flowering period is between May and October.

The specific epithet *splendens* is from its splendid and bright red calyces and corollas. Its cultivars are popular and numerous.

6) *S. x superba* Stapf -- Bot. Mag. 153: t. 9169 (1928) – Figure 1I

Syn. *S. sylvestris* L. -- Sp. Pl. 1: 24 (1753)

It is a hybrid of *S. sylvestris* and *S. villicaulis*.

Herbaceous perennial. *Stems*, up to 60 cm, erect, puberulous, with sessile glands. *Leaves* oblong, acute at apex, margin serrulate to crenate, with oil globules, pubescent. *Verticils* 2-6-flowered. Floral leaves larger than calyces, purple coloured, persistent. *Calyx* tubular-campanulate, green with violet on nerves, up to 6 mm, eglandular pubescent hairs, with oil globules. *Corolla* violet-blue, 8-10 mm long, tube c. 4 mm; lower lip longer than upper. *Style* exerted.

Botanists find the origin of this plant to be uncertain, but it is widely cultivated in Europe, England, and the United States. A few have been recently naturalized in small, limited areas in North America. It is commonly used in martyrdom and foreign cemeteries in Gallipoli Peninsula National Park. Probably, it is introduced and cultivated the cemeteries by ANZAC gardeners.

Propagation is by cuttings that can be taken in July or August. The cultivars or hybrids of *Salvia x superba* need three-quarters to full day sunlight, along with deep weekly watering. A friable soil with good drainage is also desirable. Flowering period is between May and June.

Five cultivars are grown in the world. *Salvia x superba* 'May Night', with the dark but clear violet-blue, and low-growing is only cultivated in Turkey.

7) *S. transsylvanica* (Schur ex Griseb.) Schur -- Verh. Siebenb. Ver. Naturw. 4 App.:57 (1853) – Figure 1J

Herbaceous perennial. *Stems* up to 100 cm, eglandular below, glandular pubescent above. *Leaves* long petiolate, ovate or oblong-lanceolate, cordate at base, acute at apex, more or less regularly crenate at margin, densely white-appressed-hairy beneath. *Verticils* 3-6-flowered. *Calyx* campanulate, 8-9 mm. *Corolla* blue or violet-blue, 16-21 mm long, tube c. 9-10 mm; lower lip shorter than upper. *Stamens* and *style* ± exerted.

Salvia transsylvanica has a wide range of distribution from northern and central Russia through Romania. This hardy herbaceous perennial sage is cultivated in the private gardens in Turkey. But, not commonly used.

Propagation is easiest by seed, although cuttings can be used. The cultivation of *Salvia transsylvanica* includes a half to full day of sun, good drainage, and humus incorporated in friable garden soil, deep watering once a week. Flowering begins in early summer and will continue until frost.

The specific epithet, *transsylvanica*, refers to the central area of Romania, bounded on the south by the Transylvanian Alps.

4. Conclusions

Seven species or hybrid and three cultivars of *Salvia* are determined growing in Turkey as ornamentals. These are as follows, *S. coccinea*, *S. farinacea*, *S. microphylla*, *S. officinalis*, *S. officinalis* ‘Inctarina’, *S. officinalis* ‘Purpurascens’, *S. officinalis* ‘Tricolor’, *S. splendens*, *S. x superba* and *S. transsylvanica*. *S. officinalis* has been only one cultivated species for medicinal purposes in gardens. The others have been cultivated as ornamentals in public or private gardens and refuges. *S. splendens* and *S. microphylla* are the most commonly used in the gardens. The other ornamental *Salvia* species are occasionally used.

Although Anatolia seems to be the one of the major centre of diversity area for the genus *Salvia*. In Turkey they are not commonly cultivated. However, in many developed countries especially in Europe some *Salvia* species are grown as ornamental plants. Over 200 species, hybrid or cultivar varieties have been determined in literatures, nurseries and seed catalogues (Clebsch, 2003). Some of the cultivated *Salvia* species are naturally grown in Turkey and some of them are endemic to the country. These are *S. aethiopsis*, *S. albimaculata*, *S. argentea*, *S. cadmica*, *S. caespitosa*, *S. candidissima*, *S. cyanescens*, *S. forskahlei*, *S. fruticosa*, *S. glutinosa*, *S. nemorosa*, *S. pisidica*, *S. recognita*, *S. sclarea*, *S. verticillata* and *S. viridis*. *S. albimaculata*, *S. cadmica*, *S. caespitosa*, *S. cyanescens*, *S. pisidica* and *S. recognita* are endemics to Turkey, and *S. albimaculata* is having very limited distribution in Ermenek, Karaman (Byfield & Duman, 2000). *S. caespitosa* is a popular species for limestone or volcanic slopes in rock garden in England and the United States (Clebsch, 2003). All of them have been gathered as seeds by amateur seed collectors, and germinated in gardens or nurseries. *S. cryptantha*, *S. tchihatcheffii* and *S. wiedemannii*, three endemic species in Turkey, and *S. sclarea*, *S. splendens* and *S. virgata* were recommended as ground cover and border plant for gardens (Yücel, 2002). The wild and introduced *Salvia* species have been grown in the botanical gardens as living collections in Turkey.

One of the most important and the largest collection of *Salvia* species in the world is found in the United Kingdom. Mr. Robin Middleton established a personal *Salvia* garden about 15 years ago. He gathered over 100 species and cultivars. Some of them were collected as seeds from Turkey (<http://www.robinssalvias.com>).

Eighteen species of *Salvia* have been collected by the authors while collecting material for the *Salvia* Revision Project in Turkey, and culture forms of *Salvia* have been cultivated in the Rock Garden of Biology Department in Çanakkale Onsekiz Mart University. These are *S. aethiopsis*, *S. cryptantha*, *S. forskahlei*, *S. glutinosa*, *S. microphylla*, *S. officinalis*, *S. officinalis* ‘Tricolor’, *S. pinnata*, *S. russellii*, *S. splendens*, *S. x superba*, *S. tchihatcheffii*, *S. tomentosa*, *S. transsylvanica*, *S. verbenaca*, *S. verticillata* subsp. *amasiaca*, *S. virgata* and *S. viridis*.

The *Salvia* species are mostly propagated in the form of seeds in springs. In another way both the annuals and perennials are propagated by cuttings in early summer, or division of rhizomatous species at almost any time. But in endemics, seed germination is difficult in culture. They need three-quarters to full day sunlight, some of them live in shades and moist places. They live in every kind of garden soil. However, the sages generally be best planted in well drained, light-textured limestone soil enriched with humus and grid, and with deep weekly watering. In this respect they are easily cultivated on dry conditions in the gardens. It is recommended that they can be cultivated in rock gardens.

In this research, it is found that, the *Salvia* species are not widely cultivated in public and private gardens in Turkey. In addition to the 95 wild taxa in Turkey, ten more taxa have been added to the flora.



Table1. Cultivated *Salvia* species and varietas in Turkey; **A.** *Salvia coccinea*, **B.** *Salvia farinacea*, **C.** *Salvia microphylla*, **D.** *Salvia officinalis*, **E.** *Salvia officinalis* 'Incterina', **F.** *Salvia officinalis* 'Purpurascens', **G.** *Salvia officinalis* 'Tricolor', **H.** *Salvia splendens*, **I.** *Salvia x superba*, **J.** *Salvia transsylvanica*

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References

- Behçet, L. & Avlamaz, D. 2009. A New Record for Turkey: *Salvia aristata* Aucher ex Benth. (Lamiaceae). Turk J Bot 33/1: 61-63.
- Burnie, G., Forrester, S. & Greig, D. 1999. Botanica: The Illustrated A-Z of Over 10,000 Garden Plants and How to Cultivate Them. Könemann, Hong Kong.
- Byfield, A. & Duman, H. 2000. Plate 385. *Salvia albimaculata*. Curtis's Botanical Magazine 17/2: 60-65.
- Celep, F. & Doğan, M. 2009. *Salvia ekimiana* (Lamiaceae), a new species from Turkey. Ann Bot Fennici (in press, 2009).
- Celep, F., Doğan, M. & Duran, A. 2009. A New Record for the Flora of Turkey: *Salvia viscosa* Jacq. (Labiatae). Turk J Bot 33/1: 57-60.
- Clebsch, B. 2003. A Book of Salvias: Sages For Every Garden (2nd Edition). Timber Press, Oregon.
- Dönmez, A.A. 2001. A New Turkish species of *Salvia* L. (Lamiaceae). Bot J Linn Soc 137: 413-416.
- Hamzaoğlu, E., Duran, A. & Pınar, N.M. 2005. *Salvia anatolica* (Lamiaceae), a new species from East Anatolia, Turkey. Ann Bot Fennici 42: 215-220.
- Hedge, I.C. 1972. *Salvia* L. In: Tutin, T.G., Heywood, V.H., Burges, N.A., Valentine, D.H., Walters, S.M. & Webb, D.A. (eds.) Flora Europaea, 3: 188-192. Cambridge Univ. Press, Cambridge.
- Hedge, I.C. 1982. *Salvia* L. In: Davis, P.H. (ed.) Flora of Turkey and the East Aegean Islands, 7: 400-461. Edinburgh Univ. Press, Edinburgh.
- Huber-Morath, A. 1982. *Salvia nydeggeri* Hub.-Mor. nova species Sectio *Eusphace* Benth. Bauhinia 7/3: 181.
- İlçim, A., Celep, F. & Doğan, M. 2009. *Salvia marashica* (Lamiaceae), a new species from Turkey. Ann Bot Fennici 46/1: 75-79.
- Kahraman, A., Celep, F. & Doğan, M. 2009. A New Record for the Flora of Turkey: *Salvia macrosiphon* Boiss. (Labiatae). Turk J Bot 33/1: 53-55.
- Vural, M. & Adıgüzel, N. 1996. A new species from Central Anatolia: *Salvia aytachii* M.Vural & N.Adıgüzel (Labiatae). Turk J Bot 20: 531-534.
- Walker, J.B., Systema, K.J., Treutlein, J. & Wink, M. 2004. *Salvia* (Lamiaceae) is not monophyletic: implications for the systematics, radiation, and ecological specializations of *Salvia* and tribe Mentheae. American Journal of Botany. 91/7: 1115-1125.
- Yücel, E. 2002. Türkiye'de Yetişen Çiçekler ve Yerörtücüleri I. Etam Matbaa Tesisleri, Eskişehir.

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