STUDIES IN EAST MEDITERRANEAN SPECIES OF SALVIA: III

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Salvia candidissima Vahl, Enum. i, 278 (1804)

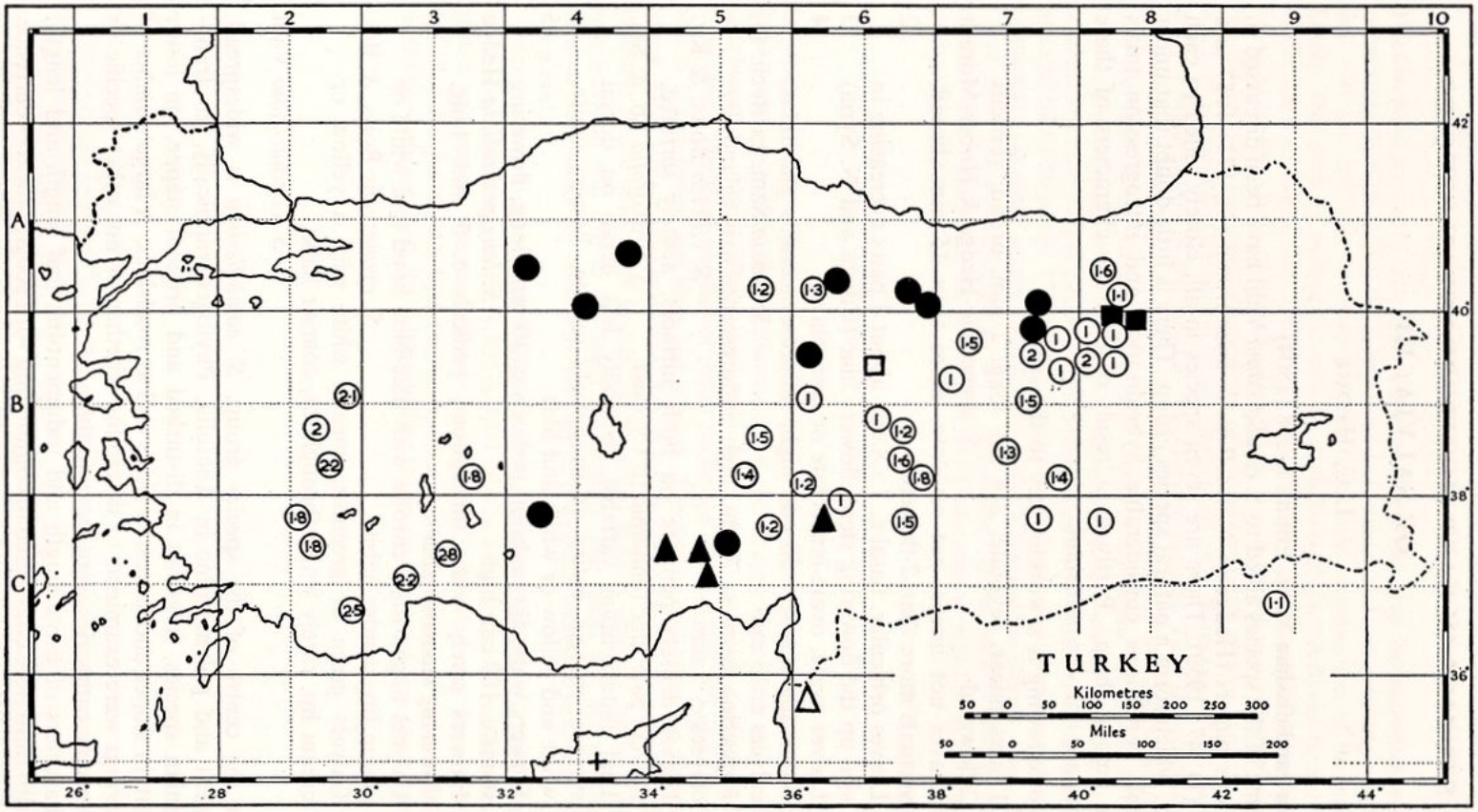
Some of the species allied to *S. candidissima* Vahl have been discussed in previous papers (Hedge in Notes R.B.G. Edinb. xxii (3), 173: 1957 and xxiii (1), 47: 1959). There are seven species in all, closely allied to each other, which form a natural species group. There is little doubt that under suitable conditions considerable hybridisation and introgression takes place among them. Partly as a result of this, the characters of these species are not very constant.

The following is a working key to the species:

1. Leaves linear, revolute, 2–4 cm. long, 2 mm. broad, verticils 2-flowered . . *S. vermifolia* Hedge & Huber-Morath
+ Leaves not linear, not revolute, more than 15 mm. broad, verticils more than 2-flowered 2
2. Leaves orbicular, basal c. 7×8 cm. about 4 pairs decreasing in size up the flowering stem, flowers lilac (Cilicia and N. Syria) 3
+ Leaves ovate, ovate-lanceolate or lanceolate . . . 4
3. Flowering stems c. 50 cm. high, inflorescence axis glandular, calyces c. 13 mm. . . . *S. cassia* Sam. ex Rech. fil.
+ Flowering stems c. 70 cm. high, inflorescence axis eglandular, calyces c. 7 mm. . . . . *S. cilicica* Boiss. & Ky.
4. Leaves densely pannose on both surfaces, acutely serrated, flowers pale lilac (endemic to Cyprus) . *S. crassifolia* Sb. & Sm.
+ Leaf indumentum variable, generally less dense on dorsal surface, margin entire or irregularly serrate, flowers white, white and yellow or white and lilac 5
5. Flowers white throughout, pedicels c. 10 mm. long, flowering stems c. 100 cm. high . . . *S. longipedicellata* Hedge
+ Flowers rarely white throughout, pedicels c. 5 mm. long, flowering stems smaller 6
6. Calyces tinged lilac, corolla with lilac-blue hood and white or cream lip, slender habit . . *S. cyanescens* Boiss. & Bal.
+ Calyces green or greenish, corolla white with a yellow or cream lip, rarely white throughout, coarser habit *S. candidissima* Vahl

At the centre of the species group, *S. candidissima* is widespread, frequent and polymorphic in Anatolia. Phytogeographically, an Irano-Turanian species, it grows in disturbed and original steppe, on lower mountain slopes and screes, in fields and at roadsides. A large number of gatherings were examined to determine whether or not other specific or sub-specific categories were recognisable.

Characters of calyx length and indumentum, leaf length and length/breadth ratio were considered in conjunction with geographical occurrence. The figures below are based on over 40 gatherings, chiefly from Turkey.



Distribution map of the *Salvia candidissima* Vahl species group. ○ *S. candidissima* Vahl. The figures within the circles are the leaf length/breadth ratio. ● *S. cyanescens* Boiss. & Bal. □ *S. vermifolia* Hedge & Huber-Morath △ *S. cassia* Sam. ex Rech. fil. ■ *S. longipedicellata* Hedge ▲ *S. cilicica* Boiss. & Ky. + *S. crassifolia* Sb. & Sm.

The calyx indumentum generally consisted of capitate glandular hairs, multicellular eglandular hairs and sessile golden-coloured oil globules. In 30 cases, all three types occurred, in 18 cases only eglandular hairs and oil globules were present.

Calyx length in mm.	9	10	11	12	13	14	15	16
No. of individuals	2	8	14	5	9	5	1	1
Leaf length in cm.	3	4	5	6	7	8	9	10
No. of individuals	1	9	11	7	5	3	5	1
Leaf length/breadth ratio	1	1·2	1·4	1·6	1·8	2	2·2	2·4	2·6
No. of individuals	9	6	6	5	3	7	3	2	1

The above data were plotted on a map. Certain features, both of a negative and positive nature, did emerge. On the negative side, there was no correlation between calyx size and indumentum and geographical occurrence. On the positive side, the specimens from eastern Anatolia had, for the most part, larger leaves with a 1:1 leaf length/breadth ratio whereas those from the west of Turkey had smaller leaves and a $\pm$2:1 leaf length/breadth ratio. As the map on which this ratio is plotted shows, there is considerable intergradation between these two types and no clear-cut division between them. However, by considering other characters such as general facies, leaf indumentum and flower colour in addition to those of leaf size and shape, it was possible with the large number of exsiccatae to group together several fairly distinct local forms.

These are described below and designated alphabetically. Future gatherings and experiments may prove their right to formal nomenclatural recognition, but with our present knowledge it would be artificial and undesirable to create a hierarchy of sub-species, varieties and forms.

Local form 'A'

Basal and stem leaves broadly ovate, $\pm$ cordate c. 8$\times$7 cm., petiole c. 7 cm., indumentum considerably denser on the ventral leaf surface, plant c. 60 cm. high, flowers white with pale lemon lower lip.

TURKEY. Prov. Diyarbakir: Diyarbakir, 5 km. S. of town, 650 m., eroded banks of the Tigris, 31 May 1957, *Davis & Hedge* D. 28749; Maden, 1300 m., igneous N.W. slopes, 2 June 1957, *Davis & Hedge* D. 29085. Prov. Tunceli: Pülümür, 1600 m., steep slopes, 11 July 1957, *Davis & Hedge* D. 30914; Pertek—Hozat, 1600 m., eroded shaley hills, 13 July 1957, *Davis & Hedge* D. 31065. Prov. Erzincan: W. of Tercan, 1500 m., dry banks, 11 July 1957, *Davis & Hedge* D. 30944; Ak Dağ, 1670 m., leaves grey densely covered with fine hairs, decumbent, non-lime screes, 26 June 1934, *Balls* 1521; Keşiş Dağ above Çimin, 1900 m., metamorphic S. slope, 26 July 1957, *Davis & Hedge* D. 31728. Prov. Erzurum: mountains between Ilica and Tercan, 1900 m., rocky igneous slopes, 10 July 1957, *Davis & Hedge* D. 30912; *Calvert & Zohrab* 385.
Grid Area C7, C8, B7, B8.

This is the most frequently occurring form in the east of Turkey. It corresponds with the type of *S. candidissima* Vahl at Copenhagen. Although I have not seen an authentic specimen of it, the type description of *S. armena* Koch (Linnaea xxi, 654: 1848) reads very like this form.

Local form 'B'

Basal leaves broadly ovate, c. 11×9 cm., petioles c. 11 cm., upper stem leaves clasping ± orbicular, indumentum thin on both leaf surfaces, plant c.? high. A very large coarse-growing form.

TURKEY. Prov. Elazig: Kharput, Garbaschi, 15 June 1889, *Sintenis* 680 W!). Prov. Kayseri: hills S.E. of Kayseri, c. 1350 m., 5 July 1856, *Balansa* 1079 (W!).

Grid Area B5, B7.

Local form 'C'

Basal leaves broadly ovate-orbicular, c. 5×5 cm., petioles c. 5 cm., distinctly cordate leaves with dense indumentum on both surfaces, plant c. 60 cm. high, flowers white with lemon lip.

IRAQ: Distr. Erbil, in glareosis c. 1100 m., 28 July 1957, *Rechinger fil.* 11052 (W!). Kurdish hills, dry slatey hillside, 25 April 1936, *Mrs. A. Low* 262 (BM!).

Grid Area C9.

The variety *cordifolia* which Nábělek described from Berwari (Iter Turcico-Persicum, 52: 1926) probably fits within this category.

Local form 'D'

Basal and stem leaves lanceolate, tapering to an acute apex, c. 12×6 cm., petioles c. 10 cm., indumentum fairly dense on dorsal and ventral surface, plant c. 70 cm. high, flowers white throughout.

TURKEY. Prov. Erzurum: Ilica—Tercan, 35 km. W. of Erzurum, 1850 m., banks, 10 July 1957, *Davis & Hedge* D. 30863; Ilica—Tercan, 1900 m., rocky igneous slopes, 10 July 1957, *Davis & Hedge* D. 30847.

Grid Area B8.

Local form 'E'

Basal and stem leaves c. 5×3·5 cm., ± rounded at base, oblong-ovate, indumentum fairly dense on dorsal and ventral surfaces, petioles c. 5 cm., plant c. 60 cm. high, flowers white with pale yellow lip.

TURKEY. Prov. Adana: distr. Saimbayli, Bozoğlan Dağ above Obruk yâyla, 1700 m., eroded slope, 7 July 1952, *Davis & Dodds* D. 19782. Prov. Kayseri: Develi, on volcanic steppe, 26 June 1952, *Davis & Dodds* D. 19170. Cappadocia, *Siehe* 202 ann. 1898 (W!); *Siehe* 183 ann. 1898 (W!). Armenia minor, Divriki, c. 1000 m., June 1893, *Bornmüller* 3495 (W!). Albistan, in gramin. calc. m. Scherdagh, alt. 1200 m. 16 Aug. 1865, *Haussknecht* s.n. Prov. Adiyaman, prope Besni, *Aucher* 2002.

Grid Area C5, C6, B5, B6.

Aucher 2002 is the specimen on which Bentham based *S. candidissima* Vahl var. *cappadocica* Benth. (in DC., Prodr. xii, 280: 1848). The variety was distinguished on the character of very short floral leaves—a feature which is so variable in this species that it is of very little importance.

Local form 'F'

Similar to the previous form but with a denser whiter indumentum on the leaves; flowers white throughout (?).

TURKEY. Prov. Gümüsane: N.E. of Bayburt, 1650 m., at edge of fields, 2 Aug. 1957, *Davis & Hedge* D. 31967; Stavri, basal leaves silver, non-lime rock crevices, *Balls* 530; in collibus incultis prope Baiburt, 14 Jul. 1862, *Bourgeau* s.n. (W!). Paphlagonia austr. in collibus ad oppidulum Kochissar (Ilkas), 1000 m., *J. & K. Bornmüller*, 23 Jun. 1929, B. 13509 (W!). Pontus Galaticus (Prov. Tokat or Amasya), in Mt. Abadsihir Dağ, 1100 m., 25 Jul. 1890, *Bornmüller* 2890 (W!).
Grid Area A6, A7, A8.

Local form 'G'

Basal and stem leaves ovate-lanceolate, c. 6×4 cm., rounded at base, acute at apex, indumentum less dense on dorsal surface, plant c. 30 cm., inflorescence compressed.

TURKEY. Prov. Malatya: Gürün, 1060 m., eroded hills of calc. shale, 19 June 1954, *Davis* 21873; Gürün, 1060 m., calc. steppe, 19 June 1954, *Davis* 21950.
Grid Area B6.

Local form 'H'

Stem leaves c. 4×4 cm., basal leaves?, ovate, indumentum less dense on dorsal surface, inflorescence loose and spreading. A form with similarities to *S. cilicica*.

TURKEY. Prov. Amasya: *Manissadjian* 1026 (W!); *Lederer* s.n. 1866 (W!). Prov. Tokat, *Wiedemann* 35.
Grid Area A5, A6.

Local form 'J'

Basal and stem leaves narrow oblong lanceolate, c. 6×3 cm., petioles c. 6 cm., indumentum fairly dense on both surfaces, plant c. 40 cm. high.

TURKEY. Prov. Isparta, distr. Sütçüler, Sarp Dağ above Kurdere, fallow field, 28 July 1947, *Davis* 15835. Prov. Kutahya, distr. Gediz, Şaphane, 1000 m., chalky slopes, *Davis* 18478. Prov. Denizli, *Huber-Morath* 5196 and 12727 (HM!). Prov. Burdur, *Huber-Morath* 5203 (HM!). Prov. Antalya, Elmali, in lacunosis et collibus, *Bourgeau* 225. Caria; 1843, *Pinard* s.n. (W!). Prov. Konya, Sultandağ, 1300 m., 1 July 1899, *Bornmüller* 5435 (W!). Prov. Uşak, 910 m., collines incultes, 8 Jul. 1857, *Balansa* 1186 (W!).
Grid Area C2, C3, B2, B3.

I have not seen sufficient material from Greece and Albania to come to any conclusion about the forms growing there.

S. odorata Willd. (Enum. Hort. Berol. 43: 1809) was based on a cultivated specimen whose origin was given as "inter Bagdad et Musul". The few differences which exist between it and wild material of *S. candidissima* are nullified when cultivated material of *S. candidissima* from known wild origin is examined. The cultivated *S. candidissima* has generally narrow foliage with a thinner indumentum and a much branched spreading raceme—the characters by which *S. odorata* Willd. was originally distinguished. Boissier rightly regarded it as synonymous with *S. candidissima*.