A REVISION OF SYMPHYTUM L. IN TURKEY AND ADJACENT AREAS

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INTRODUCTION

Much new herbarium material has accumulated since Bucknall (1913) published his sound basic revision of *Symphytum*. The present account was initially prepared in Edinburgh as a revision of the Turkish species but has been expanded to take into account species of neighbouring areas (i.e. Bulgaria, Greece, Aegean Islands and Caucasia) not found in Turkey.

Four new species are described: *Symphytum aintabicum*, *S. davisii*, *S. longipetiolatum* and *S. longisetum*.

GENERIC DESCRIPTION

Symphytum L., Sp. Pl. 1:136 (1753); Gen. Pl. ed. 5:66 (1754).
Lectotype: *S. officinale* L., designated by Britton & Brown, Illust. Fl. North United States, ed. 2, 3:92 (1913).

Syn.: *Procopiania* Guşuleac in Bul. Fac. Şti. Cernăuţi 2:435 (1928), reimpr. in Feddes Rep. 29:118 (1931). Type: *Borago cretica* Desf. in Willd., Sp. Pl. 1:778 (1797).

Hairy perennial herbs, with stalked basal leaves and usually sessile or decurrent cauline leaves. *Flowers* in terminal, forked, ebracteate scorpioid cymes. *Calyx* campanulate or tubular, often accrescent in fruit, with five teeth or segments. *Corolla* narrowly funnel-shaped or almost cylindrical, enlarged above the middle, the limb shortly and broadly five-lobed, or divided into five linear and revolute lobes longer than the tube; corolla scales (fornices) five, linear or subulate, papillose, alternating with the stamens, usually included and connivent, sometimes exserted. *Stamens* five, usually included. *Style* filiform, extending beyond the stamens; stigma small, capitate. *Nutlets* four, ovoid, smooth or granulate, obliquely keeled, with annular toothed base, the teeth clasping the receptacle.

USE OF CHARACTERS

Most species, including the type of the genus, *S. officinale*, have compact, erect rootstocks with fleshy, more or less fusiform roots serving as storage organs. Such species have branched stems and constitute Bucknall's subgenus *Ramosa* (i.e. *Symphytum* sensu stricto). In other species the rhizome is horizontal and creeping; it may be underground and fleshy, thus serving as a storage organ, and then fairly evenly thick or else tuberously expanded at intervals, or it may be above ground and rather slender, putting out tufts of leaves. The stems are unbranched and shorter than in the subgenus *Symphytum*. These species constitute Bucknall's subgenus *Simplicia*.

The indumentum of stem, branches and leaves is generally a mixture of

simple hairs and setae with tuberculate bases. The leaves are simple, entire rarely dentate. The leaf bases, especially of the upper leaves, are often used for delimiting species. In the majority of herbarium specimens with sessile and subsessile leaves it is often extremely difficult to determine whether the lamina or petiole is decurrent or not; this character has been used by Bucknall but is avoided in this paper for diagnosis.

The character of the calyx is of great significance; the relative length and shape of the segments or teeth and the length of the calyx in relation to that of the corolla tube are of diagnostic importance. The calyx is slightly zygomorphic, although this fact does not appear to have been widely recognized. The corolla is either funnel-shaped or subcylindrical, its colour ranging from white or yellowish-white to pink, lilac or blue; *Symphytum anatolicum* is unusual in having plants with either blue or white flowers. The corolla scales vary from narrowly triangular to subulate, either acute or obtuse at the apex, and in the latter case they are often slightly emarginate. The scales are generally as long as the stamens and may or may not slightly overtop them; less often they are exserted.

The stamens alternate with the corolla scales. Bucknall states that the slender style is shortly exserted in mature flowers. The style is certainly exserted in Section *Procopiania*, but from the available herbarium material it was not possible to confirm this for all the species. Bucknall had the advantage of being able to observe living material.

In the herbarium material the nutlets are usually not sufficiently mature for detailed observations; this also meant that it was not always possible to record the degree to which the calyx becomes accrescent in fruit.

Systems of Classification

The earlier classifications, including those of Kuznetsov (1910), have been reviewed by Bucknall (1913). Bucknall classified the twenty-five species known to him into no less than seven sections. His classification follows. More recently described or transferred species have been distinguished by an asterisk, and his nomenclature amended to comply with the International Code. A new section is made to accommodate *Procopiania*.

Subgenus Symphytum (Ramosa, Bucknall)
Section Symphytum (Officinalia, Bucknall)
S. officinale L., *S. uliginosum* A. Kerner (*S. tanaicense* Steven).
Section Caerulea
S. asperum Lepechin, *S. peregrinum* Ledebour, **S. hajastanum* Gviniaschvili, *S. sepulcrale* Boiss. & Bal., *S. armeniacum* Bucknall.
Section Albida
S. tauricum Willd., *S. sylvaticum* Boiss., *S. anatolicum* Boiss., *S. ottomanum* Frivald, **S. euboicum* (Runemark) Runemark, **S. davisii* Wickens.
Section Procopiania (Guşul.) Wickens, **comb. et stat. nov.**[1]
**S. circinale* Runemark, **S. creticum* (Runemark) Runemark.
Section Orientalia
S. caucasicum Bieb., *S. orientale* L., *S. kurdicum* Boiss. & Hausskn., *S. floribundum* Shuttleworth ex Nyman, *S. pseudobulbosum* Aznavour.

[1] **Procopiania** (Guşul.) Wickens **comb. et stat. nov.** affinis sect. *Albidis*. Corollae lobis linearibus, staminum filamentis longis prope basin pilis dispositis differt. Basionym: *Procopiania* Guşul. in Bul. Fac. Şti. Cernăuţi 2:435 (1928).

Section Suborientalia

S. palaestinum Boiss., **S. aintabicum* Huber-Morath & Wickens, **S. longisetum* Huber-Morath & Wickens, *S. brachycalyx* Boiss., *S. bornmuelleri* Bucknall.

Subgenus Simplicia

Section Tuberosa

S. tuberosum L., *S. mediterraneum* Koch, *S. gussonei* Schultz, *S. bulbosum* Schimper, *S. zeyheri* Schimper.

Section Cordata

S. cordatum Waldstein-Wartemberg & Kitaibel, *S. grandiflorum* DC., **S. longipetiolatum* Wickens.

The earlier classification of Boissier (1879) heavily weighted the corolla scales, with which Bucknall quite rightly disagreed. He, in turn, emphasized calyx and flower colour. It is not proposed to challenge the primary divisions of his classification at present, since insufficient material has been studied. The few chromosome counts available (Darlington & Wylie 1955; Löve & Löve 1961) are certainly of interest and appear to support the present subgeneric divisions. It is suggested, however, that Bucknall's heavy weighting of calyx shape and corolla colour leads to an artificial classification that disguises such affinities as *S. palaestinum* and *S. aintabicum* with *S. anatolicum* and *S. palaestinum* var. *majus* with *S. orientale* and *S. kurdicum*. Their overall relationships cut right across Bucknall's sections, and in fact fit more closely with the earlier attempts of Boissier.

Faegri (1931) united Bucknall's sections Symphytum (Officinalia) and Caerulea by creating *S. commune*, to which he subordinated *S. officinale*, *S. uliginosum*, *S. asperum* and *S. peregrinum* as subspecies, while retaining *S. sepulcrale* and *S. armeniacum* as species. It is a concept that has found little support.

Pawlowski (1961) has made a thorough study of the species available to him and published a synopsis, with particularly valuable illustrations of the corolla scales (fornices), including a new classification. Unfortunately this only includes ten of the known species, but it is interesting to note that he associates *S. tauricum*, *S. grandiflorum* and *S. orientale* in one section (Lingulata), and *S. bulbosum* and *S. ottomanum* in another (Bulbosum).

S. circinale and *S. creticum* are treated here as constituting a new section (Sect. Procopiania) on account of their long corolla lobes and basal hairs on the filaments (cf. Runemark, 1967). The other two Aegean species, *S. euboicum* and *S. davisii*, on account of their affinities with *S. ottomanum* and *S. anatolicum*, are placed for the present in Sect. Albida until such time as the sectional divisions can be fully revised.

It must be borne in mind that the status of some of the species is open to question in the absence of sufficient material and biosystematic information.

Geographical Distribution

Of the 33 species recognised for the genus, 27 are included in this paper, of which 19 occur in Turkey (mainland), 9 being endemic; of the remaining 8 species, 3 grow in Caucasia, 4 in the Aegean Islands, and 1 in Greece and Bulgaria. *S. officinale* and *S. uliginosum* have not been included in this

survey, although according to Bucknall the former is stated to occur in Turkey even though he cites no specimens, neither have I seen any; the latter is found in Hungary and S Russia. Of the remaining excluded species, *S. floribundum* and *S. mediterraneum* occur in France and *S. gussonei* in Sicily and Galicia.

The European species, *S. bulbosum*, has been included in this survey, partly to emphasize its close affinities with Turkish species, and also to guard against the possibility of its eventual discovery in western Turkey. It is remarkable how little material has been collected from Turkey-in-Europe since the days of Aznavour, who collected extensively near the Bosphorus.

In Turkey and the Aegean, the species are found in mesophytic sites, and in the drier areas it is unusual for more than a small population to be found in any one locality (Dr. Davis, verbal communication). This isolation is reflected in the high degree of endemism.

The distribution of nearly all the Turkish and E Aegean material, from herbaria and reliable literature citations, has been mapped (Figs. 1–3); due to inadequate data, *S. armeniacum* and *S. brachycalyx* have had to be omitted from the maps. The plots show rather discrete distribution patterns for all the species. In practice, geographical distribution could be used as an additional aid to identification. Bucknall's sectional divisions are also to some extent geographical, except for the somewhat disjunct distribution of Sect. Orientalia—the presence of *S. floribundum* in France may be taken as an example, although the above remarks are really intended to apply to Turkey. Kuznetsov (1910) has produced excellent maps showing the distribution of European and Caucasian species of *Symphytum*. The Caucasian species have recently been mapped in Grossheim (1967); they are *S. officinale*, *S. peregrinum*, *S. caucasicum*, *S. asperum*, *S. tauricum* and *S. grandiflorum*. *S. hajastanum* was described too late to be included in the Flora Kavkaza.

Key to Species

1. Corolla scales exserted 2
\+ Corolla scales not exserted 9
2. Rootstock either immediately tuberous or a slender rhizome terminating in a tuber; calyx divided almost to base; stem simple 3
\+ Rootstock fusiform or rhizomatous; stem branched . . 5
3. Corolla 14–16 mm long; calyx 6 mm long; first year's shoot sterile . . . . . 26. *S. grandiflorum*
\+ Corolla 10–11 mm long 4
4. Calyx 5 mm long; corolla 11 mm long, subcylindrical; lower leaves smaller than the middle leaves . . 24. *S. bulbosum*
\+ Calyx 7 mm long; corolla 10 mm long, infundibuliform; lower leaves nearly as large as the middle stem leaves . 25. *S. zeyheri*
5. Calyx 3–4 mm long, divided to below middle 6
\+ Calyx 6–8 mm long 7
6. Calyx segments ovate-lanceolate, subobtuse, divided to above lower quarter . . . . . 9. *S. ottomanum*
\+ Calyx segments linear-lanceolate, obtuse, divided to lower quarter . . . . . 10. *S. euboicum*

7. Calyx divided almost to middle, segments lanceolate, acute; corolla scales shortly exserted . . . . 17. *S. pseudobulbosum*
+ Calyx divided to lower quarter; corolla scales exserted . . 8
8. Corolla white, lobes c. 6 mm long, revolute . . 12. *S. circinale*
+ Corolla blue, rarely white, lobes c. 10 mm long, slightly recurved 13. *S. creticum*
9. Calyx divided to middle, or less 10
+ Calyx divided at least to lower quarter 17
10. Calyx teeth less than $\frac{1}{6}$ × length of tube, calyx 7 mm long; corolla white, 12–15 mm long . . . 22. *S. bornmuelleri*
+ Calyx teeth from $\frac{1}{3}$ to $\frac{1}{2}$ × length of tube 11
11. All or some of the flowers blue 12
+ Flowers white or yellowish-white 13
12. Corolla blue, 14 mm long, tube 3 mm wide; calyx 7 mm long, teeth broadly linear, obtuse . . . . 14. *S. caucasicum*
+ Corolla white, pink or blue, 12 mm long, tube 2 mm wide; calyx 6 mm long, teeth lanceolate, obtuse . . 19. *S. aintabicum*
13. Calyx 5 mm long, divided to middle, segments linear, obtuse; corolla 14 mm long, tube 2·5–3 mm wide . . 7. *S. sylvaticum*
+ Calyx 7–9 mm long, or if less than 7 mm, only divided to upper third or quarter 14
14. Corolla 12 mm long, tube 2 mm broad; calyx 8 mm long, teeth $\frac{1}{3}$ × length of tube, triangular-lanceolate . 21. *S. brachycalyx*
+ Corolla 15–19 mm long 15
15. Leaves distinctly asperous, upper leaves petiolate; calyx 7–9 mm long, teeth lanceolate, from first quarter to nearly half 16. *S. kurdicum*
+ Leaves not distinctly asperous, upper leaves sessile . . 16
16. Inflorescence c. 20-flowered; calyx 7–9 mm long, teeth ovate-oblong, obtuse, from first quarter to nearly half 15. *S. orientale*
+ Inflorescence c. 9-flowered; calyx 5–9 mm long, teeth linear-subulate, subobtuse, from one third to one quarter 18. *S. palaestinum*
17. Corolla blue 18
+ Corolla white or flushed with pink 24
18. Rootstock rhizomatous; 1–3 simple stems; calyx 6 mm long, segments linear-lanceolate, obtuse; corolla 12 mm long, tube 3 mm broad . . . . . 27. *S. longipetiolatum*
+ Rootstock fusiform; stem simple or branched . . . 19
19. Slender herb, base of stem less than 4 mm diameter; calyx 14–15 mm long, tube 2 mm diameter . . 8. *S. anatolicum*
+ Robust herbs, base of stem more than 4 mm diameter . . 20
20. Calyx 5–11 mm long, segments acute 21
+ Calyx 3–6 mm long, segments obtuse 22
21. Leaves narrow-lanceolate, at base cuneate; corolla 14–19 mm long . . . . . 3. *S. hajastanum*
+ Leaves elliptic-lanceolate, at base cordate, rounded or sub-attenuated; corolla 12–18 mm long . . . 2. *S. peregrinum*
22. Calyx small, 3–5 mm long; corolla 13–15 mm long 1. *S. asperum*
+ Calyx larger, 5–6 mm long, corolla 13–15 mm long . . 23

23. Stem villose; upper leaves shortly petiolate . . 4. *S. sepulcrale*
\+ Stem setose; upper leaves amplexicaul . . 5. *S. armeniacum*
24. Root either a thick tuber or immediately nodular; calyx 6 mm long, teeth linear-lanceolate, obtuse; corolla 14–16 mm long 23. *S. tuberosum*
\+ Root a taproot 25
25. Corolla 18 mm long, sometimes flushed pink; calyx 7 mm long 11. *S. davisii*
\+ Corolla 13–15 mm long 26
26. Calyx 9 mm long, segments lanceolate, acute; leaves petiolate, triangular-cordate . . . . . 6. *S. tauricum*
\+ Calyx 5–7 mm long 27
27. Leaves narrow-ovate, with long tuberculate based hairs 20. *S. longisetum*
\+ Leaves oblong-ovate, puberulous, with white tuberculate-based setae . . . . . 8. *S. anatolicum*

Description of Species

Unless otherwise stated, specimens cited have been examined and are in the Herbarium of the Royal Botanic Garden, Edinburgh; those in the private herbarium of Dr. Huber-Morath in Basel are marked 'H-M'.

1. S. asperum Lepechin in Nova Acta Acad. Sci. Petrop. 14:442 (1805). Ic.: Curtis, Bot. Mag. 24:t.929, 1806 (sub *S. asperrimum*).

Syn.: *S. orientale folio subrotundo aspero flore coeruleo.* Tournef., Coroll. 7 (1703).
S. orientale L, Sp. Pl. 136 (1753) p.p.
S. asperrimum Sims in Curtis, Bot. Mag. 24:t.929 (1806).
S. echinatum Ledeb., Index Sem. Hort. Dorpat. Suppl. 5 (1811).
S. patens Fries, Nov. Fl. Suecica Mant. 2:13 (1839) p.p.; cf. Fries, Mant. 3:18 (1842).
S. orientale sensu Fries, Nov. Fl Suecicae Mant. 3:18 (1842) p.p. non L.
S. majus Guldenst. ex Ledeb., Fl. Ross. 3:115 (1847).

Large scabrid perennial. Stem sulcate. *Lower leaves* ovate to elliptic-lanceolate, c. 14 cm or longer, cordate or rounded at base, shortly petiolate; upper leaves elliptic-lanceolate, sometimes slightly serrulate, cuneate at base, shortly petiolate; lamina scabrid, also with short tuberculate-based hairs. *Inflorescence* 15–20-flowered. *Calyx* 3–5 mm long, segments linear-lanceolate, obtuse, divided almost to base; accrescent in fruit, enlarging to 8 mm. *Corolla* pink in bud, becoming sky-blue to lilac, 13–15 mm long; tube medium broad, 3–4 mm wide, twice length of calyx; corolla scales 4·5–5 mm long, lanceolate, obtuse, about equalling stamens. *Stamen filaments* stout, 2 mm long; anthers 2·5–3 mm long. *Style* exserted 3 mm. *Nutlets* slightly curved, 4 × 2·5 mm, base constricted, strongly areolate, granulate. *Fl.* 5–7. *Picea forests, meadows and stream banks*, 700–2000 *m*. Fig. 1.

Type. "Hab. in jugo montium Caucas. Rossici."

Turkey. A7 Giresun: Tamdere, 1700 m, *Davis* 20671; Yedigözü Yaylasi, S of Giresun, 1730 m, *Huber-Morath* 13557 (H-M); Tamdere, 1620–1700 m, *Huber-Morath* 15095 (H-M); Trabzon: Hordokop, Maçka, 700 m, *Balls*

337; d. Maçka, Hamsiköy, 1230 m, *Huber-Morath* 13558 (H-M); d. Maçka, Hamsiköy, 1350–1400 m, *Huber-Morath* 15094 (H-M); Soğanli Pass, 1525 m, *Furse* 3936 (K). A8 Rize: Guneyce, Ikizdere-Çamlik, 1200 m, *Huber-Morath* 15096 (H-M); Çoruh: Artvin, 2000 m, *Stainton & Henderson* 5928; Şavval Tepe, Murgul, 1300 & 1800 m, *Davis* 32404 & 32230. A9 Çoruh: Ardanuç, Yalnizçam Pass, Ardanuç-Ardahan, 1550 m, *Huber-Morath* 16497 (H-M); Kars: Ardahan-Yalnizçam, 1900 m, *Davis* 29607.
CAUCASIA: 1838, *Ledebour* s.n.(K); Gutgare et Kaischaur, 1839, *Hohenacker* s.n. (K); Somdheken et Karabagh, 1877, *Herb. Petrop.* s.n. (K); *S. caucasicum* Bieb., 1908, *St. Littledale* s.n. (K); Bugur, Azerbaydzhan, 1939, *Prilipko* et al. s.n. (BM).
IRAN. Sakht-Sar, *Trott* 2941 (K); Ardebil-Astara, 1200 m, Bowles Scholarship Expd. 2341 (K).
RANGE: Turkey (NE Anatolia), Caucasia, Iran.

This appears to be a rather variable species as regards habit, leaf shape and leaf texture. A collection from A7 Trabzon: Hamsiköy, 1400 m, *Tobey* 2170, closely resembles *S. asperum* except for the 5 mm long calyx being scarcely divided to the middle and the corolla being only 12 mm long. Its status is uncertain.

Linnaeus, by including under his *S. orientale* both the blue- and white-flowered Turkish comfries mentioned by Tournefort, failed to distinguish *S. asperum* Lepechin (of which he had seen neither an illustration nor a specimen) from *S. orientale*.

2. S. peregrinum Ledebour, Index Sem. Hort. Dorpat. 4 (1820). "S. caule hirsuto foliis mollibus, radicalibus oblongis, caulis ovatis, acutis, calyce quinquepartito tubum corollae parum superante, laciniis erectis, corollae limbo campanulato, laciniis margine revolutis, stylo infracto.—Per plures annos culta formam servavit." Ic.: Kuznetsov in Mém. Acad. Sci. Pétersb. ser. 8, 25(5):t.1, fig. A, 4 & 8 (1910).

Root thick, fusiform, branched. *Stem* 1–2 m or more high, branched, with curved setae and sometimes tuberculate-based hairs. *Leaves* softly hispid or tuberculate-setose. *Lower leaves* 20–26 cm long, 7–13 cm broad, long-petiolate, elliptic-lanceolate, oblong-ovate, acuminate, base cordate, rounded or subattenuated into decurrent petiole; upper leaves ovate, acuminate, sessile and annexed to the stem by an uncinate prolongation of the lamina. *Inflorescence* many-flowered. *Rachis* and pedicels hispid with rigid, spreading setae. *Calyx* 5–7 mm long, puberulous-hispid, divided to lower quarter, segments triangular-lanceolate, gradually acuminate; enlarging in fruit to 11 mm, strongly tuberculate-setose. *Corolla* infundibuliform, pink becoming blue, 12–18 mm long, 3–4 times longer than calyx; corolla scales broadly triangular-subulate, obtuse, equalling or exceeding stamens. *Anthers* slightly shorter than filaments. *Style* often sharply bent below apex. *Nutlets* 4–5 × 2·5–3 mm, constricted at base, curved, strongly venose-areolate.
TYPE. "in sylvaticis ditionis Talysch, ad 8000 ped.," *Ledebour*.
RANGE: Caucasia, Talysh Mountains.

No native specimens were seen by myself or by Bucknall, from whom the above description is taken; his description agrees with that of Kuznetsov

(1910), who has monographed the Caucasian species of *Symphytum*. Gviniaschvili (1967) has confirmed that the species occurs in Caucasia. Ledebour, Fl. Ross. 3:114 (1847), states that the original material was collected by Hohenacker from Swant in Talysh at 1200 m, adding "vidi cult." Hohenacker in his Enum. Talisch, 77 (1837) only refers to his collecting trip in 1834, and I have found no reference to an earlier visit to the type locality.

Since *S. peregrinum* had been considered by some botanists as synonymous with *S. asperum*, or as a hybrid between *S. asperum* and *S. officinale*, Kuznetsov compared authenticated cultivated material from Dorpat (Tartu) with Talysh and Iranian material and concluded that they were identical, i.e. no hybridisation had occurred in cultivation before the species was described by Ledebour. Kuznetsov's excellent distribution map shows *S. peregrinum* to be geographically distinct from the alleged parents.

A. E. Wade (in litt.) is of the opinion that *S. peregrinum* is not synonymous with *S. uplandicum* as suggested by Bucknall, although he considers *S. uplandicum* may be of hybrid origin, with *S. caucasicum* as one parent. As Kuznetsov has pointed out, *S. peregrinum* appears to be intermediate between *S. caucasicum* and *S. asperum*; the former occurs further to the north, the latter to the south. Its exact status appears to require further investigation.

It should be pointed out that the distribution maps of Kuznetsov (1910) and Grossheim (1967) probably also include the recently described *S. hajastanum*.

3. S. hajastanum Gviniaschvili in Notul. Syst. Geogr. Inst. Bot. Tbilisi fasc. 26:73 (1967). Ic.: l.c. t. 1 & 2.

Perennial, taproot fusiform. Plant greenish-grey, softly hispid. *Stem* solitary, 40–75 cm tall, erect, somewhat branched. *Lower leaves* lanceolate, 9–15 cm long, 2·5–4 cm broad, apex strongly acuminate, base cuneate, attenuated into long petiole. *Terminal racemes* many-flowered; rachis and pedicels with curved hairs, densely puberulous and beset with long setae; pedicels 5–8 mm long, slender. *Calyx* 7–11 mm long, puberulous, with curved hairs and dense setae; calyx divided to base, segments linear, acute, subequal, accrescent in fruit, enlarging to 15 mm. *Corolla* 14–19 mm long, blue, tubular, limb narrow-infundibuliform, twice as long as calyx; corolla scales ligulate, apex obtuse, shorter than stamens. *Anthers* almost equalling filaments or somewhat shorter. *Style* exserted. *Nutlets* dark, 4·5–5 mm, with dense minute tuberculae and coarsely venose-areolate.

TYPE. Soviet Armenia, prope Yerevan ad ripam dextram fl. Azat-get, in viciniis fortalitionis Garni, in fruticetis, 1964, *Gviniaschvili* (TBI, n.v.).

No herbarium material has been seen. Near *S. peregrinum* Ledeb., *S. hajastanum* differs in the considerably narrower, lanceolate and strongly cuneate leaves, the calyx divided almost to the base into linear segments, and the corolla scales shorter than the stamens. It is well distinguished from *S. asperum* by its pubescence and larger calyces with acute linear segments (Gviniaschvili l.c.).

4. S. sepulcrale Boiss. & Bal. in Boiss., Fl. Orient. 4:174 (1879).

Villose perennial herb. Stem sulcate, branched. *Leaves* petiolate, membranous, ovate to broadly lanceolate, acute or acuminate, rounded or

cordate at base; lower leaves 12 cm long, 5·5 cm broad; upper leaves 7 cm long, 2·5 cm broad. *Inflorescence* 10–12-flowered. *Calyx* 6 mm long, divided nearly to base, segments lanceolate-obtuse. *Corolla* violet, 15 mm long, tube equalling calyx, 2–3 mm broad; corolla scales 4 mm long, broadly linear, equalling stamens. *Stamen filaments* 2 mm long; anthers 2 mm long. *Style* not exserted. *Nutlets* not seen, smooth or minutely tuberculate (Bucknall). *Fl.* 5. *Shady places, meadows.* Fig. 1.
TYPE. Turkey, Lazistan (Pontus Lazicus), Cimetière de Djimil (Cimil), 2032 m, 1866, *Balansa* 1514 (iso-K).
TURKEY. A7 Gümüşane; Boejukdere above Artabil, 1894, *Sintenis* 7038. A8 Rize: Cimetière turc de Djimil (Cimil), 1866, *du Parquet* s.n. (BM).

Recent collections of this species are required.

5. S. armeniacum Bucknall in J. Linn. Soc. Bot. 41:520 (1913). Ic.: l.c. fig. 1.

Perennial herb. Stem branched, with puberulous and tuberculate-based hairs. *Lower leaves* oblong-ovate, acute, 12 cm long, 4 cm broad, attenuated, decurrent; upper leaves sessile, amplexicaul. *Inflorescence* c. 20-flowered. *Calyx* 5 mm long, divided to lower quarter, segments linear, obtuse. *Corolla* blue, 13–15 mm long, tube 4 mm broad, exceeding calyx; corolla scales 6 mm long, linear, obtuse, barely exceeding stamens. *Stamen filaments* 3 mm long; anthers 3 mm long. *Style* 15 mm long, persistent. *Nutlets* not seen.
TYPE. Turkey 'Erzerum, *Calvert* 222, recd. 1867' (holo-CGE).
CAUCASIA. 'In montis pr. Nachitschewan', 1893, *Buhse* s.n. (K).
RANGE: Turkey (E Anatolia), Caucasia.

No recent material has been seen. The type may well have been collected between Erzurum and Trabzon.

6. S. tauricum Willd. in Neue Schrift. Nat. Berlin 2:120 (1799). Ic.: l.c. t. 6, fig. 1.

Syn.: *S. orientale* sensu Pallas, Cat, Pl. Fl. Taur. in Nova Acta Acad. Sci. Petrop. 306 (1792) non L.
S. bullatum Hornem. in Cat. Hort. Havn. Suppl. 2:13 (1813).

Perennial herb, 30 cm or more tall, covered with dense, long tuberculate-based hairs. *Leaves* petiolate, triangular-cordate; lower leaves 6 cm long, 3·5 cm broad; upper leaves 4 cm long, 3·5 cm broad. *Inflorescence* 16–20-flowered. *Calyx* 9 mm long, as long as the corolla tube, divided nearly to base, segments lanceolate, acute. *Corolla* yellowish-white, 13 mm long, tube 3 mm broad; corolla scales 4 mm long, equalling stamens, linear, obtuse. *Stamen filaments* 2 mm long; anthers 2 mm long. *Style* not exserted. *Nutlets* not seen. *Fl.* 5. Fig. 1.
TYPE: Crimea, 'Wächst in Taurien'.
TURKEY. A5 Sinop: clays below cliff, NW of Sinop, *Tobey* 82.
RANGE: S Russia (Podolia to Caucasia), Turkey (Paphlagonia).

The above description is based on *Tobey* 82, which resembles Crimean *S. tauricum* except for the leaves tending to be more sharply triangular, and the flowers having a larger calyx, 9 mm long instead of the 5–6 mm described by Bucknall.

7. S. sylvaticum Boiss., Pl. Or. Nov. Dec. 2:4 (1875).

Slender herb, 45 cm tall. *Stem* weakly tomentose, also with short curved tuberculate-based hairs. *Leaves* membranous, oblong-lanceolate, acute or acuminate, serrulate (Boissier, Fl. Orient. 4:172 (1879) says "denticulate", 'Folia ea *Impatiens noli-tangere* referentia'), shortly attenuate; upper surface with short tuberculate-based hairs and sparsely pilose; lower surface with short tuberculate-based hairs. *Lower leaves* shortly petiolate, 9 cm long, 4 cm broad; upper leaves sessile, 4 cm long, 1·5 cm broad. *Inflorescence* c. 9-flowered (Boissier l.c. says 5–7-flowered). *Calyx* 5 mm long, divided to middle, segments linear, obtuse; somewhat accrescent in fruit, enlarging to

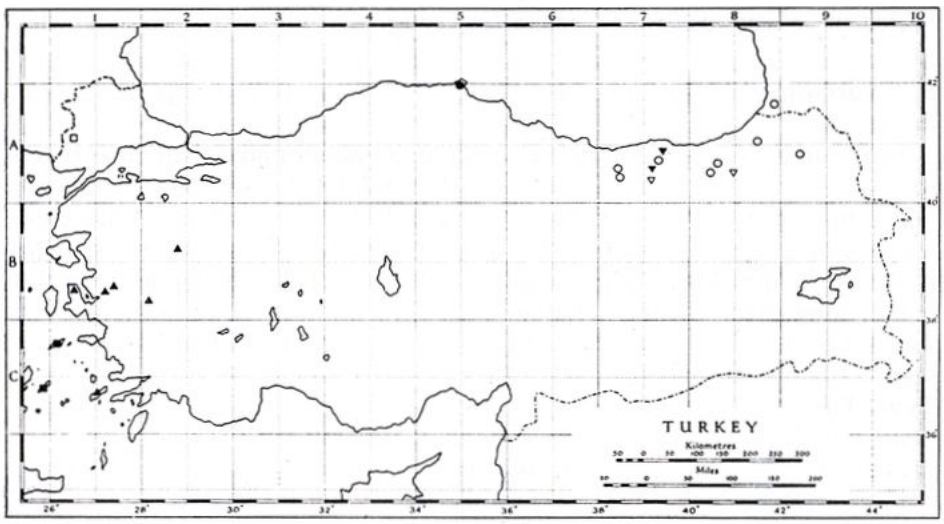

FIG. 1. Symphytum in Turkey and East Aegean Islands. ○ S. asperum; ▽ S. sepulcrale ●S. tauricum; ▼ S. sylvaticum; ▲ S. anatolicum; □ S. ottomanum; ■ S. davisii.

7 mm, campanulate. *Corolla* white, 14 mm long, tube 2·5–3 mm broad; corolla scales 4 mm long, exceeding stamens by 1 mm, triangular-subulate, subacute (broadly linear—Boissier l.c.). *Stamen filaments* 2 mm long; anthers 2 mm long. *Style* not exserted. *Nutlets* 4 × 3 mm, obliquely subglobose, areolate, minutely tuberculate. *Fl.* 7. Fig. 1.

TYPE. Turkey, Trabzon, 1862, *E. Bourgeau* exsicc. Armen. (holo-G, n.v.)

TURKEY. A7 Trabzon: d. Maçka, near Hamsiköy, 1230 m, *Huber-Morath* 13559 (H-M).

RANGE: Turkey (NE Anatolia).

8. S. anatolicum Boiss., Diagn. ser. 1, 4:43 (1844).

Syn.: *S. sicyosinum* Candargy in Bull. Soc. Bot. Fr. 44:150 (1897).

Small, slender perennial herb, 15–45 cm tall. *Stem* puberulous, with curved tuberculate-based hairs. *Lower leaves* 6·5 cm long, 2·5 cm broad, oblong-ovate, shortly petiolate, subrepandous; upper leaves 3 cm long, 2 cm broad, sessile shortly decurrent. *Leaves* shortly tuberculate-setose. *Inflorescence* 25- or more flowered. *Calyx* 5–7 mm long, divided nearly to base, segments linear-lanceolate, subacute; accrescent in fruit, enlarging to 13 mm. *Corolla* 14–15 mm long, white or violet (it is unusual for all the

flowers on one plant to be either white or coloured in *Symphytum*), corolla tube narrow, 2 mm wide, twice as long as calyx, limb spreading; corolla scales 4 mm long, linear, obtuse, scarcely exceeding the stamens. *Stamen filaments* 2·5 mm long; anthers 2 mm long. *Nutlets* 4 × 1·5 mm, curved, reticulately veined, tuberculate. *Fl.* 4–9. *Montane woodland*, 350–1390 *m*. Fig. 1.

SYNTYPES. Several syntypes from W Anatolia and E Aegean Islands, cited under two variants. Var. *albiflora* 'Hab. in umbrosis montium prope Smyrnam', 1842, *Boissier* (K); 'in sylvosis Coracis, in pratis Tmoli occidentalis circa Bozdagh, Junio 1842', *Boissier*. Var. *floribus violaceis* in insula Cos 1820, *d'Urville* s.n. (K); secus torrentes in montibus Smyrnae supra Bournabat, 1842, *Boissier*.

TURKEY. B2 Izmir: Bozdağ, *Balansa* 368 (K); Ilidja, *Bornmueller* 9742 (K); Bozdağ, 350 & 1240 m, *Huber-Morath* 2494 & 2495 (H-M); Manisa: Demirci—Simav, 1340–1390 m, *Huber-Morath* 12580 (H-M); Monte Sipylos, *Bornmueller* 9780 (K). Islands: Kos, Dikios, 1897, *Forsyth-Major* 762 (K).

RANGE: Turkey (W Anatolia), E Aegean Islands.

H. & E. Walter 524, collected in 1955 from B1, Balikesir, Kazdag near Edremit, has been assigned to this species although it differs in the calyx being scarcely divided to the middle; the lower leaves are missing. More material is required from B1.

9. S. ottomanum Friv. in Flora (Regensburg) 19:439 (1836).

Tap rooted perennial herb, 30–50 cm high. *Stem* slender, 3 mm diameter, branched, puberulous and with long tuberculate-based setae. *Leaves* subhispid, ovate, acute; lower leaves 9 cm long, 5 cm broad, exceptionally 20 cm long, 9 cm broad, attenuated into winged petiole as long as lamina; upper leaves cuneate, decurrent. *Inflorescence* c. 20-flowered. *Calyx* 4 mm long, divided to below middle, segments ovate-lanceolate, subobtuse; accrescent in fruit, enlarging to 10 mm. *Corolla* 6 mm long, subcylindrical, white; corolla scales 5 mm long, broadly lanceolate-subulate, subacute, exserted 3 mm, exceeding stamens by 3·5 mm. *Stamen filaments* 1 mm long; anthers 2 mm long. *Nutlets* 2 × 1·5 mm, suberect, areolate, minutely tuberculate. *Fl.* 5. Fig. 1.

TYPE. 'in Rumelia' 1827, *Frivaldsky* s.n. (iso-K).

TURKEY. A1(E) Edirne: between Karaağaç and Edirne, 19 v 1961, *A. & T. Baytop* (ISTF 6606), det. Huber-Morath 1962 (Hb. Baytop, H-M), n.v.

RANGE: Balkans (including Greece), Turkey-in-Europe. Dr. A. Huber-Morath has kindly communicated the first Turkish record of this species.

10. S. euboicum (Runem.) Runem. in Bot. Notiser 120:88 (1967).

Syn.: *Procopiania euboica* Runem. in Bot. Jahrb. 80:376 (1961).

Herb 30–45 cm high. *Stem* branched, hispid, with long tuberculate-based setae and sparsely pilose. *Lower leaves* 6 cm long, 3 cm broad, oblong-ovate, acute, shortly attenuate; petiole as long as lamina, winged; upper leaves subsessile. *Inflorescence* c. 25-flowered. *Calyx* 3 mm long, divided to lower quarter, linear-lanceolate, obtuse; calyx accrescent in fruit, enlarging to 7 mm. *Corolla* white, 5 mm long, tube subcylindrical, lobes triangular, erect; corolla scales 6 mm long, broadly linear-lanceolate, subacute, exceeding

corolla by 3 mm. *Stamen filaments* 0·5 mm long; anthers 3 mm long. *Style* 9 mm long, persistent. *Nutlets* 2·5 × 2 mm, curved, constricted at base, lightly areolate, tuberculate. *Fl.* 5. *Woodland.*
TYPE. Greece: Euboea, *Aucher-Eloy* 2344 (holo-W n.v., iso-K).
GREECE. Euboea: Mt. Ocha, 600 m, *Runemark* 17216 (K); Kap Kafireos, *Runemark* 18920 (K).
RANGE: Euboea.

Although first described by Runemark in *Procopiania*, this species must be placed in *Symphytum* Sect. *Albida*, where it has strong affinities with *S. ottomanum*, neither species having the long corolla lobes and basal filament hairs of Sect. *Procopiania*.

11. S. davisii Wickens, **sp. nov.**
Herba perennis. Radix lignosa, ramosa. *Caulis* 15–25 cm altus, a basi ramosus, pilis basi tuberculatis hispidis. *Folia* omnia supra parce villosa, infra dense villosa; caulina inferiora 8 cm longa, 4 cm lata, ovata, obtusa, petiolo laminae aequilongo, decurrente; superiora 3 cm longa, 1·5 cm lata, ovata, sessilia. *Inflorescentia* compacta, c. 25-flora. *Calyx* dense villosus, 10 mm longus, infra quartam partem inferiorem in lacinias lanceolatas acutas fissus. *Corolla* alba vel alba roseo-suffusa, 18 mm longa; tubus 3 mm latus, calycem aequans; lobi margine et apice reflexi; fornices 5 mm longi, lanceolati, subobtusi, stamina aequantes. *Staminum* filamenta 2 mm longa; antherae 3 mm longae. *Stylus* exsertus 1–5 mm, persistens. *Nuculae* erectae, laeves. *Fl.* 4. Hab. in locis saxosis umbrosis. Fig. 1.
TYPE. Cyclades: Is. Amorgos, Langadha, shady rocks, 1940, *Davis* 1515 (holo-E, iso-K).
CYCLADES. Is. Amorgos, Langadha, shady rocks, *Davis* 1371 & 1467.
Is. Ikaria. 'in saxosis schist., umbrosis montis Atheras, 900 m, *Rechinger* 4428 (as *S. anatolicum*, K).
RANGE: Cyclades (Amorgos) and E Aegean Islands (Ikaria).

This is a new and distinct species, very similar in vegetative habit to *S. ottomanum* Friv. from Central Europe and Balkans. It differs in having larger flowers and corolla scales not exserted; floristically it is similar to a large-flowered *S. anatolicum* Boiss. Runemark (1967) records *S. creticum* (Willd.) Runem. from the Cyclades, including Amorgos, but no specimens of it have been seen from that island.

S. creticum and the neighbouring *S. circinale* Runem. are very similar in habit to *S. davisii* but with major floral differences, having long, revolute corolla lobes and hairs at the base of the filaments.

12. S. circinale Runem. in Bot. Notiser 120:90 (1967). Ic.: l.c. fig. 2.
Slender perennial herb. Rhizome branched. *Stem* lax, 10–40 cm high, branched, tuberculate villose. *Leaves* tuberculate villose, scarcely dentate; lower leaves ovate-elliptic, 9 cm long, 5 cm broad, decurrent; petiole winged, as long as lamina; upper leaves parabolical, 3 cm long, 2 cm broad, subsessile or broadly winged, short petiole. *Inflorescence* lax, c. 10-flowered. *Calyx* 6–8 mm long, funnel-shaped, divided to lower quarter, segments

lanceolate, acute, villose, enlarging in fruit to 9–10 mm. *Corolla* white, urceolate, tube 4–5 mm long, lobes c. 8 mm long, at 45° to stamens, upper half usually revolute; corolla scales 6 mm long, subulate, acute, base broader than filaments, margin with unicellular prickles. *Stamen filaments* c. 11 mm long, inserted 2 mm below base of corolla scales, hairy cuff at 1·5 mm from base of filament; anthers 2 mm long. *Style* 16 mm long, stigma capitate. *Nutlets* 3–4 mm, obovate, erect, reticulate. *Fl.* 3–5. *Stream banks, rock crevices, shade*, 0–250 m. Fig. 2.

TYPE. Ikaria, Ag. Nikolaos, c. 25 m, 1958, *Runemark & Snogerup* 6092 (holo-LD n.v.).

EAST AEGEAN ISLANDS. Rodhos: Grottes du Mont Smith, *Bourgeau* 123 (K); Erianda, *Vaecasi* 583 (K); Salakos, *Rechinger* 7086 (K); Attain, 1000 m, *Rechinger* 7366 (K); Salakos, 250 m, *Davis* 40338 & 40392; Ikaria: Evdilos, 10 m, *Davis* 40601; Samos: Potami, *Davis* 1750; Kalymnos, 1887, *Forsyth-Major* 763 (K).

RANGE: East Aegean Islands.

The closely related *S. creticum* (Willd.) Runem. occurs in the West Aegean Islands, and *S. euboicum* (Runem.) Runem. in the island of Euboea. *S. creticum* can be distinguished by its bluish-violet, rarely white, flowers, the corolla scales being narrower at the base than the filaments, and each filament having two minute lateral hairy projections at the base. Runemark in his original description suggests both *S. circinale* and *S. creticum* have affinities with *S. anatolicum* and that *S. circinale* may well occur in West Anatolia. *S. euboicum*, however, should be placed in the vicinity of *S. ottomanum*.

13. S. creticum (Willd.) Runem. in Bot. Notiser 120:89 (1967). Ic.: l.c. fig. 2.

Syn.: *Borago cretica* Willd., Sp. Pl. 1:778 (1797).
Trachystemon creticum D. Don ex G. Don, Gen. Syst. 4:309 (1838).
Psilostemon creticum DC., Prod. 10:36 (1846).
Procopiania cretica (Willd.) Guşul. in Bul. Fac. Şti. Cernăuţi 2:435 (1928).

Slender perennial herb. Rhizome branched. *Stem* lax, 10–40 cm high, branched, tuberculate villose, rarely almost glabrous. *Lower leaves* elliptic, 2–8 cm long, winged petiole 1–5 cm long; upper leaves elliptic to broadly lanceolate, sessile. *Calyx* 6–8 mm long, divided to lower quarter, segments lanceolate, acuminate; accrescent in fruit. *Corolla* bluish-violet, rarely white, tube urceolate, c. 5 mm long, lobes c 10 mm long, slightly recurved and at 45–75° to stamens; corolla scales c. 5 mm long, narrow-linear, subulate, base narrower than filaments, margins with unicellular prickles. *Stamen filaments* c. 9 mm long, with 2 hairy lateral projections at 0·5 mm from base; anthers 2 mm long. *Style* 14 mm long, stigma capitate. *Nutlets* 3·5 × 1·5 mm, obovate, erect, minutely tuberculate. *Fl.* 3–4. *Maritime shady rock crevices.*

TYPE. 'Habitat in Creta'.

CRETE. Therisso, 1867, *Sieber* s.n. (K); Sitia, Toplou, *Gandoger* 520 (K); Khania, Cap Malaca, *Gandoger* 8284 (K); Khania, Penin. Akratiri, *Rechinger* 13325 (K); Georgioupolis-Vryssis, *Goulimy* 34 (K).

RANGE: Crete, Peloponnisos, Cyclades, Karpathos, Kithira, Zakinthos.

This species was described by Willdenow from a dried specimen, possibly no longer extant, but almost certainly collected by Andreas von Gundelsheimer, who accompanied Tournefort on his journey in the Near East; his specimens duplicated those of Tournefort, whose name *Borago cretica* is cited by Willdenow as a synonym of his *Borago cretica*. The plant of Tournefort and Gundelsheimer was illustrated by their artist Claude Aubriet, whose drawing was reproduced by Desfontaines, Choix Pl. Cor. Tournef. pl. 17 (1808).

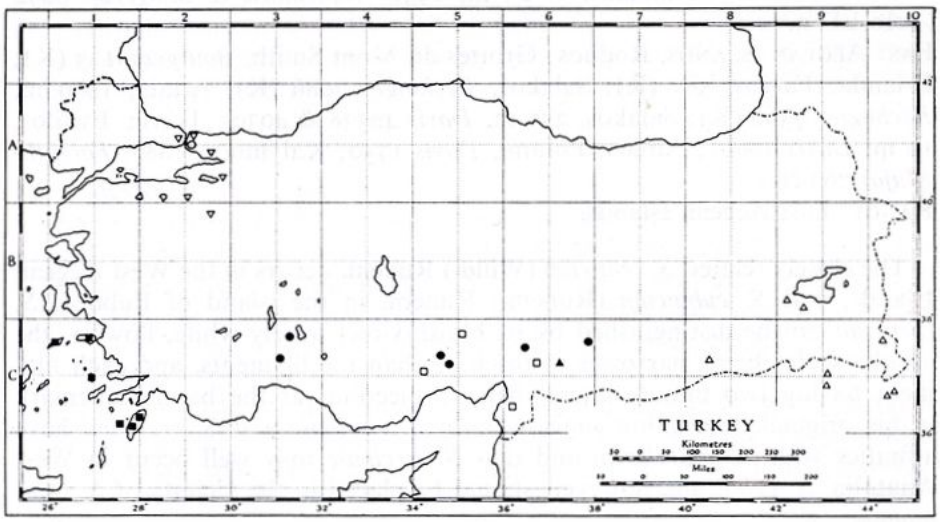

FIG. 2. Symphytum in Turkey and East Aegean Islands. ■ S. circinale; ▽ S. orientale; △ S. kurdicum; ○S. pseudobulbosum; ●S. palaestinum var. palaestinum; □ S. palaestinum var. majus; ▲ S. aintabicum.

14. S. caucasicum Bieb., Fl. Taur.-Cauc. 1:128 (1808).

Syn.: *S. racemosum* Stephan ex Roem. & Schultes, Syst. Veg. 4:752 (1819).
S. donii DC., Prodr. 10:37 (1846).

Perennial herb with branched taproot. *Stem* 30–40 cm tall, branched, lightly puberulous with tuberculate-based setae. *Lower leaves* oblong-ovate, attenuated into winged petiole; upper leaves ovate-lanceolate, shortly decurrent. *Inflorescence* c. 25-flowered. *Calyx* 7 mm long, divided to upper third or quarter, teeth broadly linear, obtuse; calyx accrescent in fruit, enlarging to 10 mm. *Corolla* blue, infundibuliform, 14 mm long, tube 3 mm broad; corolla scales 4 mm long, linear, obtuse, equalling stamens. *Stamen filaments* 2 mm long; anthers 2 mm long. *Style* 14 mm long. *Nutlets* oval, 2·5 × 2 mm, erect, areolate, minutely tuberculate.

TYPE. 'Habitat in dumetis ad fluvium Terek inter Mosdok et Kifljar minime rarum,' *Marschall von Bieberstein.*

CAUCASIA. Georgia, 1831, *Hohenacker* s.n. (K); Schusch in 'Persien', 1833, *Hohenacker* s.n. (BM); Sonukedia, 1877, Herb. Petrop. (K); Abastuman, Cathalinia, 1881, *A. & V. Brotherus* 651 (BM); Terek, 1891, *Lipsky* s.n. (photo K); Tiflis, *Grossheim & Schischkin* 240 (K); Tschuchur-jurt, Azerbaydzhan, *Zakarjan* s.n. (BM).

RANGE: Caucasia. It is not known from NW Iran, although Riedl (1967) suggests that it may occur there.

15. S. orientale L., Sp. Pl. 136 (1753) p.p.

Syn.: *S. constantinopolitanum boraginis folio et facie flore albo* Tournef. Cor. 7 (1703).
S. tauricum Sims, Bot. Mag. t. 1921 (1817).
S. jacquinianum Tausch. in Flora (Regensburg) 19:393 (1836).

Root branched, thick and woody. *Robust perennial herb*, 50 cm or more high. *Stem* branched, pilose. *Leaves* papery, softly pubescent; basal leaves oblong-ovate, rounded, cordate or truncate, 18 cm long, 8 cm broad, petiole narrowly winged at top, as long as lamina; middle leaves ovate, rounded at base, sessile or subsessile, 4·5–7 cm long, 2–4·5 cm broad. *Inflorescence* c. 20-flowered with well developed forked scorpioid cymes, 15 cm or more long in mature inflorescences; flowers large and showy. *Calyx* 7–9 mm long, tubular, divided from first quarter to nearly half, teeth ovate-oblong, obtuse; calyx accrescent in fruit, enlarging to 19 mm. *Corolla* white, 16–17 mm long, funnel-shaped, tube exceeding calyx; corolla scales 6 mm long, broadly subulate, subobtuse, shortly exceeding stamens. *Stamen filaments* 2 mm long; anthers 2 mm long. *Style* exserted 1–2 mm. *Nutlets* erect to slightly curved, 3 × 2·5 mm. *Fl.* 4–6. *Shady stream banks*. Fig. 2.

TYPE. Turkey. 'Habitat juxta Constantinople rivulos prim. vere.' (Linnaeus l.c., took this information direct from Buxbaum, Plantarum minus cognitarum cent. 5:36, t. 68, 1740).

TURKEY. A2(E) Istanbul: *Aucher-Eloy* 2349 (K); *Noé* 41 (K); *Pichler* 113 (K); Eski Serai and Taop-Kapu Serai, 1890, *Dr. Degen* s.n. (K); Halkali, 1902, *Aznavour* s.n.; Yildiz Bahçesi, 17 v 1964, *A. Baytop* (ISTF 7622) det. Huber-Morath (n.v.). A2(A) Istanbul: Soultania, Beicos, 1897, *Aznavour* s.n.; Scutaria, 1891 & 1899, *Aznavour* s.n.; Kocaeli: R. Kara-Su, *Bornmüller* 14416; Bursa: Uludağ, 1360 m, *Huber-Morath* 17414 (H-M); Iznik (Nicaea), 1966, *Stearn* s.n. (BM). B1 Izmir: Tavşanli-Inegöl, 1200–1400 m, *Dudley* (*Davis* 36175).

RANGE: NW & W Turkey.

Its limited distribution ensures that *S. orientale* will not be confused with the more membranous-leaved *S. palaestinum* var. *majus* from the Cilician Plain, Anti-Taurus and Amanus. There is a gathering from B2 Kütahya: Simav, 1300 m, *Coode & Jones* 2697, which differs from the described *S. orientale* by having more membranous and narrower leaves and also a narrower corolla tube; its status is uncertain.

Linnaeus wrongly combined at least two of Tournefort's species so that his original description also includes *S. asperum* Lepechin.

16. S. kurdicum Boiss. & Hausskn., in Boiss., Pl. Orient. Nov. Dec. 2:5 (1875).

Similar to *S. orientale* but differing in having distinctly more asperous and more membranous leaves; the upper leaves are also petiolate. *Inflorescence* c. 10-flowered, more compact than *S. orientale*. *Calyx* 7–9 mm long, divided from first quarter to nearly half, teeth lanceolate, acute to subobtuse; calyx accrescent in fruit, enlarging to 12 mm. *Corolla* white, 16–19 mm long, tube narrow, 1·5–2·5 mm broad; corolla scales 6 mm long, equalling stamens, broadly subulate, obtuse. *Stamen filaments* 3 mm long; anthers 3 mm long. *Style* not exserted. *Nutlets* 4 × 2·5 mm, constricted at base, then obliquely curved, areolate tuberculate. *Fl.* 4–5. *Shady rocks, cliffs and stream banks*. Fig. 2.

TYPE. 'Hab. in Kurdistania Persiae contermina inter Sulimanieh et Sehna', *Haussknecht*.
TURKEY. B9 Bitlis: Karz dağ above Kotum, 1800 m, *Davis* 22233 & 22262; Bitlis, 1550 m, *Davis* 43400. C8 Mardin: Mardin, 1200 m, *Davis & Hedge* D.28596. C10 Hakkari: Şemdinli-Yüksekova, 1600 m, *Davis* 44986; Kurdistania, *Sintenis* 1297 (K).
IRAQ. Kuh-Safin, 1100 m, *Bornmüller* 1633 (K); Barsarini Soyi, Rowandiz, *Guest* 2038 (K); Jabal Khantur, 1200 m, *Rawi* 8547 (K); Penjwin, 1000 m, *Rawi* 8812 (K); Jabal Bakhair, 1000 m, *Rawi* 9419 (K); Qarachitan-Zawita, 1100–1400 m, *Gillett* 7760 (K); Rust, NE Rowandiz, 1200–1800 m, *Thesiger* 923 (BM); Sheikh Adi, Ain Sifni, *Thesiger* 682 (BM); Rowandiz, *Mrs. Lane* 196 (BM); Shaqlawa, 1200 m, *Wheeler Haines* 379; Zawita Gorge, 950 m, *Emberger & Guest* 15356 (K); Pushtashan, NE Ranya, 1050 m, *Rawi & Serhang* 26570 (K); Kuh Safin, Shaqlawa, 1400 m, *Polunin* 5028; Kopi Gara Dagh, 1370, *Poore* 426 & 645 (K); Karokh Dag, 1550–1650, *Kass & Nuri* 27363 (K).
IRAN. Marivan, 1300–1600 m, *Jacobs* 6466.
RANGE: Turkey (SE), N Iraq, NW Iran.

17. S. pseudobulbosum Aznavour in Bull. Herb. Boiss. Ser. 2, 3:588 (1903).
Root thick and fleshy. *Stem* branched, 45–65 cm tall, narrowly winged below, pubescent to scabrid, also with tuberculate-based hairs. *Leaves* slightly pubescent and with short tuberculate-based hairs; basal leaves 14 cm long, 7 cm broad, ovate, apex acute, base rounded with long, winged petiole; middle leaves oblong-lanceolate, shortly petioled; *upper leaves* ovate-lanceolate, sessile or shortly decurrent. *Inflorescence* c. 15-flowered. *Calyx* 6–7 mm long, divided almost to middle, segments lanceolate, acute; calyx accrescent in fruit, enlarging to 13 mm. *Corolla* yellowish-white, 10 mm long, tube as long as calyx; corolla scales 5·5 mm long, triangular-lanceolate, acute, exserted 1 mm beyond corolla lobes. *Stamen filaments* 1·5 mm long; anthers 2·5 mm long; stamens shortly exserted. *Style* exserted 3 mm. *Nutlets* 2 mm, erect, areolate, tuberculate. *Fl.* 4–6. *Shady places*. Fig. 2.
SYNTYPES. Turkey, 'Lieux ombragés près des habitations et des jardins: à Ak-baba', *Aznavour* 1543 bis (G), Hunkiar-iskelessi, Beicos, 1891, *Aznavour* s.n., (G), Gueuk-souyou (non loin d'Anadolou-hissari), *Aznavour* 1543 bis, (G); 'localités situées toutes sur la côte asiatique de Bosphore', *Aznavour* l.c.
TURKEY. A2(A) Istanbul: Karldag, Adampol, 1899, *Aznavour* s.n.
RANGE: NW Turkey (endemic to Asiatic side of Bosphorus).

No recent collections have been seen. This is the easiest of all the Turkish species to recognise because of the slightly exserted corolla scales and stamens. Vegetatively, it is rather similar to the less robust *S. ottomanum* Friv., which has smaller leaves, wingless stem, deeply divided calyx, and corolla scales fully exserted. The latter is distributed throughout the Balkan Peninsula.

18. S. palaestinum Boiss., Diagn. Ser. 1, 11:94 (1849) var. **palaestinum**
Syn.: *S. orientale* β *angustior* DC., Prod. 10:39 (1846) p.p.
Root fusiform, simple or branched. *Pale green perennial herb* 20–55 cm tall, rather slender, usually branched from base. *Stem* pubescent, with light to moderately dense, curved tuberculate-based hairs. *Leaves* with small

tuberculate-based hairs, sometimes scabrid; lower leaves up to 10 cm long, linear-oblong or ovate, attenuated, petiolate; upper leaves narrowly ovate to lanceolate, acuminate, sessile, petioles tend to be decurrent. *Inflorescence* c. 9 or more-flowered. *Calyx* 7–9 mm long, campanulate, teeth from one third to one quarter, linear-subulate, subobtuse, tomentose; calyx accrescent in fruit, enlarging to 15 mm. *Corolla* white, 15–17 mm long (Bucknall says 11–13 mm), tube 1·5–2 mm wide, exceeding calyx; corolla scales 4 mm long, linear, obtuse, equalling stamens. *Stamen filaments* 3 mm long; anthers 2 mm long. *Style* exserted. *Nutlets* erect, narrow, 3 × 1·5 mm, areolate, tuberculate. *Fl.* 5–7. *Shady places*. Fig. 2.

TYPE. 'Hab. ad margines rupium et in cavis umbrosis circa Hierosolyman et prope Rasheya in Antilibane', *Boissier*.

TURKEY. C3 Antalya: Gebiz, Bozburun dağ, *Davis* 15698 & 15771 (K); Isparta: Dedegöl Da., 1600 m, 15 vi 1966, *Sorger* 66–46–23, det. Huber-Morath 1966. C5 Niğde: Pozanti, 870 m, *Huber-Morath* 12581 (H-M); Seyhan: Karaisali, Koca Çukur Yaylasi-Katir Pass, 1800–2000 m, *Huber-Morath* 16496 (H-M). C6 Maraş: d. Andirin, Çatak, 800 m, *Coode & Jones* 1143; Ahir dağ, 1600 m, *Balls* 935; Ahir dağ, 1100 m, *Davis & Hedge D.* 27490.

LEBANON. Tibney Bashan, 1863–64, *Lowne* s.n.; Djebel Baruk, 1500–2100 m, 1877, *Ball* s.n.

ISRAEL. Wadi Sir, *Meyers & Dinsmore* 351; Jebel Jermak, 419 m, *Davis* 4659; Wadi Qurrun at Ras el Nabi, *Davis* 4744; Rami-Buquei'a, *Davis* 4814.

RANGE: Turkey (S Anatolia), Lebanon, Israel.

var. **dentatum** Boiss., Fl. Orient. 4:174 (1879).

Leaves acute, dentate.

TYPE. 'in Lycia prope Kourmala ad occidentem urbis Adalia et Monte Solyma.' *Heldreich*, Herb. Boiss.

RANGE: Turkey (Antalya).

No specimens have been seen.

var. **majus** Bucknall in J. Linn. Soc. Bot. 41:535 (1913).

Perennial herb, 45–60 cm tall. *Leaves* larger, membranous, ovate. *Calyx* 5–8 mm long. *Corolla* 16 mm long. *Fl.* 3–7. *Shade, rocky places and stream banks*. Fig. 2.

TYPE. Turkey (C5 Içel), Kagiraki, 1896, *Siehe* 55 (K, BM, E, OXF).

TURKEY. C5 Niğde: Ala dağ, 2060 m, *Parry* 138. C6 Seyhan: Bahçe, Dumanli dağ, 1300 m, *Davis* 26893; Hatay: Hasanbeyli, 900 m, *Davis & Hedge D.* 26777.

RANGE: Turkey (S Anatolia).

var. **strigosum** Post ex Post, Fl. Syria, Palestine & Sinai, ed. 2, 2:230 (1934).

Stem strigose.

TYPE. Turkey, (C6 Gaziantep), Aintab, Herb. Post.

No specimens have been seen. This may possibly be the same as *S. aintabicum* Huber-Morath & Wickens which is endemic to Gaziantep. In Post (1934), the date of publication for this variety is given as 1931, but there is no reference for that year given in the bibliography for the Flora.

S. palaestinum sensu lato is the most widely distributed of the eastern members of the genus. There is a considerable range of variation in the indumentum and leaf texture so that the species might repay a more critical study.

19. S. aintabicum Huber-Morath & Wickens, **sp. nov.**

Herba perennis, radix palaris. *Caulis* singulus, ramosus, 30–40 cm altus; rami adscendentes, sub angulo 30° haud majore e caule divergentes, parce puberuli et subhispidi. *Folia* omnia pilis longis tuberculatis obsita; inferiora petiolata, oblongo-ovata, 3 cm longa, 1 cm lata, vel oblongo-lanceolata 7–12 cm longa, 2–3 cm lata, petiolo alato decurrente; superiora oblongo-ovata, acuta, sessilia, auriculata. *Inflorescentia* 10–15-flora, cymosa primo compacta, pendula, demum laxa adscendens, rachis pedicellique puberuli. *Calyx* ad qualtum vel tertiam partem in dentes lanceolatos subulatos obtusos fissus; sub anthesi 6 mm longus, fructifer auctus 15 mm longus. *Corolla* alba, rosea vel caerulea, 12 mm longa; tubus corollae angustus, 1·5 mm latus, calycem excedens; fornices 4 mm longi, oblongo-lanceolati, obtusi, stamina aequantes vel superantes. *Staminum filamenta* 2·5 mm longa; antherae 2 mm longae. *Stylus* haud vel breviter exsertus; stigma globosum capitatum. *Nuculae* erectae, 3 mm longae, 1·5 mm latae, supra basin constrictae, areolatae et tuberculatae. *Fl.* 4. *Hab. in locis saxosis umbrosis*, 900–1700 *m*. Fig. 2.

TYPE. Turkey, C6 Gaziantep: Ishlahiye, 38 km from Fevzipaşa, 900 m, *Huber-Morath* 13601 (holo-H-M).

TURKEY. C6 Gaziantep: Aintab, 1889, *Herb. Post* s.n. (BM); Aintab, 1000 m, *Haradjian* 865; Mt. Duluk Baba, N of Ani, 1000–1200 m, *Haradjian* 1420; Kara Tash, 1000 m, *Balls* 802; Indji (Inci) Su, 1700 m, *Balls* 2163.

RANGE: Turkey (Gaziantep).

A distinctive taxon apparently restricted to Gaziantep. It is allied to *S. palaestinum* Boiss., from which it can be readily distinguished by the distinctive habit with steeply ascending branches, and in having rose, blue or white flowers instead of constantly white flowers.

20. S. longisetum Huber-Morath & Wickens, **sp. nov.**

Herba perennis, radice lignosa. *Caulis* 20–30 cm altus, ramosus, dense albo-pilosa hispidus. *Folia* omnia pilis longis tuberculatis obsita, anguste obovata. *Folia inferiora* 7–12 × 1–3 cm, petiolo alato, 3–5 cm longo; folia superiora 3 × 1 cm, sessilia vix decurrentia. *Inflorescentia* 15–20-flora. *Calyx* fere usque ad basin in lacinias lanceolatas acuminatas setosas fissus, sub anthesi 6–7 mm longus, fructifer auctus 17 mm longus. *Corolla* alba, 13 mm longa; tubus 2·5–3 mm latus; fornices 3 mm longi, lineari-subulati, stamina aequantes. *Staminum filamenta* 1·5 mm longa; antherae 1·5 mm longae. *Stylus* exsertus 2 mm. *Nuculae* nitidae, aliquantum curvatae, 4 mm longae, 2 mm latae, supra basin constrictae, areolatae et tuberculatae, infra porphyreae tuberculatae. *Fl.* 4–6. *Hab. in sylvis deciduis quercinis ad rupes calcareas*, 700–1100 *m*. Fig. 3.

TYPE. Turkey. C4 Içel: Gilindire—Gülnar, 19 km from Gilindire, 690 m, *Huber-Morath* 10227 (holo-H-M).

TURKEY. C4 Içel: Gülnar-Ermenek, 17 km from Gülnar, 1100 m, *Huber-Morath* 10228 (H-M); Gülnar-Gilindire, 700 m, *Davis & Polunin, D.* 26018.

RANGE: Turkey (Cilicia).

A well defined taxon, perhaps for the present best considered as intermediate between *S. officinale* L. and *S. palaestinum* Boiss.

21. S. brachycalyx Boiss., Diagn. Ser. 1, 4:43 (1844).

Perennial herb, 45 cm tall; *stem* pubescent with medium to dense, curved, tuberculate-based hairs. *Leaves* with long, tuberculate-based hairs; *lower leaves* up to 7 cm long, ovate, attenuate, petiolate; *upper leaves* linear-lanceolate, sessile. *Inflorescence* c. 15-flowered. *Calyx* slightly campanulate, 8 mm long, divided to upper third, teeth triangular-lanceolate, subobtuse, setose; calyx accrescent in fruit, enlarging to 10 mm. *Corolla* white, 12 mm long, tube 2 mm broad, shortly exceeding calyx; corolla scales 5 mm, linear, obtuse, equalling the stamens. *Stamen filaments* threadlike, 3 mm long; anthers 2 mm long. *Nutlets* (not seen, described by Bucknall), constricted above base, 2·5 × 1·2 mm, areolate, tuberculate.

TYPE. Turkey. C2? 'In Cariae montibus', 1843, *Pinard* s.n. (iso-K).

RANGE: SW Turkey (Caria).

At Kew there are three sheets containing fragmentary specimens that probably represent a single gathering, possibly all belonging to one plant. It does not appear to have been collected since and its exact status must be regarded as uncertain; it may prove to be a variant of *S. palaestinum* Boiss., which also occurs in the same area.

22. S. bornmuelleri Bucknall in J. Linn. Soc. Bot. 41:536, fig. 2 (1913).

Tap root with stout lateral branches. *Perennial herb*, 15–60 cm tall; *stem* shortly pilose and with sparse tuberculate-based hairs. *Leaves* asperous, oblong-ovate; *lower leaves* 6 cm long, 3 cm broad, petiolate, petiole as long as, or longer than lamina; upper leaves ovate-lanceolate, sessile, subdecurrent. *Inflorescence* c. 20- or more-flowered. *Calyx* tubular, 7 mm long, villose, teeth ovate, obtuse, not exceeding one sixth of tube. *Corolla* white, 12–15 mm long, tube 3 mm broad; corolla scales 4 mm long, linear, obtuse, more or less equalling stamens. *Stamen filaments* 2·5 mm long; anthers 2 mm long; stamens exserted, according to notes with *Tobey* 514, but not apparent on the herbarium material. *Style* not exserted. *Nutlets* reticulate, minutely tuberculate, 3 × 1·5 mm. *Fl.* 4–8. *Shaded banks, woods, sea level to* 1900 *m.* Fig. 3.

SYNTYPES. Turkey, A5 Amasya: Ak dağ, *Bornmueller* 761 (syn-K, BM); Sanadag, Pontus Galaticus, 1200 m, *Bornmueller* 2707 (syn-K, BM, OXF).

TURKEY. A5 Amasya: Ak dağ, *Manisadjan* 731, (K); *Manisadjan* 1136 (K); Samsun: Kizilirmak, Kral Yatigi, 450 m, *Tobey* 1736. A5/6 Samsun: 15 km inland, 80 m, *Tobey* 514. A6 Samsun: 3 miles SW Samsun, *Tobey* 1736; Sivas: Yildiz Dağ, 1900 m, *Tobey* 2375; Amasya: Erbaa-Boğalli, 950 m, *Tobey* 2209. B6 Sivas: Zara, 1550–1630 m, *Huber-Morath* 13599 (H-M).

RANGE: Turkey (Paphlagonia, Galatia, Cappadocia).

Two specimens from A4 Ankara: Kalecik, 1080 & 1110 m, *Huber-Morath* 13600 & 13599 (H-M), resemble *Tobey* 514 in habit, leaf shape and indumentum except that the basal leaves are larger, 11 × 6·5 cm, and the tubular calyx has teeth from one quarter to one fifth of its length; *Tobey* 2375 from A6 also has larger basal leaves but in other respects agrees with other plants of the species. More material of *S. bornmuelleri* is required in order to determine the full range of variation within the species.

23. S. tuberosum L. subsp. **nodosum** (Schur) Soó in Acta Geobot. Hung. 4:182 (1941). Ic.: *S. tuberosum* L. in Hegi, Illustr. Fl. Mittel Eur. 5(3):2226, t. 219, fig. 5 & 3162 (1906).

Syn.: *S. nodosum* Schur, Enum. Pl. Transyl. 468 (1866).
S. foliosum Rehm. in Verh. zool.-bot. Ges. Wien 18:495 (1868).
S. tuberosum f. *longifolium* G. Beck in Ann. Naturh. Hofmus. Wien 2:132 (1887).
S. tuberosum α *latifolium* G. Beck, Fl. Nied.-Osterr. 2:963 (1892).
S. leonhardtianum Pugsley in J. Bot. (London) 69:95 (1931).
S. leonhardtianum var. *longifolium* Pugsley in J. Bot. (London) 69:96 (1931).

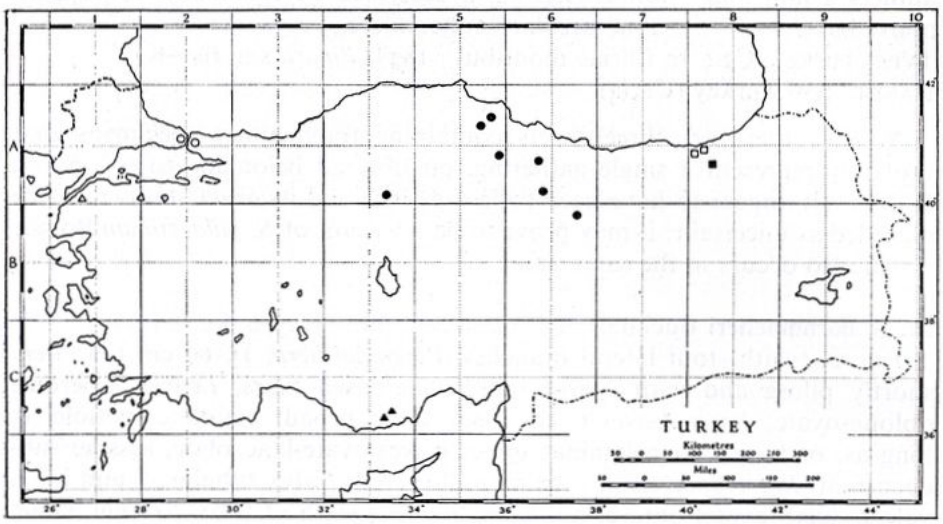

FIG. 3. Symphytum in Turkey and East Aegean Islands. ▲ S. longisetum; ●S. bornmuelleri; ○ S. tuberosum subsp. nodosum; △ S. zeyheri; □ S. grandiflorum; ▽ S. longipetiolatum.

Root either a thick, tuberous rhizome, 7 mm diameter, or immediately nodular, 15 mm diameter. *Perennial herb* 30–40 cm tall; *stem* solitary, bifurcating at apex, rarely with one axillary branch lower down; sparsely setose. *Leaves* asperous with short tuberculate-based hairs; lower leaves ovate to spatulate, 4 × 3 cm, petiole strongly winged; middle leaves larger, 11 × 4 cm, ovate, sessile, subdecurrent. *Inflorescence* c. 10-flowered. *Calyx* 6 mm long, divided almost to base, segments linear-lanceolate, obtuse. *Corolla* yellowish-white, 14–16 mm long, tube 3 mm broad, exceeding calyx; corolla scales 7 mm long, triangular-subulate, exceeding stamens by 3 mm. *Stamen filaments* 1·5 mm long; anthers 3 mm long. *Style* exserted 2–3 mm. *Nutlets* curved, ovate, 3·5 × 3 mm, finely tuberculate. *Fl.* 3–6. *Shady banks and woodland.* Fig. 3.

TYPE. Rumania, Surul, Götzenburg, 'An var. rupestris *S. tuberosi* insignis?' *Schur.*

TURKEY. A2 Constantinople, 1876, *Noé* s.n., *Aucher-Eloy* 2350 (K). A2(E) Istanbul; Therapia, 1888, *Aznavour* 1545 bis; Bagtchekeuy, 1894, *Aznavour* 1545 bis; Soultansouyou, 1894, *Aznavour* 1545 bis; Zeriekeuy, 1902 & 1905,

Aznavour s.n.; Belgrad Forest, 1902, *Post* s.n. & 1961, *Yaltirik* s.n. A2(A) Istanbul: Alemdagh, 1891 & 1892, *Aznavour* 1545 bis; Adampol, 1899, *Aznavour* s.n.; Poloneskoy, 1939, *Post* s.n.
RANGE: S Europe (including Balkans), S Russia, Turkey (Bosphorus).

Pugsley (1931) noted that under the name *S. tuberosum* plants belonging to two taxa could be distinguished. He carefully studied pre-Linnean specimens in the Linnaean literature and found two sheets in the Linnaean Herbarium labelled '*tuberosum* 2' and '2'. These belong to the pre-1753 collection and can be accepted as typifying *S. tuberosum* L. sensu stricto (i.e. subsp. *tuberosum*). This is a narrow leaved plant characteristic of SW Europe—UK, France and Spain—and is illustrated by Ross-Craig, Drawings of Brit. Pl. 21:t.4 (1965). From it Pugsley distinguished the east European plants passing as *S. tuberosum* by giving them specific rank under the name *S. leonhardtianum* Pugsley. Schur had, however, earlier used the name *S. nodosum* for Transylvanian material and this epithet must be adopted whether the taxon concerned is given specific rank, following Pugsley, or subspecific rank following Soó and Pawlowski.

Subsp. *nodosum* has a more slender rootstock than subsp. *tuberosum* and is less tufted in habit, with shorter and less branched stems bearing fewer (6–8) and broader leaves. The flowers are more conspicuous, with shorter and more strongly ciliate calyx lobes and a broader, more brightly coloured corolla. The nutlets are also smaller and paler. A number of forms have been described by Pawlowski (1961).

24. S. bulbosum Schimper in Flora (Regensburg) 8:17 (1825).
Syn.: *S. filipendulum* Bischoff in Flora (Regensburg) 9:561 (1826).
S. clusii C.C.Gmel., Fl. Bad. 4:144 (1826).
S. punctatum Gaudin, Fl. Helv. 2:41 (1828).
S. tuberosum β *exsertum* Loisel, Fl. Gall. ed. 2, 1:152 (1828).
S. macrolepis Gay in Reich., Fl. Exc. 1:347 (1832).
S. tuberosum β *clusii* Caruel in Parl. Fl. Ital. 4:879 (1884).

Root either immediately tuberous, 25 mm diameter, or immediately fine rhizome 2 mm diameter, eventually forming a tuber. *Perennial herb*, 30 cm or more tall; stem simple or branched a little above base, sparsely puberulous, with tuberculate-based setae. *Leaves* sparsely setose; lower leaves ovate or spatulate, petiolate, smaller than middle leaves; middle leaves oblong-ovate, rounded or attenuate, petiolate, petiole winged, subdecurrent; upper leaves sessile, subdecurrent. *Inflorescence* c. 7-flowered. *Calyx* 5 mm long, divided to base, segments linear-lanceolate, subacute. *Corolla* white, 11 mm long, subcylindrical, corolla lobes short, ovate, erect; corolla scales 7 mm long, broadly lanceolate-subulate, subobtuse, exserted 3 mm and exceeding stamens by 3·5 mm. *Stamen filaments* 1·5 mm long; anthers 3·5 mm long. *Nutlets* broadly ovate, 3 × 3 mm, slightly curved, constricted at base, rugose-reticulate, tuberculate.
TYPE. Germany "in ipsis vineis Heidelbergae, et forsan aliis Germaniae et Galliae locis, cum *Symphyto tuberoso* Jacq. commutatum", *Schimper*.
RANGE: S Europe (excluding Iberian peninsula but including the Balkans).

Although occurring in Greece and Bulgaria, this species apparently does not extend into modern European Turkey.

25. S. zeyheri Schimper in Flora (Regensburg) 12:418 (1829).

Syn.: *S. tuberosum* sensu Ucria Hort. Reg. Pan. 83 (1789) non L.
S. bulbosum sensu Guss., Fl. Sic. Prod. 1:219 (1827) non Schimper.
S. brochum Bory & Chaub., Exp. Morée 65 (1832).

Roots either immediately tuberous, 20 mm diameter, or fine rhizome, 2 mm diameter, eventually forming a tuber. *Perennial herb*, 20 cm tall; stem simple, pubescent and with tuberculate-based setae. *Leaves* sparsely pubescent, ovate or oblong-ovate, base subcordate or round; lower leaves 7–11 × 5–7 cm, attenuated into winged, decurrent petiole, petiole sometimes as long as lamina; upper leaves sessile, decurrent. *Inflorescence* c. 10-flowered. *Calyx* 7 mm long, divided almost to base, segments linear-lanceolate, subacute. *Corolla* white, infundibuliform, 10 mm long; corolla scales 4 mm long, broadly linear-lanceolate, subacute, exserted 1 mm, exceeding stamens by 1·5 mm. *Stamen filaments* 1·5 mm long; anthers 3 mm long. *Style* persistent, exserted 2 mm. *Nutlets* erect, 3·5 × 4 mm, constricted at base, reticulate-rugose, minutely tuberculate. Fig. 3.

TYPE. Sicily. 'Habitat in Sicilia, vidi sicca specimina plura, completa florentia et fructifera in Herb. Zeyheriano.' *Schimper*.

TURKEY. A1(A) Balikesir: 'in valle Dumbrek', Iter Trojanum, *Sintenis* 42 (K).

RANGE: Sardinia, Corsica, S Italy, Sicily, Greece, Turkey (NW Anatolia).

26. S. grandiflorum DC., Prod. 10:40 (1846).

var. **grandiflorum** Ic.: Mém. Acad. Imp. Sci. St.-Péters. ser. 8, 25(5):t. 1, fig. 12 (1910).

Syn.: *S. cordatum* sensu Bieb., Fl. Taur.-Cauc. 1:130 (1808) non Willd.
S. ibericum Steven in Bieb., Fl. Taur.-Cauc. 3:647 (1819).

Root stout, 6 mm diameter, with freely branching lateral roots. *Perennial herb* with decumbent sterile shoots in first year and erect fertile shoots in second year; fertile shoots 10–30 cm tall, either simple or dichotomising from base; stem sparsely setose. *Leaves* puberulous and with short deciduous setae; leaves of sterile shoots broadly ovate, sharply acuminate, base cordate, up to 8 × 6 cm, petiolate, petiole exceeding lamina; fertile shoots with smaller, ovate-lanceolate leaves, attenuated with winged petioles, shortly decurrent. *Inflorescence* c. 20-flowered. *Calyx* 6 mm long, shorter than corolla tube, divided almost to base, segments linear-lanceolate, obtuse. *Corolla* yellowish-white, 14–16 mm long, tube 3 mm broad; corolla scales 3 mm long, broad, linear, obtuse, equalling stamens. *Stamen filaments* 1 mm long; anthers 2 mm long. *Style* exserted 2–3 mm. *Nutlets* curved, ovate, 3 × 2·5 mm, finely tuberculate. *Fl.* 3–6. *Shady banks*. Fig. 3.

TYPE. Caucasia, 'in Georgia legit, cl. *Wilmsen*'.

TURKEY. A8 Trabzon: Trabzon-Rize, 50 m, *Stainton* 8139; Rize: Rize, wayside, *Huber-Morath* 15092 (H-M); Rize, sea level, *Guichard* TUR/19/59 (K). B8/A8 Erzurum: "Erzurum", *Zohrab* 71 (K); Armenia, *Calvert & Zohrab* 679. (The last two gatherings may well have come from near Trabzon).

CAUCASIA. Transcaucasia, 1914, *Kikodse* s.n.; Tsikhisdziri, *Buatschidze* 952b (K); Circassia, Soizi, *Kuprojanov* 952 (K); Bakuriani above Borzhomi, *Kozlowsky* 527 & 1073 (K); Abkhasia, Sukhumi, 20 m, *Davis* 33663.

RANGE: Caucasia, Turkey (NE Anatolia).

var. **abchasicum** (Trautv.) Kusn. in Mém. Acad. Imp. Sci. St.-Péters. ser. 8, 25(5): 46 (1910). Ic.: l.c. t.1, figs. 10, 13 & 14.

Syn.: *S. abchasicum* Trautv. in Bull. Soc. Nat. Mosc. 43:72 (1870).
S. ibericum var., Steven, Observ. Asperif 579 (1851).

Differs from the type variety in the cauline leaves being rounded or gradually attenuated at the base, and in the calyx segments nearly equalling the corolla tube.

TYPE. Caucasia, "In Abchasiae districtu Zebelda leg. *Dr. Lagowsky*".
CAUCASIA. Sotshi, *Kuprojanov* 526 (K); Taikhisdziri, *Buatschidze* 526 (K).
RANGE: Caucasia.

27. S. longipetiolatum Wickens, **sp. nov.**

Herba perennis. Rhizoma adscendens, furcatum, 12 mm diametro. *Caules* 25–30 cm alti, solitarii vel pauci (1–3), simplices vel semel bifurcati, in racemos scorpioideos binatos terminales desinentes; folia caulina duo superiora 2–3 cm infra racemos sita; caulis setis conspicuis curvis tuberculatis obsitus. *Folia* praecipue basalia, late ovata, cordata, 6–10 cm longa, 5–7 cm lata; petioli breviores et magis alati dum folia subsessilia attenuata. *Inflorescentia* c. 15–18-flora; pedicelli 10 mm longi. *Calyx* campanulatus, fere usque ad basin in lacinias lineari-lanceolatas obtusas fissus; sub anthesi 6 mm longus, fructifer auctus 10 mm longus. *Corolla* rosea vel caerulea, 12 mm longa, tubus 3 mm latus; fornices 5 mm longi, lanceolati, subacuti, stamina 2 mm superantes. *Staminum filamenta* 1 mm longa; antherae 1·5 mm longae. *Stylus* non exsertus, persistens. *Nuculae* curvatae, ovatae, 3 mm longae, 3 mm latae, supra basin plus minus constrictae, atrolixiviae, minute tuberculatae et areolis paucis prominentibus notatae. *Fl.* 5. *Hab. in pratis* 1000 *m.*
TYPE. Turkey, A8 Rize: Ikizdere, 1000 m, *Stainton* 8393 (holo-E).
RANGE. Turkey (NE Anatolia).

This species comes near *S. sepulcrale* in floral characters but differs markedly in vegetative habit. There appears to be a sterile vegetative shoot on one of the specimens (a feature of *S. grandiflorum*), but it is impossible to confirm this without severely damaging the material. The possibility of a hybrid between *S. sepulcrale* and *S. grandiflorum* cannot be entirely ruled out; the last two species occur in the same province, see Figs. 1 & 3. More material of *S. longipetiolatum* is required.

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