

MATERIALS FOR A FLORA OF TURKEY: XXI: SCROPHULARIA

S. S. LALL*

ABSTRACT. This paper includes 8 new Turkish species and 5 new combinations in *Scrophularia* L., 7 previously described species newly recorded from Anatolia, a check list of the 51 species accepted from the area covered by the Flora of Turkey and chromosome numbers for some Anatolian species.

The information in this paper has been largely extracted from work on *Scrophularia* accepted for the Degree of Ph.D. in the University of Edinburgh (1970).

NEW SPECIES FROM TURKEY

All the following species belong to Sect. *Scrophularia* (including Sect. *Scorodonia* G. Don, Sect. *Tomiohyllum* Benth., Sect. *Pycnanthium* Boiss., Sect. *Mimulopsis* Boiss., Sect. *Anastomosantes* Stiefelh. p.p.).

As elsewhere in this paper, unless otherwise indicated, all specimens cited have been examined.

1. *S. amana* Lall, sp. nov. (Plate 8, A; fig. 3, Ba-Bb)

Planta perennis, c. 34 cm alta, suffrutescens, pluricaulis, glabra. *Caules* rubescentes nitentes, erecti ad ascendentes, quadrangulares, simplices. *Folia* caulina opposita, inferiora ad 5.5 cm (petiolo 3 cm, purpureo), ovato-lanceolata, basi truncata vel cuneata, margine profunde pinnatifida, folia inferiora segmentis 1-2 basalibus liberis provis, lobis et segmentis serratis purpureo-venosis anastomosibus inconspicuis. *Inflorescentia* inferne foliata, pyramidato-cylindrica. *Folia floralia* inferiora ad 2.8×1.1 cm, breviter petiolata, lanceolata, basi cuneata, margine dentata; superiora sessilia, anguste linearia, sursum decrescentia. *Cymae* alternae, 6-10-florae; pedunculus 13 mm, ascendens, purpureo-niger; pedicelli 6 mm, purpurei, capillacei, glandulosi; bracteolae 3.5 mm, anguste lineares, atrovenetae, parce glandulosae. *Calycis segmenta* anguste oblonga, obtusa, 2.3×1 mm, glabra, margine albo-scarioso 0.2 mm lato. *Corolla* purpureo-brunnea, 6.5 mm, lobis superioribus purpureis, caeteris pallido-brunneis; stamina exserta; filamenta pilis glandulis oblongis capitatis; staminodium oblongum, 1×0.5 mm. *Capsulae* ignotae. *Fl. Apr.-Jun.*

S ANATOLIA. C6 Hatay: distr. Antakya (Amanus), Antakya-Yayladağ, near Şenköy, 1000 m, crevices of limestone rocks, perennial, collar woody, flowers purplish brown, 28 iv 1957, Davis & Hedge, D. 27175 (holo E).

Related to *S. variegata* Bieb. (SW Asia, Aegean), from which it can be distinguished by its linear-oblong, narrowly scarious-margined calyx segments, capillary pedicels, and pinnatifid leaves with, at the most, 1-2 free basal segments.

* Present address: Gordon College, Rawalpindi, West Pakistan.



FIG. 1. A: holotype of *Scrophularia bitlisica* Lall, $\times \frac{1}{2}$; Aa & Ab, sepals, $\times 2$; Ac, corolla, $\times 2$. B: holotype of *S. subaequiloba* Lall, $\times \frac{1}{2}$; Ba, calyx, $\times 2$; Bb, corolla, $\times 2$; Bc, staminode.

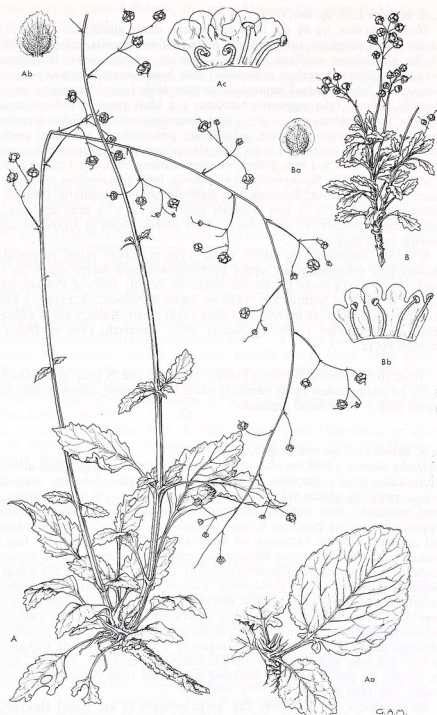


FIG. 2. A: *Scrophularia davisi* Lall, $\times \frac{1}{2}$; Aa, leaves of basal rosette (of D.23903) $\times \frac{1}{2}$; Ab, sepal, $\times 2$; Ac, corolla $\times 2$. B: holotype of *S. pumilio* Lall, $\times \frac{1}{2}$; Ba, sepal, $\times 2$; Bb, corolla, $\times 2$.

2. *S. bitlisica* Lall, sp. nov. (Fig. 1, A–Ac)

Herba perennis, 59–68 cm alta, multicaulis, dense glanduloso-puberula; caules erecti, simplices, subangulares. *Folia* caulina opposita, crassa, pallide viridia glandulosa; mediana ad 5.5×2.5 cm, anguste ovato-lanceolata breviter petiolata; superiora subsessilia; folia basi cuneata, margine penitus pinnatifida, lobo terminali acuminato serrato, lobis lateralibus acutis acute dentatis, aliquot folia segmentis basalibus 1–2 libris provisa. *Inflorescentia* aphylla, laxa, bracteis 5.7×0.5 –1 mm, linearibus acutis sessilibus glandulosis. *Cymae* alternae distantes, 3–10-florae; pedunculus 1.4–2.4 cm; pedicelli 1.5–2.5 mm; bracteolae 2–2.5 mm, glandulosae. *Calycis segmenta* ovata vel obovata 3.4×3.4 mm, glabra, margine scarioso albo, 0.5–1.2 mm lato. *Corolla* 6 mm longa, flavo-virens vel viridifusca, lobis superioribus purpureo-fuscis; stamina inclusa, filamenta pilis glandulis oblongis capitatis; staminodium reniforme, 1×2 mm. *Capsula* globularis, 4×4 mm, apiculata, calyce duplo longior. *Fl.* Apr.–Jun.? Waste places, slopes in steppe, mixed forests, 1550–1829 m.

S & SE ANATOLIA. B9 Bitlis: Bitlis, 1550 m, castle ruins, perennial, flowers pale yellowish-green, upper lip purplish-brown, stems many, 20 v 1966, Davis 44314 (holo E), Tatvan-Ahlat, nr. Söğüt, Davis & Polunin, D. 24613; W flank of Nemrut Da., 1829 m, Davis & Polunin, D. 23595; 3 km S of Tatvan, 1700–1720 m, Huber-Morath 11581; distr. Bitlis, 3 km N above Bitlis, Huber-Morath 11586. C5 Adana: distr. Karaisali, 1750 m, Huber-Morath 15542.

Allied to *S. rimarum* Bornm. (Turkey, NW Iran and N Iraq) from which it can be distinguished by its narrowly ovate to lanceolate, deeply pinnatifid leaves with 1–2 free basal segments.

3. *S. davisii* Lall, sp. nov. (Fig. 2, A–Ac)

Herba biennis, 18–68 cm alta, parce glanduloso-puberula (glandulis albis), multicaulis; caules simplices vel ramosi. *Folia* basalia rosulata, magna, crassa, petiolata, glauca vel rufescentia; lamina 2.4 – 8×1.8 – 7 cm, coriacea, basi rotundata, raro truncata vel cuneata, margine crenato; folia caulina opposita, superiora petiolata sursum gradatim sessilia, ovata, basi cordata vel cuneata, margine bicrenata vel bidentata. *Inflorescentia* aphylla, laxa; pedunculus 3–4 cm; cymae distantes ascendentes divaricatae 4–10-florae; pedicelli (4)–5–9 mm longi, parce glandulosi. *Bracteolae* lineares, 2–3.5 mm, pedicellis breviores, parce glandulosae. *Calycis segmenta* ovata vel $\pm$ orbicularia, 2.8 – 4×3.5 – 4 mm, glabra, margine scarioso albo vel pallido 0.6–1.2 mm lato. *Corolla* 6.5–7 mm, lobis superioribus rubello-fuscis, caeteris virescenti-albis; stamina inclusa vel breviter exserta; filamenta pilis glandulis oblongis capitatis; staminodium oblongum, 1.1 – 3×0.5 – 0.7 mm. *Capsulae* 4 – 7×5 – 6 mm, globulares, apiculatae; semina 2 mm longa. *Fl.* Mai.–Jun. In gorges, on gravel terraces, limestone scree and steep calcareous eroded slopes, 700–1800 m.

SE ANATOLIA. C9 Hakkari: Zap gorge beneath (8 km from) Hakkari, 1250 m, limestone scree, annual? or biennial, stems several from base, 21 v 1966, Davis 45367 (holo E); nr. Hakkari, $\pm$ 1800 m, 21 v 1966, Eiselt; Zap gorge beneath Çukurca, 700–750 m, Davis 47846; Cilo Da., in Diz

deresi, 1644 m, *Davis & Polunin*, D. 23903; Morinos De., opposite Marunis, 1550 m, *Davis* 45324.

The nearest relative of this remarkable species is apparently the *S* Transcaucasian *S. atropatana* Grossh., from which it differs in its widely divaricate ascending cymes, longer pedicels (1–2 mm in *S. atropatana*), oblong filament glands, staminode extending beyond the point of junction of the two upper corolla lobes (situated below this point in *S. atropatana*), calyx segments with a broader scarious margin, and larger flowers and seeds (the latter twice as long as in *S. atropatana*). *Davis* 23903 differs from the other material in its relatively shorter pedicels, and lamina with a cordate base.

4. *S. gypsicola* Hub.-Mor. & Lall, sp. nov. (Fig. 3, Ca–Cc)

Herba biennis, 30 cm alta, pluricaulis, minute denseque glanduloso-puberula. *Caules* simplices, erecti, in parte inferiore purpurei, quadrangulares. *Folia* omnia opposita (infima emarcida), purpureo-virentia, inferiora 2–4 cm longa, petiolata (petiolo purpureo, ad 1.8 cm), sursum gradatim sessilia; folia bipinnatisecta, segmentis primariis 6–9 mm longis, segmentis secundariis 3.5–4.5 × 2–2.5 mm. *Inflorescentia* aphylla cylindrica, foliis floralibus ad 4 mm longis subulatis glandulosis, superne deminuentibus. *Cymae* inferiores 1–2-natae oppositae, superiores alternae, distantes, 3–5-florae; pedunculus 9–10 mm; pedicelli 1–2 mm, glandulosi; bracteolae 1.5–2.5 mm, glandulosae. *Calycis segmenta* obovata vel orbicularia, 2–2.5 × 2.5 mm, parce glandulosa, margine albo-scarioso 0.4–0.5 mm lato. *Corolla* 4 mm longa, laete flava lobis superioribus intra purpureis; stamina longe exserta; filamenta glandulis pilis oblongis capitatis; *staminodium* ± rotundum, 1–1.3 × 1–1.25 mm, margine crenato. *Capsulae* globulares, 4.5 × 4.5 mm, mucronatae, purpureae, calyce duplo longiores. *Fl. Apr.–Jun.*

E ANATOLIA. B6 Sivas: distr. Kangal, Tecer-Gürün, Gipsschutt, 37 km S von Tecer, 1570 m, 27 vi 1955, *Huber-Morath* 14004 (holo Hb. Huber-Morath, Basel).

Related to the Caucasian *S. olgae* Grossh., from which it differs in its staminode shape, bright yellow corolla, longer exserted stamens, and ovate calyx segments. This is one of the Anatolian endemics confined to gypsum soils.

5. *S. mersinensis* Lall, sp. nov. (Plate 8, B; fig. 3, Aa–Ac)

Herba perennis, 40 cm alta, multicaulis, praeter inflorescentiam fere glabra. *Caules* simplices, erecti vel ascendentes, subangulares, superne atropurpurascens. *Folia* caulina opposita, inferiora ad 9.5 cm longa, longipetiolata, sursum gradatim subsessilia, lyrato-bipinnata, segmentis vel pinnis primariis petiolatis ovatis, 2.5 × 1.2 cm, lyrate pinnatifidis vel pinnatis; segmenta ultima crenato-mucronata. *Inflorescentia* subfoliata angustissime pyramidata, foliis floralibus inferioribus pinnatis vel pinnatisectis segmentis dentatis; cymae 5–7-florae pare infimo cymarum opposito, caeteris ± alternis; pedunculus 1.4–1.8 cm; pedicelli 6.5–14 mm, dense glandulosi; bracteolae anguste oblongae, acutae, glabrae, 4.5–7 mm, pedicellis minores. *Calycis segmenta* 3.5–4 × 1.8–2.2 mm, ovata vel obovata, glabra, margine scarioso albo 1.5–2 mm lato. *Corolla* pallide roseo-fusca,

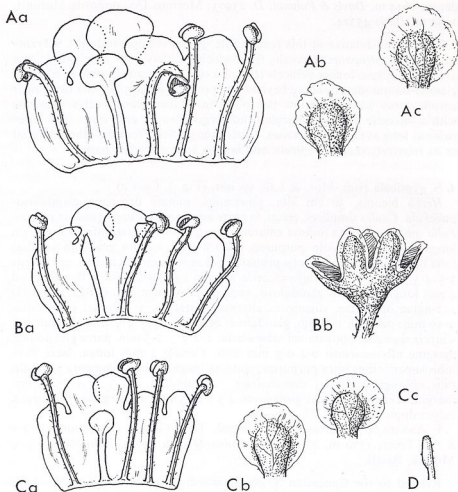


FIG. 3. Aa–Ac: *Scrophularia mersinensis* Lall; Aa, corolla, $\times 2.5$; Ab, & Ac, sepals, $\times 2.5$. Ba–Bb: *S. amana* Lall; Ba, corolla, $\times 2.5$; Bb, calyx, $\times 2.5$. Ca–Cc: *S. gypsicola* Lall; Ca, corolla, $\times 2.5$; Cb, & Cc, sepals, $\times 2.5$. D: staminode cf *S. serratifolia*, $\times 2.5$.

9 mm longa; stamina exserta, filamenta pilis glandulis oblongis capitatis; staminodium reniforme, 1.4×2.2 mm. *Capsulae* ignotae. *Fl.* Apr.

S ANATOLIA. C4 İçel, distr. Gülnar: Bozağaç-Ahirini, between Gülnar and Gilindire, 700 m, on limestone rocks in deciduous oak forest, perennial, flowers pale pinkish brown, 14 iv 1956, *Davis & Polunin*, D. 26041 (holo E, iso K).

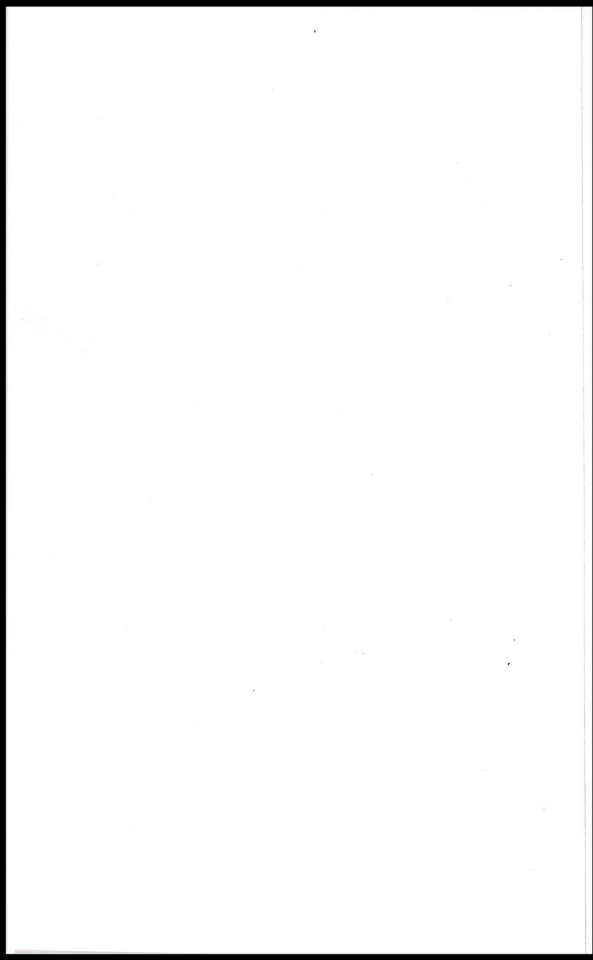
Related to *S. lucida* L. (S Europe, SW Asia) from which it differs in its elongated pedicels which are longer than the bracteoles, and the calyx segments with a wider scarious margin.

6. *S. pumilio* Lall, sp. nov. (Fig. 2, B–Bb)

Herba perennis, nana, dense glanduloso-puberula, basi caudicibus prostratis basibus persistentibus foliorum vestitis et surculos florentes 5–11 cm



PLATE 8. A: holotype of *Scrophularia amana* Lall, D.27175. B: holotype of *S. mersinensis* Lall, D.26041.



altos simplices vel subramosos emittentibus. *Caulis* plus minusve niger, subquadrangularis. *Folia* parva, petiolata, subopposita, pro maxima parte prope basin surculorum aggregata, coriacea, 2-3.2 cm longa, spathulata vel oblonga, margine crenato vel obtuse dentato. *Inflorescentia* aphylla, subracemosa, racemum confertum pauciflorum in cymam trifloram terminantum (interdum ad cymam trifloram redactum) formans; pedicellus 3-7 mm glandulosus; bracteolae 1.5-2.5 mm, lineares glandulosae. *Calycis segmenta* oblonga, 2.3 × 1.5 mm, peranguste scarioso-marginata, glandulosa. *Corolla* marronina, 5 mm; stamina inclusa, filamenta pilis glandulis oblongis capitatis; staminodium anguste oblongum, 1.25 × 0.25 mm. *Capsulae* ovatae, 5-6 × 5-5.5 mm, parietibus tenuibus, mucronatae, calyce 2-3-plo longiores. *Fl. Jun.-Aug.*

SE ANATOLIA. C10 Hakkari: Cilo Tepe, 3353 m, 8 viii 1954, loose scree, Davis & Polunin, D. 24064 (holo K, iso E); Cilo Da., Reşko Tepe, 3000 m, S facing limestone crevices, 5 ix 1967, Duncan & Tait 242.

A very distinct alpine species of doubtful affinities. Perhaps distantly related to *S. nachitschevanica* Grossh. (S Transcaucasia and NW Iran) from which it is distinguished by its dwarf stature, narrowly oblong staminode, aphyllous subracemose inflorescence, and rosulate leaves. The limited material makes it difficult to be sure of the exact structure and development of its conferted, subracemose inflorescence.

7. *S. serratifolia* Hub.-Mor. & Lall, sp. nov.

Herba perennis, 36 cm alta, ascendens, dense glanduloso-puberula, multicaulis. *Caules* rufi, quadrangulares, ramosi. *Folia* caulina opposita simplicia, coriacea, inferiora et mediana petiolata (petiolo 1.4-2.2 cm); lamina ovata ad 1.9 × 1.1 cm, basi cuneata, apice acuta, margine incisoserrata, laminis aliquot foliorum inferiorum praesertim basin versus pinnatifidis, folia superiora subsessilia oblonga, margine serrata, basi cuneata, apice acuta. *Inflorescentia* aphylla; cymae distantes 1-3-florae; pedunculus 1.2 cm; pedicelli 4.5 mm longi, glandulosi, bracteolis longiores. *Bracteolae* lineares, glandulosae, 2.8 mm longae. *Calycis segmenta* obovata vel orbicularia, 2.5 × 2.2 mm, glandulosa, margine albo-scariosa. *Corolla* 4.5 mm, lobis superioribus purpureis, caeteris pallidis; stamina inclusa, filamenta pilis glandulis oblongis capitatis; staminodium oblongum, 0.8-0.4 mm, (Fig. 3D). *Capsulae* subglobulares, apiculatae, 5 × 6.5 mm, calyce 2-3-plo longiores. *Fl. Mai.-Jun.*

C ANATOLIA. A6 Sivas: distr. Suşehri, Serefiye Yayla—Suşehri, Eruptivgestein 11 km NE Serefiye, 1900 m, 30 vi 1955, Huber-Morath 13994 (holo Hb. Huber-Morath, Basel).

Approaching some forms of *S. rupestris* Bieb. var. *libanotica* (Boiss.) Lall, from which it can be distinguished by its densely glandular calyx segments and deeply serrate leaves.

8. *S. subaequiloba* Lall, sp. nov. (Fig. 1, B-Bc)

Herba perennis, 30 cm alta, pluricaulis, glabra. *Caules* erecti vel ascendentes, simplices vel parum ramosi, subangulares, basi purpurascens, in parte superiore virides. *Folia* caulina opposita, parva ad 3.5 cm, inferiora

breviter petiolata, sursum gradatim sessilia, bipinnatisecta segmentis primariis vel pinnis 1.4 cm longis. *Inflorescentia* aphylla, laxa, bracteis anguste oblongis 4.5 × 0.5 mm, glabris; cymae alternae 2-3-florae; pedunculus 8-9 mm, parce glandulosus; pedicelli 4-5.5 mm, glandulosi; bracteolae oblongo-lineares, 2 mm longae, glabrae. *Calycis segmenta* obovata vel rotunda, 2.5 × 3 mm, glabra, margine scarioso albo angusto, 0.5 mm lato. *Corolla* 5 × 5 mm, tubo marronino, lobis pallide viridibus subaequalibus; stamina breviter exserta; filamenta pilis glandulis oblongis capitatis; staminodium reniforme, 1.7 × 2.2-2.5 mm, inferne canale dorsali provisum. *Capsulae* ignotae. *Fl. Jul.-Aug.*

E ANATOLIA. B7 Tunceli: Munzur dağ above Ovacik, 2800 m, rocky limestone slopes, perennial, flowers pale greenish-maroon, stamens strongly reflexed, 17 vii 1957, *Davis & Hedge*, D. 31231 (holo E, iso K).

Approaching *S. myriophylla* Boiss. & Heldr. (syn.: *S. laxa* Boiss. & Heldr. from Anatolia and Greece) in general facies, but distinguished from it by the subequal corolla lobes and the form of its staminode. The new species is unique in providing a connecting link between the two sections, approaching Sect. *Venilia* G. Don (Sect. *Ceramanthe* Boiss.) in its equal corolla lobes and Sect. *Scrophularia* in having a large reniform staminode, but standing on its own because of its unique staminode provided with a dorsal canal (probably storing nectar). The species, although intermediate between the two sections in floral morphology, is placed in Sect. *Scrophularia* on account of its facies, where it apparently deserves the status of a new subsection.

NEW COMBINATIONS

S. rupestris Bieb., *Fl. Taur.-Cauc.* 2:79 (1808).

var. *libanotica* (Boiss.) Lall, **comb. nov.** Syn.: *S. libanotica* Boiss., *Diagn. ser. 1*, 12:36 (1853). Turkey & E Aegean islands, Caucasia, Iran, Iraq, Lebanon, Syria, Palestine. Very variable.

var. *mesogitana* (Boiss.) Lall, **comb. et stat. nov.** Syn.: *S. mesogitana* Boiss., *Fl. Or.* 4:407 (1879). Turkey (W Anatolia).

Var *rupestris* is apparently confined to the Crimea, and possibly Caucasia.

S. scopolii [Hoppe ex] Pers., *Syn.* 2:160 (1806).

var. *nusairiensis* (Post) Lall, **comb. et stat. nov.** Syn.: *S. nusairiensis* Post, *Pl. Post.* 5:13 (1893); *S. antiochia* Post, *Pl. Post.* 5:13 (1893). Turkey (Amanus), W Syria.

Other Turkish varieties of this very variable species are as follows: var. *scopolii* (syn.: *S. imolea* Boiss., *S. crenophila* Boiss., *S. guestii* Eig), var. *smyrnaea* (Boiss.) Boiss., var. *adenocalyx* Som. & Lev., and var. *longirostrata* Heywood.

S. variegata Bieb., *Fl. Taur.-Cauc.* 2:78 (1808).

subsp. *depauperata* (Boiss.) Lall, **comb. et stat. nov.** Syn.: *S. depauperata* Boiss., *Diagn. ser. 1*, 4:68 (1844). Turkey (W, SW and E Anatolia), Caucasia, Iran.

subsp. *pinardii* (Boiss.) Lall, **comb. et stat. nov.** Syn.: *S. pinardii* Boiss.

Diagn. ser. 1, 4:70 (1844); *S. lyrata* Heywood in Notes R.B.G. Edinb. 21:81 (1952); *S. rupestris* Bieb. var. *pinnatisecta* Heywood l.c. p. 84 (1952). Turkey (SW Anatolia), E Aegean islands and probably Palestine.

Subsp. *variegata* (*S. xylorrhiza* Boiss. & Hausskn.: lectotype [Turkey C7 Urfa] Gebel Taktak Mesopotamiae, *Haussknecht* 737) occurs in Turkey and is widespread in SW Asia, extending into SE Europe.

SPECIES RECORDED FROM TURKEY FOR THE FIRST TIME

S. amplexicaulis Benth. in DC., Prodr. 10:310 (1876). Syn.: *S. hadjariana* Parsa in Kew Bull. 217 (1948).

E Anatolia. B9 Hakkari: Kara Da., 3305 m, *Davis & Polunin*, D. 24502. C9 Bitlis: Pelli Da. above Pelli, 3048 m, *Davis & Polunin*, D. 22510. (N Iraq, N Iran, Caucasia).

S. kurdica Eig in Pal. Journ. Bot. J. ser. 3:81 (1941).

SE Anatolia. C9 Hakkari: Cilo Da. in Diz De., 1764 m, *Davis & Polunin* D. 24008. (N Iraq).

S. macrobotrys Ledeb., Fl. Ross. 3:217 (1847).

E Anatolia. B8 Erzurum: Erzurum, Palentekan (Palandöken Da.), 1980 m, 26 vii 1874, *Radde* (LE)—*fide* E. Gabrielian in litt. (W Caucasia).

I have not seen this specimen.

S. nachitschevanica Grossh. in Not. Syst. (Leningrad) 13:20 (1950).

E Anatolia. B9 Kars: 3–5 km E of Aralik (Aras valley), 850 m, *Davis* 43669. (Caucasia: Nachitschevan, NW Iran).

S. striata Boiss., Fl. Or. 4:413 (1879).

C & E Anatolia. B5 Niğde: Hasan Da., above Taşpinar, 1300 m, *Davis & Dodds*, D. 18901. C6 Gaziantep: Nisib—Birecik, 400 m, *Davis & Hedge*, D. 27947. C6 Urfa: Urfa—Akçakale, 450 m, *Davis & Hedge*, D. 28163. C8 Siirt: 15 km SW of Siirt on way to Erüh, 500 m, 17 v 1966, *Eiselt*. C9 Mardin: Hessana at foot of Cudi Da., 900 m, *Davis* 42813. (Iran, Afghanistan, W Pakistan, C Asia).

In Turkey this species shows some intergradation with *S. xanthoglossa* Boiss. Extreme forms of *S. striata* approach *S. thesioides* but can be distinguished on staminode shape (orbicular instead of narrowly oblong).

S. thesioides Boiss. & Buhse in Nouv. Mém. Soc. Nat. Mosc. 12:164 (1860).

E Anatolia. A7 Gümüşane: Gümüşane—Bayburt, 31 km S of Gümüşane, 1500 m, *Huber-Morath* 14403. (S Caucasia).

S. zuvandica Grossh. in Not. Syst. (Leningrad) 13:23 (1950).

E Anatolia: A9 Erzurum: Horasan—Karaorgan, 17 miles from Horasan, 2000 m, *Davis & Hedge*, D. 29501. (Caucasia: Talysh).

CHECK LIST FOR TURKEY

Synonymy has mainly been given where it differs from that of Stiefel-hagen's revision in Engler, *Bot. Jahrb.* vol. 44 (1910).

Sect. *Venilia* G. Don: *S. chrysantha* Jaub. & Sp. (syn.: *S. lunariifolia* Boiss. & Bal.), *S. cryptophila* Boiss. & Heldr. (syn.: *S. praeterita* Heywood), *S. kotschyana* Benth. (syn.: *S. bornmülleri* Freyn & Sint., *S. ballsii* Heywood), *S. orientalis* L.

Sect. *Scrophularia*: *S. amana* Lall, *S. amplexicaulis* Benth., *S. atropatana* Grossh. (fide Grossh., *Fl. Kavk.* ed. 2, 7:map 549, 1967), *S. bitlisica* Lall, *S. candelabrum* Heywood, *S. canina* L. subsp. *bicolor* (Sibth. & Sm.) Greuter (syn.: *S. heldreichii* Boiss.), *S. capillaris* Boiss. & Bal., *S. catariifolia* Boiss. & Heldr. (syn.: *S. glandulosissima* Freyn & Sint., *S. sintenisii* Freyn & Sint.), *S. chlorantha* Ky. & Boiss., *S. davisii* Lall, *S. gypsicola* Hub.-Mor. & Lall, *S. hyssopifolia* Boiss., *S. ilwensis* C. Koch, *S. kurdica* Eig, *S. lepidota* Boiss., *S. lucida* L., *S. luridiflora* Fisch. & Mey., *S. macrobotrys* Ledeb., *S. macrophylla* Boiss., *S. marginata* Boiss. [fide Stiefel-hagen in Engler, *Bot. Jahrb.* 44:473 (1910)], *S. mersinensis* Lall, *S. mesopotamica* Boiss., *S. myriophylla* Boiss. (syn.: *S. laxa* Boiss.), *S. nachitschevanica* Grossh., *S. nodosa* L., *S. olympica* Boiss., *S. pegaea* Hand.-Mazz., *S. peregrina* L., *S. peyronii* Post, *S. pulverulenta* Boiss. & Noë, *S. punilio* Lall, *S. rimarum* Bornm. (syn.: *S. cilicica* Heywood), *S. rupestris* Bieb., *S. scariosa* Boiss., *S. scopolii* [Hoppe ex] Pers., *S. serratifolia* Hub.-Mor. & Lall, *S. striata* Boiss., *S. subaequiloba* Lall, *S. tagetifolia* Boiss. & Hausskn., *S. thesioides* Boiss. & Buhse, *S. trichopoda* Boiss., *S. umbrosa* Dum. (syn.: *S. alata* Gilib., *S. robusta* Pennell, *S. epicalycina* Heywood, *S. umbrosoides* Heywood), *S. uniflora* Richter ex Stapf (n.v.), *S. variegata* Bieb., *S. versicolor* Boiss., *S. xanthoglossa* Boiss. (syn.: *S. pinardi* Boiss. var. *acutilobata* Parsa), *S. zuvandica* Grossh.

S. clematidifolia Eig, described from the Amanus, is imperfectly known and may be a damaged form of *S. scopolii* [Hoppe ex] Pers. *S. heterophylla* Willd., previously recorded from Turkey and the E Aegean islands, apparently does not grow in that area (specimens are mostly referable to *S. rupestris* var. *libanotica* and *S. variegata* s.l.); it is in fact confined to the mainland of Greece, the Cyclades and Crete.

CHROMOSOME NUMBERS

Plants were raised at the Royal Botanic Garden, Edinburgh, from seed of wild Turkish origin. The seeds were collected from herbarium sheets, but failed to germinate when more than 2-3 years old. The chromosome counts were taken in one case (*S. umbrosa*) from root tips, in the remainder from pollen mother cells. Flower buds were fixed in 1:3 acetic alcohol and left under refrigeration for 2-3 hours. The chromosome number was determined for the first time in *S. cryptophila*, *S. chrysantha* (both in Sect. *Venilia*), *S. scopolii* var. *adenocalyx*, *S. rupestris* var. *libanotica* and *S. variegata* subsp. *depauperata*, and confirmed in *S. umbrosa* and *S. peregrina* (cf. Vaarama & Hiirsalmi, *Hereditas* 58:331-358, 1967). Figure 4 gives camera lucida drawings for those Turkish taxa the chromosomes of which have been counted for the first time. Table 1 gives my results.

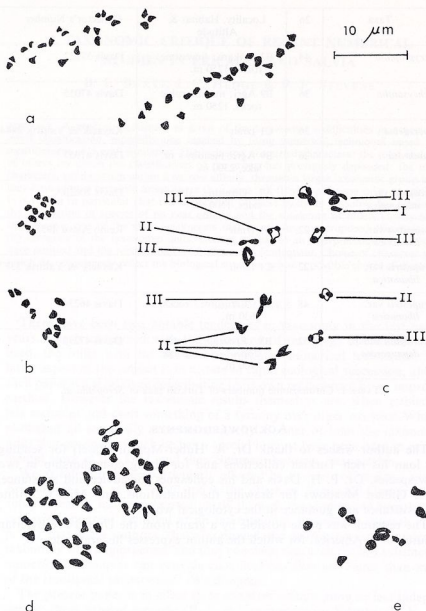


FIG. 4. Camera lucida drawings of meiotic chromosome complements. a, *S. cryptophila*, 1st. meiotic telophase, $2n = 44$; telophase, $2n = 36$; b, *S. scopolii* var. *adenocalyx*, 1st. meiotic telophase, $2n = 26$; c, *S. variegata* subsp. *depauperata*, 1st. meiotic metaphase, $2n = 32$, showing 1 univalent, 5 bivalents and 7 trivalents. d & e, *S. rupestris* var. *libanotica*: d, 1st. meiotic telophase, the bivalent-like bodies uppermost in the figure are pre-cociously separating chromatids, $2n = 48$; e, $n = 11$, each representing one pole of a 1st. meiotic telophase.

Taxa	2n	Locality, Habitat & Altitude	Collector's Number
<i>S. cryptophila</i>	44	B3 Ankara; limestone rocks, 1250 m.	Davis 37222
<i>S. chrysanth</i>	36	B9 Ağrı; metamorphic rocks, 1250 m.	Davis 47055
<i>S. peregrina</i>	36	C1 Izmir	Kayacik & Yaltirik 3444
<i>S. umbrosa</i>	26	B9 Ağrı; meadows nr. lake, 2300 m.	Davis 47057
<i>S. scopoli</i> var. <i>adenocalyx</i>	26	A7 Giresun; stream sides, 1600 m.	Davis 20620A
<i>S. rupestris</i> var. <i>libanotica</i>	22	C1 Izmir	Reino Alava 4958A
<i>S. rupestris</i> var. <i>libanotica</i>	22	C1 Izmir	Kayacik & Yaltirik 3387
<i>S. rupestris</i> var. <i>libanotica</i>	48	B8 Erzurum; rocks, 1630 m.	Davis 46234
<i>S. variegata</i> subsp. <i>depauperata</i>	32	B8 Erzurum; rocky slopes in gorge, 1700 m.	Davis 47296

TABLE 1. Chromosome numbers of Turkish taxa of *Scrophularia*.

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