

THIRTEEN NEW SPECIES FROM TURKEY

B. YILDIZ* & KIT TAN

ABSTRACT. Thirteen new endemic species in the following genera are described from Turkey: *Polygonum* (1), *Reaumuria* (1), *Geranium* (1), *Eryngium* (2), *Heracleum* (1), *Helichrysum* (2), *Campanula* (1), *Ajuga* (1) and *Stachys* (3). All have been collected from the vilayet of Sivas in east central Anatolia with the exception of *Eryngium* and *Heracleum* (both Umbelliferae) and two species of *Stachys* (Labiatae).

This paper stems from a consideration of new taxa that have emerged in conjunction with the working up of a substantial quantity of unnamed gatherings, the result of recent collecting by one of us (B.Y.) as well as of material that has lain undetermined for years in the Edinburgh herbarium. All cited specimens have been examined. Four new species and five new subspecies of *Asyneuma* are described separately in *Willdenowia* 18:68-80 (1988) and another thirteen new species belonging to various families will be included in a forthcoming paper. It is clear however, from this paper that much remains for botanical investigation in the vilayet of Sivas; especially rich and interesting is the flora on the gypsum hills.

POLYGONACEAE

***Polygonum sivasicum* Kit Tan & Yildiz, sp. nov. (Sect. *Polygonum*).**

Affinis *P. setoso* Jacq. a quo caulibus brevibus prostratis, ochreis internodiis aequalibus vel longioribus, marginibus foliorum valde revolutis, inflorescentiaque congesta (non laxa), floribus ad quemque nodum numero 2-3 facile distinguitur.

Suffrutescent perennial with a hard woody stock. Stems numerous, branched at base, prostrate, 5-10cm, conspicuously sulcate; internodes 5-12mm, glabrous to minutely scabridulous. Ochreae membranous, up to 12mm, equalling or longer than internodes, 6-8-veined, strongly laciniate, upper hyaline, lower reddish-brown. Leaves numerous, sessile, linear, 10-20 × 1-1.5mm, entire, light greyish-green, subapiculate, margins strongly revolute, veins prominent. Inflorescence unbranched, spicate, dense-flowered. Bracts similar to but smaller than cauline leaves. Flowers 2-3 at each node, rarely subsolitary, sessile, rarely with 1-1.5mm slender pedicels. Perianth campanulate, 2.5-3mm; lobes longer than tube, broadly rounded-obovate, white to creamy white, suffused pink at centre and veined pink; tube 0.5mm, rose-pink. Stamens 8, filaments c.1mm, anthers lemon-yellow. Ovary trigonous, 0.8-1mm; styles 3, 0.2mm. Immature nut trigonous, black, included in persistent perianth. *Fl.* late July to August.

Type. Turkey B6 Sivas: Şerefiye, near summit of Köse Dağı, above Kirkgöz Yayla, open scree, 2300-2400m, 26 vii 1985, *B. Yildiz* 6845 (holo. E, iso. Cumhuriyet Üniversitesi Herbarium, Sivas).

NC ANATOLIA. A6 Sivas: Şerefiye, Karabayır geçidi, 1700-1800m, 25 vii 1985, *Yildiz* 6665 (E).

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Endemic. Irano-Turanian element? A very attractive little plant known only from the two gatherings cited. Affinities with *P. setosum* Jacq. from which it can be readily distinguished by its short prostrate stems, ochreae equalling to or longer than the internodes, strongly revolute leaf margins, and congested, not lax, inflorescence with 2-3 flowers at each node. *P. setosum* has \pm unbranched, erect stems 10-70cm long with the ochreae shorter than the internodes, flat (rarely slightly revolute) leaves, a branched spike with flowers rather distantly spaced and solitary at each node.

TAMARICACEAE

***Reaumuria sivasica* Kit Tan & Yildiz, sp. nov.**

A *R. alternifolia* (Lab.) Britten foliis linearibus acutis, calyce longiore lobis acuminatis, corollis longioribus differt.

Glabrous subshrub much-branched at base. Stems ascending-erect, 20-30cm, stramineous below, suffused pink in upper part, densely leafy. Leaves linear to narrowly elliptic-lanceolate, 5-15 \times 1-1.5mm, subfleshy, sessile, not attenuate at base, entire, glaucous to greyish-green. Inflorescence raceme-like with sessile flowers single at ends of short branches but oldest flowers at apex, or stem with single sessile terminal flower. Bracts numerous, leaf-like, much longer than and attached to or below calyx. Calyx 5-lobed, 6-8mm, united below into c.2mm tube; lobes triangular- to lanceolate-ovate, long-acuminate; margins pale coloured, membranous, obscurely denticulate. Corolla 13-14mm, pale, almost flesh-pink. Stamens numerous, filaments pale pink. Ovary globose; styles 5, 3-4mm, thicker than filaments. Capsule (immature) depressed-globose, 5 \times 4-4.5mm, opening by 5 valves. Seeds (immature) glabrous? *Fl.* late June to July.

Type. Turkey A6 Sivas: Suşehri, Kelkit valley, on gypsaceous hill, c.700m, 10 vii 1986, *B. Yildiz* 8245 (holo. E; iso. Cumhuriyet Üniversitesi Herbarium, Sivas, RSA).

Endemic. Irano-Turanian element. The genus *Reaumuria* is represented in Turkey by one other species, *R. alternifolia* (Lab.) Britten. This saline steppe species has a wide distribution, occurring in the Syrian Desert and eastwards to arid regions in West Pakistan; it differs in having mucronate leaves attenuate at base, a 3.5-4.5mm calyx with mucronate lobes, a 9-11mm corolla and densely hairy seeds.

GERANIACEAE

***Geranium chelikii* Kit Tan & Yildiz, sp. nov.**

Affinis *G. asphodeloidi* Burm. fil. sed rhizomatibus longis radicibus filiformibus, caulibus sparse patentibus pilosis, calyce corollaque brevior differt.

Perennial herb. Rhizome elongate, oblique, roots slender. Stems erect, 50-60cm, quadrangular, sulcate, spreading glandular-pilose, leafless below first dichotomy. Stipules triangular-ovate, 7-10mm, acuminate to aristate, long-ciliate. Basal leaves long-petiolate; petioles 10-15cm, spreading glandular-pilose, hairs 2-3mm. Lamina reniform to orbicular, 3-3.5 \times 5-6cm, palmately dissected to $\frac{2}{3}$, glandular- and eglandular-adpressed pilose; segments broadly cuneate, 2-3-fid into entire or incised-dentate lobes. Cauline leaves sessile, floral leaves similar, smaller. Inflorescence lax,

many-flowered. Peduncles 3–7cm, spreading glandular-pilose (glands conspicuous, capitate, violet), 2-flowered. Bracts 4, lanceolate, 4–5mm. Pedicels 10–15mm, glandular-pilose, erect in fruit. Sepals ovate-lanceolate, (4–)5–6mm (excl. 1–1.5mm awn), glandular-pilose, 5-veined, green, inner surface magenta. Petals narrowly obovate-oblong, 7–9(–10) × 4–5mm, entire, bluish-lilac, bearded at base. Stamens 10; filaments linear, long-ciliate, purple. Ovary glandular-pubescent, style c.5mm; stigmas 5, c.1.5mm. Mericarps subglobose, 3 × 3mm, glandular-pilose; beak (excl. style) 10–12mm. Seeds broadly obovate to rounded, 2 × 1.5–2mm, foveolate, dark reddish-brown to blackish-brown. *Fl.* July to August.

Type. Turkey B6 Sivas: Şerefiye, Köse Dağı, Cehennem dere, wet meadow, 1800–2000m, 11 viii 1984, *B. Yildiz & N. Çelik*, Y. 4994 (holo. E, iso. Cumhuriyet Üniversitesi Herbarium, Sivas).

Endemic. Euxine element. With some affinities to *G. asphodeloides* Burm. fil. which has short rhizomes bearing fleshy, fusiform roots, very densely retrorsely or spreading hairy stems, a 6–8mm calyx and 9–16mm corolla.

Named after the co-discoverer of this plant, Dr Necati Çelik from Cumhuriyet Üniversitesi, Sivas.

UMBELLIFERAE

Eryngium davisii Kit Tan & Yildiz, *sp. nov.* Fig. 1.

A petiolis foliorum caulium spinosis, lobis primariis foliorum latioribus ad dimidium laminae indivisis, bracteis secus margines spinosis, fructibus breviter oblongis, haec planta a taxo *E. bourgatii* Gouan subsp. *heldreichii* (Boiss.) Davis nominato differt.

Glabrous perennial with blackish-brown fibrous collar. Flowering stems 1–2, 17–20cm, branched only at inflorescence, 2–3mm diam. at base, sulcate, stramineous. Basal and lower cauline leaves persistent, petiolate, coriaceous; lamina ± suborbicular in outline, 1.5–3cm, palmately 3–5-partite; segments trisect or dentate, prominently veined, spiny. Petioles (2–)3–4cm, entire or spiny-winged. Middle cauline leaves similar but petioles short, (1–1.5cm), winged, margins spiny. Uppermost leaves 2–4cm, sessile, trisect or dentate, lanceolate, long-acuminate. Inflorescence a dense or lax yellowish-green panicle. Capitula 5–7, globose, 1–2cm diam. Involucral bracts 7–9, ± equal, linear-lanceolate, (2–)3–5cm, c.3mm at base (excl. marginal spines), 5–7-veined, 2–3 × capitulum, pale green or suffused blue. Bracteoles (paleae) all entire, linear, 5–7mm, equalling flowers. Sepals lanceolate, c.3mm, longer than corolla, with thickened midvein produced in spinose tip; margins narrow, hyaline. Corolla 1.5–2mm, bluish. Style exserted. Fruits shortly oblong, with scale-like outgrowths; seeds on upper half of fruit more numerous, longer, acute; those on lower half shorter, obtuse. *Fl.* late August to September.

Type. Turkey C4 Konya: south of Karanje dere, between Geyik Dağı and Bozkır, 1830m, 1 ix 1947, *P. H. Davis* 14616 (holo. E, iso. K).

SANATOLIA. C4 Konya: Ermenek, Göktepe, Dumlugöze köyü, 950–1300m, 13 ix 1983, *H. Sümbül* 2442 (E, HUB).

Endemic. East Mediterranean element. This species was first collected in 1947 by Peter H. Davis who noted the obvious differentiating character of the spiny petioles of the cauline leaves but treated it (reluctantly, in sched.)

FIG. 1. Holotype of *Eryngium davisi* Kit Tan & Yildiz (Davis 14616).

as an undescribed form of *E. bourgatii* Gouan subsp. *heldreichii* (Boiss.) Davis as he only had a single, though ample, gathering. It was not till nearly 40 years later that a second collection of the same taxon was made by Hüseyin Sümbül c.100km further east. The same distinct and constant characters—spiny petioles, broader primary leaf segments divided only to middle, spiny-margined involucre bracts and shortly oblong fruits—clearly confirmed that the taxon is not merely a form of *E. bourgatii* but it justifies recognition at species level.

***Eryngium hedgeanum* Kit Tan & Yildiz, sp. nov. Fig. 2.**

Herba perennis, glabra, rigida, ad basin collo fibroso provisa. *Caulis* florifer solitarius, erectus, c.50cm altus, simplex, flavovirens. *Folia basalia* persistentia, petiolo 5cm longo, coriacea; lamina ambitu suborbicularis, c.5cm, dissecta et ternato-composita, prominente venosa, glauca; lobi late ovati usque suborbiculares imbricati, dentati, spinis brevibus 1-2mm longis. *Folia caulina mediana* petiolata; petioli 1-1.5cm longi, apicem versus expansi, amplexicaules, auriculis c.1mm longis, marginibus espinosis; lamina usque ad costam trisecta, lobis ad minus quam $\frac{1}{2}$ divis. *Folia floralia* sessilia, tripartita, c.2cm, lobis integris. *Inflorescentia* c.25cm, in partem inferiorem spicata, supra umbellata, flavovirens. *Bracteae involucreales* 5-6, inaequales, lineari-lanceolatae, 10-15mm, integrae, quam capitula breviores, 2mm latae et ad basem 3-5-venosae, spinosae. *Capitula* 25-30, hemisphaerica usque subglobosa, 10-15 \times 15-20mm (bracteis involucrealibus exclusis). *Bracteolae (paleae)* omnes integrae, lineares, 5-7mm, flores \pm aequantes. *Sepala* obovata, 2.5-3mm, corolla longiora, costa incrassata in apicem spinosam producta. *Corolla* c.2mm, colore ignoto. *Stylus* exsertus. *Ovarium* 2mm, squamis scariosis dense obtectum; squamae laterales eis in superficiebus dorsalis ventralibusque majoribus. Fructus immaturi.

Glabrous rigid perennial with a fibrous collar. Flowering stem solitary, erect, c.50cm, unbranched, yellowish-green. Basal leaves persistent, with 5cm petiole, coriaceous; lamina suborbicular in outline, c.5cm, dissected and ternately compound, prominently veined, glaucous; lobes broadly ovate to suborbicular, overlapping, dentate, spines short, 1-2mm. Median cauline leaves petiolate; petioles 1-1.5cm, apically expanded, amplexicaul, with c.1mm auricles, margins not spiny; lamina trisect to midrib, lobes divided to less than $\frac{1}{2}$. Floral leaves sessile, tripartite, c.2cm, lobes entire. Inflorescence c.25cm, spicate below, umbellate above, yellowish-green. Involucre bracts 5-6, unequal, linear-lanceolate, 10-15mm, entire, shorter than capitula, 2mm wide and 3-5-veined at base, spiny. Capitula 25-30, hemispherical to subglobose, 10-15 \times 15-20mm (excl. involucre bracts). Bracteoles (paleae) all entire, linear, 5-7mm, \pm equalling flowers. Sepals obovate, 2.5-3mm, longer than corolla, with thickened midvein prolonged into spinose tip. Corolla c.2mm, colour unknown. Style exserted. Ovary 2mm, densely covered with scarios scales; lateral scales longer than those on dorsal and ventral surfaces. Fruits immature. *Fl.* July to August.

Type. Turkey B6 Maraş: Göksun, west slope of Berit Dağ, calcareous stony *Astragalus* steppe, 1500-1700m, 25 vii 1981, B. Yildiz 3150 (holo. E, photo. HUB).

Endemic. A very distinct taxon unique in having apically expanded, amplexicaul, shortly auriculate petioles without spiny margins. Only known from a solitary collection on Berit Dağ and efforts will certainly be made in the near future to re-collect it.

It is a pleasure to name this *Eryngium* after Ian C. Hedge, a botanist well familiar with Turkish and Iranian Umbelliferae.



FIG. 2. Holotype of *Eryngium hedgeanum* Kit Tan & Yildiz (Yildiz 3150).

***Heracleum marashicum* Kit Tan & Yildiz, sp. nov.**

Heracleum marashicum Kit Tan & Yildiz, a *H. pastinacifolium* C. Koch fortasse proximo sed fructibus maioribus alis 2- vel 3-plo latioribus, vittis dorsalibus filiformibus fructuum longitudine $\frac{1}{2}$ partes aequantibus, vittis commissuralibus duabus adsunt, stylopodio petaloidi expanso conspicue differt.

Perennial. Flowering stems 50–60cm tall, branched, c.7mm diam. at base, with scarious collar, striate, puberulent-glandular or eglandular, stramineous below, suffused purplish above. Basal leaves unknown, not persistent. Lower and median cauline leaves imparinnate; lamina ovate to rounded in outline, 5–10 × 8–10cm; leaflets 5–7, oblong-ovate, 3–5 × 1.5–3cm, sessile or shortly stalked, truncate to cordate at base, irregularly dentate to lobate, rounded at apex, adpressed pubescent on both surfaces. Petioles 7–10cm, expanded and sheathing at base. Upper cauline leaves reduced, pinnate to ternate, 1–2.5 × 1–1.5cm, with 2–3cm long scarcely dilated sheaths. Bracts absent or early caducous. Rays 10–14, subequal, 4–5–5cm in fruit, spreading, densely glandular-puberulent to scabridulous. Bracteoles 5–8, linear, 2–5mm, glabrous, persistent. Raylets 20–30, filiform, 5–6mm, subequal, \pm glabrous. Calyx obsolete. Corolla obovate, 2mm, bilobed, white? Ovary obconical, glabrous. Fruits broadly oblong-obovate, 10–12 × 8–9mm, retuse, glabrous, wings c.1mm. Dorsal vittae filiform, $\frac{1}{4}$ length of fruit; commissural vittae 2, as long as dorsal vittae; stylopodium expanded, 2mm, margins undulate-crenate, dark purple; style 0.5–1mm. *Fl.* late May to June. Type. Turkey C6 Maraş: between Suleymanli to Ilica köyü, mixed *Pistacia-Quercus* scrub, above *Pinus brutia* forest, 900m, 16 vi 1981, B. Yildiz 2815 (holo. Cumhuriyet Üniversitesi Herbarium, Sivas; fragment & photo. E).

Perhaps closest to *H. pastinacifolium* C. Koch but differing conspicuously by its larger fruits with wings 2–3 × as broad, filiform dorsal vittae $\frac{1}{4}$ × as long as fruit, presence of 2 commissural vittae and expanded, petaloid stylopodium. In need of further collecting.

COMPOSITAE

***Helichrysum kitianum* Yildiz, sp. nov. Fig. 3.**

Affinis *H. compacto* Boiss. Anatoliae austro-occidentali sed habitu stolonifero, foliis basalibus caespites non formantibus, foliis caulinis longioribus (2.5–3.5cm, non 1.2cm longis), capitulis heterogamis differt.

Rhizomatous perennial herb, densely yellowish-white lanate. Flowering stems erect, 10–15cm, arising from short caudices, unbranched, densely leafy; sterile stems prostrate, 5–7cm, shoots with prominently swollen leaf bases. Basal and lower cauline leaves withered at anthesis; median and upper cauline leaves oblong-lanceolate, 25–35 × 3–4(–5)mm, sessile, entire, subacute, closely adpressed to stem, overlapping. Capitula 15–20(–25) per inflorescence, heterogamous, densely aggregated, obovoid to subglobose, 5–6 × 4–5mm. Receptacle flat, alveolate. Phyllaries 5–6-seriate, scarious, lemon-yellow; outer and median spatulate to elliptic-oblong, 2.5–3 × c.1mm; inner linear-lanceolate, 5 × 0.3–0.5mm; innermost filiform. Flowers c.60; female c.18–22, marginal, yellow; hermaphrodite c.38–42, orange. Corollas tubular, 5-fid, c.2.5mm, lobes glandular. Achenes (immature) cylindrical, 0.6–0.8mm, glandular-papillose. Pappus hairs 15–18, yellowish-white, c.3mm, scabrid. *Fl.* July to August.

FIG. 3. Holotype of *Helichrysum kitianum* Yildiz (Yildiz 6877).

Type. Turkey B6 Sivas: Şerefiye, west slopes of Köse Dağı, steppe with *Astragalus*—*Verbascum* dominant, igneous substrate, local, 1700m, 26 vii 1985, B. Yildiz 6877 (holo. E; iso. Cumhuriyet Üniversitesi Herbarium, Sivas, RSA).

Endemic to EC Anatolia. Irano-Turanian element? Known only from the type gathering. A very distinct species with affinities to *H. compactum* Boiss. (endemic to SW Anatolia) and *H. leucocephalum* Boiss. from Iran; both these species are also characterized by the very neat, small densely aggregated inflorescences. *H. kitianum* differs from *H. compactum* mainly by its stoloniferous habit, non-tufted basal leaves, longer cauline leaves (2.5–3.5cm not 1.2cm long) and heterogamous capitula.

Named in honour of Dr Kit Tan, in grateful appreciation of her kind help during my sabbatical visit to the Royal Botanic Garden, Edinburgh—B. Yildiz.

***Helichrysum sivasicum* Kit Tan & Yildiz, sp. nov.**

H. armenio DC. affinis sed valde suffrutescens et propter phyllaria corollasque multo longiores capitulis majoribus (8–9 × 7–8mm, non 5–6 × 4–5mm).

Suffrutescent glandular perennial, 15–20cm. Stems herbaceous, ascending-erect, thinly lanate to white-arachnoid villous, branched at middle, sulcate. Leaves linear, 10–20 × 1–2mm, sessile, entire, incanescens-villous, margins revolute or not, acute to acuminate. Inflorescence terminal, loose, 6–15-capitulate. Peduncles 4–10mm. Capitula homogamous (all flowers hermaphrodite), obovoid-globose, 8–9 × 7–8mm. Phyllaries 7–8-seriate, weakly cucullate, laxly imbricate; outer ovate to lanceolate, 3–4 × 2–2.5mm, stramineous; median and inner phyllaries oblanceolate-spathulate to linear, 7–8 × 1–2mm, lemon-yellow. Receptacle flat, alveolate. Corolla orange-yellow, cylindrical, 3–4mm, lobes glandular. Achenes immature. Pappus hairs c.25, 4.5–5mm, yellowish-white, scabrid. *Fl.* June to July.

Type. Turkey B6 Sivas: Zara, Bolucan, Yeşildere Molular, Mezresi cadde, steppe, 1600–1700m, 6 vii 1986, B. Yildiz 7915 (holo. E, iso. RSA).

EC ANATOLIA. Endemic. Irano-Turanian element. Allied to *H. armenium* DC. but with much larger capitula (8–9 × 7–8mm not 5–6 × 4–5mm) caused by the longer phyllaries and corollas.

CAMPANULACEAE

***Campanula sivasica* Kit Tan & Yildiz, sp. nov.**

Species affinitatibus nonnullis *C. fastigiatae* Dufour sed ramis densis foliatis fastigiatis basi caulis carentibus, floribus maioribus corolla minus divisa (usque ad tantum $\frac{1}{10}$ – $\frac{1}{8}$, non usque $\frac{1}{4}$ – $\frac{1}{3}$), capsulis poris subapicalibus (non valvis) dehiscentibus differt.

Small annual. Stems erect or ascending-erect, 5–15cm, unbranched, quadrangular, slightly winged at angles, glabrous or sparsely scabridulous. Leaves few, shape and measurements variable, slightly fleshy; lower and median cauline leaves obovate to rounded, (2–)4–8(–12) × 2–5mm, sessile, dentate; upper leaves lanceolate, 4–8 × 2–3mm, rounded or subacute at apex. Inflorescence a dichasium or stem only 1-flowered. Bracts similar to upper leaves, lanceolate, 3–8mm, entire or tridentate at apex. Peduncles 3–15mm. Bracteoles linear, 2–5mm. Flowers conspicuous, erect, apical flowers sessile, lateral flowers sessile or with 2–5mm pedicels. Calyx lobes erect, linear to

linear-lanceolate, 2.5–3(–5)mm, margins narrowly scarious, obtuse, equaling to longer than ovary, distinctly longer than corolla; appendages absent. Corolla campanulate, 2–2.5mm, divided to $\frac{1}{10}$ – $\frac{1}{8}$, violet-blue. Filaments short; anthers 0.5mm, shortly awned. Ovary 3-locular, obconical, 2–3mm; style included, stigmas 3. Capsule erect, obconical, 4–5mm, smooth or papillose, 5-veined, opening by 3 subapical pores. Seeds numerous, ellipsoid, 0.5 × 0.2mm, light brown, shiny. *Fl.* late June to July.

Type. Turkey B6 Sivas: Bolucan, 15km from Zara, on gypsum, rare, 1400m, 6 vii 1986, *B. Yildiz* 7882 (holo. E; iso. Cumhuriyet Üniversitesi Herbarium, Sivas, RSA).

EC ANATOLIA. B6 Sivas: Karayün, Mollu köyü, gypsum, 1500–1550m, 25 vi 1985, *Çelik* 3240 (E, Cumhuriyet Üniversitesi Herbarium, Sivas).

Endemic; apparently restricted to gypsum. Irano-Turanian element. With some affinities to *C. fastigiata* Dufour which however, is readily distinguished by the stems with densely leafy fastigate branches arising from base, inconspicuous axillary flowers crowded at the apices of branches, corolla divided to $\frac{1}{4}$ – $\frac{1}{3}$ not $\frac{1}{10}$ – $\frac{1}{8}$ and capsules opening by subapical valves not pores. Subgen. *Brachycodonia* (Fed.) Damboldt of which *C. fastigiata* is the sole representative is particularly interesting, being distinguished by capsules dehiscing by three apical valves as in the genus *Legousia* Durande. It has been treated by some authors as a separate monotypic genus. However, the capsules of *C. sivasica* open by pores, not valves. This links it a little closer to subgen. *Rapunculus* (Fourr.) Charadze which also has a porate-type of capsule dehiscence.

LABIATAE

Ajuga davisiana Kit Tan & Yildiz, sp. nov. Fig. 4 A–E.

Affinis *A. orientale* L. sed indumento in parte inferiore caulis et foliorum rosularum basaliom nullo, foliis etiam integris, purpureo-suffusis (non crenatis, cinero-canescensibus), verticillastris 10–15-floris non 4–6-floris, et lobis corollae brevioribus conspicue differt.

Perennial herb with stout woody root. Flowering stem solitary, 12–15cm, ascending-erect, arising laterally from base of leaf rosette, glabrous below, sparsely to densely villous above, purple, hollow. Rosette leaves elliptic to elliptic-ovate, 2–5 × 1.5–2cm, attenuate into petiole, ± entire, obtuse to subacute, completely glabrous, suffused purple. Cauline leaves 2–3-paired, similar to basal leaves, glabrous or sparsely villous. Verticillasters crowded, 10–13, 10–15-flowered. Bracts ovate to broadly rhomboidal-ovate, 3-lobed or dentate above middle, suffused purple, villous, glands sessile. Pedicels 1–2mm. Calyx 6–7mm, teeth 3–4.5mm, equalling or slightly longer than tube, densely glandular villous; tube sessile-glandular, sparsely villous. Corolla resupinate, 10–11mm, pubescent, villous within tube, exannulate; upper lip 1mm, 2-lobed; lower lip 3-lobed, median lobe 1.5mm, lateral lobes 1mm; all lobes ± oblong-elliptic, rounded. Stamens short, included in corolla tube. Style included, 3mm. Nutlets obovoid-conical, 3 × 1.5mm, reticulate-rugose. *Fl.* & *Fr.* July to August.

Type. Turkey B6 Sivas: Şerefiye, west-facing slopes of Köse Dağı, open *Astragalus*–*Verbascum* steppe, c.1800m, 11 viii 1984, *B. Yildiz* & *N. Çelik*, Y. 4910 (holo. E, iso. RSA).

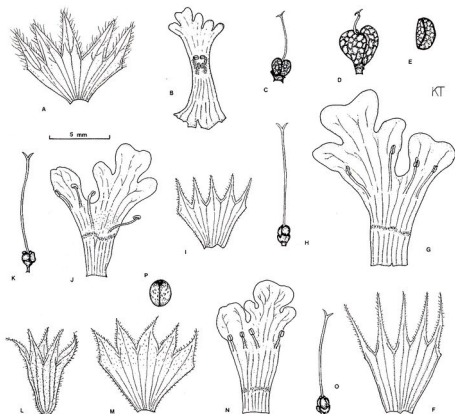


FIG. 4. A-E, *Ajuga davisiana*: A, calyx; B, corolla; C, gynoecium; D, fruit; E, nutlet. F-H, *Stachys sivasica*: F, calyx; G, corolla; H, gynoecium. I-K, *S. baytopiorum*: I, calyx; J, corolla; K, gynoecium. L-P, *S. willemsei*: L & M, calyx; N, corolla; O, gynoecium; P, nutlet. All drawn to scale shown.

Endemic. Known only from the cited gathering. Allied to the widespread species *A. orientalis* L. but conspicuously different by the complete absence of indumentum on the lower part of the stem and leaves; the latter are also entire and suffused purple, not crenate and grey-canescens. In addition, the verticillasters are 10-15- not 4-6-flowered and the corolla lobes much shorter. In need of further collecting.

Named in honour of Professor Peter H. Davis, botanist and plant-collector extraordinary.

***Stachys sivasica* Kit Tan & Yildiz, sp. nov. Fig. 4 F-H.**

A *S. megalodonta* Hausskn. & Bornm. ex P. H. Davis subsp. *megalodonta*, *S. sivasica* caulibus minime duplo longioribus flexuosis (50-70cm, non 20-30cm longi), foliis minoribus basibus subcordatis usque truncatis, bracteolis linearibus (non setaceis), dentibus calycis brevioribus apicibus spinescentibus, nuculis majoribus per totam longitudinem (non tantum ad basem) anguste alatis distinguit. A subsp. *mardinense* Bhattacharjee differt etiam caulibus duplo longioribus, verticillastris remotis 3-7cm distantibus, dentibus calycis apicibus spinescentibus, nuculis alatis.

Suffrutescent saxatile perennial. Flowering stems 50–70cm, \pm pendent, fragile at base, branched at or below middle, retrorsely pubescent-pilose, glandular hairs shortly stalked. Cauline leaves ovate, 13–17 \times 7–12mm at most, clear green, truncate at base, acute to mucronate, unequally dentate-serrate, adpressed hairy, glandular hairs \pm sessile; lower leaves with 2–3mm petiole. Floral leaves similar to but smaller than cauline leaves. Verticillasters 4–7, remote (3–7cm apart). Bracts linear, herbaceous, pilose. Flowers shortly pedicellate. Calyx \pm regular, infundibular, 8–10mm, retrorsely pilose on tube, glands sessile; teeth triangular-lanceolate, $\frac{1}{2}$ –1 \times tube, spinescent-tipped. Corolla (12–)14–17mm, lemon-yellow, hairy, tube subexserted, annulate; upper lip oblong, 4–5mm, obtuse-rounded, with 2 magenta-coloured stripes at margin; lower lip 7–8(–9)mm, 3-lobed, middle lobe 2 \times lateral lobes. Nutlets trigonous-oblong, 2.5–3 \times 1.5–2mm, narrowly winged along entire length. *Fl.* June to July.

Type. Turkey B6 Sivas: Zara, west of Deredam köyü, calcareous rocks, 1400m, 7 vii 1986, *B. Yildiz & N. Çelik*, Y. 7997 (holo. E; iso. HUB, RSA). C ANATOLIA (Cappadocia). A6 Sivas: Suşehri, Karabayır geçidi, serpentine rocks, 1500m, 8 vii 1986, *B. Yildiz* 8114 (E, HUB, RSA).

Endemic. Irano-Turanian element. In habit and floral characters most closely related to *S. megalodonta*, a taxon geographically distinct. From subsp. *megalodonta* (from N Iraq and W Iran), *S. sivasica* is distinguished by its long flexuous stems, smaller leaves with truncate bases, linear (non-setaceous) bracteoles, shorter and spinescent-tipped calyx teeth and larger nutlets narrowly winged throughout, not only at the base. From subsp. *mardinensis* (endemic to SE Anatolia), it differs, again by its longer stems, remotely spaced verticillasters 3–7cm apart, spinescent-tipped calyx teeth and marginally winged nutlets.

***Stachys baytopiorum* Kit Tan & Yildiz, sp. nov.** Fig. 4 I–K.

Affinis *S. megalodontae* Hausskn. & Bornm. ex P. H. Davis sed marginibus foliorum serrulatis, verticillastris congestis floribus sessilibus, calyce corollaque brevior differt.

Suffrutescent saxatile perennial. Flowering stems 25–30cm, erect to \pm pendent, fragile at base, simple or branched at middle, densely retrorsely pilose, glandular hairs sessile. Cauline leaves ovate to oblong-ovate, 10–15 \times 6–9mm, greyish-green, subcordate to truncate at base, acute to submucronate, serrulate, densely adpressed hairy, glands sessile; lower shortly petiolate (petiole to 3mm at most); middle and upper sessile. Floral leaves similar to but smaller than cauline leaves. Verticillasters \pm congested, 3–4, lowermost 5–6mm apart. Bracteoles conspicuous, herbaceous, linear, 5–6mm, \pm equalling calyx, spreading pilose, not spinescent at tips. Flowers sessile. Calyx \pm regular, narrowly infundibular, c.6mm, spreading-pilose; teeth triangular-lanceolate, $\frac{1}{2}$ \times tube, not spinescent-tipped. Corolla 10–11mm, yellowish, pilose outside, tube slightly exserted, annulate; upper lip oblong-elliptic, 4mm, obtuse-rounded; lower lip c.6mm, 3-lobed, middle lobe 2 \times lateral lobes. Nutlets immature. *Fl.* June.

Type. Turkey C8 Mardin: Diyarbakir to Mardin, 7 vi 1971, *A. & T. Baytop* ISTE 20069 (holo. E, iso. ISTE).

SE Anatolia. Probably occurring in N Iraq. Irano-Turanian element. Closely related to *S. megalodonta* Hausskn. & Bornm. ex P. H. Davis but

differs by its leaves with serrulate margins, congested verticillasters with sessile flowers, shorter calyx and corolla.

***Stachys willemsei* Kit Tan & Hedge, sp. nov.** Fig. 4 L-P.

S. ibericae Bieb. affinis, a qua habitu altiore, floribus minoribus sessilibusque et staminibus haud exsertis distinguitur.

Suffrutescent perennial c.1m tall. Flowering stems herbaceous, erect, simple, glabrous, eglandular-hairy above. Cauline leaves ovate- to oblong-elliptic, 6-7 × c.1.5cm, dark green, glabrous, faintly crenate to subentire, acute to acuminate, base attenuate, with 1cm petiole. Floral leaves subsessile to sessile, ovate-lanceolate above, 1.5-2.5cm, crenate to crenate-dentate, shortly acuminate. Verticillasters 7-12, remote, lower ones at least 4-5cm distant, 4-6-flowered. Bracteoles absent. Flowers ± sessile. Calyx infundibular, c.7.5mm, shortly spreading pilose, conspicuously 10-veined; teeth erect, subequal, triangular-lanceolate, c. $\frac{1}{2}$ × tube, aristate-mucronate at tip. Corolla 10-11.5mm, pink, glabrous without; tube subexserted, annulate; upper lip entire, broadly ovate, c.2.5 × 3.3mm, with 2 darker streaks near throat margin, obtuse; lower lip c.4.5mm, 3-lobed, middle lobe ± equalling upper lip, spotted and streaked, very much larger than 2 lateral lobes. Stamens hardly exserted. Nutlets reddish-brown at maturity, obovoid-trigonal, c.2 × 1.5mm, unwinged. *Fl.* August.

Type. Turkey B9 Van: 22km from Van near road to Hakkari, on road to ruins of Çavuştepe, damp places, corolla pink, 3 viii 1987, *R. H. Willemse* 1449 (holo. & photo. E).

The closest affinities of this species seem to be with *S. iberica* Bieb. from which it can be distinguished by its taller habit, smaller sessile flowers and non-exserted stamens. Described as conspicuously glandular by the collector, after whom the species is named, the glands are in fact the fruiting bodies of an *Aspergillus*.

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