

MATERIALS FOR A FLORA OF TURKEY XXII: PLUMBAGINACEAE

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ABSTRACT. Seven new species in the *Plumbaginaceae* are described from Turkey. Five belong to *Acantholimon* Boiss.: *A. confertiflorum* Bokhari; *A. dianthifolium* Bokhari; *A. halophilum* Bokhari; *A. reflexiflorum* Bokhari; *A. strigillosum* Bokhari. One is a new species of *Limonium* Mill.—*L. tamaricoides* Bokhari, and one a new species of the previously monotypic *Limoniopsis* Lincz.—*L. davisii* Bokhari. In addition, three new subspecies and six new varieties of *Acantholimon* and one new variety of *Limonium* are described. The correct name for the widespread '*A. echinus* L.' is shown to be *A. androsaceum* (Jaub. & Sp.) Boiss.

INTRODUCTION

This paper deals with the new taxa and new records that have come to light in the course of work on the family *Plumbaginaceae* as it occurs in Turkey. In the largest genus *Acantholimon*, I have recognised 27 species, 5 of which are new, and in *Limonium* 15 species, 1 of which is new. In *Limoniopsis* I have described a new species thus making the genus ditypic.

The material in this paper has largely been extracted from a more extensive work on the family which has been submitted as a Ph.D. thesis at the University of Edinburgh. It is hoped to publish some of the wider aspects of the classification of *Acantholimon* and *Limonium* in a later paper.

NEW SPECIES OF ACANTHOLIMON

***Acantholimon confertiflorum* Bokhari, sp. nov.** (Sect. *Staticopsis*) Figs. 1, 4.

Affinis *A. aceroso* (Willd.) Boiss. sed foliis puberulis, scapis brevibus primo spicis dense distichis, foliis subulatis recedit; a secundo foliis subulatis, bractea exteriore bracteis interioribus longiore differt.

Fruticulus laxè pulvinatus, valde glaucus, ramis longis laxè foliosis. *Folia* anguste linearia, subsubulata, 30–50 × 1 mm, margine ± laevia, glabra. *Scapi* simplices foliis breviores, 3–4 squamis provisi; squamae imbricatae internodiis longiores. *Spicae* dense distichae, 15–25 mm longae. *Spiculae* 8–12, uniflorae, 3-bracteatae, 11–13 mm longae articulis plus minusve bis longiores; bractea exterior lanceolata-triangularis, 9 mm longa bracteis interioribus paulo longior, acuta, cuspidata, anguste scarioso-marginata; bractee interiores anguste lanceolatae, late scarioso-marginatae. *Calyx* infundibuliformis, 11–12 mm longus; tubus limbo longior, parce pilosus; limbus obsolete 10-lobus; nervi 5, purpurascens, ad medium limbi concolorescentes. *Petala* rosea.

TURKEY C4 Konya: Bozkir, 1100 m, on calcareous soil, Davis 16600 (holo E); Bozkir, 1219 m, chalky hills, Davis 14603!

A. confertiflorum is related to *A. kotschyi* (Jaub. & Sp.) Boiss., but differs in its densely distichous spikes and more or less subulate leaves. In the form of its spikes, it resembles *A. dianthifolium* Bokhari but differs in having its outer bract longer than the inner bracts and in its much narrower and longer leaves.

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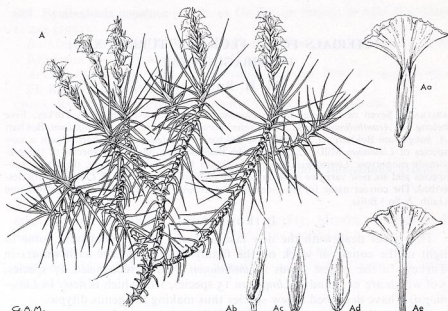


FIG. 1. A-Ae, holotype of *Acantholimon confertiflorum* Bokhari: A, habit $\times \frac{1}{2}$; Aa, spikelet; Ab, outer bract; Ac, middle bract; Ad, inner bract; Ae, calyx. Aa-Ae $\times 3$.

A. dianthifolium Bokhari, *sp. nov.* (Sect. *Staticopsis*) Figs. 2, A-Ae; 4.

Affinis *A. aceroso* (Willd.) Boiss. sed foliis puberulis, scapis brevibus esquamosis, spicis dense distichis, bracteis saltem in nervo puberulis, bracteis interioribus distincte retuso-mucronatis differt.

Fruticulus densiuscule pulvinatus, ramis brevibus dense foliosis. *Folia* plana, lineari-lanceolata, $15-40 \times 1.5-3$ mm lata, versus apicem breviter canaliculata, breviter puberula, margine scabra glaucescenti-viridia. *Scapi* simplices, foliis breviores vel ea paulo superantes, plerumque esquamosi, puberulenti. *Spicae* dense distichae, 20-35 mm longae. *Spiculae* 6-12, uniflorae, 3-bracteatae, 12-15 mm longae quam articuli bis longiores. *Bractee* subaequales, saltem in nervo puberulosae; bractea exterior ovato-lanceolata, acuminata cuspidata, angustiuscule scarioso-marginata; bractee interiores oblongo-lanceolatae, bracteam anteriorem aequantes vel ea paulo longiores, praeter nervos membranaceae, distincte retuso-mucronatae. *Calyx* infundibuliformis, 11-13 mm longus; tubus limbo sesquilingior; limbus 10-lobus; nervi usque ad medium limbi parce pilosi, ad marginem dilatati et excurrentes. *Petala* intense rosea.

TURKEY C9 Hakkari: Kara Da., 2743 m, rocky north face, Davis & O. Polunin, D. 24375; Cilo Tepe, 2956 m, rocky slopes, Davis & O. Polunin, D. 24114. C10 Hakkari: Sat Da. (above Yüsekova), near permanent snow beds, patches of earth in the rocks, 2900 m, Duncan & Tait 91 (holo E); Sat Da. (above Yüsekova), lakeside, 2800 m, Duncan & Tait 49.

The new species is allied to *A. acerosum* (Willd.) Boiss., from which it differs in its short scaleless scapes, densely distichous spikes and retuse-mucronate inner bracts.

A. halophilum Bokhari, sp. nov. (Sect. *Staticopsis*) Figs. 2, B-Be; 4.

Affinis *A. venusto* Boiss. sed pulvinis parvis densis, calyce albo lobis acutis et plerumque nervis ante marginem evanidis differt.

Fruticulus dense pulvinatus, valde glaucus, ramis brevissimis dense foliosis. *Folia* plano-triquetra, 10-30 × 1-1.2 mm, versus apicem conspicue canaliculata, glabra margine minute scabra. *Scapi* simplices folia aequantes vel eis sesquilingiores, 2-4-squamosi. *Spicae* laxae distichae, 50-80 mm longae. *Spiculae* 10-15, uniflorae, 3-bracteatae, articulis paulo longiores. *Bractee* glabrae; bractea exterior ± triangularis, 6 mm longa, acuta, cuspidata, anguste scarioso-marginata; bractee interiores oblongo-lanceolatae exteriore sesquilingiores, acutae vel anguste obtusae, late scarioso-marginatae. *Calyx* late infundibuliformis, 10-12 mm longus; tubus limbo sesquilingior; limbus distincte 10-lobus; lobi acuti; nervi 5, ad medium limbi parce pilosi, ante marginem angustati et plerumque evanidi. *Petala* rosea.

TURKEY B4 Konya: 10 km from Halkenli to Çihanbeyli, 1000 m, salt steppe in sand, *Dudley*, D. 35931 (holo E; iso K); distr. Çihanbeyli, Acituz gölü near Kırkişla, saline clay hillocks, 900-1000 m, *Davis* 16628. C3 Konya: Beyşehir to Konya, 13 km from Beyşehir, 1100 m, *Dudley*, D. 35848.

This species is unusual in inhabiting saline places and is another addition to the number of distinct endemics now known from the salt steppes of Central Anatolia. It is related to *A. venustum* Boiss., but differs in its small dense cushions, smaller leaves and white calyces with acute lobes.

A. reflexifolium Bokhari, sp. nov. (Sect. *Staticopsis*) Fig. 4.

Affinis *A. puberulo* Boiss. & Bal., sed foliis inferioribus valde reflexis, scapis foliis plerumque longioribus, bracteis interioribus ellipticis non carinatis differt.

Fruticulus dense pulvinatus, ramis ± brevibus dense foliosis. *Folia* lineari-triquetra, 8-20 × 1-1.2 mm, folia inferiora valde reflexa superiora patentia, margine scabra, glaucescentia viridia, pubescentia vel glabra. *Scapi* simplices, foliis aequantes vel superantes, 1-2-squamis provisi, pubescentes vel glabri. *Spicae* dense imbricatae interdum plus minusve distichae. *Spiculae* 4-7, uniflorae, 3-bracteatae, 11-12 mm longae, articulis bis vel ter longiores. *Bractee* pubescentes vel glabrae; bractea exterior late triangularis, 5-6 mm longa, acuta, cuspidata, anguste scarioso-marginata; bractee interiores ellipticae bracteam exteriorem bis longiores carinatae, late scarioso-marginatae, anguste obtusae, cuspidatae. *Calyx* late infundibuliformis, 11-12 mm longus; tubus limbum plus minusve aequans; limbus 10-lobus, lobi obtusi; nervi 5, ad medium limbi pilosi, breviter excurrentes. *Petala* intense rosea.

TURKEY A6 Sivas: Yildiz Da., Sariyer, open slopes, NW exposure, 1700 m, *Tobey* 2348 p.p. (upper specimen on the Edinburgh sheet). B9 Van: Van-Başkale, Halanduran Da., 20 km from Başkale, 3000 m, *McNeill* 657 (holo E; iso K); Ereğ Da., 2338 m, volcanic rocks, *Davis & O. Polunin*, D. 22929.

This new species is related to *A. puberulum* Boiss. & Bal. It differs in its strongly reflexed lower leaves, longer scapes and elliptic, keeled inner bracts.

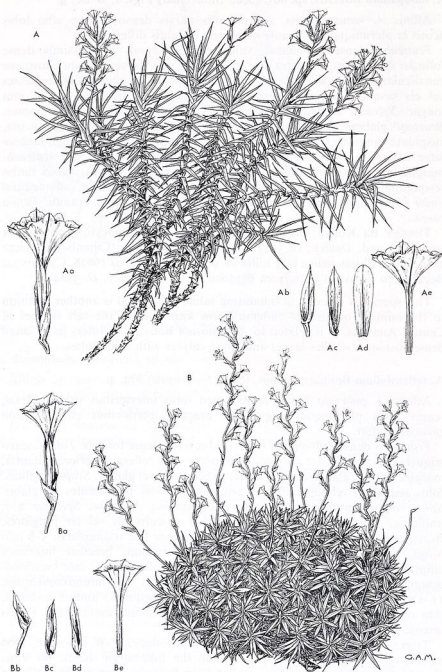


FIG. 2. A-Ae, holotype of *Acantholimon dianthifolium* Bokhari: A, habit $\times \frac{1}{2}$; Aa, spikelet; Ab, outer bract; Ac, middle bract; Ad, inner bract; Ae, calyx. Aa-Ae $\times 2.5$. B-Be, holotype of *A. halophilum* Bokhari: B, habit $\times \frac{1}{2}$; Ba, spikelet; Bb, outer bract; Bc, middle bract; Bd, inner bract; Be, calyx. Ba-Be $\times 2.5$.

A. strigillosum Bokhari, **sp. nov.** (Sect. *Staticopsis*) Fig. 4.

Affinis *A. gorganensi* Mobayen, sed scapis 5–8-squamatis, bracteis interioribus acuto-cuspidatis, foliis scapis bracteis minute strigulosis differt.

Fruticulus dense pulvinatus, valde glaucus, ramis brevibus dense foliosis. *Folia* lineari-triquetra, 14–18 × 1–1.2 mm, strigulosa, margine scabra. *Scapi* simplices, foliis 5–6 plo longiores, 5–8-squamosi strigillosi. *Spicae* dense distichae, 15–25 mm longae. *Spiculae* 2–5, uniflorae, 3-bracteatae, 12–14 mm, longae articulis bis longiores, articulis scabris. *Bractee* strigillosae; bractea exterior late triangularis, 5 mm longa, acuta, breviter cuspidata, anguste scarioso-marginata; bractee interiores exteriore sesquilingiores, acutae, cuspidatae, praeter nervos scariosae. *Calyx* infundibuliformis, 10–12 mm longus, in parte media dense pilosus; tubus limbum aequans; limbus obsolete 10-lobus; nervi 5 ad marginem angustati et breviter excurrentes. *Petala* rosea.

TURKEY B6 Malatya: 2 miles N of Hekimhan, 1100 m, very eroded hillsides, Davis & O. Polunin, D. 24828 (holo E; iso K).

Only known from the type gathering, this distinctive new species is not closely related to any Turkish species, but is allied to *A. gorganense* Mobayen from NE Iran. It differs from the Iranian species in its 5–8-scaled scapes, inner bract acute-cuspidate instead of muticous or subbilobed and mucronate; and its strigillose leaves, scapes and bracts.

NEW INFRASPECIFIC TAXA IN ACANTHOLIMON

Acantholimon caryophyllaceum Boiss. subsp. **parviflorum** Bokhari, **subsp. nov.**

A subsp. *caryophyllaceo* calyce brevior (usque 9 mm longo), limbo angustiore (3–5 mm lato), bracteis interioribus glabris differt.

TURKEY A5 Sinop: Boyabat, 350 m, bare eroded hills (clay), Davis, Coode & Yaltirik, D. 38043 (holo E).

A. kotschyi (Jaub. & Spach) Boiss. subsp. **laxispicatum** Bokhari, **subsp. nov.**

A subsp. *kotschyi* rhache spicis rectis, spiculis longioribus (10–14 mm longis) bracteis interioribus oblongo-lanceolatis mucronatis vel breviter cuspidatis differt.

TURKEY A7/B7 Gümüşane: Erzincan–Kelkit, 1700 m, dry slopes, Davis & Hedge, D. 31924 (holo E; iso K). A8 Gümüşane: Bayburt–Aşkale, 13 km south of Bayburt, 1630 m, Ch. Simon in Huber-Morath 14467. B5 Nevşehir: Göreme, 10 km from Kayseri to Sivas, 1020 m, M. Birand & K. Karamanoglu 64. B6 Malatya: in the vicinity of Derindeh, G. B. Post 89. B7 Erzincan: Egin, Kainarsschar, vii 1890, Sintenis 2968.

A. androsaceum (Jaub. & Spach) Boiss. subsp. **lycaonicum** (Boiss. & Heldr.) Bokhari, **comb. et stat. nov.** Syn.: *A. lycaonicum* Boiss. & Heldr. in DC., Prodr. 12: 627 (1848); *A. wiedemannii* Bunge in Mem. Acad. Sc. Petersb. ser. 7, 18, 2: 45 (1872).

A subsp. *androsaceo* scapo plerumque 2-spicato, bractea exteriore ovato-triangulari, bracteis interioribus obtusis breviter cuspidatis recedit.

TURKEY A5 Amasya: Ak dagh near Amasya, vii 1908, Manissadjian in Hb. B. V. D. Post; Samsun: Kurt Yayla (Lâdik), 1700 m, Tobey 722. A6

Sivas: in monte Yildis-dagh (Yildiz dagh) Galatiae, *Wiedemann*. A7 Trabzon: Zigana Da., 2300–2400 m, *T. Baytop* 14279. A8 Gümüşane: 30 miles north of Bayburt on Bayburt road, 1675 m, *J. Apold*, *P. A. Cox* & *P. C. Hutchison* 164. B7 Erzincan: Mercan Da., top of Akaba, 3000 m, *Demiriz* 343. B9 Van: Artos Da., 3400 m, *Tong* 265. C3 Antalya: Takhtali Dağ (Kemer), 2000–2300 m, *Davis* 14143. C4 Konya: inter Beyşehir et Konialı Lycaonicae, *Heldreich* (iso K!). C5 Niğde: Ala Da., Narpiz gorge, 2338 m, *P. W. Wood*, *W. B. Gibson* 218; Adana: Karaisali, Katirgediği, NW of Pozanti, 2050 m, *Huber-Morath* 16270.

A. androsaceum (Jaub. & Spach) Boiss. var. **purpurascens** Bokhari, var. nov.

A typo spiculis paucis (3–4), calyce roseo vel purpureo differt.

TURKEY C2 Muğla: Sandras Da., 2000 m, *Davis* 13530; Baba Da., above Fethiye, 1776 m, *Davis* 13669. C3 Isparta: Sütçüler (Isauria), Dedegöl Da., above Dedegöl tarn, 2500 m, *Davis* 16012 (holo E; iso K).

A. puberulum Boiss. var. **longiscapum** Bokhari, var. nov.

A typo scapo foliis bis longiore, bracteis interioribus anguste scarioso-marginatis differt.

TURKEY C4 Konya: S Karance Dere between Geyik Da. and Bozkır, 829 m, *Davis* 14630 (holo E; iso K).

var. **glabrum** Bokhari, var. nov.

A typo foliis glabris, bracteis interioribus praeter nervos scariosis differt.

TURKEY C2 Antalya: district Elmali, Çamçukuru Yayla, Bey Da., 1750 m, *Khan*, *Prance* & *Ratcliffe* 315 (holo E; iso K).

A. acerosum (Willd.) Boiss. var. **parvifolium** Bokhari, var. nov.

A typo foliis parvis (usque 18 mm longis), bracteis interioribus praeter nervos scariosis differt.

TURKEY B6 Maraş: above Göksun, 1067 m, open ground, top of pass, *J. Darrah* (holo E). B7 Tunceli: Pertek-Hozat, 1600 m, *Davis* & *Hedge*, *D.* 31059.

A. damassanum Mobayen var. **lancibracteatum** Bokhari, var. nov.

A typo bracteis interioribus anguste lanceolatis (6 mm longis et 2 mm latis), limbo calycis 5-lobato differt.

TURKEY A7 Erzincan: foot of Keşiş Da. above Cimin, 1700 m, dry metamorphic hills, *Davis* & *Hedge*, *D.* 31676 (holo E; iso BM). B9 Van: Van-Hoşap, 15 km west of Hoşap, 2020 m, *Huber-Morath* 11547.

A. bracteatum (Girard) Boiss. var. **capitatum** (Sosn.) Bokhari, comb. et stat. nov. Syn.: *A. capitatum* Sosn. in *Monit. Jard. Bot. Tiflis* 11: 11 (1915); *A. scabiosum* Mobayen, *Revis. Taxon. Acanthol.* 298 (1964).

A typo calyce albo, nervis ± excurrentibus differt.

TURKEY A8 Erzurum: 'Kars': d. Olty, inter pp. Karnawazet et Lespek, vii 1911, *Sosnowsky*, type TBI (photo E!; K!). B8 Erzurum: 1700 m, Aras river gorge, *Tobey* 2091. B9 Bitlis/Van: mt. 10 km SE of Pelli, 2591 m, *Davis* & *O. Polunin*, *D.* 22539. Van: distr. Şatak, Kavuşşahap Da., 3100 m, *Davis* & *O. Polunin*, *D.* 23144.

A NAME CHANGE IN ACANTHOLIMON

A. androsaceum (Jaub. & Spach) Boiss. in Diagn. ser. 1, 7: 73 (1846).

Syn.: *Statice androsaceum* Jaub. & Spach in Ann Sc. Nat. 2, 20: 250 (1843); *Acantholimon echinus* auct.; Boiss., Fl. Orient. 4: 840 (1879), quoad descr. excl. non (h.) Boiss.

NEW TAXA OF LIMONIUM AND LIMONIOPSIS

Limonium tamaricoides Bokhari, sp. nov. (Sect. *Limonium*) Figs. 3, B-Be; 4.

Affinis *L. iconico* (Boiss. & Heldr.) O. Kuntze et *L. coralloidi* (Tausch.) Lincz.; a primo caudice dense squamato, bractea interiore prima fere ad medium herbacea, spicis subcapitatis recedit; a secundo spiculis 2-3-floris, spicis subcapitatis differt.

Planta perennis, 15-25 cm alta. *Caudex* subsphaeroideo-incrassatus, breviramosus, lignosus, squamis subtriangularibus brunneolis dense tectus. *Folia* radicalia pauca, obovata vel oblongo-spathulata, 10-20 × 3-5 mm, apice apiculato-acuminata, glabra, glauca, basi in petiolum tenuem sensim angustata, cito evanida. *Scapi* numerosi, fere a basi corymboso-paniculati in parte inferiore ramis sterilibus iterum iterumque furcatis numerosis provisi. *Spiculae* 2-3-florae, 4-5-bracteatae, 3-3.5 mm longae, ad ramos terminales subcapitato-congestae. *Bractea* exterior late ovata, 1 mm longa, praeter basem membranacea; bractea interior prima exteriore duplo major, orbicularis fere ad medium usque herbacea, superne late hyalina ± retusa; bractea interior secunda interiore primae similis sed longior et oblonga; ceterae interiores (ad flores singula tantum) paulo minores et omnino hyalinae. *Calyx* obconicus 2-3 mm longus; tubus in tota longitudine dense pilosus; lobi obtuse ± emarginato-apiculati; nervi 5 ante apicem evanidi. *Petala* pallide rosea.

TURKEY B4 Niğde: Aksaray, K. Karamanoğlu (holo E; iso Hb. Hub.-Mor.).

This species, only known from the type gathering, is related to the Anatolian *L. iconicum* (Boiss. & Heldr.) O. Kuntze and *L. coralloides* (Tausch.) Lincz. from Central Asia. From *L. iconicum* it differs in its densely scaly caudex, globose spikes and the second inner bract which is herbaceous up to the middle; from *L. coralloides* (e descr.) it differs in its 2-3-flowered spikelets, first inner bract not bipartite, and calyx lobes ± emarginate and apiculate.

L. gmelinii (Willd.) O. Kuntze. var. **lancifolium** Bokhari, var. nov.

A typo foliis anguste elliptico-lanceolatis (lamina 60-70 mm longa et 20-30 mm lata), lobis calycis triangularibus differt.

TURKEY A1(E) Tekirdağ: Marmarae-reglisi, 45 km from Tekirdağ, salty flats, near sea level, Davis & Coode, D. 39189 (holo E); Marmarae-reglisi, about 25 km from Tekirdağ, sea level, Davis & Coode, D. 39252. A2 Kocaeli: 20 miles east of Istanbul, off Ankara road, 100 yards from sea, G. W. Findlay 8. B6 Sivas: Zara-Hafik, 1400 m, by saline lake, Davis & Hedge, D. 32712.

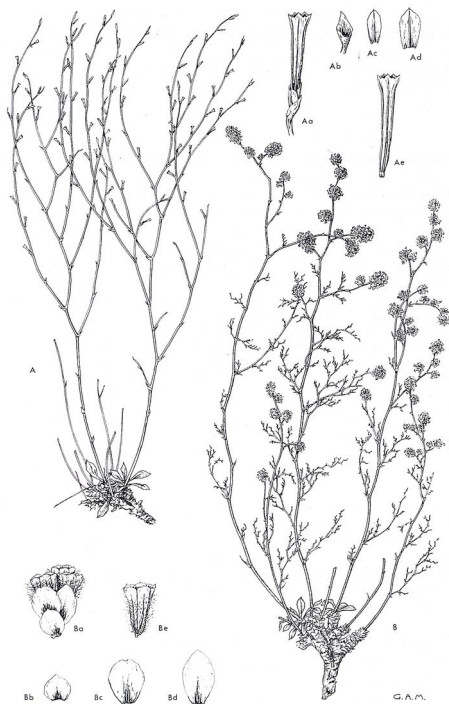


FIG. 3. A-Ae, holotype of *Limoniopsis davisii* Bokhari: A, habit $\times \frac{1}{2}$; Aa, spikelet; Ab, outer bract; Ac, first inner bract; Ad, second inner bract; Ae, calyx. Aa-Ae $\times 4$. B-Bc, holotype of *Limonium tamaricoides* Bokhari: B, habit $\times \frac{1}{2}$; Ba, spikelet; Bb, outer bract; Bc, first inner bract; Bd, second inner bract; Be, calyx. Ba-Be $\times 5.5$.

***Limoniopsis davisii* Bokhari, sp. nov. Figs. 3, A-Ae; 4.**

Affinis *L. owerinii* (Boiss.) Lincz., sed spiculis plerumque unifloris, bracteis interioribus non cuspidatis, nervis calycis non excurrentibus differt.

Planta perennis, 20–30 cm alta. *Caudex* lignosus reliquiis vaginarum petiolorum vetustorum tectus. *Folia* subradicalia pauca, satis crassa et carnosa, oblongo-ovata vel spathulata, 10–15 × 4–6 mm, apice apiculato-mucronata, glabra, glauca, basi in petiolum brevem planum sensim attenuata.

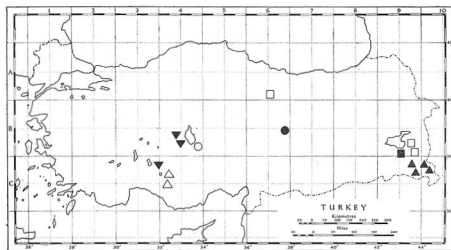


FIG. 4. Distribution of the new species described in this paper: ○ *Limonium tamaricoides*; ■ *Limoniopsis davisii*; ▲ *Acantholimon dianthifolium*; △ *A. confertiflorum*; ▼ *A. halophilum*; □ *A. reflexifolium*; ● *A. strigillosum*.

Scapi numerosi, ramosi, in parte inferiore teretes, breviter hispiduli, in parte superiore leviter angulares et glabri; rami scapi graciles virgati. *Spiculae* uniflorae, 3-bracteatae, 8–10 mm longae, secus ramos scapi valde porcatos remote (10–20 mm distantiae) dispositae. *Bractea* exterior ovato-triangularis, 2 mm longa, acuminata, angustiuscule membranaceo-marginata; bractea media exteriorem aequans, ovato-membranacea; bractea interior exteriore 1½–2-plo longior, oblongo-ovata, praeter basem et costam membranacea, mucronata. *Calyx* subtubulosus, 7–9 mm longus, 10-lobus; lobi 5 primarii majores triangulares, lobis 5 intermediis minoribus obtusis alternantes; nervi 5, virescentes, intra marginem loborum primorum evanidi. *Petala* pallide rosea.

TURKEY B9 Van: distr. Gevaş, Artos Da., 3134 m, gorge, in limestone crevices, Davis 22704 (holo E; iso K).

Only known from the type gathering, the new species is closely allied to *L. owerinii* (Boiss.) Lincz., the only other species of the genus and known from the upper Euphrates and E Daghestan (Caucasus). It can be easily distinguished by its usually 1-flowered spikelets, non-cuspidate inner bract, and non-excurrent calyx nerves. This distinctive, now ditypic, genus is an Irano-Turanian element.

ACKNOWLEDGMENTS

I am grateful to Dr P. H. Davis and Mr B. L. Burtt for their guidance and for correcting the Latin descriptions. My thanks are due to the Directors of the Edinburgh, Kew and British Museum herbaria and the Director of the Natural History Museum at Vienna for putting material at my disposal, and to Dr A. Huber-Morath of Basle for sending on loan his invaluable Turkish material. I am also indebted to Miss Gillian Meadows for making beautiful illustrations of five of the new species.

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