

## Synopsis of Turkish *Acantholimon* Boiss. (Plumbaginaceae)

MUSA DOĞAN<sup>1\*</sup> and GALİP AKAYDIN<sup>2</sup>

<sup>1</sup>Department of Biological Sciences, Middle East Technical University, 06531 Ankara, Turkey

<sup>2</sup>Department of Biology Education, Hacettepe University, 06800 Beytepe, Ankara, Turkey

Received December 2005; accepted for publication March 2007

A synopsis of *Acantholimon* in Turkey is given on the basis of a revisional study conducted in Turkey by the authors. An account of 52 species, ten subspecies, and 17 varieties is given, including keys to the species, subspecies, and varieties, and a general indication of their distribution, as well as their conservation status in Turkey. Seven new taxa, namely *A. ekimii* sp. nov., *A. capitatum* ssp. *sivasicum* ssp. nov., *A. calvertii* var. *glabrum* var. nov., *A. huetii* var. *breviscapum* var. nov., *A. acerosum* ssp. *longibracteolorum* ssp. nov., *A. lycaonicum* ssp. *capadocicum* ssp. nov., and *A. halophilum* var. *coloratum* var. nov., are described, together with a few new combinations. *A. wiedemannii*, *A. iconicum*, and *A. lycaonicum*, described from Turkey in the past, but placed under other species as synonyms in the *Flora of Turkey*, are recognized once again as good species. *A. multiflorum* and *A. parviflorum* are given a species status. In Turkey, the presence of *A. latifolium*, *A. araxanum*, *A. lepturoides*, *A. hohenackerii*, *A. senganense*, *A. fominii*, *A. petraeum*, and *A. tragacanthinum* is also confirmed. © 2007 The Linnean Society of London, *Botanical Journal of the Linnean Society*, 2007, 154, 397–419.

ADDITIONAL KEYWORDS: new taxa – revision – taxonomy.

### INTRODUCTION

The genus *Acantholimon* Boiss. was first described by Boissier (1846), and later, in his *Flora Orientalis*, he recognized 74 species in the area. Recent estimates suggest that the genus comprises about 200 species worldwide, and its main centre of diversity lies in the Irano-Turanian Phytogeographical Region (Bokhari, 1970).

*Acantholimon* species are perennial, laxly or densely pulvinate subshrubs forming thorn cushions. The genus has considerable ecological and ornamental importance with nicely coloured and long-lasting flowers (Muvaffak, Doğan & Bilgin, 2001). Approximately 100 years after the first publication of the monograph of *Acantholimon* (Bunge, 1872), Bokhari (1970, 1972a) was the second person to carry out an extensive taxonomic study on the family Plumbaginaceae. He recognized six genera, namely *Acantholimon* Boiss., *Limoniopsis* Lincz., *Limonium* Miller, *Armeria* Willd.,

*Goniolimon* Boiss., and *Plumbago* L., in Turkey, from where he also described six new species in *Acantholimon* (*A. confertiflorum*, *A. halophilum*, *A. reflexifolium*, *A. dianthifolium*, *A. hypochaerum*, and *A. strigillosum*). Bokhari (1972b) also studied the stigma and the pollen types in *Acantholimon* and *Limoniopsis*. Bokhari & Edmondson (1982) recognized 25 species of *Acantholimon* in the *Flora of Turkey and the East Aegean Islands* (Vol. 7), and also indicated the possibility of finding more species either imperfectly known (two species) or doubtfully recorded (nine species).

Since 2000, as part of a revision of the family Plumbaginaceae in Turkey, the authors have carried out extensive field surveys and laboratory studies, and have studied previously collected specimens deposited in various herbaria.

The studies have revealed 12 additional new species, namely *A. birandii* Doğan & Akaydin (Doğan & Akaydin, 2001), *A. avanosicum* Doğan & Akaydin (Doğan & Akaydin, 2002a), *A. anatolicum* Doğan & Akaydin (Doğan & Akaydin, 2002b), *A. karamanicum* Akaydin & Doğan (Akaydin & Doğan, 2002),

\*Corresponding author. E-mail: doganm@metu.edu.tr

*A. köycegizicum* Dogan & Akaydin, *A. göksunicum* Dogan & Akaydin (Doğan & Akaydin, 2003a), *A. turcicum* Dogan & Akaydin (Doğan & Akaydin, 2003b), *A. yildizelicum* Akaydin (Akaydin, 2004), *A. bashkaleicum* Dogan & Akaydin, *A. artosense* Dogan & Akaydin, *A. hoshapicum* Dogan & Akaydin (Doğan & Akaydin, 2004), and *A. evrenii* Dogan & Akaydin (Doğan & Akaydin, 2005). The studies confirmed the presence of the following species in Turkey, namely *A. latifolium* Boiss., *A. araxanum* Bunge, *A. lepturoides* (Jaub. & Spach) Boiss., *A. hohenackerii* (Jaub. & Spach) Boiss., *A. senganense* Bunge, *A. fominii* Kuhn., *A. petraeum* Boiss. & Hausskn. ex Bunge, and *A. tragacanthinum* (Jaub. & Spach) Boiss., and clarified the taxonomy of *A. laxiflorum* Boiss. ex Bunge, an endemic species in Turkey (Doğan, Duman & Akaydin, 2003).

The present account of the genus is condensed from the final report of the research project, which was based on material collected by us or stored at various herbaria in Europe (G, K, E) and Turkey (ANK, GAZI, HUB, ISTF, FUH, and EGE).

#### MATERIAL AND METHODS

Since 2000, as part of a revision of the genus *Acantholimon*, extensive field surveys were conducted in

Turkey and a large number of specimens were collected. The specimens were pressed carefully and dried using standard techniques (Davis & Heywood, 1973).

The specimens were all cross-checked with the various *Acantholimon* accounts given in the relevant floras and monographs, such as *Flora of Turkey and the East Aegean Islands* (Bokhari & Edmondson, 1982), *Flora Orientalis* (Boissier, 1879), *Flora Iranica* (Rehlinger & Schiman-Czeika, 1974), *Flora Europaea* (Moore, 1972), *Flora of USSR* (Komarov, 1967), *Flora of Syria, Palestine and Sinai* (Post, 1933), *Die Gattung Acantholimon* Boiss. (Bunge, 1872), and *Revision Taxonomique du Genre Acantholimon* (Mobayen, 1964).

In addition to our own collections of *Acantholimon* from Turkey, the revision has been based primarily on the collections housed at the herbaria of the Royal Botanic Garden Edinburgh (E), the Royal Botanic Gardens Kew (K), the Coservatoire et Jardin Botaniques (G), as well as some other Turkish herbaria (ANK, GAZI, HUB, ISTF, FUH, and EGE). The authorities are cited in accordance with *Authors of Plant Names* (Brummitt & Powell, 1992), and the specimens are cited using the policy of *Flora of Turkey* (Davis, 1965). The threat categories of the taxa are given on the basis of IUCN (2001).

#### A REVISED KEY TO ACANTHOLIMON BOISS. IN TURKEY

1. Spikelets 2–5 flowered, 4–6 bracteate
  2. Calyx purple or brownish to light brown
    3. Spikelets at least 20 mm
      4. Spring leaves 3–4 mm in width; scape branched; calyx tube 8–10 mm ..... 7. *evrenii*
      4. Spring leaves 1–2 mm in width; scape unbranched; calyx tube 11–12 mm ..... 8. *latifolium*
    3. Spikelets shorter than 17 mm
      5. Outer bract ±orbicular with very broadly hyaline margins to 5 mm wide; spikelets 2–5 flowered, 4–6 bracteate; calyx purple ..... 1. *bracteatum*
      5. Outer bract ovate, with narrowly hyaline margins to 2 mm wide; spikelets (1–)2–3 flowered, 2–4 bracteate; calyx brownish ..... 6. *petuniiflorum*
  2. Calyx white or colourless
    6. Inflorescence type a laxly to densely distichous spike
      7. Spike densely distichous; outer bract longer (9–10 mm) than inner ones (8–9 mm); calyx veins reaching margin ..... 5. *artosense*
      7. Spike laxly distichous; outer bract shorter (7–10 mm) than inner ones (8–11 mm); calyx veins excurrent ..... 3. *hoshapicum*
    6. Inflorescence type a densely terminal spike
      8. Spikelets with 2 flowers; outer bract 6–7 mm; spike up to 1.5 cm in width ..... 4. *bashkaleicum*
      8. Spikelets with at least 5 flowers; outer bract 10–11 mm; spike at least 2.5 cm in width ..... 2. *capitatum*
1. Spikelets usually 1-flowered, 1–3 bracteate
  9. Calyx tubular; inflorescence laxly paniculate ..... 10. *quinquelobum*
  9. Calyx infundibular; inflorescence spicate, capitate, or shortly branched densely paniculate
    10. Leaves heterophyllous; spikelets 1–2-flowered ..... 9. *tragacanthinum*
    10. Leaves monomorphic; spikelets 1-flowered
      11. Previous years' leaves with persistent circinnate leaf bases in lower parts of stem
      12. Spike elongate, laxly distichous

13. Scape 8–18 cm long; spike 15–30 cm, 16–36-flowered; flowers 13–15 mm ..... 11. *laxiflorum*  
 13. Scape 6–9 cm long; spike 2.5–7 cm, 4–8(–10)-flowered; flowers 16–18 mm ..... 19. *turcicum*
12. Spike terminal, densely distichous
14. Spike simple, unbranched ..... 16. *ekimii*
14. Spike 1–5-branched
15. Scape 17–27 cm long, 7–8-scaled; leaves rigid, with spine at tip ..... 14. *köycegizicum*  
 15. Scape 5–15 cm long, 1–2-scaled; leaves not rigid, without spine at tip
16. Leaves dark green, glabrous or ciliate; outer bract 6–10 mm long ..... 15. *calvertii*  
 16. Leaves glaucous-green, puberulent or pubescent; outer bract 4.5–6(–7) mm long
17. Leaves puberulent; scape 5–8 cm long; outer bract 4.5–5 mm, ovate; inner bracts 7.5–8 mm ..... 17. *göksunicum*  
 17. Leaves pubescent; scape 3–5 cm long; outer bract 5–6(–7) mm, oblong-triangular; inner bracts 9–10 mm ..... 18. *huetii*
11. Previous years' leaves without persistent circinnate leaf bases in lower parts of stem
18. Spike simple, elongate, not congested terminally
19. Spike densely distichous; outer bract 2 × internodes
20. Leaves linear-lanceolate, 1.5–3 mm broad; calyx 12–13 mm; calyx veins excurrent .....  
 ..... 12. *dianthifolium*
20. Leaves linear-subulate, 1–1.5 mm broad; calyx to 12 mm; calyx veins not excurrent
21. Leaves 30–50 mm; calyx 11–12 mm; limb 8–9 mm broad ..... 28. *confertiflorum*  
 21. Leaves 10–30(–35) mm; calyx less than 10 mm; limb 4–6 mm broad
22. Spike 8–14-flowered; bracts longer than calyx tube ..... 33. *avanosicum*  
 22. Spike 2–6(–8)-flowered; bracts equal to or slightly shorter than calyx tube
23. Spikelets 10–12 mm; outer bract longer than inner bracts; calyx 9–10 mm; petals white-cream ..... 26. *karamanicum*  
 23. Spikelets 9–10 mm; outer bract ± equal to inner bracts; calyx 7–8 mm; petals pink ..... 27. *birandii*
19. Spike laxly distichous; outer bract equal to or at most 1.5 × internodes
24. Calyx limb pink to dark purple, pale flesh-coloured or brownish *in sicco*
25. Inner bracts shorter than calyx tube; calyx limb brownish; calyx veins not excurrent .....  
 ..... 52. *venustum*
25. Inner bracts equal to calyx tube; calyx limb pink to dark purple or pale flesh-coloured; calyx veins excurrent
26. Leaves 1–1.3 mm in width, margins scabrid; scape up to 6 cm; spike 4–5 cm; inner bracts 7–8 mm ..... 46. *senganense*  
 26. Leaves 1.5–2 mm in width, margins scabridulous; scape 8–10 cm; spike 6–7 cm; inner bracts 6–7 mm ..... 51. *petraeum*
24. Calyx limb white or cream
27. Calyx lobes acute at tip ..... 38. *halophilum*  
 27. Calyx lobes obtuse or truncate at tip
28. Scapes equal to leaves or slightly longer; spikes just above tips of leaves
29. Spikes up to 25 mm long; outer bract carinate; lower leaves ± patent; calyx 12–13 mm ..... 44. *libanoticum*  
 29. Spikes longer than 30 mm; outer bract non carinate; lower leaves ± reflexed; calyx 8–9 mm ..... 34. *armenum*
28. Scapes much longer than leaves; spikes much above leaves
30. Calyx veins bright purple, contrasting with limb; inner bracts hairy at least on veins ..... 31. *caryophyllaceum*  
 30. Calyx veins bright pink, not contrasting with limb; inner bracts glabrous
31. Outer bract longer than inner bracts ..... 37. *iconicum*  
 31. Outer bract shorter than or equal to inner bracts
32. Rachis flexuous; outer bract equal to inner bracts ..... 36. *kotschyi*  
 32. Rachis straight; outer bract shorter than inner bracts
33. Densely pulvinate; scape 15–25 cm long, with 3–4 scales; calyx 12–14 mm; outer bract 7–8 mm ..... 32. *acerosum*  
 33. Laxly pulvinate; scape 6–12 cm long, with 4–8 scales; calyx 10–12 mm; outer bract 5–6 mm ..... 45. *parviflorum*
18. Spike usually 1–2-branched or occasionally simple, ± dense and congested terminally

34. Scape not visible or up to the level of leaves, at most 2 cm long; spike at the level of leaves or slightly longer
35. Calyx veins excurrent at tip
36. Laxly pulvinate; leaves 25–40 mm long; calyx 16–17 mm; outer bract 8–10(–12) mm, ± green ..... 13. *hypochaerum*
36. Densely pulvinate; leaves 11–15 mm long; calyx 9–10 mm; outer bract 5–6 mm, purple ..... 39. *lycaonicum*
35. Calyx veins not excurrent at tip
37. Laxly pulvinate; inner bracts shorter than calyx tube; petals yellow–cream ..... 21. *yildizelicum*
37. Densely pulvinate; inner bracts longer than or equal to calyx tube; petals pink
38. Bracts equal; outer bract (6)8–10 mm; leaves puberulous all over ..... 25. *puberulum*
38. Bracts unequal; outer bract up to 6 mm; leaves glabrous or pubescent
39. Scapes with 2 scales; spikelets 14–15 mm; calyx 13–14 mm ..... 20. *wiedemannii*
39. Scapes without scales; spikelets 12–14 mm; calyx 9–11 mm ..... 24. *ulicinum*
34. Scape visible, longer than leaves, more than 3 cm long; spike above leaves
40. Scapes very short, 2(–3)× leaves, fragile; leaves more than 1(–1.5) mm in width, glaucous
41. Spike unbranched; inner bracts equal to calyx tube; outer bract 5–7 mm; inner bracts 7–8 mm ..... 40. *damassanum*
41. Spike 1–2-branched; inner bracts shorter than calyx tube; outer bract 4–5 mm; inner bracts 6–7 mm ..... 42. *saxifragiforme*
40. Scapes much longer than leaves, at least (3)4× leaves, non fragile; leaves up to 1 mm in width, greenish
42. Bracts strigillous; scape with 5–8 strigillous scales; spikes fragile ..... 23. *strigillosum*
42. Bracts not strigillous; scape with at most 4–5 scales, scales not strigillous; spikes not fragile
43. Leaves hairy or ciliate; spike dense and congested terminally, nearly unbranched; rachis segments not visible, shorter than 1/2× outer bract
44. Spike 3–5-flowered; spikelet 10–11 mm; calyx 9–10 mm ..... 47. *spirizianum*
44. Spike 5–15-flowered; spikelets at least 12 mm; calyx usually longer than 11 mm
45. Lower leaves strongly reflexed; scape up to 5 cm long ..... 29. *reflexifolium*
45. Lower leaves not reflexed; scape longer than 5 cm
46. Leaves 5–12 mm; scape with 4–5 scales; spike 1.5–2 cm long; bracts hairy ..... 22. *anatolicum*
46. Leaves 15–22 mm; scape with 2–3 scales; spike 3–4 cm long; bracts glabrous ..... 30. *caesareum*
43. Leaves glabrous; spike lax and not congested terminally, clearly branched; rachis segments visible and longer than 1/2× outer bract
47. Leaves reflexed, light green; spikelets 13–15 mm; calyx 12–14 mm ..... 43. *glumaceum*
47. Leaves not reflexed, ±glaucous; spikelets shorter than 13 mm; calyx up to 11 mm
48. Calyx veins not clearly visible or light brown; outer bract longer than calyx tube and inner bracts or occasionally equal
49. Spike 6–8 cm, 10–12-flowered, rachis segments equal to spikelets ..... 35. *lepturoides*
49. Spike 4–5 cm, 5–6(–8)-flowered, rachis segments shorter than spikelets ..... 49. *araxanum*
48. Calyx veins visible, purple; outer bract shorter than calyx tube and inner bracts or occasionally equal
50. Leaves linear; scape 4–6 cm long; outer bract brownish; inner bracts carinate ..... 48. *multiflorum*
50. Leaves linear-lanceolate or linear-subulate; scape 7–15 cm long; inner bracts not carinate
51. Leaves 0.5–1 mm in width; scape 7–9 cm long; outer bract (4)5–6 mm; calyx veins excurrent ..... 41. *hohenackerii*
51. Leaves 1–1.5 mm in width; scape 11–15 cm long; outer bract 6–7 mm; calyx veins not excurrent ..... 50. *fominii*

## SECT. ACANTHOLIMON BOISS.

1. *A. bracteatum* (Girard) Boiss., *Diagn. ser. 1* (7): 70 (1846).

Syn.: *Statice bracteata* Girard, *Ann. Sci. Nat. ser. 3*, 2: 330 (1844)! *Acantholimon splendidum* Bunge, *Mém. Acad. Sci. Pétersb. ser. 7*, 18 (2): 17 (1872). *Acantholimon bracteatum* (Girard) Boiss. var. *bracteatum* *Flora of Turkey and the East Aegean Islands* 7: 482 (1982). Ic: Mobayen, *Revis. Taxon. Acantholimon* fig. 18 (1964)!; *Fl. Iranica* 108: t. 100 figs 1 & 2 (1974)! *Flora of Turkey and the East Aegean Islands*, 7, fig. 15 (1982).

Type: '[N. W. Iran] in Aderbidjan prope Seid Khadjé, *Aucher* 5242 (holo. P, iso. FI, G!, K!).'

South-east Anatolia. B9 Van: 34 km from Başkale to Hoşap, Güzeldere pass, 2800 m, 3.vii.1966, D. 45914! (K), ibid. 6.vii.2002, Doğan & Akaydın 7541! Başkale, between Gürpınar–Başkale, Esentepe pass, 2800 m, 19.vii.2001, Doğan & Akaydın 7006! C9 Hakkari: Diz stream, around Zap suyu gorge, 2000 m, 24.vi.1967 Watson *et al.* 2867! around Behçelen, 2500 m, 7.vii.2002, Doğan & Akaydın 7555! above Hakkari, 2200 m, 23.vi.1966, D. 45439! C10 Hakkari: near Bacirge, 1700–1800 m, 18.vi.1966, D. 45286!

Iran (West Azerbaijan province). Irano-Turanian element. Threat Category: VU.

2. *A. capitatum* Sosn., *Monit. Jard. Bot. Tiflis* 11: 11 (1915).

Syn.: *A. scabiosum* Mobayen, *Revis. Taxon. Acantholimon* 298, fig. 20 (1964)! *A. bracteatum* (Girard) Boiss. var. *capitatum* (Sosn.) Bokhari, *Notes R.B.G. Edinb.* 30: 300 (1970).

1. Calyx 11–13 mm; outer bract 10–11 mm .....  
.....ssp. *capitatum*  
1. Calyx 9–10 mm; outer bract 8–9 mm .....  
.....ssp. *sivasicum*

ssp. *capitatum*

Type: '[Turkey] A8 Erzurum: prov. Kars, distr. Oltu, inter pp. Karnawaz et Lespek, 8.vii.1911, *Sosnovsky* (holo. TBI, photo. E! iso. K!).'

East Anatolia. A8 Erzurum: around Aras, 1700 m, *Tobey* 2091! A9 Kars: Killik Da. West of Akçay towards Cumaçay, 2250–2500 m, 18.vii.1967, *Watson et al.* 3392! B9 Bitlis/Van: Pelli Da., 2500–3000 m, 9.vii.1971, *Edmondson* 638! Van: Çatak, Kavuşhapp Da., 3100 m, 23.vii.1954, *Davis* 23144! (type of *A. scabiosum*!), 2860 m, 13.vii.1967, *Watson et al.* 3573! on the Erciş road, 1700 m, 18.vii.2001, *Doğan & Akaydın* 6990! Gevaş, Artos Da., 2350 m, 5.vii.2002, *Doğan & Akaydın* 7528! C10 Van: around Başkale, 2200 m, 19.vii.2001, *Doğan & Akaydın* 7023!

Endemic. Irano-Turanian element. Threat Category: VU.

ssp. *sivasicum* Dogan & Duman, 46 subsp. nov.

A typo calycibus 9–10 mm longis, bracteolis 8–9 mm longis differt.

Type: '[Turkey] B6 Sivas: Ulaş, between Kutlukaya and Boğazdere village, 1400–1500 m, serpentine, steppe, 7.vii.2003, *H. Duman* 8983 (holo. GAZI!).'

Central Anatolia. Endemic. Irano-Turanian element. Threat Category: CR.

The species mentioned above was considered as a variety of *A. bracteatum* by Bokhari & Edmondson (1982), but, after examination of the type kept at Kew, it seemed worthwhile to recognize it as a species because of its white petals and non-excurrent calyx veins. A new subspecies, ssp. *sivasicum*, named after the type locality, is described because of its smaller calyces (9–10 mm) and shorter outer bracts (8–9 mm).

3. *A. hoshapicum* Dogan & Akaydın, *Bot. J. Linn. Soc.* 144: 497–505 (2004).

Type: '[Turkey] B9 Van: Gürpınar–Başkale road, around Hoşap (Guzelsu), 2050 m, 6.vii.2002, *Doğan & Akaydın* 7540 (holo. ANK!).'

East Anatolia. Endemic. Irano-Turanian element. Threat Category: CR.

4. *A. bashkaleicum* Dogan & Akaydın, *Bot. J. Linn. Soc.* 144: 497–505 (2004).

Type: '[Turkey] B10 Van: Van–Hakkari road, near Başkale on mountain slopes, 2100 m, 6.vii.2002, *Doğan & Akaydın* 7544 (holo. ANK!).'

East Anatolia. Endemic. Irano-Turanian element. Threat Category: CR.

5. *A. artosense* Dogan & Akaydın, *Bot. J. Linn. Soc.* 144: 497–505 (2004).

Type: '[Turkey] B9 Van: Gevaş, Artos Da., 2500 m, 5.vii.2002, *Doğan & Akaydın* 7532 (holo. ANK!).'

East Anatolia. Endemic. Irano-Turanian element. Threat Category: CR.

6. *A. petuniiflorum* Mobayen *Revis. Taxon. Acantholimon* 305, fig. 49 (1964).

Type: '[Iraq]: Nergan Nr. Bardanas (MRO), in montibus, 2500–2600 m, 25.viii.1957, *al Rawi & Serhang* 24365a (holo. K!).'

South-east Anatolia. C10 Hakkari: Haruniye pass, 17 km west of Şemdinli, *Watson et al.* 1584! Between Yüksekova and Şemdinli, around Haruniye Pass, 2200 m, 6.vii.2002, *Doğan & Akaydın* 7549!

Iraq. Irano-Turanian element. Threat Category: CR.

7. *A. evrenii* Dogan & Akaydin, *Bot. J. Linn. Soc.* 149: 351–356 (2005).

*Type*: '[Turkey] B7 Elazığ: Palu, Yaylım Da., near Baltaş, 1500–1600 m, 29.vi.1983 H. Evren 1585 (holo. ANK!).'

East Anatolia. Endemic. Irano-Turanian element. Threat Category: CR.

8. *A. latifolium* Boiss. *Diagn. Pl. Or. Nov. Ser.* 2, 4: 61 (1859).

*Type*: 'In Persia Mesopotomiae finitima prope Mandali', *Noe* 185 (G!).

South-east Anatolia. C9 Siirt: between Şirvan and Pervari, 28 km to Pervari, calcareous steppe, c. 1350–1400 m, 14.vi.1980, *M. Koyuncu* 3222 & *A. Güner*!

North Iraq and west Iran. Irano-Turanian element. Threat Category: CR.

#### SECT. TRAGACANTHINA BUNGE

9. *A. tragacanthinum* (Jaub. & Spach) Boiss., *Diagn. Ser.* 1(7): 81 (1846).

*Syn.*: *Statice tragacanthina* Jaub. & Spach, *Ann. Sc. Nat. Ser.* 2, 20: 256 (1843), Mobayen, *Revis, Taxon. Acantholimon* fig. 68, p. 268 (1964).

*Type*: '[W. Iran] In Media ad lacum matianum, *Auch.* 5239 (p.p. G!).'

East Anatolia. A9 Kars: between Kağızman and Tuzluca, 18.vii.2001, *Doğan & Akaydin* 6957!

Iran (West Azerbaijan province). Irano-Turanian element. Threat Category: EN.

10. *A. quinquelobum* Bunge, *Mém. Acad. Sci. Pétersb. ser.* 7, 18 (2): 56 (1872). *IC: Fl. URSS* 18: t. 18 fig. 4 (1952); Mobayen, *Revis, Taxon. Acantholimon* (1964).

1. Calyx nearly straight, veins reaching tips of lobes .....

..... var. *quinquelobum*

1. Calyx curved, veins in middle of lobes .....

..... var. *curviflorum*

var. *quinquelobum*

*Type*: '[N. Iran] in rupibus dolomiticis aridis prope Schahrud provinciae Chorassan occidentalis (Shahrud, prov. Khorassan), *Bunge & Bienert* (holo. LE, iso. G!, P).'

East Anatolia. A9 Kars: 10 km from Kağızman to Igdir, 2.vii.1963, *Jardine* 555A! 30–38 km west of Tuzluca, 1100 m, *Rech.* 57424! Aras valley, 25 km east of Kağızman, 1100 m, 6.vii.1967, *Watson* 3077! Between Kağızman–Tuzluca, 1200 m, 18.vii.2001, *Doğan & Akaydin* 6955! Between Kağızman–Igdir, 1125 m, *Doğan & Akaydin* 7498! Digor–Tuzluca road, around Halıkışlak, 1000 m, 11.viii.2003, *Doğan & Akaydin* 8094!

Iran. Irano-Turanian element. Threat Category: EN.

var. *curviflorum* (Bunge) Dogan & Akaydin, **comb. et stat. nov.**

*Syn.*: *A. curviflorum* Bunge in *Mém. Acad. Sci. Pétersb. ser.* 7, 18(2): 57 (1872).

*Type*: '[W. Iran] in rupestribus persiae mediae occidentalis prope Kohrud et prope Scur-ab, inter Isfahan et Kum, *Bunge & Bienert* (holo. LE).'

East Anatolia. A9 Kars: near Kağızman in Aras valley, 1300 m, 18.vii.1966, *Davis* 46843! Kağızman–Tuzluca road, 1160 m, 18.vii.2001, *Doğan & Akaydin* 6970!

Iran. Irano-Turanian element. Threat Category: EN.

*A. curviflorum* and *A. quinquelobum* were both treated as different species in *Flora of Turkey and the East Aegean Islands* (Bokhari & Edmondson, 1982), but the current research findings have shown that both species grow in the same habitat, flower at the same time, but their calyx tubes vary. Therefore, these species are given variety statuses.

#### SECT. STATICOPSIS BOISS.

11. *A. laxiflorum* Boiss. ex Bunge, *Mém. Acad. Sci. Pétersb. ser.* 7, 18(2): 28 (1872)!

*Syn.*: *A. venustum* Boiss. var. *laxiflorum* (Boiss. ex Bunge) Bokhari, *Notes R.B.G. Edinb.* 32: 70 (1972).

*Type*: '[Turkey] C5 Hatay: in glareosis fluvii Nahr Syad infra pagum Ursusa montis Amani, Syriae bor., 200', 2.vii.1862, *Kotschy* 128 (G!).'

South Anatolia. C5 Hatay: Arsuz, near Avcılarsuyu De., 30 m, 36°22'58"N, 35°53'01"E, 9.viii.2000, *H. Duman* 8422! (Chorotype: GAZI!). *ibid.* 23.vi.2001, *H. Duman* 8588! (Chorotype: GAZI! ANK! HUB!).

Endemic. Mediterranean element. Threat Category: CR.

This species was first described by Boissier on the basis of the type specimen collected by Kotschy from Arsuz (C5 Hatay) in 1872, but was somehow, by mistake, placed under *A. venustum* as a variety by Bokhari & Edmondson (1982), who mixed the type specimens. The current research findings proved it to be quite distinct from *A. venustum*, as well as the other species of *Acantholimon*, having circinnate leaf bases (Doğan *et al.*, 2003).

12. *A. dianthifolium* Bokhari, *Notes R.B.G. Edinb.* 30: 296, figs 2A–Ae (1970).

*Type*: '[Turkey] C10 Hakkari: Sat Da. (above Yüksekova), near permanent snow beds, patches of earth in the rocks, 2900 m, [28.viii.1967], *Duncan & Tait* 91 (holo. E!).'

South-east Anatolia. B9 Ağrı: between Horasan–Eleşkirt, Tahir Pass, 2350 m, 24.vi.1966, *Davis* 47309!

C9 Hakkari: Kara Da., 2750 m, *Davis 24375!* Hakkari–Van road, around Karadağ, 2500 m, 7.vii.2002, *Doğan & Akaydın 7552!* 2750 m, Karadağ, 15.viii.1954, *Davis 24375!* Cilo Tepe, 2950 m, *Davis 24114!* Between Hakkari–Uludere, Süvari Halil Pass, 2500–2600 m, *T. Ekim 8086!* C10 Hakkari: Mor Da., 2750–3600 m, *Watson et al. 3632!*

Iran. Irano-Turanian element. Threat Category: CR.

This species is closely related to *A. acerosum*, but differs by its very dense spikes, scabridulous leaf margins, and shorter scapes.

13. *A. hypochaerum* Bokhari, *Notes R.B.G. Edinb.* 32: 74 (1972).

Syn.: *A. sintenisii* Hausskn. in sched.; *A. hypochaerum* Mobayen, *Revis. Taxon. Acantholimon.* 303, t. 47 (1964), *nom. inval.*, Ic. Mobayen, *Revis. Taxon. Acantholimon.* 303, t. 47 (1964).

*Type:* [Turkey] B7 Erzincan: Erzincan–Refahiye, 1400 m, 26.viii.1957, *Davis & Hedge, D. 32684* (holo. K! iso. E!).

East Anatolia. A7 Gümüşhane: west of Erzincan, 26.viii.1986, *J.C. Archibald 8146!* (E), Gümüşhane, 1525 m, 28.viii.1934, *Balls 2017!* A8 Gümüşhane: north of Bayburt, 1830 m, 27.viii.1966, *Archibald 3273!* Around Bayburt, 29.vii.1862, *Bougeau!* (K), around Değirmendere, 1950 m, 15.vii.2001, *Doğan & Akaydın 6869!* B7 Erzincan: Sipirkör Da., 28.viii.1890, *Sintenis 3218* (the type of *A. sintenisii* Hausskn.!) Between Erzincan–Sivas, Sakaltutan Pass, 2160 m, 15.vii.2001, *Doğan & Akaydın 6876!* Erzincan, Tayran Da., Kızıltepe, 2500 m, 25.viii.1967, *J.M. Watson 3766!* Çimen Da., Ahmediye Pass, 1850 m, 1967 *Watson 3829!* B10 Ağrı: Doğubeyazıt, Hama Da., 2800 m, 3.viii.1956 *T. Baytop* (ISTE 4866!).

Endemic. Irano-Turanian element. Threat Category: EN.

Calyx is usually pink in this species, but in some specimens it may vary between pink and white.

14. *A. köycegizicum* Dogan & Akaydın, *Ann. Bot. Fennici*, 40: 53–58 (2003).

*Type:* [Turkey] C2 Muğla: Köyceğiz around Sultaniye, serpentine slopes, 20 m, 23.viii.2001 *Doğan & Akaydın 7237* (holo. ANK! iso. E! K!).

South-west Anatolia. C2 Muğla: between Köyceğiz and Kaplıcalar, serpentine slopes, 20 m, 23.viii.2001 *Doğan & Akaydın 7238!* Köyceğiz, around Sultaniye Köyü, Kersele, 20 m, 24.vii.1992, *A. Güner 10689!* 14 km from Köyceğiz towards Muğla, 150 m, 6.vii.1984, *Per Hartvig, Ö. Seçmen & Arne Strid, Strid 23247!*

Endemic. Mediterranean element. Threat Category: CR.

This local endemic species is closely related to *A. laxiflorum*, but differs by its branched spikes.

15. *A. calvertii* Boiss., *Diagn. ser. 2(4)*: 65 (1859).

Syn.: *A. glumaceum* (Jaub. & Spach) Boiss. var. *glabra* Mobayen, *Revis. Taxon. Acantholimon* 313 (1964); *A. calvertii* Boiss. var. *sanguineum* Mobayen, *op. cit.*: 312 (1964).

1. Leaves and bracts hairy ..... var. *calvertii*  
1. Leaves and bracts glabrous ..... var. *glabrum*

*var. calvertii*

*Type:* [Turkey] B8 Erzurum: monte Techdag (Palandöken Da.), *Calvert 507* (holo. G!, iso. E!, K!) Received May 1867, H.H. Calvert and J. Zohrab.

East Anatolia. A7 Trabzon: Rize, near Stavri, 2500 m, *Balls 520!* B7 Elazığ: Hazarbabı Da., 2450 m, *Hand.-Mazz. 2581!* Hazarbabı Da., 2050 m, *Doğan & Akaydın 6760!* Tunceli: Munzur Da., 1971, *Thoma!* Erzincan: Cimin, Keşiş Da., 2500–2600 m, 26.vii.1957, *Davis 31666!* B8 Erzurum: south of Erzurum towards Çat, 3000 m, 16.viii.1957, *Rix et al. 1044!* Palandöken Da., 2500 m, 22.vii.1986, *J.C. Archibald 7964!* Siirt: Meleto (Meretuğ) Da., above Sason, 2950–3150 m, *Hand.-Mazz. 2759!* B9 Bitlis: Nemrut Da., 2000 m, 11.viii.1956, *McNeill 519!* Van: Süphan Da., above Adilcevaz, 3050 m, 28.viii.1954, *Davis 24701!* Gevaş, Artos Da., 2300 m, *Doğan & Akaydın 7036!* Between Van and Çatak 2000 m, 9.viii.1956, *T. Baytop* (ISTE 4896!) Ağrı: between Akçay and Cumaçay, 2300 m, 18.vii.2001, *Doğan & Akaydın 6959!* Tahir Pass, 2470 m, 25.viii.1966, *Archibald 3242!* B10 Ağrı: 16 km west of Doğubeyazıt, 1210 m, 4.viii.1962, *Furse 3547!* C9/C10 Hakkari: Karadağ, 11 000 ft (3535 m), 16.viii.1954, *Davis 24425!*

Endemic. Irano-Turanian element. Threat Category: LC.

*var. glabrum* Akaydın & Dogan, *var. nov.*

*A typo foliis vel bracteis glabrescentibus differt.*

*Type:* [Turkey] A8 Erzurum: between Pasinler and Narman, Çimenli Yayla, 2160 m, 17.vii.2001, *Doğan & Akaydın 6930* (holo. ANK!).

East Anatolia. Endemic. Irano-Turanian element. Threat Category: VU.

*Acantholimon calvertii*, an endemic species, is mainly confined to East Anatolia. It is related to *A. turcicum*, but differs by its white calyx colour, longer scapes (5–15 cm), small scale number (one-scaled), subequal bracts, longer outer bracts (7–8 mm), shorter calyces (10–12 mm), and calyx tube which is equal to or shorter than the bracts. For the first time, a dwarf specimen, identified as var. *glabrum*, collected from Gazipaşa (C4 Antalya) by H. Sümbül (2392), is the only record from the

Mediterranean, where it grows as a pasture element on mountains at a height of 2000 m.

16. *A. ekimii* Dogan & Akaydin, *sp. nov.*, (Fig. 1)

Affinis *A. calvertii* sed differt foliis brevioribus (15–20 mm longis), angustioribus (0.5–0.7 mm lata), plerumque puberulentibus; scapo monostachybus, puberulentibus; spicae 10–20 mm longae, 4–8 spiculis compositae; spiculis 11–13 mm longi, bractea florali externa brevior (5–7 mm longa), lanceolata, purpurascens; bracteolis internis brevioribus (6.5–8 mm longo); calycibus 12–13 mm longis, purpureo-rosatis; limbo 5-lobati, nervis limbi marginem attingentibus.

*Type*: [Turkey] B9 Ağrı: between Akçay and Cumaçay, high mountain steppe, 2300 m, 18.vii.2001, *Doğan & Akaydin* 6962 (holo. ANK!).

*Description*: Laxly pulvinate shrublet. Leaves homomorphic, 15–20 × 0.5–0.7 mm, green, glabrous to slightly puberulent on lower surface in the lower part, linear, plano-triangular, margins scabridulous, previous year's leaf bases circinnate. Scapes simple, equal to or slightly exceeding leaves, 3–10 cm, puberulent all over, with one scale; scale 5–7 mm, lanceolate, aristate, largely hyaline on margin, puberulent. Inflorescence simple, dense terminal spike. Spikes 10–20 mm, with 4–6 spikelets. Spikelets one-flowered, 11–13 mm. Bracts 3, unequal, puberulent, purple; outer bract 5–7 mm, lanceolate-obovate, cuspidate, narrowly hyaline on margins; inner bracts 6.5–8 mm, lanceolate, cuspidate, largely hyaline on margins, equal to calyx tube. Calyx infundibular, purple, 12–13 mm, tube 6–7 mm, pubescent; limb 5–6 mm, five-veined, lobes obtuse-truncate, 6–7 mm in diameter, veins excurrent. Petals dark pink. Fl. 7. High mountain steppes in *Astragalus* spp. and *Stipa* spp. steppe, 1400–2300 m altitude.

East Anatolia. B9 Bitlis: Baykan, 30 km from Bitlis, 1400 m, 22.vi.1983, *T.Ekim!* Ağrı: between Akçay and Cumaçay, 2300 m, 18.vii.2001, *Doğan & Akaydin* 6963!

Endemic. Irano-Turanian element. Threat Category: CR.

*Etymology*: This rather rare local endemic species is named after the well-known Turkish botanist Professor Tuna Ekim of Istanbul University, Department of Biology, to whom we are greatly indebted for his great contributions to systematic botany in Turkey.

*Ecology*: This new species is found in high mountain steppes between Akçay and Cumaçay in Ağrı, in East Anatolia, where it grows with various *Astragalus* spp., *Stipa* spp., *Festuca* spp., *Poa* spp., and *Bromus* spp.

*Conservation*: This new species is very rare and on the verge of extinction in its habitat. It is known only from the type locality. The populations seem to be small and threatened by excessive grazing. Therefore, it should be graded as Critically Endangered (CR) because of its local appearance and its small population size (IUCN, 2001).

This local endemic species is closely related to *A. turcicum* and *A. calvertii*, but differs from both in a number of properties, as shown in Table 1.

17. *A. göksunicum* Dogan & Akaydin, in *Ann. Bot. Fennici*, 40: 53–58 (2003)

*Type*: [Turkey] B6 Kahramanmaraş: Göksun, between Kurucaova and Güneyoluk, calcareous slopes, 2100 m, 8.vii.2001, *Doğan & Akaydin* 6797 (holo. ANK!).

South-east Anatolia. Endemic. Irano-Turanian element. Threat Category: CR.

18. *A. huetii* Boiss., *Fl. Or.* 4: 835 (1879)

1. Scapes 3–5 cm, longer than leaves..... var. *huetii*  
1. Scapes 1.5–2.5 cm, equal to leaves..... var. *breviscapum*

var. *huetii*

*Type*: [Turkey] A8 Erzurum: Turcica supra Maimansour, [viii.1853], *Huet du Pavillon* (holo. G!).

B6 Maraş: Çardak, Kandil Da., 2200 m, 25.vii.1952, *Davis* 20272! (E), Göksun, above Yalak, Binboğa Da., 2000 m, 14.vii.1952, *Davis* 19924! C6 Maraş: Berit Tepe, 2650 m, 20.vii.1964, *Watson* 383! Göksun, Keklikoluk village, 2300 m, 18.viii.2001, *Doğan & Akaydin* 7154! Göksun–Sarız road, 1700 m, 19.viii.2001, *Doğan & Akaydin* 7161!

South-east Anatolia. Endemic. Irano-Turanian element. Threat Category: CR.

var. *breviscapum* Akaydin & Dogan, *var. nov.*

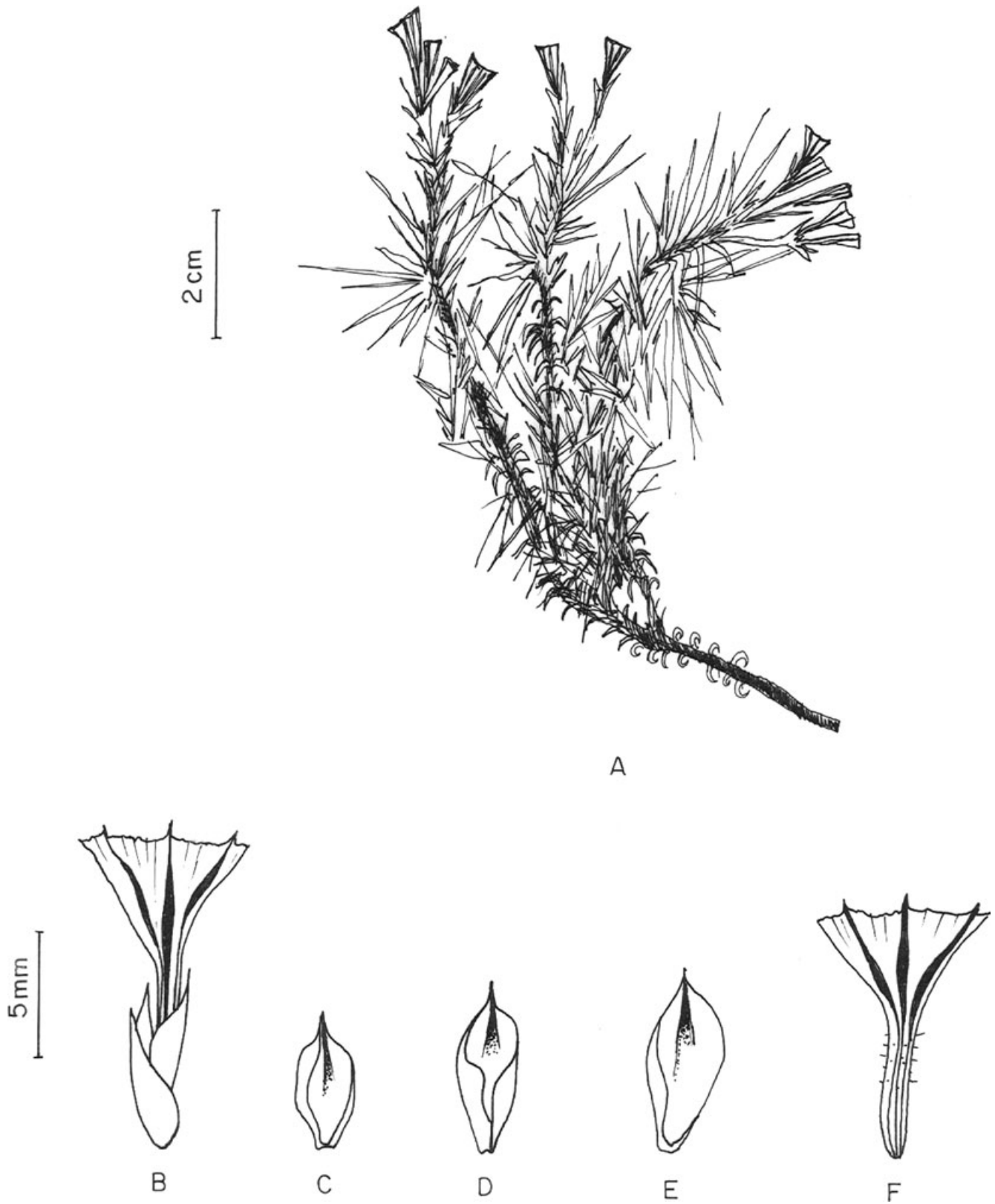
A typo scapo 1.5–2.5 cm longis, caulibus e foliis aequalibus differt.

*Type*: [Turkey] B6 Kahramanmaraş: Göksun, above Keklikoluk, 2100 m, 9.vii.2001, *Doğan & Akaydin* 6808 (holo. ANK!).

South-east Anatolia. Endemic. Irano-Turanian element. Threat Category: CR.

This endemic species also has circinnate leaf bases from the previous year, but this property was not clearly indicated in the *Flora of Turkey and the East Aegean Islands* by Bokhari & Edmondson (1982). For the first time, a new variety, var. *breviscapum*, is recognized on the basis of its shorter scapes (1.5–2.5 cm). A specimen of Davis (*D* 24868) from Sivas, given in the flora as *A. huetii*, has been identified as *A. wiedemannii*.





**Figure 1.** *Acantholimon ekimii*. A, habit; B, spikelet; C, outer bract; D–E, inner bracts; F, calyx.

**Table 1.** A comparison of *Acantholimon ekimii*, *A. turcicum*, and *A. calvertii*

	<i>A. ekimii</i>	<i>A. turcicum</i>	<i>A. calvertii</i>
Habit	Laxly pulvinate dwarf shrublet	Densely pulvinate dwarf shrublet	Laxly pulvinate shrublet
Leaves	15–20 × 0.5–0.7 mm, linear, triquetrous, green, glabrous to slightly puberulent on lower surface, margins scabridulous	15–30 × 1–1.2 mm, linear-subulate, triquetrous, glaucous-green, calcareous, glabrous, scabridulous on margins, lower ones spreading	20–35 × 0.8–1 mm, linear, triquetrous, green, margins ciliolate-scabridulous
Scapes	Equal to or slightly exceeding leaves, 3–10 cm, with 1 scale, puberulent	Exceeding leaves, 6–9 cm, with 2–3 scales	Exceeding leaves, 5–15 cm, with 1 scale, glabrous
Inflorescence	Dense terminal simple spike	Laxly distichous simple spike	Dense terminal distichous spike with 2 branches
Spike	10–20 mm long, with 4–6 spikelets	25–70 mm long, with 4–8(–10) spikelets	18–30 mm long, with 6–10 spikelets
Spikelets	11–13 mm, 1-flowered	16–18 mm, 1-flowered	12–17 mm, 1-flowered
Bracts	Unequal, puberulent, purple	Unequal, glabrous	Subequal, puberulous to glabrous
Outer bract	5–7 mm, lanceolate-obovate cuspidate	5–6 mm, lanceolate, acute-mucronate	7–10 mm, triangular-lanceolate, acuminate
Inner bracts	6.5–8 mm, lanceolate, cuspidate, equal to calyx tube, largely hyaline on margin	9–10 mm, linear-lanceolate, acute-mucronate, keeled, largely hyaline on margin	8–9 mm, narrowly oblong-lanceolate, acuminate, largely hyaline on margin
Calyx	12–13 mm, pubescent; limb purple, 6–7 mm in diameter, 5-lobed; lobes obtuse-truncate, veins excurrent	16–17 mm, sparsely pilose; limb brownish, 7–8 mm in diameter, 5-lobed; veins purple, not excurrent	10–12 mm, sparsely pilose; limb white or purplish, 10-lobed; veins reaching margins or sometimes excurrent
Habitat	High mountain steppes	Calcareous, mountain scree	Igneous rocks, limestone slopes
Altitude (m)	2300	1660	1210–3535
Flowering time	July	July	June–August
Phytogeography	Irano-Turanian	Irano-Turanian	Irano-Turanian

19. *A. turcicum* Dogan & Akaydin, *Israel J. Plant Sci.* 51: 231–236 (2003).

*Type:* [Turkey] B7 Elazığ: above Sivrice, Hazar Mountains, calcareous mountain scree in *Astragalus* spp. steppe, 38°24'23"N to 39°19'24"E, 1660 m, 4.vii.2001, *Akaydin 6757 & Doğan* (holo. ANK!).'

*Paratype:* B7 Elazığ: between Elazığ and Hazar G., 1525 m, 22.vi.1954, *Davis 22089* (E!, K!).

East Anatolia. Endemic. Irano-Turanian element. Threat Category: CR.

This endemic species, having a very narrow distribution in East Anatolia, looks like *A. venustum*, but differs by its circinnate leaf bases of the previous year's leaves and longer spikelets (16–18 mm).

20. *A. wiedemannii* Bunge, in *Mém. Acad. Sci. Pétersb. ser. 7, 18(2): 45* (1872).

*Type:* [Turkey] A6 Sivas: Yıldız Da., 1845, *Wiedemann* (holo G!).'

Central Anatolia. A6 Sivas/Tokat: between Artova and Tokat, Çamlıbel Da., 4.ix.1954, *Davis 24868!* Tokat: between Tokat and Yıldızeli, Çamlıbel Da., 1500 m, 17.viii.2001, *Doğan & Akaydin 7099!* Sivas: Yıldızeli, Yıldız Da., around Gök kaya, 1430 m, 17.viii.2001, *Doğan & Akaydin 7111!* A8 Bayburt: between Bayburt & Trabzon, Soğanlı Y. 2000 m, 16.vii.2001, *Doğan & Akaydin 6904!* B5 Yozgat: Saraykent, around Güllük, 1265 m, 14.vii.2001 *Doğan & Akaydin 6815!* Akdağmadeni, near Pazarcık, 1250 m, 14.vii.2001, *Doğan & Akaydin 6820!* Kayseri: Develi, 10 km from Develi to Erciyes, on Erciyes road, 1880 m, 2.vii.2001, *Doğan & Akaydin 6694!* B6 Sivas: Tokat-Sivas yolu, 1270 m, 8.viii.2003, *Doğan & Akaydin 8024!* B7 Erzincan: between Sivas and Erzincan, 2160 m, 15.vii.2001, *Doğan & Akaydin 6875!* C4 Antalya: Elmalı, 2100 m, *Doğan & Akaydin 7611!*

Endemic. Irano-Turanian element. Threat Category: VU.

This species was accepted as the synonym of *A. ulicinum* ssp. *lycaonicum* by Bokhari & Edmondson (1982), but the outcome of this study has shown that its longer spikelets (14–15 mm) and calyces (13–14 mm) differentiate it from the other species. The record from Elmalı (Antalya) seems worthy of further investigation.

21. *A. yildizelicum* Akaydın, *Nordic J. Bot.*, 22: (6) 679–682 (2002).

Type: '[Turkey] B6 Sivas: Yıldızeli, Çamlıbel Mountain, Çamlıbeli pass, in open *Acantholimon*, *Astragalus*, and *Festuca* steppe, 1700 m, 17.viii.2001, Akaydın 7100 (holo. ANK!).'

Central Anatolia. Endemic. Irano-Turanian element. Threat Category: CR.

This endemic species is the only *Acantholimon* species with cream to yellow petals.

22. *A. anaticum* Dogan & Akaydın, *Bot. J. Linn. Soc.* 140: 443–448 (2002).

Type: '[Turkey] A3 Ankara: Kuş Cenneti between Çayırhan and Nallıhan, deep gypseous sandy soil on mountain slopes, 500 m, 19.viii.2000, Doğan 2007, 2008, 2009 & Akaydın (holo. ANK!).'

Central Anatolia. Endemic. Irano-Turanian element. Threat Category: CR.

This endemic species looks similar to *A. strigillosum*, which grows in Hekimhan (Malatya), but its shorter leaves (5–12 mm), small scale numbers (4–5), denser spikes with 6–12 spikelets, and puberulent hairy bracts distinguish it from the other species.

23. *A. strigillosum* Bokhari, *Notes R.B.G. Edinb.* 30: 299 (1970).

Type: '[Turkey] B6 Malatya: 3 km north of Hekimhan, very eroded hillsides, 1100 m, [2.ix.1954], Davis & O. Polunin, D. 24828 (holo. E! iso. K!).'

East Anatolia. B6 Malatya: between Darende and Hekimhan, 1250 m, 3.vii.2001, Doğan & Akaydın 6744! Around Karadere village, 1240 m, 21.vii.2001, Doğan & Akaydın 7062! Between Hekimhan and Kuluncak 7 km from Hekimhan, 1200 m, 17.viii.2001, Doğan & Akaydın 7137a! B7 Erzincan: around Sahran, 1530 m, 15.vii.2001, Doğan & Akaydın 6860! Sivas: between Zara and Divriği, 17 km from Zara, 1450 m, 9.viii.2003, Doğan & Akaydın 8038!

Endemic. Irano-Turanian element. Threat Category: VU.

24. *A. ulicinum* (Willd. ex Schultes) Boiss in DC., *Prodr.* 12: 627 (1848).

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

1. Calyx light brown or fleshy coloured.....  
..... var. *purpurascens*

1. Calyx white coloured

2. Leaves 5–8 mm long; leaves and bracts pubescent..... var. *creticum*

2. Leaves 8–20 mm long; leaves and bracts glabrous..... var. *ulicinum*

var. *ulicinum*

Syn.: *Statice ulicina* Willd. ex Schultes, *Syst.* 6: 798 (1820); *S. androsacea* Jaub. & Spach, *Ann. Sci. Nat. ser.* 2,20: 250 (1843); *S. pauciflora* Jaub. & Spach, *loc. cit.* (1843). *S. tournefortii* Jaub. & Spach (1853); *A. androsaceum* (Jaub. & Spach) Boiss., *Diagn. ser.* 1(7): 73 (1846); *Acantholimon tournefortii* (Jaub. & Spach) Boiss. in DC., *Prodr.* 12: 627 (1848); *A. libanoticum* Boiss. var. *ulicinum* (Willd. ex Schultes) Boiss. in DC., *loc. cit.* (1848); *A. echinus sensu* Boiss., *Fl. Or.* 4: 840 (1879) *quoad desc. excl. basionym*, non (L.) Boiss., *loc. cit.* (1848). Ic: Jaub. & Spach, *Ill. Pl. Or.* 1: t. 90 (1853).

Type: 'in Oriente (*Limonium orientale* caryophyllifolio acutissimo, floribus velut in capitulum congestis, [calyce albo acaulon], *Tournefort* (holo. B-Willd., iso. P-Tourn. 3129!).'

South, West and Central Anatolia: A2(A) Bursa: Ulu Da., viii.1874, Pichler 15! (the type of *A. olympicum*) *ibid.*, Aucher 2508! (the type of *A. androsaceum*), B1 Bahkehir: Kaz Da., *Sint.* 15.vii.1883: 425! (the type of *A. trojanum*), B2 İzmir: Boz Da., 1500–2100 m, 21.vi.1939, Davis 282! (E), B3 Afyon: Kasaba (Şuhut), 1200 m, Tchihatchef, B4 Ankara: Elma Da., 1200 m, *Balls* 154, C2 Denizli: above Geyran Y., Boz Da., 1800–2100 m, Davis 13360!, C3 Isparta: Sütçüler, 1600 m, 10.ix.2000, Doğan & Akaydın 6525!, 6532!, Eğirdir, Barla Da., 1750 m, Khan *et al.* 399! C4 Karaman: between Hadim & Beyreli, 1950 m, 21.viii.2001, Doğan & Akaydın 7209! 7214! C5 İçel: between Arslanköy and Ayranç, 2100 m, Doğan & Akaydın 7170! Niğde: near Demirkazık, Ala Da., 1800–1900 m, Findlay 75a!

South Albania, Greece, Crete. East Mediterranean element. Threat Category: LC.

var. *purpurascens* (Bokhari) Bokhari & Edmondson, Davis (ed.) *Flora of Turkey*, 7, 498 (1982).

Syn.: *A. androsaceum* (Jaub. & Spach) Boiss. var. *purpurascens* Bokhari, *Notes R.B.G. Edinb.* 30: 300 (1970).

Type: '[Turkey] C3 Isparta: Sütçüler (Isauria), Dedeğöl Da., above Dedeğöl tarn, 2500 m, [3.viii.1949] P. H. Davis 16012 (holo. E! iso. K!).'

South-west Anatolia: C2 Muğla: Sandras Da., 2000 m, 16.vii.1947, Davis 13530!, 2000 m (6–7) 1968 Quézel *et al.*!, C3 Antalya: Tahtalı Da., 2000–2300 m, 16.viii.1947, Davis 14143!, C4 Karaman: Ermenek, Balkusan village, 1750 m, 23.viii.2000, Doğan & Akaydın 6509!

Endemic. East Mediterranean element. Threat Category: CR.

*var. creticum* (Boiss.) Bokhari & Edmondson in Davis (ed.) *Flora of Turkey*, vol. 7: 498 (1982).

Syn.: *A. androsaceum* (Jaub. & Spach) Boiss. *var. creticum* Boiss., *Diagn. Ser. 1(7)*: 73 (1846); *A. creticum* (Boiss.) Rech. fil., *Öst. Bot. Zeitschr. 84*: 180 (1935). Bokhari, *Notes R.B.G. Edinb. 30*: 300 (1970).

*Syntype*: '[Crete] in montibus altioribus Cretae, Sibthorp; *ibid.*, Sieber.'

Central and South Anatolia: B4 Ankara: between Ankara and Kırıkkale, 57 km from Ankara, 670 m, *Buttler & Bothmer 22549*! C2 Antalya: Altınyayla, Kızılcadağ, Mamatlar village, 1750 m, 22.viii.2001, *Doğan & Akaydın 7227*! C4 Karaman: between Hadim and Alanya, 2000 m, 21.viii.2001, *Doğan & Akaydın 7213*! Antalya: Alanya, Geyik Da., 2500 m, 31.viii.1947, *Davis 14543*! C5 İçel: between Arslanköy and Ayrancı, 2200 m, 20.viii.2001, *Doğan & Akaydın 7171*!

Crete. East Mediterranean element. Threat Category: LC.

25. *A. puberulum* Boiss. & Bal. in *Boiss., Diagn. ser. 2(4)*: 62 (1859).

1. Scapes shorter than leaves; inner bracts completely hyaline ..... subsp. *puberulum*

1. Scapes longer than leaves; inner bracts narrowly hyaline on margin

2. Bracts and leaves glabrous ..... subsp. *peroninii*

2. Bracts and leaves hairy ..... subsp. *longiscapum*

**subsp. puberulum, comb. et stat. nov.**

Syn.: *A. puberulum* Boiss. & Bal. *var. glabrum* Bokhari, *Notes R.B.G. Edinb. 30*: 300 (1970).

*Type*: '[Turkey] B6 Kayseri: in regione alpina montis Aslandach Cappadociae ad orientem montis Argaei (Arslantaş, north-east of Bey Da.) *Balansa* [599] (holo. G!).'

Central and East Anatolia. A5 Amasya: Kaisari, Karababa, near Ak Da. 2000–2200 m, *Bornm. 1890: 1233*! A8 Gümüşhane: Aktaş, *Sint. 1894: 6249*! B4 Ankara: between Ankara and Kırıkkale, 650 m, 15.viii.2001, *Doğan & Akaydın 7068*! Konya: Kulu, between Ankara and Cihanbeyli, 1000 m, 10.ix.1949, *Davis 16677*! B5 Yozgat: 4 km east of Sorgun, 1410 m, *Hub.-Mor. 14462*! B6 Sivas: Yıldızeli, Çamlıbel, 1700 m, 17.viii.2001, *Doğan & Akaydın 7144*! Maraş: Berit Da., *Hausskn.* (the type of *A. cataonicum*)! B7 Elazığ: Hazar Da., 2050 m, 4.vii.2001 *Doğan & Akaydın 6759*! Sivas: Kızıldağ, 2150 m, *Lamond 5053*! B7 Erzincan: around İmranlı, 1820 m, 15.vii.2001, *Doğan & Akaydın 6858*! B8 Erzurum: Karakaya Da., 15 km north of Hınıs, 2450 m, 20.viii.1967, *Watson*

*et al. 3698*! B9 Van: Near Çuh, 20 km north-west of Başkale, 2800 m, *Watson et al. 3662*! B10: Ağrı: between Doğubeyazıt and Diyadin, 1070–1220 m, *Hewitt 173*! C1 Muğla: Tekke Da., 1900 m, *1968. Quézel et al.*! C4 Karaman: between Karaman and Mut, Avlama Da., Sertavur pass, 1700 m, 5.viii.2000, *Doğan & Akaydın 6414*! Ermenek, Balkusan village, 1750 m, 23.viii.2000 *Doğan & Akaydın 6507*! C10 Hakkari: Mor Da., 3450 m, *Watson et al. 3644*!

North Iraq. Irano-Turanian element. Threat Category: LC.

**subsp. longiscapum** (Bokhari) Dogan & Akaydın, **comb. et stat. nov.**

Syn.: *A. puberulum* *var. longiscapum* Bokhari, *Notes R.B.G. Edinb. 30*: 300 (1970).

*Type*: '[Turkey] C4 Konya: S. Karance Dere between Geyik Dağ and Bozkır, 830 m, 2.ix.1947, *Davis 14630* (holo. E! iso. K!).'

Central Anatolia. B3 Eskişehir: Sündiken Da., 1400 m, *Ekim 718*! C4 Karaman: between Hadim & Beyreli, 1950 m, 21.viii.2001, *Doğan & Akaydın 7206*! Başyayla between Hadim & Alanya, 2000 m, 21.viii.2000, *Doğan & Akaydın 7212*! Between Ermenek and Anamur, Taşeli Y., 1600 m, 13.ix.2000, *Doğan & Akaydın 6574*! Başyayla, Turanşah Da., 1850 m, 24.viii.2000, *Doğan & Akaydın 6520*! Ermenek, Balkusan village, 1600 m, 23.viii.2000, *Doğan & Akaydın 6504*!

Endemic. Irano-Turanian element. Threat Category: LC.

**ssp. peroninii** (Boiss.) Akaydın & Dogan **comb. et stat. nov.**

Syn.: *A. peroninii* Boiss., *Fl. Or. 4*: 842 (1879).

*Type*: '[Turkey] C4 Karaman: Hab. In montibus Ciliciae Tracheae inter Ermenek et Mout, *Peronin 199*!'

South Anatolia. B3 Isparta: between Eğirdir & Akşehir, 1700 m, 16.vii.2002, *Doğan & Akaydın 7618*!, C2 Burdur: Altınyayla, Dirmil pass, 1400 m, 11.ix.2000, *Doğan & Akaydın 6550*! Antalya: Altınyayla, Mamatlar village, 2100 m, 22.viii.2001, *Doğan & Akaydın 7233*! Elmalı, Çamçukuru Y., Bey Da., 1750 m, 28.vii.1960, *Khan et al. 315*! (the type of *var. glabrum*). C3 Antalya: Beydağları, 2060 m, 26.vi.2002, *Doğan & Akaydın 7435*! Between Finike and Elmalı, Hördübek Y., 1650 m, 15.vii.2002, *Doğan & Akaydın 7597*! C4 Karaman: Oyuklu Da., 1800 m, 23.viii.2000, *Doğan & Akaydın 6503*! Konya: between Ermenek and Mut, Toros Da., 900–1200 m, *Péronin 199*! (the type of *A. peroninii*). C5 İçel/Adana: Kızıltepe, 2800 m, viii.1895, *Siehe 285*! İçel: Arslanköy, near Dümbelek boğazı, 1900 m, 20.viii.2001, *Doğan & Akaydın 7164*! C6 Kahraman-

maraş: Çardak, Kandil Da., 2200 m, 25.vii.1952, *Davis 20272!* (as *A. peroninii*).

Endemic. Mediterranean element. Threat Category: LC.

Bokhari & Edmondson (1982) recognized the presence of the two varieties that have been given subspecies status, together with *A. peroninii* Boiss., for the first time.

26. *A. karamanicum* Akaydın & Dogan, *Israel J. Plant Sci*, 50: 67–71 (2002).

Type: '[Turkey] C4 Karaman: between Basyayla and Taskent, Turansah Da., calcareous mountain slopes in open *Quercus cerris* scrub, 1600 m, 24.viii.2000, *Akaydın 6518* & *Doğan* (holo. ANK!).'

Central Anatolia. Endemic. Irano-Turanian element. Threat Category: CR.

This local endemic species is confined to higher altitudes on the Toros Mountains and looks similar to *A. confertiflorum* and *A. birandii*. It can be distinguished from the former by its shorter leaves (10–30 mm), calyces (9–10 mm), and calyx limb diameter (4–6 mm). It differs from *A. birandii* by its longer flowers (10–12 mm), shorter outer bracts than inner ones, and longer calyces (9–10 mm).

27. *A. birandii* Doğan & Akaydın, in *Nordic J. Bot.*, 21: 481–484 (2001)

Type: '[Turkey] C4 Karaman: On the road to Bucakkışla, 23 km from Karaman, 1350 m, 23.viii.2000, *Doğan 2081* & *Akaydın* (holo. ANK!).'

Central Anatolia. Endemic. Irano-Turanian element. Threat Category: CR.

28. *A. confertiflorum* Bokhari, *Notes R.B.G. Edinb.* 30: 295, fig. 1 (1970).

Type: '[Turkey] C4 Konya: Bozkır, on calcereous soil, 1100 m, [7.ix.1949], *P. H. Davis 16600* (holo. E!).'

Central Anatolia. C4 Konya: Bozkır, 1220 m, 2.ix.1947, *Davis 14603!* Ibid. 1300 m, 24.viii.2000, *Doğan & Akaydın 6528!* Karaman: between Ermenek and Anamur, 1300 m, 13.ix.2000, *Doğan & Akaydın 6569!* Around Pınarbaşı, between Karaman and Hadim, 1350 m, 21.viii.2001, *Doğan & Akaydın 7192!* Sertavur Pass, 1450 m, 24.viii.2000, *Doğan & Akaydın 6516!* Karaman, on Bucakkışla road, 1300 m, 23.viii.2000, *Doğan & Akaydın 6492!* Around Kilbasan, 1100 m, 23.viii.2000, *Doğan & Akaydın 6485!*

Endemic. Irano-Turanian element. Threat Category: EN.

This species is closely related to *A. dianthifolium*, which grows in south-east Anatolia, and can be recognized by its longer leaves (3–5 cm), shorter scapes (5–7 cm), and dense spikes.

29. *A. reflexifolium* Bokhari, *Notes R.B.G. Edinb.* 30: 297 (1970).

Type: '[Turkey] B9 Van: Van–Başkale, Halanduran Da., 20 km from Başkale, 3000 m, [26.viii.1956], *McNeill 657* (holo. E! iso. K!).'

Central and east Anatolia. A6 Sivas: Yıldız Da., Sarıyer, 1700 m, 14.viii.1967, *Tobey 2348!* B5 Kayseri: Develi, near Bakırdağ village, 7.viii.2000, 2000 m, M. Öztekin! B6 Sivas: Yıldız village, 2000 m, 17.iii.2001, *Doğan & Akaydın 7126!* B9 Van: Erek Da., 2340 m, 18.vii.1954, *Davis 22929!*

Endemic. Irano-Turanian element. Threat Category: VU.

30. *A. caesareum* Boiss. & Bal. in Boiss., *Diagn. ser.* 2(4): 66 (1859).

Type: '[Turkey] B6 Kayseri: in regione subalpina monits Alidagh prope Caesaream (Kayseri) Cappadociae, [1220 m], *Balansa [946]* (holo. G!).'

Central Anatolia. A4 Ankara: 57 km from Ankara to Çankırı 1120 m, *Buttler 21565!* Çankırı: 21 km from Çankırı to Kastamonu, 1430 m, *Buttler 15574!* Çankırı, around Sarayköy, between Çubuk and Eldivan 900 m, 21.viii.2000 *Doğan & Akaydın 6479!* A6 Sivas: near Karabayır, 1910–1930 m, *Buttler 20372!* A7 Sivas: above Suşehri, 2000 m, 26.viii.1957 *Davis 32697!* Gümüşhane: Stavri, 2285 m, *Balls 520!* B5 Kayseri: Develi, 1880 m, 2.vii.2001, *Doğan & Akaydın 6699!* Erciyes Da., 2170 m, *Çetik 4166!*

Endemic. Irano-Turanian element. Threat Category: CR.

31. *A. caryophyllaceum* Boiss., *Diagn. ser.* 1 (7): 78 (1846). Ic: *Fl. Armenii* 2: t. 153 (1956).

Type: '[Iraq] monte Gara, 3.vii.1841, *Kotschy 368* (holo. G!, iso. K!).'

East Anatolia. A8 Gümüşhane: South of Soğanlı Da., above Bayburt, 1700 m, 4.viii.1957, *Davis 32119!* Erzurum: between Pasinler and Narman, 2160 m, 17.vii.2001, *Doğan & Akaydın 6927!* A9 Kars: 8 km from Akçay to Cumaçay, 1650 m, 17.vii.1966, *Davis 46807!* B6 Sivas: near Yıldız village, 2000 m, 17.viii.2001, *Doğan & Akaydın 7114!* B7 Tunceli: Munzur Da., above Ovacık, Aksu Deresi, 1600 m, 21.vii.1957, *Davis 31446!* Elazığ: Sivrice, Hazar Da., 1850 m, 4.vii.2001, *Doğan & Akaydın 6758!* B8 Erzurum: between Erzurum and Aşkale, 35 km west of Erzurum, 1700 m, 4.viii.1965, *Lamond 2593!* Bingöl: between Bingöl and Elazığ, Kuruca pass, 1880 m, 21.vii.2001, *Doğan & Akaydın 7061!* Erzincan: between Erzincan and Tercan, 1600 m, 3.vii.2002, *Doğan & Akaydın 7462!* B9 Van: between Narlıca and Bahçesaray, 2200 m, 5.viii.1986, *J.C. Archibald 8007!* Gevaş, Artos Da., 2300 m, 20.vii.2001, *Doğan & Akaydın 7037!* Bitlis: 15 km south-west of Tatvan, 1900 m, 9.vii.1966, *Davis 46124!* Adilcevaz, Süphan

Da., Sütay Yaila, 2500 m, 20.vii.2001, *Doğan & Akaydın 7051!* Kuskunkiran pass, 2200 m, 1.viii.1986, *J.C. Archibald 7967!* Ağrı: between Akçay & Cumaçay, 1700 m, 18.vii.2001, *Doğan & Akaydın 6967!* B10 Iğdır: between Doğubeyazıt and Çaldıran, 2200 m, 18.vii.2001, *Doğan & Akaydın 6979!* C9 Hakkari: Cilo Da., between Cilo Yaila and Diz Deresi, 2340 m, 10.viii.1954, *Davis 24271!* C10 Hakkari: Between Yüksekova & Dağlıca, 1900 m, 19.vii.2001, *Doğan & Akaydın 7017!*

Armenia, north Iraq, north and west Iran. Irano-Turanian element. Threat Category: LC.

32. *A. acerosum* (Willd.) Boiss., *Diagn. ser. 1* (7): 80 (1846).

Syn.: *Statice acerosa* Willd., *Ges. Natur, fig. Neue Schr.* 3: 420 (1801).

1. Outer bract reddish, equal to inner bracts; lower leaves strongly reflexed ..... subsp. *brachystachyum*  
1. Outer bract greenish, shorter than inner bracts; lower leaves not reflexed

2. Inner bracts longer than calyx tube; bracts densely calcareous punctate.....

..... subsp. *longibracteolorum*

2. Inner bracts equal to calyx tube; bracts slightly calcareous punctate ..... ssp. *acerosum*

subsp. *acerosum*

Syn.: *A. acerosum* (Willd.) Boiss. var. *acerosum* Bokhari in Davis, *Fl. of Turkey*, 7, 487 (1982). *A. assyriacum* Boiss. var. *micraceme* Náb. & Bornm., *Publ. Fac. Sci. Univ. Masaryk Brno* 3: 420 (1929).

1. Leaves shorter than 18 mm; inner bracts up to 8 mm ..... var. *parvifolium*

1. Leaves at least 20 mm; inner bracts longer than 9 mm ..... var. *acerosum*

var. *acerosum*

*Type:* [E. Turkey] (*Limonium orientale frutescens caryophyllifolio in aculeum rigidissimum abeunte*), Tournefort.

Anatolia (except south-east Anatolia). A3 Bolu: around Abant Lake, 27.vii.1937, *B. Post!* A4 Ankara: 57 km from Ankara to Çankırı, 1120 m, *Buttler 21564!* A5 Çorum: Kös Da., 500 m, 30.vii.1967, *Watson 3520!* A6 Sivas: Yıldız Da., Çırçır, 1500 m, 17.ix.1967, *Tobey 2345!* A7 Giresun: Şebinkarahisar, 5.ix.1952, *Davis 20459!* A9 Erzurum: Pasinler, between Erzurum and Ağrı, near Aras river, 1600 m, 3.vii.2002, *Doğan & Akaydın 7478!* Kars: 26 km from Benli Ahmet to Kağızman, 1870 m, 16.vii.1966, *Davis 46652!* B3 Afyon: between Bolvadin and Emirdağ, 1200 m, 16.vii.2002, *Doğan & Akaydın 7621!* B4 Ankara: Şereflikoçhisar, near Tuz gölü, 930 m, 24.vi.2002, *Doğan & Akaydın 7431!* B6 Sivas: Yıldızeli, Çamlıbel pass, 1800 m, 14.vii.2001, *Doğan & Akaydın 6829!* B7 Erz-

incan: above Cimin, Keşiş Da., 1900–2100 m, 26.vii.1957, *Davis 31722!* B10 Iğdır: Doğubeyazıt–Çaldıran road, 50 km from Doğubeyazıt, 2200 m, 18.vii.2001, *Doğan & Akaydın 6984!* C2 Denizli: Boz Da. Between Abbas and Geyran Yayla, 1650 m, 16.vii.1947, *Davis 13316!* C3 Burdur: 3 km west of Burdur, 1020 m, *Hub.-Mor. 8168!* C4 Konya: 35 km from Konya to Beyşehir, 1510 m, *Buttler & Uzunoğlu 13648!* C5 Niğde: above Demirkazık, 28.viii.1965, *Findlay 128!*

West Syria, north Iraq, Armenia, north-west Iran. Irano-Turanian element. Threat Category: LC.

var. *parvifolium* Bokhari, *Notes R.B.G. Edinb.* 30: 300 (1970).

*Type:* [Turkey] B6 Maraş: above Göksun, top of pass, 1070 m, [22.viii.1969], *Darrah 711* (holo, E!).

South-east Anatolia. Endemic. Irano-Turanian element. Threat Category: VU.

**subsp. *brachystachyum*** (Boiss.) Dogan & Akaydın **comb. et stat. nov.**

Syn.: *A. acerosum* (Willd.) Boiss. var. *brachystachyum* Boiss. *Fl. Or.* 4: 838 (1879); *A. tchihatcheffii* Fisch. & Mey., *Ann. Sci. Nat. ser. 4, 1*: 30 (1843); *A. phrygium* Boiss., *Diagn. ser. 1*(7): 79 (1846); *A. pinardii* Boiss., *loc. cit.* (1846); *A. listoniae* Boiss. in DC., *Prodr.* 12: 631 (1848); *A. acerosum* (Willd.) Boiss. var. *pinardii* (Boiss.) Mobayen, *Revis. Taxon. Acantholimon*: 179 (1964). Ic: Tehihat., *Asie Min. Bot., Atlas t.* 36 (1860).

*Type:* Numerous Turkish syntypes.

West and central Anatolia. A3 Ankara: Nallıhan, on Istanbul road, 600 m, 19.viii.2000, *Doğan & Akaydın 6425!* B1 Manisa: Sipyulus (Manisa Da.) above Manisa, *Bal. 1854, 284!* B3 Konya: Sultan Da. above Akşehir, 1000–1100 m, *Bornm. 1899*: 5511! B4 Konya: near Kulukessi, 1030 m, *Tchihatcheff* (as *A. pinardii*), B6 Tokat: Çamlıbel Da. 14 km north of Yıldızeli, 1400 m, 30.vii.1977 *McPhail & Watson 5752!* C2 Burdur: Gölhisar, Güre Da., 1260 m, 11.ix.2000, *Doğan & Akaydın 6541!* C3 Isparta: South of Eğridir, *Hub.-Mor. 8166!* C4 Konya: Kara Da., *Andrasovszky 573!* C5 İçel: Gülek Kale, *Kotschy 1853*: 99!

Endemic. Irano-Turanian element. Threat Category: LC.

**subsp. *longibracteolorum*** Dogan & Akaydın, **subsp. nov.**

A typo bracteolis e calycibus tubus longioribus differt.

*Type:* [Turkey]: B3 Eskişehir: Sündiken Dağı, 400–500 m, 22.vi.1974, *Ekim 923!* (holo ANK!).

Central Anatolia. A4 Kastamonu: 20 km from Ilgaz to Kurşunlu, 1000 m, 28.vi.2001, *Doğan & Akaydın 6636!* A5 Kastamonu: between Kastamonu and Tosya, 1000 m, 15.viii.2001, *Doğan & Akaydın*

7075! B6 Sivas: Zara, near Emre village, 1300 m, 15.vii.2001, *Doğan & Akaydın 6848!*

Endemic. Irano-Turanian element. Threat Category: LC.

Bokhari & Edmondson (1982) recognized three varieties under this species, but the current research findings support the recognition of three subspecies, one of which, subsp. *longibracteolorum* subsp. nov., appears to be new.

33. *A. avanosicum* Dogan & Akaydın, *Bot. J. Linn. Soc.* 138: 365–368 (2002).

Type: '[Turkey] B5 Nevşehir: between Avanos–Hacıbektaş, 3 km from Avanos, clay stone slopes, 950 m, 20.viii.2000, *Doğan 2052 and Akaydın*. (holo. ANK!).'

Paratype: B5 Nevşehir: between Avanos–Hacıbektaş, 6 km from Avanos, clay stone slopes, 950 m, 20.viii.2000, *Doğan 2053 and Akaydın!*

Central Anatolia. Endemic. Irano-Turanian element. Threat Category: CR.

This local endemic species looks like *A. confertiflorum* with its rather dense spikes, but differs by its short leaves (13–32 mm), ciliate leaf margins, exerted scapes (40–60 mm), numerous scales (5–6), and more flowers (8–14) in each spike.

34. *A. armenum* Boiss. & Huet. in Boiss., *Diagn. ser.* 2(4): 64 (1859).

1. Leaves 2–3 mm wide; outer bract longer than inner ones .....var. *armenum*

1. Leaves up to 1.5 mm wide; outer bract equal to inner ones or slightly shorter .....var. *balansae*

var. *armenum*

Syn.: *A. baltanense* Boiss. & Hausskn. in Boiss., *Fl. Or.* 4: 838 (1879)!

Type: '[Turkey B8] Erzurum: prope Erzurum, [vii.1853], *Huet du Pavillon* (holo. G!, iso. K!).'

South and east Anatolia. A8 Gümüşhane: near Bayburt, *Bourgeau 1862*: 235! Erzurum: between Narman and Oltu, 1600 m, 17.vii.2001, *Doğan & Akaydın 6932!* A9 Kars: around Kafkas University, 1860 m, 17.vii.2001, *Doğan & Akaydın 6949!* B5 Kayseri: between Develi and Bakırdağ, 1360 m, 2.vii.2001, *Doğan & Akaydın 6703!* Between Kayseri and Tomarza, 1450 m, 1.vii.2001, *Doğan & Akaydın 6692!* B6 Sivas: around Yıldızeli, 8.ix.1957, *K.H. Rechinger 15228!* B8 Erzurum: Pasinler plain, 1700 m, 3.vii.2001, *Doğan & Akaydın 7469!* C5 Konya: Ereğli (Allahverdi) viii.1905, Azn.! İçel: Gülek Kale, 1400 m, vi.1896, *Siehe 405!* C6 Maraş: Berit Da., 1865, *Hausskn.!* Adana: above Hasanbeyli, *G. Post!*

West Syria, Armenia, north Iraq. Irano-Turanian element. Threat Category: LC.

var. *balansae* Boiss. & Huet in Boiss. *Diagn. ser.* 2(4): 64 (1859).

Syn.: *A. balansae* (Boiss. & Huet) Bunge, *Mém. Acad. Sci. Pétersb. ser.* 7, 18(2): 36 (1872); *A. haussknechtii* Bunge, *op. cit.* 37 (1872)!

Type: '[Turkey] B5 Kayseri: in jugo Aslan dach (Aslantaş) Antitauri 12 leucis (48 km) ad orientem Caesareae in Cappadocia, 1856, *Balansa* (holo. G!).'

South and east Anatolia. B4 Ankara: Şereflikoçhisar, 1150 m, 30.vi.2001, *Doğan & Akaydın 6653!* B5 Aksaray: Aksaray–Nevşehir yolu, 1220 m, 1.vii.2001, *Doğan & Akaydın 6657!* B6 Sivas: Kangal, 3 km from Böğrüdelik to Behramcalı, 1750 m, *Hub.-Mor. 14466!* B7 Erzincan: Ak Da., 1370 m, 1934, *Balls 1508!* C5 İçel: Arslan Köy, Göcekdere Boğazı, 2350 m, 20.vii.2001, *Doğan & Akaydın 7280!* C6 Maraş: Ahır Da., 900 m, vii.1865, *Hausskn.!* (the type of *A. haussknechtii*) Hatay: north of Belen, *G. Post!* Adıyaman: Ak Da., between Malatya and Adıyaman, 2745 m, vii.1865, *Hausskn.!*

Armenia. Irano-Turanian element. Threat Category: LC.

This species is closely related to *A. acerosum*, but differs by its shorter scapes (3–7 cm) and smaller spikelets (7–8 mm).

35. *A. lepturoides* (Jaub. & Spach) Boiss. *Diagn. ser.* 1(7): 77 (1846).

Syn.: *Statice lepturoides* Jaub. & Spach, *Ann. Sci. Nat. ser.* 2, 20: 254 (1843)! Mobayen, *Revis. Taxon. Acantholimon* fig. 43 (1964).

Type: 'Described from the vicinity of Tibilisi (P).'

East Anatolia. A8 Erzurum: between Narman and Oltu, 1400 m, 17.vii.2001, *Doğan & Akaydın 6937!* A9 Ardahan: between Oltu and Ardahan, 1300 m, 17.vii.2001, *Doğan & Akaydın 6939!*

Armenia. Irano-Turanian element. Threat Category: NT.

36. *A. kotschyi* (Jaub. & Spach) Boiss., *Diagn. ser.* 1(7): 74 (1846).

Syn.: *Statice kotschyi* Jaub. & Spach, *Ann. Sci. Nat. ser.* 2, 20: 252 (1843)! *A. kotschyi* (Jaub. & Spach) Boiss., subsp. *laxispicatum* Bokhari, *Notes R.B.G. Edinb.* 30: 299 (1970).

Type: '[Turkey] C5 in Monte Tauro, Aestate 1836, *Kotschy [416]* (holo. P, iso. K!).'

South and central Anatolia. B4 Konya: between Eskil and Aksaray, 870 m, 20.vii.2000, *Doğan & Akaydın 6444!* B5 Nevşehir: Göreme, 10 km west of Ürgüp, 1000 m, 3.viii.1956, *McNeill 409!* Nevşehir: Kılıçlar village, 1150 m, 1.vii.2001, *Doğan & Akaydın 6666!* Between Avanos and Kayseri, 1000 m,

1.vii.2001, *Doğan & Akaydın 6683!*, B6 Malatya: between Elbistan and Darende, 13.vii.1906, *G. & B. Post!* C3 Konya: 19 km from Beyşehir to Konya, 1210 m, *Hub.-Mor. 8169!* C5 Niğde: between Ulukışla and Maden, Bolkar Da., 1580 m, 18.vii.1995, *Z. Aytaç 7122!* İçel: between Aslanköy and Ayrancı, 2350 m, 20.viii.2001, *Doğan & Akaydın 7181!* C6 Maraş: Ahir Da., *G. Post!*

Endemic. Irano-Turanian element. Threat Category: LC.

37. *A. iconicum* (Boiss.) Boiss. & Heldr., *Boiss., Fl. Or.* 4: 839 (1879).

Syn.: *Acantholimon kotschy* (Jaub. & Spach) Boiss. var. *iconicum* (Boiss.) Boiss. in DC., *Prodr. 12*: 628 (1848)!

*Type*: [Turkey] C4 Konya: Konya yakınları, Sille, vi.1846, *Heldr.!* (E).'

North and central Anatolia. A7 Gümüşane: between Gümüşhane and Bayburt, 1360 m, 16.vii.2001, *Doğan & Akaydın 6896!* Between Bayburt and İspir, 1570 m, 16.vii.2001, *Doğan & Akaydın 6901!* B4 Ankara: Bala, 1050 m, 28.vi.2002, *Doğan & Akaydın 7451!* B5 Kayseri: Develi, around Saraycık, 1675 m, 23.viii.2002, *Doğan & Akaydın 7642!* Nevşehir: İhlara valley, around Kılçlar village, 1150 m, 1.vii.2001, *Doğan & Akaydın 6665!* B6 Kayseri: between Kayseri and Gürün, 1800 m, 2.vii.2001, *Doğan & Akaydın 6722!* Kahramanmaraş: Göksun, above Keklikoluk village, 2400 m, 18.viii.2001, *Doğan & Akaydın 7152!* Malatya: between Hekimhan and Darende, 1600 m, 21.vii.2001, *Doğan & Akaydın 7064!* B7 Erzincan: Egin (Kemaliye), Kainartschar, 13.vii.1890, *Sintenis 2968!* Kelkit, Kolçekmez Da., 1775 m, 15.vii.2001, *Doğan & Akaydın 6882!* Between Erzincan and Sivas, Sakaltutan Pass, 2160 m, 15.vii.2001, *Doğan & Akaydın 6878!* B8 Erzurum: Aşkale, Kop Pass, 1950 m, 16.vii.2001, *Doğan & Akaydın 6917!*

Endemic. Irano-Turanian element. Threat Category: EN.

This species was included in *A. kotschy* in *Flora of Turkey and the East Aegean Islands* (Bokhari & Edmondson, 1982), but the research findings support its recognition as an independent species. In *A. iconicum*, the outer bract is longer than the inner ones, but *A. kotschy* has equal bracts.

38. *A. halophilum* Bokhari, *Notes R.B.G. Edinb. 30*: 297, fig. 2(B) (1970).

1. Calyx limbs white ..... var. *halophilum*  
1. Calyx limbs pink ..... var. *coloratum*

var. *halophilum*

*Type*: [Turkey] B4 Konya: 10 km from Halkenli to Cihanbeyli, 1000 m, salt steppe in sand, [17.vi.1962], *Dudley, D. 35931* (holo. E! iso. K!).'

Central Anatolia. B4 Konya: Cihanbeyli, Acıtuz lake near Kırkışla, 900–1000 m, 8.ix.1949, *Davis 16628!* Between Cihanbeyli and Tuzla, 900 m, 26.vi.2001, *Doğan & Akaydın 6615!* Ankara: Şerflikoğhisar, near Tuz Gölü, 930 m, 4.vi.2002, *Doğan & Akaydın 7408!* Aksaray: between Aksaray and Emirgazi, 1200 m, 21.vi.2002, *Doğan & Akaydın 7365!* C3 Konya: 21 km from Beyşehir to Konya, 1100 m, 15.vi.1962, *Davis 35848!*

Endemic. Irano-Turanian element. Threat Category: CR.

**var. *coloratum*** Dogan & Akaydın **var. nov.**

A typo calycibus limbo roseus differt.

*Type*: [Turkey] B4 Konya: between Cihanbeyli and Tuzla, near Tuz Gölü, 950 m, 21.vi.2002, *Doğan & Akaydın 7398* (holo. ANK!).

Endemic. Irano-Turanian element. Threat Category: CR.

39. *A. lycaonicum* Boiss. & Heldr. in DC., *Prodr. 12*: 627 (1848).

Syn.: *A. ulicinum* (Willd. ex Schultes) Boiss. subsp. *lycaonicum* (Boiss. & Heldr.) Bokhari & Edmondson, *Notes R.B.G. Edinb. 30*: 299 (1970).

1. Bracts hairy ..... subsp. *lycaonicum*  
1. Bracts glabrous ..... subsp. *cappadocicum*

subsp. *lycaonicum*

*Type*: [Turkey] C4 Konya: inter Beyshehr (Beyşehir) et Koniah (Konya) Lycaoniae, *Heldreich* (holo. G!).'

South and central Anatolia. A4 Çankırı: near Tukht, 1500 m, *Czeczott 195!* Kırıkkale: between Elmadağ and Kalecik, 800 m, 15.viii.2001, *Doğan & Akaydın 7069!* C2 Antalya: Altınyayla, Mamatlar village, 1850 m, 22.viii.2001, *Doğan & Akaydın 7230!* Burdur: Seki, Zorlar village, 1500 m, 11.ix.2000, *Doğan & Akaydın 6551!* C3 Isparta: between Sütçüler and Eğirdir, Tota Da., 1500 m, 10.ix.2000, *Doğan & Akaydın 6531!* C4 Karaman: Karadağ, 2250 m, 23.viii.2000, *Doğan & Akaydın 6486!* C5 Niğde: Aladağlar, between Sokulu and Yedigöller, 2100 m, 28.vii.2000, *Doğan & Akaydın 6394!*

Endemic. East Mediterranean element. Threat Category: NT.

**subsp. *cappadocicum*** Dogan & Akaydın **subsp. nov.**

A typo bracteis glabris differt.

*Type*: [Turkey] A4 Çankırı: Kalecik, Karabasan Da., 850 m, 21.viii.2000, *Doğan and Akaydın 6474*. (holo. ANK!).'

Central Anatolia. A4 Ankara: between Kalecik and Çankırı, Karabasan Da., 850 m, 21.viii.2000, *Doğan &*



*Akaydın 6482!*, 30 km from Çankırı to Kastamonu, 1250 m, 15.viii.2001, *Doğan & Akaydın 7073!* Between Ilgaz and Kurşunlu, 1000 m, 28.vi.2001, *Doğan & Akaydın 6633!* Çankırı: between Çerkeş and Orta, Saçakbeli pass, 1450 m, 21.viii.2000, *Doğan & Akaydın 6472!*

Endemic. Irano-Turanian element. Threat Category: NT.

This species was first described from Konya, but later, in *Flora of Turkey and the East Aegean Islands*, placed under *A. ulicinum* as a synonym by Bokhari & Edmondson (1982) because of its short scapes that might have caused some confusion. In this species, calyx veins are exserted and bracts are pinkish in colour. This species may also be confused with *A. hypochaerum*, from which it differs by its denser cushion formation, shorter leaves (11–15 mm), and smaller spikelets (9–10 mm). The populations of this species collected from central Anatolia have glabrous bracts. Therefore, they are treated as ssp. *cappadocicum* Doğan & Akaydın.

40. *A. damassanum* Mobayen, *Revis. Taxon. Acantholimon* 306, fig. 55 (1964).

Syn.: *A. damassanum* Mobayen var. *lancibracteatum* Bokhari, *Notes R.B.G. Edinb.* 30: 300 (1970).

*Type:* '[Anti-Lebanon] Syria, Gabal Hisa (Nebek prope Damascus), 1676 m ('1800 m'), 21.vi.1943, [P.H. Davis] 6451 (holo. K! iso. E!).'

East Anatolia. B6 Malatya: 3 km from Darendé to Hekimhan, 1250 m, 3.vii.2001, *Doğan & Akaydın 6738!* Between Gürün and Darendé, 1300 m, 3.vii.2001, *Doğan & Akaydın 6729!* B7 Erzincan: foot of Keşiş Da. above Cimin, 1700 m, [26.vii.1957], *Davis 31676!* (the type of *A. damassanum* var. *lancibracteatum*), Diyarbakır: 3 km north-west of Ergani, 1200 m, Iter Leydense, 27.v.1959, *1471!* Malatya: 12 km east of Malatya towards Elazığ, 850 m, *Hub.-Mor. 10243!* Elazığ: near Harput, 1320–1390 m, *Hub.-Mor. 10242!*

Syria, Anti-Lebanon. Irano-Turanian element. Threat Category: VU.

41. *A. hohenackerii* (Jaub. & Spach) Boiss., *Diagn. ser.* 1(7): 75 (1846).

Syn.: *Statice hohenackeri* Jaub. & Spach, *Ann. Sci. Nat. ser. III:* 251, tab. 92 (1843)! Mobayen, *Revis. Taxon. Acantholimon* fig. 58 (1964).

*Type:* 'Crescit in provincia Talysch in collibus apricis in tractu Suwant alt. 4000 ped., Julio florens, *Hohenacker* (P).'

East Anatolia. B9 Van: between Van & Özalp, 2000 m, 4.vii.2002, *Doğan & Akaydın 7520!* Güzeldere pass, 2700 m, 8.viii.1986, *J.C. Archibald 8059!*

Iran, Armenia. Irano-Turanian element. Threat Category: VU.

42. *A. saxifragiforme* [Hausskn. & Sint. ex] Bokhari, *Notes R.B.G. Edinb.* 32: 74 (1972).

Syn.: *A. saxifragiforme* Hausskn. & Sint. in *Sched.*; *A. saxifragiforme* Mobayen, *Revis. Taxon. Acantholimon* 307, fig. 56 (1964), *nom. illegit.*

*Type:* '[Turkey] B7 Diyarbakır: 5 km north of Ergani, calcareous hillsides, 1000 m, [2.vi.1957], *Davis & Hedge, D. 29022* (holo. BM, iso. E!).'

East Anatolia. B7 Elazığ: Harput, around graveyard, 1500 m, 4.vii.2001, *Doğan & Akaydın 6752!* Near Buzlu Mağaraları, 1570 m, *Doğan & Akaydın 6754!* near Erbilli village, 1475 m, 3.vi.2001, *Karavelioğulları 3015!*

Endemic. Irano-Turanian element. Threat Category: CR.

The specimens of *Alava 7159* and *Iter Leydense 1959:1471* were identified as *A. saxifragiforme* (Bokhari & Edmondson, 1982), but they appeared to be incorrect identifications. The specimen of *Alava 7159* from Ürgüp has been identified as *A. venustum*, and the other specimen collected from Diyarbakır by *Iter Leydense* appears to be a new record of *A. damassanum*.

43. *A. glumaceum* (Jaub. & Spach) Boiss., *Diagn. ser.* 1(7): 75 (1846).

Syn.: *Statice glumacea* Jaub. & Spach, *Ann. Sci. Nat. ser. 2,20:* 251 (1843)! Ic: Jaub. & Spach, *Ill. Pl. Or. 1:* t. 91 (1844); Planchon, *Fl. des Serres* 7: 95 (1851–2).

*Type:* '[Turkey] East Anatolia (*Limonium armenum humilium* caryophylli folio angustiori non aculeato, flore spicato suave rubente), *Tournefort* (holo. P-Tourn. 3130).' [Probably collected from Ağrı Da.].

East Anatolia. A8 Bayburt: between Bayburt & Erzurum, 1700 m, 16.vii.2001, *Doğan & Akaydın 6910!* Erzurum: between Erzurum and Tortum, c. 27 km from Erzurum, 1950 m, 29.vii.1966, *Davis 47530!* A9 Kars: between Arpaçay & Çıldır, 1850 m, 17.vii.2001, *Doğan & Akaydın 6947!* B8 Erzurum: west of Kandilli, 1520 m, 27.viii.1966, *Archibald 3267!* B9 Ağrı: between Akçay & Cumaçay, 1700 m, 18.vii.2001, *Doğan & Akaydın 6968!*

Armenia. Irano-Turanian element. Threat Category: VU.

This species is distributed only in north-east Anatolia, and the specimens cited from central Anatolia are all identified as *A. wiedemannii*. The specimens *Siehe 1895: 285* and *Darrah 298*, both identified as *A. glumaceum* in *Flora of Turkey and the East Aegean Islands* by Bokhari & Edmondson (1982), appear to be incorrect identifications. *Siehe's* specimen is identified as *A. puberulum*, and *Darrah's* specimen is found to be a typical *A. caesareum*.

44. *A. libanoticum* Boiss. in DC., *Prodr.* 12: 630 (1848). Syn.: *A. caryophyllaceum* Boiss. var. *brachystachyum* Boiss., *Diagn. ser.* 1(7): 79 (1846).

*Type*: '[Lebanon] in regione media Libani ad Cedros et in declivitate orientali circa Aiente, *Aucher* 2507 (holo. G!, iso. K!).'

South-east Anatolia. B6 Kahramanmaraş: Nurhak, near Tatlar, 2200 m, 9.vii.2002, *Doğan & Akaydın* 7578! Göksun, around Güneyoluk, 2100 m, 9.vii.2001, *Doğan & Akaydın* 6787! C5 Adana/Niğde: Aladağlar, Demirkazık, between Karayalak and Narpız valley, 2000–2100 m, 22.vii.1984, Güven Görk, *Per Hartvig & Arne Strid* 23813! C6 Adana: Bahçe, Döldül Da., Atlık Yaila, 1700–1800 m, 26.viii.1949, *Davis* 16370! Maraş: Ahır Da., 1700–1900 m, 8.vii.2001, *Doğan & Akaydın* 6784! Adana: Kozan, Feke Da., Görpiyez Yaila, 1700 m, *Doğan & Akaydın* 6197!

Lebanon, Anti-Lebanon. East Mediterranean element. Threat Category: VU.

45. *A. parviflorum* (Bokhari) Akaydın & Dogan, **comb. et stat. nov.**

Syn.: *A. caryophyllaceum* Boiss. var. *parviflorum* Bokhari, *Notes R.B.G. Edinb.* 30: 299 (1970).

*Type*: '[Turkey] A5 Sinop: Boyabat, 350 m, bare eroded hills, [24.vii.1962], *Davis, Coode & Yaltırık, D.* 38043 (holo. E!).'

Central Anatolia. A3 Ankara: between Beypazarı and Nallıhan, 500 m, 19.viii.2000, *Doğan & Akaydın* 6427! A4 Ankara: between Ayaş and Nallıhan, near Acısu, 500 m, 19.viii.2000, *Doğan & Akaydın* 6417! Çankırı: between Çankırı and Tosya, around Suluca, 700 m, 24.ix.2000, *Doğan & Akaydın* 6594! A5 Sinop: between Hanönü and Boyabat, around Salar village, 330 m, 15.vii.2001, *Doğan & Akaydın* 7076!

Endemic. Irano-Turanian element. Threat Category: CR.

This species was placed under *A. caryophyllaceum* as a variety in *Flora of Turkey*, but it seems quite different. For the first time, it is given species status because of its rather small calyx (10–11 mm), glabrous inner bracts, and veins colourless to light pink.

46. *A. senganense* Bunge, *Mém. Acad. Sci. Pétersb. ser.* 7, 18(2): 20 (1872); Mobayen, *Revis. Taxon. Acantholimon* fig. 42 (1964)

*Type*: 'Persia borealis inter Chorom-derreh, Sultanieh et Sengen, *Bunge & Bienert* (P).'

East Anatolia. B10 Iğdır: between Doğubeyazıt and Çaldıran, 2200 m, 18.vii.2001, *Doğan and Akaydın* 6977!

Iraq. Irano-Turanian element. Threat Category: NT.

This species is closely related to *A. venustum*, but differs by its excurrent veins and inner bracts

equal to the calyx tube. This species also resembles *A. petraeum*, but differs by its narrow leaves (1.0–1.3 mm), and shorter scapes and spikes (4–5 cm).

47. *A. spirizianum* Mobayen, *Revis. Taxon. Acantholimon* 304 (1964).

*Type*: '[Turkey] B9 Van: prope Van, in declivibus Buskal (Ispiris Dag), 2700 m, 31.vii.1954, *Davis & O. Polunin, D.* 23678 (holo. K! iso. E!).'

East Anatolia. B9 Van: Başkale, İspiriz Da., 2600 m, 31.vii.1954, *Davis* 23620! Between Gürpınar and Başkale, Esentepe Pass, 2800 m, 19.vii.2001, *Doğan & Akaydın* 7009! B10 Iğdır: between Doğubeyazıt and Çaldıran, 2200 m, *Doğan & Akaydın* 6980!

Endemic. Irano-Turanian element. Threat Category: VU.

48. *A. multiflorum* (Bokhari) Dogan & Akaydın, **comb. et stat. nov.**

Syn.: *A. spirizianum* Mobayen var. *multiflorum* Bokhari, *Notes R.B.G. Edinb.* 32: 70 (1972).

*Type*: '[Turkey] B9 Van: 34 km from Gürpınar (Havasor) to Hoşap, dry stony hills, 2150 m, 3.vii.1966, *P.H. Davis, D.* 45970 (holo. E! iso. K!).'

East Anatolia. B7 Erzincan: between Mutu and Tercan, 4 km east of Hoşap, 1180 m, *Hub.-Mor.* 11546! B9 Van: 34 km from Gülpınar (Havasor) to Hoşap, 2150 m, [3.vii.1966], *P. H. Davis, D.* 45970! (the type of *A. spirizianum* var. *multiflorum*), between Van and Gürpınar, 10 km from Van, 2100 m, 6.vii.2002, *Doğan & Akaydın* 7535!, around Hoşap, 2050 m, 6.vii.2002, *Doğan & Akaydın* 7539! B10 Iğdır: between Iğdır and Doğubeyazıt, near Karabuluk, 1600 m, 4.vii.2002, *Doğan & Akaydın* 7505!

Endemic. Irano-Turanian element. Threat Category: VU.

49. *A. araxanum* Bunge, *Mém. Acad. Sci. Pétersb. ser.* 7, 18 (2): 33 (1872).  *Ic. Mobayen, Revis. Taxon. Acantholimon*, fig. 59 (1964).

*Syntype*: 'In apricis siccis ad Araxem et in districtu, Choi provinciae atropatannae, Persiae boreali-occidentalis, *Szovits*. [G! P, W].'

East Anatolia. A9 Erzurum: between Horasan and Kağızman, 1200 m, 3.vii.2002, *Doğan & Akaydın* 7492! Kars: between Kars and Kağızman, around Kötek, 1400 m, 18.vii.2001, *Doğan & Akaydın* 6952! Iğdır: around Doğubeyazıt, 1500 m, 11.viii.2003, *Doğan & Akaydın* 8101!

Iran (West Azerbaijan province). Irano-Turanian element. Threat Category: NT.

50. *A. fominii* Kusn., *Trav. Soc. Nat. Petersbg.* 32, 3: 186 (1902).

*Type*: 'In region. steppos. Transcauc. Orient. In Eldar et Bas-dagh. (LE).'

East Anatolia. B9 Van: between Van and Başkale, 2100 m, 6.vii.2002, *Doğan & Akaydın 7538!*

Iran (West Azerbaijan province). Irano-Turanian element. Threat Category: VU.

51. *A. petraeum* Boiss. & Hausskn. ex Bunge, *Mém. Acad. Sci. Pétersb. ser. 7, 18(2): 28* (1872).

Type: '[Turkey] B8 Muş: Prov. Muş, In rupestribus trachiticis supra Gochkar, 6800', *Kotschy 379* (W).'

East Anatolia. B8 Erzurum: between Ilca & Tercan, 1900 m, 10.vii.1957, *Davis 30901!* Palandöken Da., 20–23 km from Çat to Erzurum, 2350 m, 27.vii.1966, *Davis 47356!* Muş: south-west of Bingöl Da., 1900 m, 10.vii.1966, *Davis 46204!* B9 Bitlis: Adilcevaz, Süphan Da., 2650 m, 20.vii.2001, *Doğan & Akaydın 7053!* B10 Iğdır: between Doğubeyazıt and Çaldıran, 2200 m, 18.vii.2001, *Doğan & Akaydın 6981!*

Iran (West Azerbaijan province). Irano-Turanian element. Threat Category: NT.

52. *A. venustum* Boiss., *Diagn. ser.1(7): 80* (1846). *İc. Mobayen, op. cit. t. 41* (1964).

Syn.: *Statice dianthifolia* Jaub. & Spach, *Ann. Sci. Nat. ser. 2(20): 253* (1843).

1. Scape and bracts covered by dense hairs.....  
.....var. *assyriacum*  
1. Scape hairy; bracts glabrous ..... var. *venustum*

var. *venustum*

Type: '[Turkey C5] in Tauro Cilicico, Aestate 1836 *Kotschy 414*, (holo. G!, K!).'

South, east, and central Anatolia. A6 Sivas: Zara, 11 km from Şerefiye to Suşehri, 1900 m, *Hub.-Mor. 14472!*, A7 Gümüşhane: between Gümüşhane and Bayburt, 1730 m, 16.vii.2001, *Doğan & Akaydın 6898!* B5 Kayseri: Develi, 26.vi.1952, D. 19178! B6 Malatya: between Gürün and Darende, 1525 m, 19.vi.1954, *Davis 21870!* Sivas: between Sivas and Zara, 1300 m, 15.vii.2001, *Doğan & Akaydın 6846!* Kayseri, Sarız, Dokuzdolambaç Pass, 1890 m, 2.vii.2001, *Doğan & Akaydın 6718!* B7 Erzincan: 2 km north of Refahiye, 1550 m, *Hub.-Mor. 16274!* Between Erzincan and Sivas, Sakaltutan Pass, 2160 m, 15.vii.2001, *Doğan & Akaydın 6872!* B9 Bitlis: Adilcevaz, Süphan Da. Sütay Yaila, 2650 m, 20.vii.2001, *Doğan & Akaydın 7057!* C2 Antalya: near Elmalı, 1250–1350 m, *Hub.-Mor. 8469!* Antalya, Elmalı vi.1860, *Bourgeau 249!* Elmalı in arvis incultis petrosis, 20.vi.1860, *Bourgeau 295!* (the type of *A. venustum* var. *laxiflorum*) C3 Antalya: 26 km from Elmalı to Korkuteli, 18.vi.1966, *Alava & Bocquet 5254!* Between Korkuteli and Elmalı 21 km from Elmalı, 1270 m, 14.vi.1954, *Hub.-Mor. 8470!* C5 Niğde: Anti-Taurus, 4000 ft. south-west of Kayseri, 15.vii.1960, *Furse et Synge 909!* Maden, 1829 m, 1.viii.1969, *J. Darrah 427!* Aladağ, around Çamardı, 1600 m, 22.vii.1967, *R. W. Cutler 5A!* Adana: Karaisalı,

Toros Da., south-west of Pozantı, 1450–1500 m, *Hub.-Mor. 16273!* C6 Kahramanmaraş: 25 km from Maraş to Göksun, 690 m, *Hub.-Mor. 14468!* C7 Diyarbakır: Karacadağ, 5600 ft, 3.vii.1952, *E.S. Brown 625!* C8 Mardin: Mardin, 25 vi *Sint. 1888: 890!*

West Syria, North Iraq, West Iran. Irano-Turanian element. Threat Category: LC.

var. *assyriacum* (Boiss.) Boiss., *Fl. Or. 4: 832* (1879).

Syn.: *A. assyriacum* Boiss., *Diagn. ser. 1(7): 81* (1846).

Type: '[Turkey C8] in Assyria inter Diarbekir et Mardin, *Kotschy [313]* (holo. G!, iso. W, K!).'

East Anatolia. B6 Kahramanmaraş: Nurhak, Tatlar, 1700 m, 9.vii.2002, *Doğan & Akaydın 7576!* Sivas: 12 km north of Zara, 1700 m, 12.vii.1971, *JSA et al. 2220!* B7 Malatya: 10 km from İsmet Paşa to Gündüzbey, 1400 m, *Hub.-Mor. 9130!* C7 Adıyaman: Kahta, Nemrut Da., *Hand.-Mazz. 2139!*

Endemic. Irano-Turanian element. Threat Category: VU.

## ACKNOWLEDGEMENTS

The authors wish to thank the Director of the Royal Botanic Garden, Edinburgh (E) for making available the duplicates of Davis' material of *Acantholimon*, for providing herbarium facilities, and for sending some of the types on loan; the authorities of the Sibbald Trust at the Royal Botanic Garden, Edinburgh for a 1-month grant to G.A.; the Directors of the Conservatoire et Jardin Botaniques de la Ville de Genève and Kew (K) for making their herbarium facilities available; the Scientific and Technical Research Council of Turkey (TUBITAK; TBAG-2195 and TBAG-1781); the Middle East Technical University (METU) Research Fund for their financial assistance to this study; and Mr A. Sargın from the Ministry of Forestry and Environment in Ankara for his drawings of the species. Thanks are also due to the following Turkish herbaria (ANK, GAZI, HUB, ISTF, EGE, and FUH) for making their herbarium material available.

## REFERENCES

- Akaydın G. 2004.** A new species of *Acantholimon* Boiss. Sect. *Staticopsis* Boiss. (Plumbaginaceae) from North Anatolia, Turkey. *Nordic Journal of Botany* **22**(6): 679–682.
- Akaydın G, Doğan M. 2002.** A new species of *Acantholimon* Boiss. (Plumbaginaceae) from Western Taurus Mountains of Turkey. *Israel Journal of Plant Sciences* **50**: 67–71.
- Boissier E. 1846.** *Diagnoses Plantarum Orientalium Novarum, Series 1* **7**: 69 (July–October).
- Boissier E. 1879.** *Flora orientalis*, Vol. 4. Basle: Reg. Acad. Scient., 823–854.

- Bokhari MH. 1970.** Materials for a *Flora of Turkey* XXII. *Plumbaginaceae*. *Notes Royal Botanic Garden, Edinburgh* **30**: 295–304.
- Bokhari MH. 1972a.** Synopsis of *Plumbaginaceae* in Turkey. *Notes Royal Botanic Garden, Edinburgh* **30**: 57–77.
- Bokhari MH. 1972b.** A brief review of stigma and pollen types in *Acantholimon* and *Limonium*. *Notes Royal Botanic Garden, Edinburgh* **32**: 79–84.
- Bokhari MH, Edmondson JR. 1982.** *Acantholimon* Boiss. In: Davis PH, ed. *Flora of Turkey and the East Aegean Islands*, Vol. 7. Edinburgh: Edinburgh University Press, 478–502.
- Brummitt RK, Powell CE, eds. 1992.** *Authors of plant names*. Kew: Royal Botanic Gardens.
- Bunge A. 1872.** *Die Gattung Acantholimon* Boiss. *Mem. de l'Academie Imperiale des Sciences de St.-Petersbourg*, VII. Serie, t 27 f. 8: 1–72.
- Davis PH, ed. 1965.** *Flora of Turkey and the East Aegean Islands*, Vol. 1. Edinburgh: Edinburgh University Press, 1–3.
- Davis PH, Heywood VH. 1973.** *Principles of angiosperm taxonomy*. Huntington, NY: Robert E. Kieger Publishing Co, 558.
- Doğan M, Akaydın G. 2001.** A new species of *Acantholimon* Boiss. (*A. birandii*. sp.nov.). (Plumbaginaceae) from the Central Anatolian Steppe in Turkey. *Nordic Journal of Botany* **21**(5): 481–484.
- Doğan M, Akaydın G. 2002a.** A new species of *Acantholimon* Boiss. (Plumbaginaceae) from Central Anatolia, Turkey. *Botanical Journal of the Linnean Society* **138**: 365–368.
- Doğan M, Akaydın G. 2002b.** A new species of *Acantholimon* Boiss. (Plumbaginaceae) from Ankara, Turkey. *Botanical Journal of the Linnean Society* **140**: 443–448.
- Doğan M, Akaydın G. 2003a.** Two new species of *Acantholimon* sect. *Staticopsis*. (Plumbaginaceae) from Turkey. *Annales Botanici Fennici* **40**: 53–58.
- Doğan M, Akaydın G. 2003b.** An undescribed species of *Acantholimon* Boiss. Sect. *Staticopsis* Boiss. (Plumbaginaceae) from Turkey. *Israel Journal of Plant Sciences* **51**: 231–236.
- Doğan M, Akaydın G. 2004.** Three new species with two flowered spikelets in *Acantholimon* (Plumbaginaceae) from East Anatolia, Turkey. *Botanical Journal of the Linnean Society* **144**: 497–505.
- Doğan M, Akaydın G. 2005.** A new species of *Acantholimon* Boiss. sect. *Glumaria* Boiss. (Plumbaginaceae) from Elazığ, Turkey. *Botanical Journal of the Linnean Society* **149**: 351–356.
- Doğan M, Duman H, Akaydın G. 2003.** Taxonomy and conservation status of *Acantholimon laxiflorum* Boiss. ex Bunge (Plumbaginaceae). *Turkish Journal of Botany* **27**: 447–452.
- IUCN. 2001.** *Red list categories*, Version 3.1. Gland, Switzerland/Cambridge, UK: IUCN Species Survival Commission.
- Komarov VL, ed. 1967.** *Flora U.R.S.S.*, Vol. 18. (English translation). Jerusalem: Israel Program for Scientific Translations.
- Mobayen S. 1964.** *Revision taxonomique du genre Acantholimon*. Thesis, Université de Montpellier, France.
- Moore DM. 1972.** In: Tutin TG, Heywood V, Burges NA, Moore DM, Valentine DH, Walters SM, Webb DA, eds. *Flora Europaea*, Vol. 3. Cambridge: Cambridge University Press, 30.
- Muvaffak A, Doğan M, Bilgin CC. 2001.** Numerical taxonomic study of the genus *Acantholimon* Boiss. (Plumbaginaceae) in Ankara Province. *Israel Journal of Plant Sciences* **49**: 297–300.
- Post GE. 1933.** *Flora of Syria, Palestine and Sinai*. Beirut: American Press, 510–511.
- Rechinger KH, Schiman-Czeika H. 1974.** *Flora Iranica: Plumbaginaceae*. Graz: Akademische Druck-u. Verlagsanstalt No: 108.

## INDEX OF TAXA

Name of taxon	Page number
<i>Acantholimon acerosum</i> (Willd.) Boiss.	410
var. <i>acerosum</i>	410
var. <i>brachystachyum</i> Boiss.	410
var. <i>pinardii</i> (Boiss.) Mobayen	410
ssp. <i>acerosum</i>	410
var. <i>acerosum</i>	410
var. <i>parvifolium</i> Bokhari	410
ssp. <i>brachystachyum</i> (Boiss.) Dogan & Akaydin	410
<b>ssp. longibracteolorum</b> Dogan & Akaydin	410
<i>A. anatolicum</i> Dogan & Akaydin	407
<i>A. androsaceum</i> (Jaub. & Spach) Boiss.	407
var. <i>creticum</i> Boiss.	408
var. <i>purpurascens</i> Bokhari	407
<i>A. araxanum</i> Bunge	414
<i>A. armenum</i> Boiss. & Huet.	411
var. <i>armenum</i>	411
var. <i>balansae</i> Boiss. & Huet	411
<i>A. artosense</i> Dogan & Akaydin	401
<i>A. assyriacum</i> Boiss. var. <i>micracme</i> Nab. & Bornm.	410
<i>A. avanosicum</i> Dogan & Akaydin	411
<i>A. balansae</i> (Boiss. & Huet) Bunge	411
<i>A. baltanense</i> Boiss. & Hauskn.	411
<i>A. bashkaleicum</i> Dogan & Akaydin	401
<i>A. birandii</i> Dogan & Akaydin	409
<i>A. bracteatum</i> (Girard) Boiss.	401
var. <i>bracteatum</i>	401
var. <i>capitatum</i> (Sosn.) Bokhari	401
<i>A. caesareum</i> Boiss. & Bal.	409
<i>A. calvertii</i> Boiss.	403
var. <i>calvertii</i>	403
<b>var. glabrum</b> Akaydin & Dogan	403
var. <i>sanguineum</i> Mobayen	403
<i>A. capitatum</i> Sosn.	401
ssp. <i>capitatum</i>	401
<b>ssp. sivasicum</b> Dogan & Duman	401
<i>A. caryophyllaceum</i> Boiss.	409
var. <i>brachystachyum</i> Boiss.	414
var. <i>parviflorum</i> Bokhari	414
<i>A. confertiflorum</i> Bokhari	409
<i>A. creticum</i> (Boiss.) Rech. fil.	408
<i>A. curviflorum</i> Bunge	402
<i>A. damassanum</i> Mobayen	413
var. <i>lancibracteatum</i> Bokhari	413
<i>A. dianthifolium</i> Bokhari	402
<i>A. echinus sensu</i> Boiss.	407
<b>A. ekimii</b> Dogan & Akaydin	404
<i>A. evreni</i> Dogan & Akaydin	402
<i>A. fominii</i> Kusn.	414
<i>A. glumaceum</i> (Jaub. & Spach) Boiss.	413
var. <i>glabra</i> Mobayen	404
<i>A. göksunicum</i> Dogan & Akaydin	405
<i>A. halophilum</i> Bokhari	412
var. <i>halophilum</i>	412
<b>var. coloratum</b> Dogan & Akaydin	412

INDEX OF TAXA *Continued*

Name of taxon	Page number
<i>A. haussknechtii</i> Bunge	411
<i>A. hohenackerii</i> (Jaub. & Spach) Boiss.	413
<i>A. hoshapicum</i> Dogan & Akaydin	401
<i>A. huetii</i> Boiss.	404
<b>var. breviscapum</b> Akaydin & Dogan	404
var. <i>huetii</i>	404
<i>A. hypochaerum</i> Bokhari	403
<i>A. iconicum</i> (Boiss.) Boiss. & Heldr.	412
<i>A. karamanicum</i> Akaydin & Dogan	409
<i>A. kotschyi</i> (Jaub. & Spach) Boiss.	411
ssp. <i>laxispicatum</i> Bokhari	411
var. <i>iconicum</i> (Boiss.) Boiss.	412
<i>A. köycegizicum</i> Dogan & Akaydin	403
<i>A. latifolium</i> Boiss.	402
<i>A. laxiflorum</i> Boiss. ex Bunge	402
<i>A. lepturoides</i> (Jaub. & Spach) Boiss.	411
<i>A. libanoticum</i> Boiss.	414
var. <i>ulicinum</i> (Willd. ex Schultes) Boiss.	407
<i>A. listoniae</i> Boiss.	410
<i>A. lycaonicum</i> Boiss. & Heldr.	412
<b>ssp. cappadocicum</b> Dogan & Akaydin	412
ssp. <i>lycaonicum</i>	412
<i>A. multiflorum</i> (Bokhari) Dogan & Akaydin	414
<i>A. parviflorum</i> (Bokhari) Akaydin & Dogan	414
<i>A. peroninii</i> Boiss.	408
<i>A. petraeum</i> Boiss. & Hausskn. ex Bunge	415
<i>A. petuniiflorum</i> Mobayen	401
<i>A. phrygium</i> Boiss.	410
<i>A. pinardii</i> Boiss.	410
<i>A. puberulum</i> Boiss. & Bal.	408
ssp. <i>longiscapum</i> (Bokhari) Dogan & Akaydin	408
ssp. <i>peronii</i> (Boiss.) Akaydin & Dogan	408
ssp. <i>puberulum</i>	408
var. <i>glabrum</i> Bokhari	408
var. <i>longiscapum</i> (Bokhari) Dogan & Akaydin	408
<i>A. quinquelobum</i> Bunge	402
var. <i>curviflorum</i> (Bunge) Dogan & Akaydin	402
var. <i>quinquelobum</i>	402
<i>A. reflexifolium</i> Bokhari	409
<i>A. saxifragiforme</i> [Hausskn. & Sint. ex] Bokhari	413
<i>A. scabiosum</i> Mobayen	401
<i>A. senganense</i> Bunge	414
<i>A. sintenisii</i> Hausskn.	403
<i>A. spirizianum</i> Mobayen	414
var. <i>multiflorum</i> Bokhari	414
<i>A. splendidum</i> Bunge	401
<i>A. strigillosum</i> Bokhari	407
<i>A. tchihatcheffii</i> Fisch. & Mey.	410
<i>A. tragacanthinum</i> (Jaub. & Spach) Boiss.	402
<i>A. tournefortii</i> (Jaub. & Spach) Boiss.	407
<i>A. turcicum</i> Dogan & Akaydin	406
<i>A. ulicinum</i> (Willd. ex Schultes) Boiss.	407
ssp. <i>lycaonicum</i> (Boiss. & Heldr.) Bokhari & Edmondson	407
var. <i>creticum</i> (Boiss.) Bokhari & Edmondson	407

INDEX OF TAXA *Continued*

Name of taxon	Page number
var. <i>purpurascens</i> (Bokhari) Bokhari & Edmondson	407
var. <i>ulicinum</i>	407
<i>A. venustum</i> Boiss.	415
var. <i>assyriacum</i> (Boiss.) Boiss.	415
var. <i>laxiflorum</i> (Boiss. ex Bunge) Bokhari	402
var. <i>venustum</i>	415
<i>A. wiedemannii</i> Bunge	406
<i>A. yildizelicum</i> Akaydın	407
<i>Statice acerosa</i> Willd.	410
<i>S. androsacea</i> Jaub. & Spach	407
<i>S. bracteata</i> Girard	401
<i>S. dianthifolia</i> Jaub. & Spach	415
<i>S. glumacea</i> Jaub. & Spach	413
<i>S. hohenackerii</i> Jaub. & Spach	413
<i>S. kotschyi</i> Jaub. & Spach	411
<i>S. lepturoides</i> Jaub. & Spach	411
<i>S. pauciflora</i> Jaub. & Spach	407
<i>S. tournefortii</i> Jaub. & Spach	407
<i>S. tragacanthina</i> Jaub. & Spach	402
<i>S. ulicina</i> Willd. ex Schultes	407