

NEW ALLIUM TAXA FROM TURKEY

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ABSTRACT. The following new taxa of *Allium* (Liliaceae) from Turkey are described: *Allium baytopiorum* Kollm. & N. Özhatay, *A. junceum* subsp. *tridentatum* Kollm., Koyuncu & N. Özhatay, *A. macrochaetum* subsp. *tuncelianum* Kollm., *A. phaneranthum* subsp. *deciduum* Kollm. & Koyuncu, *A. proponticum* var. *parviflorum* Kollm., *A. robertianum* Kollm., *A. sandrasicum* Kollm., N. Özhatay & Bothmer, and *A. stearnianum* subsp. *stearnianum* Koyuncu, Özhatay & Kollm. and subsp. *vanense* Kollm. & Koyuncu in sect. *Allium*; *A. deciduum* N. Özhatay & Kollm., *A. flavum* L. subsp. *tauricum* (Besser ex Reichenb.) Stearn var. *pilosum* Kollm. & Koyuncu, *A. huber-morathii* Kollm., N. Özhatay & Koyuncu, *A. kastambulense* Kollm. and *A. kurtzianum* [Asch. & Sint. ex] Kollm. in sect. *Codonoprasum*; *A. alpinarii* N. Özhatay & Kollm., *A. sieheanum* [Hauskn. ex] Kollm., *A. sivasicum* N. Özhatay & Kollm., and *A. wendelboanum* Kollm. in sect. *Scorodon*. Chromosome counts are reported for three species in sects *Codonoprasum* and *Scorodon*: *A. deciduum*, *A. huber-morathii* and *A. sivasicum*, all of which have $2n = 16$.

The genus *Allium* in Turkey comprises about 150 species. The relatively high number of species and great number of endemics can possibly be explained by Turkey being a meeting place of three phytogeographical regions and by the great diversity of habitats. Vegetative reproduction by bulb, in addition to reproduction by seed, may have enabled *Allium* species to maintain themselves also in niches that are not favourable for propagation by seed.

While preparing an account of *Allium* for the *Flora of Turkey*, extensive material of the genus was examined by the first author. During the years 1973-81 many new collections in different parts of Turkey and observations of living plants were made by the second and third authors and by Profs A. and T. Baytop (Istanbul). In this way, the authors came across a number of still unknown *Allium* taxa, two of which have since been described—*A. nevsehirense* Koyuncu & Kollm. & *A. karamanoglui* Koyuncu & Kollm. (*Isr. J. Bot.* 27: 90-93, 1978). Chromosome counts were carried out by the second author for three of the new species.

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Allium alpinarii N. Özhatay & Kollm., **sp. nov.** (sect. *Scorodon*) Fig. 1A.

Affinis *A. obtusifolio* DC. (= *A. erythraeo* Griseb.) spatha brevi et staminibus inclusis sed differt spathae forma, umbella pauciflora, pedicellis subaequalibus, perigonii segmentorum forma.

Bulbus 1cm diam., ovoideus; tunicae exteriores nigrae, coriaceae; interiores albae, membranaceae. Scapus 12–15cm, curvatus. Folia 0.7–1mm lata, filiformia, fistulosa. Spatha valvis binis; valvae 5–6mm latae, mucronatae, umbella multo breviores. Umbella 1–1.5cm diam., pauciflora (3–8), laxa; pedicelli subaequales, perigonio subaequilongi. Perigonium campanulatum; segmenta 4–4.5mm, roseo-purpurea, nervo medio atropurpureo, elliptica, apice subretrorsa, interiora exterioribus latiora, exteriora acuta, interiora truncata et apiculata. Filamenta inclusa, perigonio tertia parte breviora, basi in annulum 1–1.5mm altum connata, filamenta interiora bidentata vel edentata. Ovarium 2.5–3mm, ellipsoideum, apice manifeste angustatum. Stylus 1mm. Capsula 4mm, obovoidea, valvis apiculatis. Fl. Aug.

Type. Turkey. C5 İçel: Bolkar Dağları, Arslanköy, Küçükyıldız Tepesi, 2300m, 10 viii 1970, K. *Alpinar* (holo. ISTE 35796).

Endemic. E Medit.(mt) element; known only from the type collection.

This new species is very distinct with its curved stem, broad and short mucronate spathe valves, few-flowered umbel, and truncate and apiculate inner perianth segments.

Allium baytopiorum Kollm. & N. Özhatay, **sp. nov.** (sect. *Allium*) Fig. 2.

Affinis *A. viridi* Grossh. et *A. hamrinensi* Hand.-Mazz. habitu et characteribus tunicarum exteriorum; a priori differt perigonii segmentorum magnitudine, forma, scabritudine; a posteriore perigonii segmentorum colore (segmentis viridibus vel brunneolis nec violaceis).

Bulbus 2–3cm diam., globosus; tunicae exteriores pallide brunneae, reticulato-fibrosae; bulbili pauci, rubescenti-brunnei. Scapus 60–100cm, crassus. Folia 3–4, usque ad 5mm lata, fistulosa, teretia, glabra. Spatha decidua. Umbella 5cm diam., hemisphaerica, densa; pedicelli 1.5–2cm, inaequales, basi bracteolis albis, membranaceis provisi; bracteolae 10mm, tenues, anguste-lanceolatae. Perigonium oblongo-campanulatum; segmenta 6–6.5mm, brunnescentia vel virescentia, marginibus albis, angustis, apice reflexa, exteriora late elliptica, acuta, margine et dorso minute et dense scabra, interiora oblonga, truncata, glabra. Filamenta paulo exserta, basi paulo ciliata; cuspis media cuspidibus lateralibus et lamina indivisa brevior. Capsula 4mm, perigonio brevior. Fl. Mai.

Type. Turkey. B10 Kars: Foot of Ağrı Dağı, 1200m, 19 v 1979, T. *Baytop* (holo. ISTE 43568).

Endemic. Ir.-Tur. element; known only from the type collection.

Allium deciduum N. Özhatay & Kollm., **sp. nov.** (sect. *Codonoprasum*) Fig. 1 B & C.

Bulbus 1–1.5cm diam., globosus; tunicae exteriores cinerascanti-brunneae, interiores albae, membranaceae. Scapus 15–30(–50)cm, plerumque basi purpureus. Spatha bivalvis; valvae anguste-lanceolatae, plerumque deciduae, una saltem umbella multo longior. Umbella 2.5–5cm diam.,

hemisphaerica, laxa; pedicelli capillacei, perigonio 3–5(–10)-plo longiores, basi bracteolati. Perigonium cylindrico-campanulatum; segmenta 4mm, pallide lilacina nervo viridi, oblonga, obtusa vel truncata, aliquando apice abrupte retrorso. Filamenta alba vel purpurea, segmentis 1.5-plo longiora. Ovarium 2mm, obovoideum, truncatum, parum stipitatum; stylus 6mm, valde exsertus. Capsula 3–4mm, late cordata. $2n=16$. Fl. Jul.–Aug. On stony slopes and rocks, 550–1750m.

Two subspecies are recognized and can be distinguished as follows:

1. Spathe deciduous, perianth segments without an abrupt retrorse apex
subsp. **deciduum**
- + Spathe sometimes deciduous, perianth segments with an abrupt retrorse apex subsp. **retrorsum**

subsp. **deciduum**. Fig. 1B.

Type. Turkey. C2 Muğla: d. Köyceğiz, Sandras Dağı, nr Böceli, 1670m, 24 vii 1977, *E. Özhatay* 1219 (holo. ISTE 43971).

SW ANATOLIA: C2 Denizli: Kale to Muğla, 550m, *N. & E. Özhatay* (ISTE 44853). Muğla: d. Köyceğiz, Sandras Dağı, *N. & E. Özhatay* (ISTE 45919). Antalya: Korkuteli–Fethiye, 4km from Söğüt, 1400m, *N. Özhatay* (ISTE 45627).

Endemic. E Medit. element.

subsp. **retrorsum** *N. Özhatay & Kollm.*, subsp. **nov.** Fig. 1C.

Perigonii segmenta apice abrupte retrorsa. Spatha aliquando decidua.

Type. Turkey. C5 İçel: Bolkar Dağları, Arslanköy, Boğazağzi etekleri, 1750m, 6 viii 1976, *K. Alpınar* (holo. ISTE 35799).

Endemic. Known only from the type collection.

A. deciduum differs from the vast majority of species which belong to section *Codonoprasum* in having a deciduous spathe, though a persistent spathe is one of the characteristic traits of the section.

Allium flavum L., Sp. Pl. 298 (1753). (sect. *Codonoprasum*) subsp. **tauricum** ([Besser ex] Reichenb.) Stearn in Ann. Mus. Goulandris 4: 167 (1978).

var. **pilosum** Kollm. & Koyuncu, var. **nov.**

A subsp. *taurico* var. *taurico* foliorum laminis vaginisque et interdum scapo usque ad umbellam pilos longos et molles ferentibus differt. Fl. Jun. Dry hillsides, rocky hills, scrub, 800m.

Type. Turkey. C6 Gaziantep: about 2km E of Gaziantep on the road to Urfa, *Alava* 6705b (holo. TUR, *n.v.*; iso. HJ).

S ANATOLIA. C6 Adana: Osmaniye above Fevzipaşa, 800m, *Koyuncu* (AEF 2150).

Endemic. Ir.-Tur. element. The length and quality of the hairs are variable.

Allium huber-morathii Kollm., *N. Özhatay & Koyuncu*, sp. **nov.** (sect. *Codonoprasum*) Fig. 3A.

Affinis *A. armeno* Boiss. & Ky. et *A. tchihatschewii* Boiss. Differt ab *A.*

armeno foliis scapo plerumque brevioribus, spathae valvis umbella longioribus, perigonio campanulato, perigonii segmentis ellipticis-oblongis, purpurascensibus, filamentis minus exsertis. *A. armenum* habitat in Anatolia orientali, *A. huber-morathii* in Anatolia centrali. Ab *A. tchihatschewii* species nova differt scapi colore, spathae valvis umbella longioribus, floribus purpurascens-roseis, filamentis exsertis.

Bulbus 0.8–1cm, globosus vel ovoideus; tunicae exteriores nigrae vel cinerascens-brunneae, coriaceae, interiores membranaceae, saepe purpureae. Scapus 5–20(–25)cm; scapi bini saepe bulbo uno ascendentes. Folia 1–2mm lata, cylindrica, scapo breviora vel subaequilonga. Spatha bivalvis; valvae venis purpureis saepe percursae, valva una saltem umbella multo longior. Umbella (1.5–)2–4cm diam., plerumque densa, 10-multiflora; pedicelli perigonio aequilongi vel 2–3-plo longiores. Perigonium campanulatum; segmenta 3.5–4mm, purpurascens-rosea, raro pallide rosea vel alba, elliptica vel oblonga. Filamenta paulo exserta, parte superiori purpurascens; antherae purpurascens. Ovarium globosum, manifeste stipitatum; stylus 3–4mm. Capsula 4mm, globosa, valvis cordatis. $2n = 16$. Fl. Jun.–Jul.(–Aug.). In woods of *Quercus* and *Pinus nigra* and on dry limestone screes, 1000–2000m.

Type. Turkey. B4 Ankara: between Gerede and Ankara, nr Alyarma pass, 1400m, forest of *Pinus*, dry meadow, 10 vii 1976, Carle & Loh 76–257 (holo. TUB).

C ANATOLIA: A4 Ankara: d. Kizilcahamam, 2km from Kizilcahamam, 1060–1120m, *Huber-Morath* 14418; 20km S Kizilcahamam, 1000m, *Sorger* 62-81-2; Çubuk–Karagöl rd, 914m, *Guichard* T/33/60; Karagöl, 1500m, *Koyuncu* (AEF 5426); Hüseyin Gazi Dağ, 1200m, *Lindberg*. Çankiri: 20km from Kurşunlu to Korgun, 1400m, *A. & T. Baytop* (ISTE 35308); 9km from Korgun to Kurşunlu, 1420m, rocky places, *N. Özhatay* (ISTE 47267). B2 Kütahya: Murat Da., *A. Baytop* (ISTE 35708) cult. Istanbul. B4 Ankara: Gerede–Ankara, nr Kizilcahamam, 1200m, *McNeill* 281.

Endemic. Ir.–Tur. element.

Allium junceum Smith in Sibth. & Smith, Fl. Graec. Prodr. 1:226 (1809); Fl. Graeca 4: 19, t. 322 (1823). (sect. *Allium*).

subsp. ***tridentatum*** Kollm., *Koyuncu* & N. Özhatay, subsp. nov. Fig. 3B.

A subsp. *junceo* differt filamentis interioribus tri-–nec quinque-dentatis et perigonii segmentis exterioribus quam interiora brevioribus.

Perigonii segmenta exteriora quam interiora breviora, atropurpurea, filamenta interiora 3-dentata. Fl. May. Roads, nr sea, 5–10m.

Type. Turkey. C3 Antalya: Konyaalti, 10m, 17 v 1937, *Tengwall* 669 (holo. K).

S ANATOLIA. C3 Antalya: Konyaalti, 5m, *Sorger* 63-40-42; Konyaalti, 10m, *Koyuncu* & *Coşkun* (AEF 6112); Konyaalti, 10m, *N. & E. Özhatay* (ISTE 48791). Yeniceköy, *Uslu* (AEF 2670).

Endemic subspecies.

Allium kastambulense Kollm., sp. nov. (sect. *Codonoprasum*) Fig. 4.

Affinis *A. olympico* sed differt bulbis oblongis, tunicis exterioribus fibrosis, inflorescentia pauciflora, floribus majoribus, segmentis oblongis.

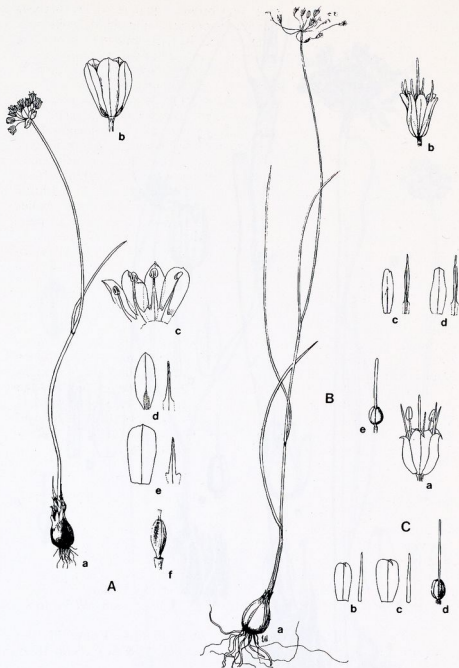


FIG. 1. A. *Allium alpinarii*: a, habit; b, flower; c, inner surface of stamens and segments; d, outer segment and filament; e, inner segment and filament; f, ovary. a $\times$ approx. $\frac{1}{2}$, b-f $\times$ approx. $\frac{3}{4}$. B. *Allium deciduum* subsp. *deciduum*: a, habit; b, flower; c, outer segment and filament; d, inner segment and filament; e, ovary. a $\times$ approx. $\frac{1}{2}$, b-e $\times$ approx. $\frac{3}{4}$. C. *A. deciduum* subsp. *retrorsum*: a, flower; b, outer segment and filament; c, inner segment and filament; d, ovary. a-d $\times$ approx. $\frac{3}{4}$.

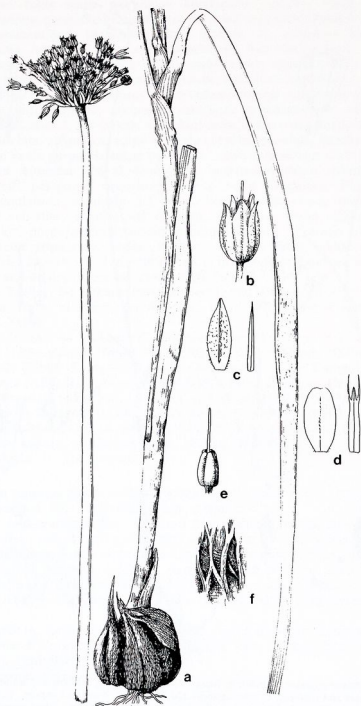


FIG. 2. *Allium baytopiorum*: a, habit; b, flower; c, outer segment and filament; d, inner segment and filament; e, ovary; f, part of outer tunics. a $\times$ approx. $\frac{2}{3}$, b–e $\times$ approx. $\frac{3}{4}$, f $\times$ approx. $6\frac{1}{2}$.

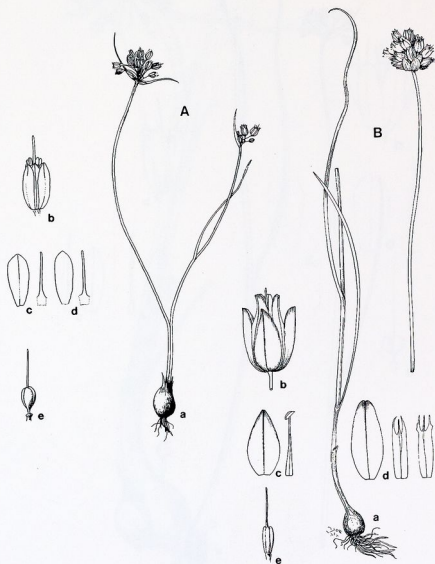


FIG. 3. A. *Allium huber-morathii*: a, habit; b, flower; c, outer segment and filament; d, inner segment and filament; e, ovary. a $\times$ approx. $\frac{1}{2}$, b-e $\times$ approx. $3\frac{1}{4}$. B. *Allium junceum* subsp. *tridentatum*: a, habit; b, flower; c, outer segment and filament; d, inner segment and filament; e, ovary. a $\times$ approx. $\frac{1}{2}$, b-e $\times$ approx. $3\frac{1}{4}$.



FIG. 4. *Allium kastambulense*: a, habit; b, flower; c, outer segment and filament; d, inner segment and filament; e, ovary. a $\times$ approx. $\frac{3}{4}$, b-e $\times$ approx. $3\frac{1}{4}$.

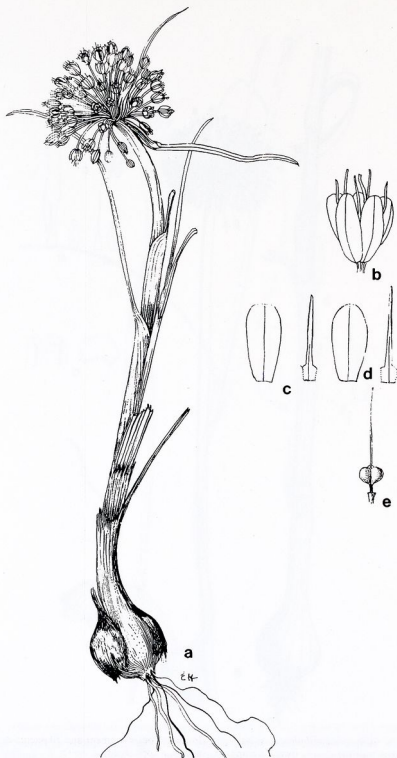


FIG. 5. *Allium kurtzianum*: a, habit; b, flower; c, outer segment and filament; d, inner segment and filament; e, ovary. a $\times$ approx. $\frac{1}{2}$, b-e $\times$ approx. $3\frac{1}{4}$.

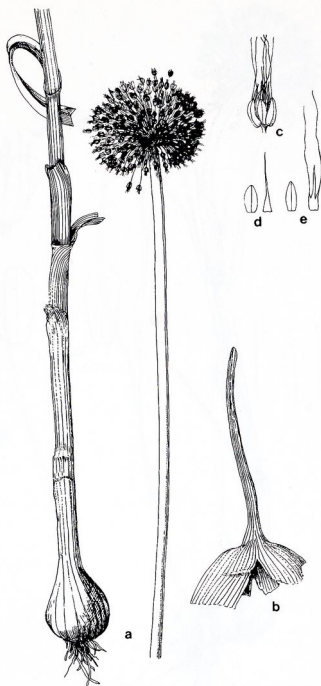


FIG. 6. *Allium macrochaetum* subsp. *tuncelianum*: a, habit; b, spathe; c, flower; d, outer segment and filament; e, inner segment and filament. a-b $\times$ approx. $\frac{1}{2}$, c-e $\times$ approx. $3\frac{1}{4}$.

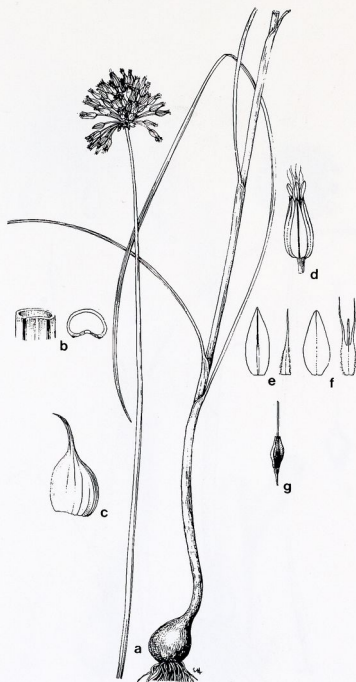


FIG. 7. *Allium phaneranthum* subsp. *deciduum*: a, habit; b, cross-section of leaf; c, spathe; d, flower; e, outer segment and filament; f, inner segment and filament; g, ovary. a, c $\times$ approx. $\frac{1}{2}$, b, d-g $\times$ approx. $\frac{3}{4}$.

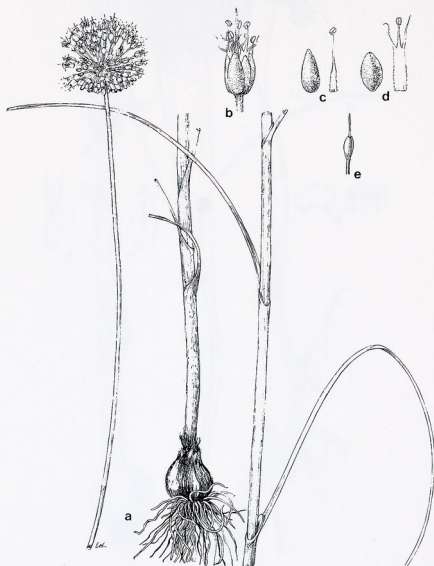


FIG. 8. *Allium proponcticum* var. *parviflorum*: a, habit; b, flower; c, outer segment and filament; d, inner segment and filament; e, ovary. a $\times$ approx. $\frac{3}{5}$, b-e $\times$ approx. $3\frac{1}{4}$.

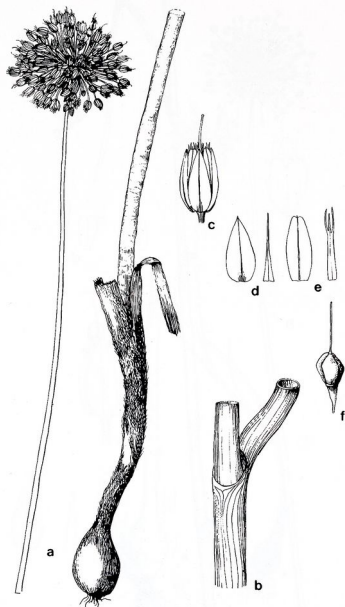


FIG. 9. *Allium robertianum*: a, habit; b, part of stem and leaf; c, flower; d, outer segment and filament; e, inner segment and filament; f, ovary. a $\times$ approx. $\frac{2}{3}$, b $\times$ approx. 1, c-f $\times$ approx. $3\frac{1}{4}$.

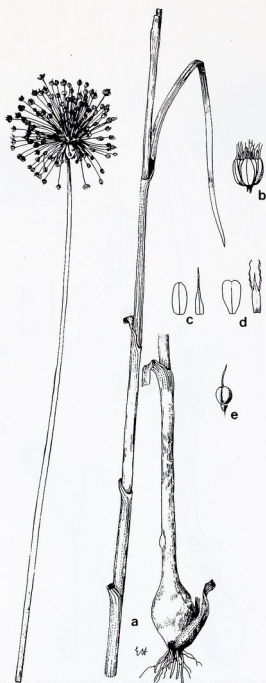


FIG. 10. *Allium sandrasicum*: a, habit; b, flower; c, outer segment and filament; d, inner segment and filament; e, ovary. a $\times$ approx. $\frac{1}{2}$, b-e $\times$ approx. $3\frac{1}{4}$.

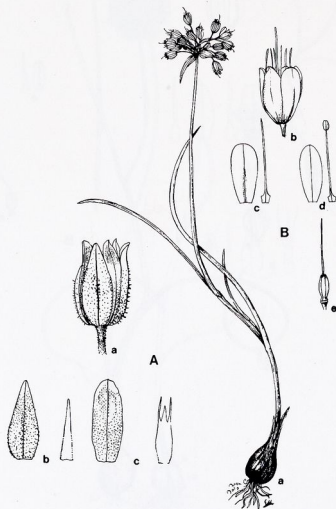


FIG. 11. A. *Allium asperiflorum* Misch.: a, flower; b, outer segment and filament. a-c $\times$ approx. $3\frac{1}{4}$. B. *Allium sieheanum*: a, habit; b, flower; c, outer segment and filament; d, inner segment and filament; e, ovary. a $\times$ approx. $\frac{2}{3}$, b-e $\times$ approx. $3\frac{1}{4}$.

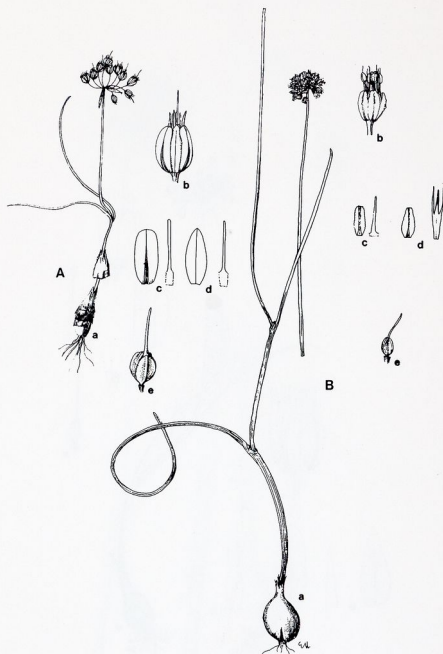


FIG. 12. A. *Allium sivasicum*: a, habit; b, flower; c, outer segment and filament; d, inner segment and filament; e, ovary. a $\times$ approx. $\frac{1}{2}$, b-e $\times$ approx. $3\frac{1}{4}$. B. *Allium stearnianum* subsp. *stearnianum*: a, habit; b, flower; c, outer segment and filament; d, inner segment and filament; e, ovary. a $\times$ approx. $\frac{1}{2}$, b-e $\times$ approx. $3\frac{1}{4}$.

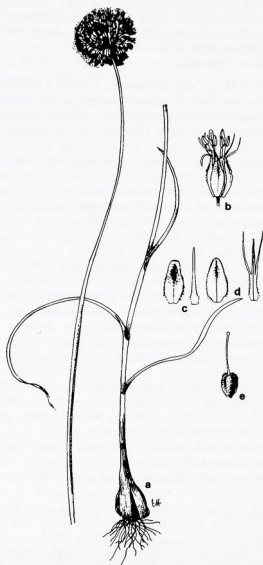


FIG. 13. *Allium stearnianum* subsp. *vanense*: a, habit; b, flower; c, outer segment and filament; d, inner segment and filament; e, ovary. a $\times$ approx. $\frac{1}{2}$, b-e $\times$ approx. $3\frac{1}{4}$.

Bulbus 1cm diam., oblongus; tunicae exteriores brunneolae vel nigricantes, in fimbrias solutae. Scapus 20–35cm, aliquando scapi bini bulbo uno ascendentes. Folia 2–3, c. 2mm lata, plana. Spatha valvis umbellae aequilongis vel ea longioribus, e basi lata in caudas graciles abrupte contractis. Umbella 1.5–2cm diam., hemisphaerica, pauciflora, valde laxa; pedicelli 1cm, subaequales. Perigonium late-campanulatum; segmenta malvino-rosea, 5–5.5mm, oblonga, obtusa. Filamenta exserta. Stylus valde exsertus. Capsula c.4mm, depresso-globosa. Fl. Jun.–Jul. Rocky slopes, limestone cliffs, on ledges, sandy clay, (40–)800–1250m.

Type. Turkey. A4 Kastamonu: pass between Küre and Inebolu, 2km E of pass, 1000m, 31 vii 1962, *Davis* 38576 (holo. E).

N ANATOLIA. A4 Kastamonu: Küre to Inebolu, 1250m, *Coşkun & Çelik* (AEF 2198); 40km from Azdavay to Cide, 800m, 31 vii 1962, *Davis* 38688. A5 Sinop: Ince Burun, 40m, *Tobey* 1079.

Endemic. Euxine element.

The sheet AEF 2198 has whitish flowers. It bears a relatively early date of collection and it seems that the plant flowered on the herbarium sheet.

Czczott's records of an unidentified *Allium* from above Inebolu (Czczott in *Feddes Repert., Beih.* 107: 243, 1939) may refer to this species.

Allium kurtzianum [Asch. & Sint. ex] Kollm. sp. nov. (sect. *Codonoprasum*) Fig. 5.

Syn.: [*A. kurtzianum* Asch. & Sint. in sched.!]

Affinis *A. staticiformi* sed differt scapo humiliore, floribus paulo majoribus et spathae valvis non abrupte contractis. *A. staticiforme* habitat in arenosis maritimis, sed *A. kurtzianum* in montibus.

Bulbus 1–2cm diam., ovoideus vel globosus; tunicae exteriores nigrae, membranaceae, secus scapum in collum longum productae; tunicae interiores flavescens, coriaceae. Scapus (5–)10–15cm, crassus, parte inferiore curvatus, ad 3/4 longitudinis vel fere ad umbellam foliatus; scapi bini aliquando bulbo uno ascendentes. Folia 2–3, 1mm lata, fistulosa scapo aequilonga vel eo longiora; vaginae distincte costatae. Spatha valvis umbellae aequilongis vel ea longioribus, e basi latiore lanceolatis. Umbella 1.5–3cm diam., hemisphaerica, multiflora, densa; pedicelli subaequales, perigonio 1.5–2-plo longiores. Perigonium campanulatum; perigonii segmenta subroseo-purpurea, nervo medio atriore, elliptica, obtusa. Filamenta e basi latiore, anguste-lanceolata, exserta. Ovarium triquetroglobosum, substipitatum; stylus exsertus. Capsula 4mm, globosa. Fl. Jul. Mountain slopes on marble.

Type. Turkey. B1 Çanakkale: Mt Ida, marmor. mt Szu-Szus Da. (Susuz Da.), 17 vii 1883, *Sintenis* 729 (holo. LD).

Endemic. E Medit. (mt) element; known only from the type gathering.

Allium macrochaetum Boiss. & Hausskn. in Boiss., Fl. Or. 5: 239 (1882). (sect *Allium*).

subsp. ***tuncelianum*** Kollm., subsp. nov. Fig. 6.

Affinis subsp. *macrochaeto* magnitudine, colore, facie glabra perigonii segmentorum, longitudine filamentorum et cuspidum. Differt bulbo et statura majore, foliis latioribus, spatha majore, rostro longiore, pedicellis

basi non bracteolatis vel bracteolis inconspicuis provis. Affinis etiam *A. ampelopraso* diametro bulbi, statura, foliorum et spathae forma, sed valde differt perigonii characteribus.

Bulbus 2–2.5cm diam.; tunicae exteriores cinerascetes, membranaceae. Scapus 40–100cm. Folia 7–20mm lata. Spatha decidua, rostro 7–16cm longo. Umbella 6–8cm diam., globosa, valde densa; pedicelli lilacini, bracteolis inconspicuis provis vel sine bracteolis. Perigonii segmenta 2.5–3mm, pallide sordide malvinea vel lilacino-rosea, glabra. Filamenta perigonio 2–3-plo longiora; cuspis media lamina basali longior, cuspides laterales filiformi, cuspid media 2-plo longiores. Fl. Jul.-Aug. Rocky places, limestone screes, 1100–2100m.

Type. Turkey. B7 Tunceli: Munzur Da., in Aksu Dere above Ovacik, 1800m, 21 vii 1957, *Davis* 31498 (holo. E).

E ANATOLIA. B7 Tunceli: Tunceli to Ovacik, *T. Baytop* 16; ibidem, 1100m, *T. Baytop* (ISTE 23198 & 32231). B7 Erzincan: Tepecik village, Munzur Da., 2100m, *Koyuncu* (AEF 3953).

Subsp. *tuncelianum* is similar to subsp. *macrochaetum*, which is found in the neighbouring districts, in size, colour and smooth surface of perianth segments and in length of the filaments and their lateral cusps. It differs from *A. macrochaetum* mainly in its larger bulb, taller stature, broader leaves, larger spathe with longer beak, absence of conspicuous bracteoles at the base of the pedicels and in the larger, globose, very dense umbel. In only one of the specimens examined (*Davis* 31498) are the outer bulb tunics present; they do not seem to split into fibres as in *A. macrochaetum*.

Allium phaneranthrum Boiss. & Hausskn. in Boiss., Fl. Or. 5: 235 (1882). (sect. *Allium*).

subsp. **deciduum** Kollm. & Koyuncu, subsp. nov. Fig. 7.

A subsp. *phaneranthro* differt spatha decidua et pedicellis bracteolatis.

Flores cerasinei, purpureo-rubri vel malvinei. Spatha brevis, ovata, in rostrum abrupte attenuata, decidua. Bulbili purpurei. Pedicelli bracteolis numerosis basi provis, parte superiore saepe minute tuberculati. Fl. Jun.-Aug. Forests of *Pinus halepensis*, open forests of *Fagus*, *Ostrya*, *Quercus*, *Sorbus* & *Cedrus*, rocky places & screes, gabbros, or calcareous soil, (200–)670–1800m.

Type. Turkey. C6 Adana: Amanus, western slope between Karagouz and Bagajak, 800–1600m, Pinetum halepense, 1 vii 1932, *Eig* & *M. Zohary* (holo. HUJ).

S ANATOLIA. C5 İçel: Mersin, d. Anamur (Cilicia Trachea), Olucak-Kürkür (Ermenek-Anamur), 18 viii 1969, *Davis* 16343. C5 Adana: Gülek Boğazi, 1200m, 20 vi 1965, *Koyuncu* (AEF 2143); 3–4km N of Pozanti, 670m, 31 viii 1971, *Aberdeen Univ. Amanus Exped.* N2 849; Pozanti, 3 miles N on eastward slopes of Toros Dağı, 1200m, 13 vii 1971, *Aberdeen Univ. Amanus Exped.* A2 64. C6 Hatay: Amanus, ascent to Achagi Zarkoun from Kiraksiyeh, 800–1000m, 30 vi 1932, *Eig* & *M. Zohary*; Amanus, pente de Achagi Zarkoun, 1000–1200m, vi 1932, *Delbès*; Amanus, source de Triton, 1000–1200m, vi 1932, *Delbès*; Amanus (Nur Dağları), c. 7km above Yarpuz, 29km E of Osmaniye, 1550–1650m, 13 vii 1978, *Ehrendorfer et al.* 787-42-5.

Allium proponticum Stearn & Özhatay in Ann. Mus. Goulandris 3: 48, f. 2 (1977). (sect. *Allium*).

var. **parviflorum** Kollm. var. nov. Fig. 8.

A var. *propontico* differt perigonii segmentis minoribus.

Pedicelli et perigonii segmenta dense papillosa; segmenta 2.5–3mm longa. Fl. Jul. Forests of *Quercus*, *Ostrya* and *Juniperus*, walls, hard limestone and marble, 800–900m.

Type. Turkey. C3 Antalya: Thermessos, 30km SW of Antalya, forest of *Quercus infectoria* and *Ostrya*, hard limestone and marble, 900m, 20 vii 1971, *Shmida* & *Lev-Ari* (holo. HJ).
S ANATOLIA. C3 Antalya: SW of Antalya, 800m, 11 vii 1971, *Shmida*.

Allium robertianum Kollm., sp. nov. (sect. *Allium*). Fig. 9.

Affine *A. hamrinensi* Hand.-Mazz. tunicis reticulato-fibrosis, sed differt scapis elatioribus, foliis latioribus, perigonii segmentis albedo-viridibus vel albidis, glabris, longioribus et angustioribus, filamentis magis exsertis. *A. hamrinense* habitat in desertis Iraquiensibus, *A. robertianum* in area mediterranea Anatoliae.

Bulbus c. 2cm diam., oblongus; tunicae exteriores reticulato-fibrosae, secus scapum in collum longum productae. Scapus 50–200cm, usque ad 1.7cm crassus. Folia 0.5–1.5cm lata, cylindrica, fistulosa. Spatha univalvis, rostro brevi, decidua. Umbella 2–7cm diam., globosa, multiflora, densa; pedicelli perigonio 1–2-plo longiores, basi bracteolis albis provisi. Perigonium cylindrico-campanulatum; segmenta 4–4.5(–5)mm, albedo-viridia, nervo medio viridi, ovato-oblonga, exteriora acuta, interiora obtusa. Stamina paulo exserta, cuspis media filamentorum interiorum cuspidibus lateralibus brevior et lamina basali multo brevior; antherae violaceae. Ovarium oblongum vel ellipticum; stylus 4mm. Capsula 3mm, perigonio inclusa. Fl. Mai–Jul. (–Aug). Crevices of limestone cliffs, roadsides, s.l.–1550m.

Type. Turkey. C3 Antalya: Pamphylia between Çakirli and Antalya, nr s.l., plain in *Vitex* association, 16 vii 1969, *Davis* 15422 (holo. E).

S ANATOLIA. C2 Antalya: Susuz Dağ, 1450–1550m, *Sorger* 63-34-4. C3 Antalya: d. Serik, Serik, *Khan*, *Prance* & *Ratcliffe* 185. C5 Adana: Kozan (Antitaurus), 300m, 12 iv 1957, *Davis* 26610 (in bud). C5 Hatay: Iskenderun, Arsuz, 200m, *Koyuncu* (AEF 6099).

Endemic.

This species is named in honour of Dr Robert Mill, research assistant for Flora of Turkey.

Allium sandrasicum Kollm., N. Özhatay and Bothmer, sp. nov. (sect. *Allium*). Fig. 10.

Affinis *A. guttato* Stev. subsp. *sardoo* (Moris) Stearn et *A. bourgeaui* Rech. subsp. *bourgeaui*. A priore differt umbella laxa, globosa, pedicellis apice non incrassatis, foliis latioribus, a posteriore differt foliis angustioribus, perigonii segmentis semper parvis, albis sine papillis, rostro spathae brevior.

Bulbus 1–1.8cm diam., ovoideus; tunicae exteriores nigrae, membranaceae; bulbili pauci, flavi vel brunnescentes, oblongo-ovoidei, fusi-

formes, stipitati, secus scapum ascendentes. Scapus 50–65(–90)cm. Folia 2–4, 2.5–4(–8)mm lata, plana, aliquando marginibus scabriusculis. Spatha decidua, rostro 5–8cm. Umbella (1.5–)2–5cm diam., globosa; pedicelli 1.5–2cm, tenuissimi. Perigonium late campanulatum; segmenta 2.2–5mm, alba, nervo medio viridi, glabra, interiora exterioribus latiora; exteriora oblonga, interiora obovata, retusa. Filamenta valde exserta; cuspis media filamentorum interiorum cuspidibus lateralibus brevior et lamina indivisa subaequilonga. Capsula 3.5–4mm, plerumque perigonio longior. Fl. Jun.–Jul. Limestone cliffs nr seashore, crevices of rocky outcrops, 10–300m.

Type. Turkey. C2 Muğla: d. Köyceğiz, Sandras Dağı, Pağuduz Tepe, 200m, 10 vii 1979, *E. Özhatay* 2465 (holo. ISTE 43996).

SW ANATOLIA. C2 Muğla: Marmaris, NW of the town, 20–50m, *Runemark & Bentzer* 24920; 7km SW of the harbour village of Datca, 280–300m, *Bothmer* 23123. C3 Antalya: Çarın Da., 243m, *Little* 35; c. 75km SE on the road to Lara, 50m, *Buttler & Erben* 17590; Konyaalti, 10m, *Sorger* 65-31-21.

Endemic. E Medit. element.

Allium sieheanum [Hausskn. ex] Kollm., **sp. nov.** (sect. *Scorodon*) Fig. 11B.

Syn.: [*A. sieheanum* Hausskn. in sched.!]

Affinis *A. olympico* Boiss. sed differt spathae valvis umbella brevioribus, umbella laxiore et perigonio majore.

Bulbus 0.8–1.2cm diam., ovato-oblongus; tunicae exteriores nigricantes, demum in fibras solutae. Scapus (10–) 15–25(–30)cm, purpurascens, parte inferiore foliatus. Folia 1.5–2mm lata, carnosa, semicylindrica, scapo breviora. Spatha valvis lanceolato-acutis, umbella plerumque brevioribus. Umbella 1.2–2.5cm diam., fastigiato-hemisphaerica; pedicelli 0.8–1.5cm, subaequales. Perigonium cylindrico-campanulatum; perigonii segmenta rosea vel laete purpurascens-rosea, nervo medio purpureo, 4–5mm, spathulata, obtusa. Filamenta exserta, segmentis 1.5-plo longiora; antherae flavae. Capsula 3.5–4mm, depresso-globosa, perigonio brevior. Fl. Jul.–Aug. Meadows, steppes, saline soil amongst *Juncus*, 900–1200m.

Type. Turkey. B5 Kayseri: Prov. Cappadocia, Argaeus (Erciyas Da.) am Salzsee von Ewerek, 1200m, *Siehe* 1898: 252 (holo. WU, iso. P).

C ANATOLIA. B3 Eskişehir: Türkmen Da., Kavalike Dere, 1300m, *Ekim* (AEF s.n.); Yarımcı Köyü, *Regel* (EGE 14392); Sündiken Da., 1980m, *Malyer* (ISTE 45286). B4 Konya: Cihanbeyli, Boluk G., 1010m, *Khan et al.* 542 & 822. B4 Niğde: N of Sultanhanı, Tuz G., 905m, *Kürschner et al.* 78–220; Sultanhanı, 950m, *A. Baytop et al.* (ISTE 41412); Koçhisar, Tuz G., nr Dondurma, c. 900m, *Kasapligil* 742. C4 Konya: nr Konya, 1000m, *Koyuncu* (AEF 5633).

Endemic. Ir.-Tur. element.

Specimens from Eskişehir have bulbs with inner purple tunics; they form dense clumps and have rather narrow, filiform leaves and a smaller perianth.

Allium sivasicum N. Özhatay & Kollm., **sp. nov.** (sect. *Scorodon*) Fig. 12A.

Affinis *A. flavo* L. subsp. *taurico* (Besser ex Reichenb.) Stearn et *A. hymettio* Boiss. et Heldr. sed facile distinctum ab utroque tunicis interioribus aurantiaceis, spathae valvis umbella multo brevioribus.

Bulbus 0.8–1.4cm diam., oblongo-ovoideus; tunicae exteriores nigricantes, demum in fibras solutae, interiores coriaceae, aurantiaceae; tunicae omnes secus caulem serie verticali persistentes. Scapus 6–15cm, curvatus, tenuis. Folia 1–2(–3), 0.4–1mm lata, fistulosa. Spatha bivalvis; valvae 6–12mm, subaequales, umbella breviores. Umbella 1.5–3cm diam.; pedicelli 6–13mm, inaequales, tenues. Perigonium oblongo-cylindricum; segmenta 3.5–4mm, flavescentia vel subalba, roseo vel brunneo tincta, exteriora oblonga, interiora ovato-lanceolata, acuta. Filamenta exserta ad 1.5-plo segmentis longiora, antherae flavidae. Ovarium subglobosum, substipitatum; stylus 5–6mm, exsertus. Capsula c. 3mm. $2n=16$. Fl. Jun.–Jul. On dry gypsaceous hills, 1270–1450m.

Type. Turkey. B6 Sivas: 6km from Hafik to Sivas, nr Durulmuş köyü, open gypsum hillsides, 1350m, 22 vii 1978, *A. Baytop* (holo. ISTE 41029).

CANATOLIA. B6 Sivas: 20km from Hafik to Sivas, *T. Baytop* (ISTE 40183); Hafik to Zara, Tödürge gölü, 1300m, *A. Baytop* (ISTE 41034); *ibid.*, dry hillsides, 1320m, *E. Tuzlaci* (ISTE 42547); Sivas to Hafik, nr Durulmuş köyü, gypsum hills, 1300m, *E. Tuzlaci* (ISTE 42528); above Tecer köyü, 1450m, *N. Özhatay* (ISTE 47242); 7km from Hafik to Sivas, gypsum hills, 1270m, *N. Özhatay* (ISTE 47250). B7 Erzincan: Iliç, c. 900m, *Kesercioglu & Gözler* (EGE 14406).

Endemic. Ir.-Tur. element.

Allium stearnianum Koyuncu, N. Özhatay & Kollm., **sp. nov.** (sect. *Allium*) Fig. 12B.

Affinis *A. pustulosum* Boiss. et Hausskn. sed differt perigonii segmentis margine et apice purpureis, non omnino sed superne, solum circum nervum medium scabris.

Bulbus 1–1.5(–2.5)cm diam., ovoideus vel globosus; tunicae exteriores brunneoli-cinerascentes vel brunneolae, membranaceae, parte superiore in fimbrias solutae. Scapus 20–35(–40)cm, ± erectus vel valde flexuosus, saepe glaucus, et basi vel parte superiore purpurascens. Folia 1–3, 2–3(–4)mm lata, cava, complanata vel canaliculata, margine laevia vel scabridiuscula, folium inferius saepe circinatum; vaginae ± costatae. Spatha univalvis, rostro brevi, decidua. Umbella 1–2.5cm diam., globosa, densa; pedicelli inaequales perigonio aequilongi vel eo usque ad 3-plo longiores, basi bracteolis membranaceis provisi. Perigonium campanulatum vel ovoideo-campanulatum; segmenta 2.5–4mm, alba nervo viridi vel purpureo, oblonga vel ovato-lanceolata, parte superiore secus carinam et marginibus purpurea et verrucoso-scabra. Filamenta albida vel purpurea, perigonio 1.5-plo longiora, filamenta exteriora simplicia, subulata, interiora tricuspidata; cuspis media cuspidibus lateralibus brevior; antherae purpureae. Ovarium laeve vel papillosum. Capsula 2–3mm, ovoidea.

This species is named in honour of Prof. W. T. Stearn, the well-known specialist in taxonomy and nomenclature of *Allium*.

Two subspecies are recognized.

subsp. **stearnianum**

Fl. Jul. Rocky hills, 1600–1750m.

Type. Turkey. B6 Sivas/Tokat: Çamlıbel Dağ, steppe, 1650–1750m, 5 vii 1980, *Koyuncu et al.* (holo AEF 7456).

C ANATOLIA. B6 Sivas: Yıldızeli-Tokat, Çamlıbel pass, 1650m, 24 vii 1981, N. Özhatay (ISTE 47260); Çamlıbel Dağ, 1600–1700m, Çelik (AEF 5703).

subsp. **vanense** Kollm. & Koyuncu, **subsp. nov.** Fig. 13.

Affinis *A. gramineo* var. *ampeloprasoides* Grossh. et *A. stearniano* subsp. *stearniano*. A priore differt filamentis perigonio longe exsertis et textura membranacea perigonii segmentorum; a posteriore scapo glauco, ± erecto, non valde flexuoso, foliis glaucis, margine scabridiusculis, segmentis 3–4 (nec 2.5–3)mm longis et ovario papilloso.

Scapus 20–35cm, erectus, glaucus. Folia glauca, canaliculata, cava, margine scabridiuscula. Umbella 1–2.5cm diam., ovoideo-hemisphaerica vel globosa. Perigonii segmenta 3–4mm longa, albida nervo viridi vel purpureo, vel parte superiore omnino purpurea, nitida, carina et marginibus verrucoso-scabra. Stamina longe exserta; antherae purpureae. Ovarium papillosum. Fl. Jul. (–Aug.). Dry stony slopes, 2400–3200m.

Type. Turkey. B9 Van: Gürpınar to Başkale, Çuh pass, 2750m, *T. Baytop* (holo. ISTE 45342).

E ANATOLIA. B9 Van: Hoşap to Başkale, Güzeldere, 2500m, *Koyuncu* (AEF 2091); Güzeldere pass, 24km S of Güzelsu, 2790m, *Mertens & Pasche* 81/73. C9 Hakkari: Barcelan plateau, 3000m, *Koyuncu* (AEF 2116).

Allium wendelboanum Kollm., **sp. nov.** (sect. *Scorodon*).

A. stamineo Boiss. et *A. armeno* Boiss. & Kotschy sectionis *Codonoprasi* Reichenb. affinis sed ambobus bulbi tunicis exterioribus fibrosis, caulibus et vaginis foliisque pubescentibus differt.

Bulbus 1–1.2cm diam., ovoideus; tunicae exteriores nigrescento-brunneae, fibrosae. Scapus 6–18cm, tenuis, curvatus. Folia 1–3, c. 1mm lata, filiformia, scapo fere aequilonga; scapi, vaginae foliaque pubescentes. Spathae valvae brevissimae, umbella multo breviores. Umbella laxa, 2–3cm diam.; pedicelli subaequales. Perigonium late campanulatum; segmenta 3mm, roseo-malvina, late obovata, subacuta. Filamenta exserta, perigonio sesquiolongiora. Stylus exsertus. Capsula c. 3mm, globoso-depressa, in perigonio inclusa. Fl. Jun. Among rocks.

Type. Turkey. C8 Mardin: Mardin, in saxosis Mt Notre-Dame, prope Deir Zafran, 19 vi 1888, *Sintenis* 1169 (holo. LD, iso. WU).

Endemic. Ir.-Tur. element. Known only from the type gathering.

Closely allied to *A. stamineum* and *A. armenum*, differing from both in the fibrous-reticulate outer bulb tunics, and the pubescent stems, sheaths and leaves.