

Contributions to the flora of Turkey, 2

Authors: Parolly, Gerald, and Eren, Özkan

Source: Willdenowia, 37(1) : 243-271

Published By: Botanic Garden and Botanical Museum Berlin (BGBM)

URL: <https://doi.org/10.3372/wi.37.37114>

BioOne Complete (complete.BioOne.org) is a full-text database of 200 subscribed and open-access titles in the biological, ecological, and environmental sciences published by nonprofit societies, associations, museums, institutions, and presses.

Your use of this PDF, the BioOne Complete website, and all posted and associated content indicates your acceptance of BioOne's Terms of Use, available at www.bioone.org/terms-of-use.

Usage of BioOne Complete content is strictly limited to personal, educational, and non-commercial use. Commercial inquiries or rights and permissions requests should be directed to the individual publisher as copyright holder.

BioOne sees sustainable scholarly publishing as an inherently collaborative enterprise connecting authors, nonprofit publishers, academic institutions, research libraries, and research funders in the common goal of maximizing access to critical research.

GERALD PAROLLY & ÖZKAN EREN (ed.)

Contributions to the flora of Turkey, 2

Abstract

Parolly, G. & Eren, Ö. (ed.): Contributions to the flora of Turkey, 2. – Willdenowia 37: 243-271. – ISSN 0511-9618; © 2007 BGBM Berlin-Dahlem.
doi:10.3372/wi.37.37114 (available via <http://dx.doi.org/>)

Continuing a series of miscellaneous contributions on the taxonomy, nomenclature, site-ecology and chorology of vascular plants of Turkey, the second instalment deals with 15 taxa of the families *Alliaceae*, *Apiaceae*, *Asteraceae*, *Brassicaceae*, *Colchicaceae*, *Dipsacaceae*, *Euphorbiaceae*, *Lamiaceae*, *Papaveraceae* and *Ranunculaceae*. *Allium antalyense*, *Cephalaria gazipashensis* subsp. *pilifera* and *Teucrium pseudaroanium* are described as new to science and illustrated. *Allium* (sect. *Allium*) *antalyense* belongs to the informal *Sphaerocephalon* group and is closely allied to *A. reuterianum*. It is an overlooked local endemic of the Western Taurus (Teke Dağı) and grows in the subalpine belt on limestone. *Teucrium* (sect. *Teucrium*) *pseudaroanium* was found in the Demre Çayı valley in the province of Antalya, where it inhabits limestone marble cliffs of the thermo-Mediterranean belt. It forms together with the Greek endemic *T. aroanium* and the SW Anatolian endemic *T. alyssifolium* a group of closely related species that are linked by reticulately distributed characters. Characters and ecological requirements of the members of this *T. aroanium* group are discussed; the taxonomically important trichome types are particularly considered and figured by SEM micrographs. *Chamaesyce nutans*, *R. peltatus* s.str. and *Zuvanda exacoides* are new records for the flora of Turkey. Three taxa are suggested to be sunk in synonymy, viz. *Allium vuralii* (in *A. scabriflorum*), *Draba terekemensis* (in *D. imeretica*) and *Ranunculus kastamonuensis* (in *R. peltatus*). The new combinations *Chamaesyce forskalii* and *Colchicum figlalii* are validated. New keys are provided for the genus *Chamaesyce* and the infraspecific taxa of *Camelina hispida*.

Key words: *Allium* sect. *Allium*, Anatolia, angiosperms, chorology, taxonomy, *Teucrium* sect. *Teucrium*.

Introduction

This second instalment continues a series of miscellaneous contributions dealing with the taxonomy, nomenclature, site-ecology and chorology of the vascular plant flora of Turkey. Explanations and criteria for the inclusion of data in this series, specification of citations as well as sequence of taxa have been published in the first instalment (Parolly & Eren 2006). If not otherwise indicated, all specimens cited have been seen by the authors of the contributions.

The next instalment will be published in the near future; all colleagues are cordially invited to send their contributions to the editors. In the present part of the series, contributions (apart from the editors') come from İlker Çinbilgel (Antalya), Prof. Dr Hayri Duman (Ankara), Dr Adnan Erdağ (Aydın), Prof. Dr Mustafa Gökçeoğlu (Antalya), Prof. Dr Harald Kürschner, Birgit Nordt (both Berlin), Burcu Tarikahya (Ankara), Robert Ulrich (Tübingen) and Şinasi Yıldırım (Ankara).

Abbreviations. – D. = Dağ, Dağı (Turkish: mountain); Da. = Dağları (Turkish: mountains); T. = Tepe, Tepesi (Turkish: hill); Y. = Yayla, Yaylası (Turkish: summer pasture). – The abbreviations of herbaria follow Holmgren & Holmgren (1998-), with the recent-most addition of AKDU (= Herbarium of the Akdeniz University Antalya).

Electronic supplement. – Reference is made in several places to the electronic supplement to this instalment, which is published on the internet at www.bgbm.org/willdenowia/willd37/parolly+eren.htm

Dicotyledoneae

Apiaceae

***Peucedanum longibracteolatum* Parolly & Nordt**

Descendants of the type material of *Peucedanum longibracteolatum* were brought into cultivation in autumn 2005 in order to get closer insights into the species' life cycle and the variation of morphology. Ten individuals survived the wet and long-lasting winter season 2005-06. One individual flowered and fruited in late summer/autumn 2006, while the other plants till today remained in the stage of sterile rosettes.

The morphology observed fits the protologue in all details, except that the plant attained only a height of 150 cm (reaching 200-250 cm in the wild). Production of a sticky, bitter and aromatic resin with a *Daucus*-like smell in the lower part of the stem was found both in the cultivated individual and in plants at the type locality. R. Ulrich re-visited the site in late summer 2006 and found most plants strongly browsed to about half a metre, indicating that the parts with larger amounts of bitter resin are scorned by the cattle (Ulrich in litt. 10.2006).

The umbels of the single flowering plant in cultivation were frequently visited by wasps (*Polistes* spp. and *Vespula* spp.) and some syrphid flies. The fruiting plant died off shortly after a fairly poor fruit-set, suggesting that *Peucedanum longibracteolatum* may well have a biennial to paucennial life cycle. Autogamy seems at least partly possible.

TURKEY: C4 ANTALYA: Alanya, Mahmutlar - Taşkent, etwa 50 km NE Mahmutlar, Tal des Gökdere Çayı nahe Çayarası, 1130 m, Ulrich 1/40, cult. in BG Berlin, 27.9.2006, Nordt & Parolly (AYDN, B, herb. Kürschner, herb. Parolly).
G. Parolly & B. Nordt

***Prangos heyniae* H. Duman & M. F. Watson**

This species was described from the Konya province and is hitherto known only from two localities in the Central Taurus, where it was reported to occur on limestone slopes between 1300 and 1450 m (Duman & Watson 1999). The new record documents its radiation into the Lycian Taurus (now its westernmost station of occurrence) and extends the altitudinal distribution into the sub-alpine belt. For a general description of the plant and a photograph see Duman & Watson (1999).

TURKEY: C3 ANTALYA: Beydağları, Pozan D., ascent to Pozan D. above Dereköy, *Elytrigia* stand, 1750 m, limestone, 3.7.2004, Eren 194/04 (AYDN, B, GAZI, herb. Kürschner, herb. Parolly); ibid., 14.7.2005, Eren 172/05 (AYDN, B, herb. Parolly).

Ö. Eren, M. Gökçeoğlu, H. Duman & G. Parolly

Asteraceae

***Centaurea wernerii* Wagenitz & al.**

The electronic supplement provides the first colour pictures of the recently described *Centaurea wernerii* (Wagenitz & al. 2006). The following gathering was made at the type locality.

TURKEY: C3 ANTALYA: Finike – Korkuteli, N Finike, 460 m, senkrechte Kalkfelsen, S-exp., 24.4.2006, *Ulrich 6/2* (B, herb. Parolly). R. Ulrich

Brassicaceae

***Camelina hispida* var. *stiefelhagenii* (Bornm.) Yıld.**

Camelina stiefelhagenii Bornm. represents the strange case where an Oriental weed has its type locality in Central Europe. It was described as an alien plant based on a gathering from a dump area near Dresden, E Germany, where “kleinasiatische resp. syrische Getreideabfälle” had been deposited (Bornmüller 1941: 131). Two decades later, Huber-Morath (1962) recorded it from Kırşehir, Turkey. Hedge (in Davis 1965: 493) treated *C. stiefelhagenii* as an imperfectly known species closely related to *C. hispida* Boiss., while Med-Checklist (Greuter & al. 1986) cites it as a doubtful synonym of the latter.

Yıldırım (1998), when making the formal combination under *Camelina hispida* Boiss., designated a neotype (also from Kırşehir), because he believed the type of *C. stiefelhagenii* at B to be destroyed in the 1943 air raids. However, we could trace the holotype (for its illustration see Bornmüller 1941: t. 349), including Bornmüller’s fully documented correspondence with Hans Stiefelhagen, Dresden, and René Maire, Algiers, related to the description of *C. stiefelhagenii*. Parts of these letters and postcards (for a selection, see the electronic supplement) are excerpted in the protologue, which in combination with Huber-Morath (1962) still makes a good reading today.

A re-evaluation of the type material, the references mentioned and the *Camelina* specimens kept at B largely confirm the taxonomic treatment of Yıldırım (1998). However, the only character he used to distinguish his var. *stiefelhagenii* from the other varieties of *C. hispida* – the “papillose” valves – has no taxonomic value and is also found in other *Camelina* taxa, including the type material of *C. grandiflora* Boiss. Such a “papillosity” is caused by bulging cells that give immature fruits of herbarium specimens a papillose appearance. This sampling artefact disappears as the fruits matures. The holotype of *C. stiefelhagenii* displays fully ripe fruits, which in accordance with the protologue are not at all papillose. The neotype depicted by Yıldırım (1998: 2) represents a plant with immature fruits and is, judging from the shape of the siliculae, possibly identical with *C. hispida* var. *grandiflora* (Boiss.) Hedge. Huber-Morath’s collection for a long time was the only record of proper var. *stiefelhagenii* (Huber-Morath 1962) in Turkey; duplicates of this gathering in ANK could not be traced. New records, provided by the second author and identified with the help of the following new key to the infraspecific taxa of *Camelina hispida*, are given below.

1. Mature siliculae oblong-subclavate, 2-3 × longer than wide (5-6.5 × 2-2.5 mm), narrowly winged in upper half; valves glabrous; fruiting pedicels adpressed . . . var. *stiefelhagenii*
- Mature siliculae obovate to wide elliptic, <1.5 × longer than wide (3-4.5 × 2-2-3.5 mm), narrowly winged all around; valves glabrous or hispid; fruiting pedicels adpressed or ± horizontally spreading 2
2. Valves of fruit hispid [to be expected but not yet recorded for Turkey]
- var. *lasiocarpa* (Boiss.) Post
- Valves of fruit glabrous 3
3. Fruiting pedicels ± horizontally spreading var. *hispida*
- Fruiting pedicels adpressed var. *grandiflora*

DEUTSCHLAND: SACHSEN: Adventivflora von Dresden, Coswig, im Gleisdreieck zwischen Coswig und Naundorf auf Getreideabfällen westasiatischer Herkunft, 13.7.1938, *Stiefelhagen* (holotype, B).

TURKEY: B4 ANKARA: Çayyolu (Kutuğun) köyü, inside of crop fields, 950-1000 m, 2.6.1992, Ş. Yıldırım 14988 (herb. Parolly, herb. Yıldırım). – B5 KIRŞEHİR: Mucur, towards Ayırdağları, crop fields, 1250-1300 m, 21.5.1989, Ş. Yıldırım 2152 (AYDN, herb. Parolly, herb. Yıldırım).

– C4 KONYA: Ankara road, around engine factory, roadside, 1000 m, 1.6.1985, Ş. Yıldırım 8156 (herb. Yıldırım).

Specimens of Camelina hispida var. grandiflora seen. – TURKEY: Caria, 1843, Pinard (syntype, B). – A6 TOKAT: Pontus austr., in decliv. dumosis prope Tschengelhan inter Amasia et Tokat, 30.5.1890, Bornmüller 1713 (isotype of *C. subadpressa* Hausskn. & Bornm., B). – B4 ANKARA: Garten der deutschen Botschaft, Steppenrest, 29.5.1955, H. & E. Walter 3615 (det. Huber-Morath, B). – C2/3 BURDUR: Pisidia ad Bouldour [Burdur], in aridis ad vias, 24.5.1849, Heldreich 710 (syntype, B).

GERMANY: BERLIN: Köpenick, bei der Dampfmühle, eingeschleppt, 15.5.1896, O. & R. Schulz (B). – BRANDENBURG: Bei Rüdersdorf, eingeschleppt, 3.6.1894, O. & R. Schulz (B).

G. Parolly, Ş. Yıldırım & Ö. Eren

***Draba imeretica* (Rupr.) Rupr.**

= *D. terekemensis* Yıld. in Ot 7(2): 2. 2002 [“2000”], **syn. nov.**

While doing comparative literature studies on the Turkish flora, the first and third author came across an engraving in the splendid “Enumeratio plantarum anno 1890 in Caucaso lectarum” (Sommier & Levier 1900: t. 11), depicting the W Transcaucasian (Gorgean) endemic *Draba imeretica*. It immediately reminded us of the localised NE Anatolian *D. terekemensis*, which was described only a few years ago (Yıldırım 2002). The illustrations provided in both works (see electronic supplement) as well as the additional descriptions in Schulz (1927: 130) and Tolmachev (1939) confirmed together with the studies on the original material the conspecificity of both taxa. Anatolian herbarium material of *D. imeretica* (herb. Parolly) is illustrated in the electronic supplement.

Draba imeretica belongs to *Draba* ser. *Imereticae* Tolm. It is an Euxine chasmophyte of the forest zone and was hitherto only known from a few localities in Georgia, especially in the environs of Kutaissi, where the Rioni river and tributaries step out of the Greater Caucasus (Kharadze & Mtskhvetadze 1979: 155, Schulz 1927). At least three recent localities are reported from Racha-Lechkhumi (referring to region 3 in “Flora of Georgia 5”; David Kikodze in litt., 2.2007). The discovery of *D. imeretica* in Turkey is less surprising because the Turkish station (A9 Ardahan, Çıldır, between Yıldırımtepe köyü and Şeytankalesi) is very close to the Georgian border and lies only c. 150 km apart from the next Caucasian occurrences.

In Georgia, *Draba imeretica* descends along the rivers down to c. 1000 m (Schulz 1927: 130) and seems to prefer gorge positions. Radde’s remark (1899: 262) that this plant “ist am unteren Rion schon bei Kutais und am Hippos (Muri) exklusiv an die Steilfelsen der Kalkfelsen gebannt” equally matches the situation in Turkey. This geological restriction certainly narrows its potential area down to a very few, disjunct ranges.

Specimens seen. – See Yıldırım (2002).

G. Parolly, Ş. Yıldırım & Ö. Eren

***Zuvanda exacoides* (DC.) Askerova**

≡ *Sisymbrium exacoides* DC., Syst. Veg. 2: 463. 1821 ≡ *Malcolmia exacoides* (DC.) Spreng., Syst. Veg., ed. 16, 2: 899. 1825.

= *Conringia nana* Boiss. & Kotschy in Boissier, Diagn. Pl. Orient., ser. 2, 5: 25. 1856.

= *Malcolmia conringiodes* Boiss., Fl. Orient. 1: 230. 1867.

Erect, slender annual herb, 3-6 cm (outside Turkey to 18 cm). *Stems* simple or branched from base with 1-4 erect to ascending branches; ± tuberculate-hairy throughout. *Leaves* oblanceolate to oblong-lingulate, the lower (10-)15-30(-50) × 3-8(-12) mm, glabrous or faintly to distinctly papillose at least along the lower surface of the mid-vein; margins subentire or remotely bluntly to acutely dentate; radical leaves narrowed into a distinct petiole comprising ¼-½ of the total leaf length, stem leaves variably narrowed below but always sessile with expanded sheathing, often distinctly auriculate, bases. *Inflorescence* a raceme with 2-9 large flowers, the lower remote. *Pedicels* 2-6 mm, patent-erect, scabrid, incrassate in fruit. *Sepals* 10-12 mm, yellowish green,

saccate at base, loosely papillate hairy. *Petals* 13-18 mm, intensively yellow with darker claws (in Turkey), in adjoining areas also primerose with yellowish claws; the lamina cuneate-oblong to cuneate-obovate, entire, narrowed below to the much longer claw. Inner filaments free. *Siliquae* narrowly linear, 40-90 × 2-2.5 mm, slightly curved, patent-ascending, glabrous or tuberculate, style terete, obscurely bifid. *Seeds* (in Turkish material not present) brown, 1.25 mm, minutely areolate.

Recent molecular studies (Warwick & al. 2006, 2007) on *Hesperideae* Prantl emend. O. E. Schulz have confirmed the morphology-based view that *Zuvanda* (Dvorák) Askerova was correctly segregated from *Malcolmia* R. Br. (Askerova 1985). The small, largely Irano-Armenian genus *Zuvanda* comprises three species with a partly unsettled taxonomy (see Townsend 1980), viz. *Z. crenulata* (DC.) Askerova, *Z. exacoides* and *Z. meyeri* (Boiss.) Askerova.

Presently only *Zuvanda crenulata* (as *Malcolmia crenulata* (DC.) Boiss.) is known from Turkey (Cullen in Davis 1965: 462). A second species, *Z. exacoides*, can now be added. This taxon, the only *Malcolmia* in the sense of the “Flora of Turkey” with yellow petals, is a Mesopotamian element with occurrences in Palestine, Lebanon and Syria (Townsend 1980). Its discovery in an adjoining part of Turkey was quite likely. One record substantiated by voucher specimens near Hasankeyf and additional observations in the Batman and Mardin provinces reflect that *Z. exacoides* is locally fairly abundant on arable fields over limestone (growing together with, e.g., *Ceratocephala falcata* (L.) Pers. and *Corydalis oppositifolia* DC. subsp. *oppositifolia*) and in devastated xerophytic shrubland composed of *Amygdalus arabica* Oliv., *Anagyris foetida* L., *Cerasus microcarpa* (C. A. Mey.) Boiss. subsp. *microcarpa*, *Paliurus spina-christi* Mill., *Quercus brantii* Lindl. and *Rosa* spp. A wider distribution in the SE edge of Turkey can be assumed for this early flowering species.

For detailed descriptions of and keys to *Zuvanda exacoides* see Townsend (1980: 1030), Rechinger (1964: 314-317) and Zohary (1966: 266), for its full synonymy Askerova (1980: 524), for illustrations Mouterde (1986: t. 60, fig. 9) and the electronic supplement to this instalment.

TURKEY: C8 BATMAN: Hasankeyf - Gercüş, Üçyol Boğazı c. 8-10 km S Hasankeyf, 37°41'17.1"N, 04°27'17.4"E, 680-700 m, steinige Kalkhänge, devastierte Gebüsche (*Quercus brantii*, *Paliurus spina-christi*, *Anagyris foetida*, *Amygdalus arabica*) und Felder, terra rossa, 19.6.2006, Hauke & Parolly 06-49 (AYDN, B, herb. Kürschner, herb. Parolly).

SYRIA: Circa Zebdaine prope Damascus, in humosis vallis Martsch Manschura rara, 6000 ped., 8.6.1855, Kotschy 85 (isotype of *Conringia nana*, B).

LEBANON: Jabaal el Knaisse, 6000 ft., earthy places on exposed mountainside, *Polunin* 5228 (B).

G. Parolly

Dipsacaceae

Cephalaria gazipashensis subsp. *pilifera* Parolly, Kürschner & Eren, **subsp. nov.**

Holotype: Turkey, C4 Antalya, distr. Alanya, slopes of Akdağ (2461 m), between Şekerkahve and Gökbek Yaylası, 1100-1300 m, oak forest, limestone and dolomite, 12.7.2000, Eren & Parolly 7947 (B; isotypes: AYDN, E, herb. Parolly) – Fig. 1.

A subspecies typica foliis, squamis involucratis et pedunculis patente pilosis (non glabris) differt.

Cephalaria gazipashensis H. Sümbül is known to occur in the Western and western Central Taurus (Göktürk 2002) and is especially abundant in the montane elevations of the Isaurian Taurus. This area appears to be a particular diversity centre of the genus (see, e.g., *C. ekimiana* R. S. Göktürk & H. Sümbül, *C. isaurica* V. A. Matthews and *C. sumbuliana* R. S. Göktürk). In the Göksu catchment area some populations of *C. gazipashensis* are locally more variable than its protologue (Sümbül 1991) and subsequent treatments in the “Flora of Turkey” (Duman in Güner & al. 2000: 148-149) and by Göktürk (2002) suggest.

We observed at different localities plants with non-coriaceous, fairly mesomorphic (basal) leaves and a quite dense, soft and pilose indumentum all over. The (0.1-)0.3-0.6 mm long hairs merge along the margin and the mid-vein gradually into much coarser, 1-2 mm long setae with a

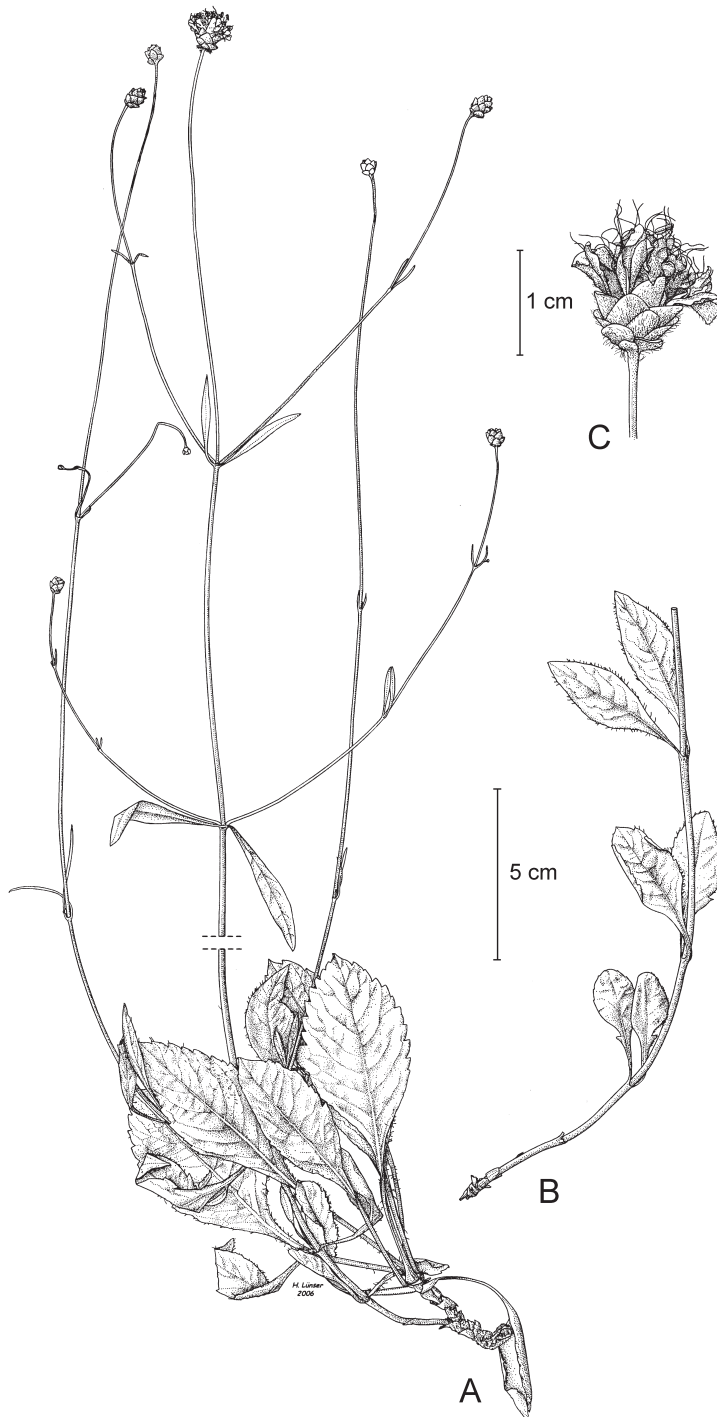


Fig. 1. *Cephalaria gazipashensis* subsp. *pilifera* – A: habit; B: lower portion of stem; C: capitulum. – Drawings by H. Lünser after the type collection.

somewhat swollen base. Proper *C. gazipashensis* has a leaf indumentum of scattered, bulbotrifid hairs confined to the (mid)-vein(s) and margin; otherwise the leaves are glabrous or sparsely pilose between the veins, and coriaceous and reticulate-rugose.

The material of the population of *Cephalaria gazipashensis* that does not fit the present description comes from the slopes of Akdağ below Gökbel Y. The plants have densely pilose involucre bracts and an obvious indumentum on the peduncles below the capitula. The basal leaves are relatively wide (lamina c. 1.5-2.3× as long as wide, petiole as long as or shorter than lamina). We recognise this population as sufficiently distinct to be described at the rank of a subspecies. The other populations growing north of Akdağ match subsp. *pilifera* in their leaf indumentum but approach subsp. *gazipashensis* in leaf shape and often in the glabrous surface of the involucre bracts and peduncles. However, in some individuals of these intermediate plants (see below), some scattered hairs can be found on the involucre and/or the upper part of the stem.

The distinguishing characters of the two subspecies of *Cephalaria gazipashensis* can be summarised as follows:

1. Leaves coriaceous, reticulate-rugose, glabrous (stem leaves) or sparsely hirsute especially on veins and margin; lamina of basal and lower stem leaves lanceolate, to 40-60 × 15-18 (-25) mm; petiole of most leaves (clearly) longer than lamina; involucre bracts glabrous or with a few and thin, adpressed hairs; peduncle below capitulum completely glabrous subsp. *gazipashensis*
- Leaves soft-textured to subcoriaceous, ± densely hairy with a clearly heterotrichous indumentum consisting of soft, spreading hairs on both surfaces and longer setae along mid-vein and margin; lamina of basal and lower stem leaves (narrowly) ovate to broadly lanceolate, to 30-60 × 20-32 mm; petiole as long as or distinctly shorter than lamina; involucre bracts densely spreading-pilose (to adpressed-pilose) by soft hairs; peduncle below capitulum spreading-pilose with a mixture of dense, short hairs and much longer and coarser setae. subsp. *pilifera*

The type population of *Cephalaria gazipashensis* subsp. *pilifera* was recorded in a *Quercus cerris*-*Q. ithaburensis* subsp. *boissieri* oak forest supported by the lower, gentle slope along the ascent to the Gökbel Y. *Phlomis samia* is locally the dominant plant in the understorey. The *Cephalaria* was observed at elevations between c. 1050-1400 m, in various exposures and both at fairly sunny and shady places (including the interior of the forest, gaps, road-sides). The geological substrate noted is dolomitised limestone under a thin cover of humus.

Additional notes on Cephalaria gazipashensis. – Following the protologue, the corolla size of *C. gazipashensis* is given erroneously as 10-15 mm in all publications, but is actually no more than 6-7 mm long. The scale of fig. 3.153c in Göktürk (2002) clearly supports this. The plants of subsp. *pilifera* are only 30-50 cm tall (not 70-100 cm as indicated for *C. gazipashensis*).

The species is more variable than expected and appears to form the core of a complex species group, including *C. dirmilensis* Hub.-Mor., *C. ekimiana*, *C. lycica* Matthews and *C. scoparia* Contandr. & Quézel. In spite of the recent achievements by Göktürk (2002), a biosystematic study of this group may reduce the number of accepted species; e.g., the enigmatic *C. ekimiana* falls in most respects within the range of *C. gazipashensis* and only barely merits specific status.

Specimens of intermediates between subsp. pilifera and subsp. gazipashensis seen. – TURKEY: C4 ANTALYA: Distr. Alanya, etwa 64 km NE Mahmutlar, 1210 m, Kalkfelsen und Felsfuß, Exp. W, 8.10.2000, *Ulrich 0/39* (herb. Parolly). – C4 KONYA: Distr. Hadim, 7 km E Beyreli, 1500-1550 m, *Cedrus libani*-*Abies cilicica* subsp. *isaurica* forest, 11.7.2000, *Eren & Parolly 7902* (B, herb. Parolly); *ibid.*, *Eren 3642 & Parolly* (AYDN).

Specimens of subsp. gazipashensis seen. – TURKEY: C3 ISPARTA: Dedegöl D., 2300-2400 m, taşlık, 23.7.1997, *Ekici 2045* (det. Göktürk; GAZI). – C4 ANTALYA: Türbelihisar, Taşatan-Yerköprü arası, 1000-1200 m, *Pinus nigra* açıklıkları, taşlık alanlar, 31.8.1993, *Duman 5474 & Aytaç* (GAZI); distr.

Alanya, Çayarası-Gevne arası, 1200-1300 m, *Pinus nigra* açıklıkları, 2.9.1993, *Duman 5505 & Aytaç* (GAZI); 39 km NE Mahmutlar, Richtung Gökbel Y., 1480 m, steiler mit Geröll durchsetzter Hang, Kalk, NE-exp., 25.9.2006, *Ulrich 6/17* (herb. Parolly); Gazipaşa, Sugözü Köyü, Maha Y., 1450 m, 5.7.1983, *Sümbül 2373* (holotype, HUB). – C4 KONYA: Ermenek, Göktepe Kasabası, Dumlugöze Köyü, Gavuralanı mevki, 1800 m, 16.7.1984, *Sümbül 3177* (HUB); distr. Hadim, Ermenek to Hadim, c. 1 km NW Taşkent, 1500 m, limestone slopes, ruderalised “steppe”, 10.7.2000, *Eren & Parolly 7891* (AYDN, B, herb. Parolly). G. Parolly, H. Kürschner & Ö. Eren

Euphorbiaceae

Chamaesyce J. Gray

The generic split of *Chamaesyce* from *Euphorbia* L. is recommended by many experts in *Euphorbiaceae* today and supported by an increasing number of systematic studies; these results find more and more acceptance in country-wide checklists and floras. If constituted as a distinct genus as advocated here for pragmatic reasons, *Chamaesyce* forms a large and quite natural assemblage of c. 350-400 species (Raju & Rao 1987). The morphological, physiological, stomatal, palynological, caryological and carpological arguments for keeping *Chamaesyce* generically distinct from *Euphorbia* are summarised, supplemented by the relevant references, in Benedí (1997: 286) and Wisskirchen (in Wisskirchen & Haeupler 1998: 142). It is especially noteworthy that the *Chamaesyce* species are mostly C4 plants displaying chlorenchymatous leaf bundles (kranz syndrome), whereas in *Euphorbia* C3 and CAM metabolism is recorded.

In “Flora of Turkey”, Radcliffe-Smith (in Davis 1982: 571-630) and later Gemici (in Güner & al. 2000: 213-214) treated *Chamaesyce* “classically” as a subgenus of *Euphorbia*. The record of a new synanthropic *Chamaesyce* species for the flora of Turkey provides the opportunity to present a nomenclaturally and taxonomically updated key that also incorporates another addition, *Euphorbia forskalii* J. Gay (Sümbül 1991, Gemici, l.c.). The description of the Turkish material of this species for the “Flora of Turkey” deviates in some characters (e.g., habit, smaller capsules and seeds) from the descriptions given by Boulos (2000), Migahid (1978) and Zohary (1972) and is partly incomplete concerning some taxonomically relevant characters (hair types, seed colour, etc.). The Anatolian specimens were noted to differ from all Turkish species of the (sub)genus in their always erect reddish stems and entire leaves. However, all standard floras throughout the wide range of this taxon (large parts of Africa, the Canary Islands and Asia eastwards to Central Asia and N India) mention a prostrate habit and at least slightly toothed leaves (e.g., Migahid 1978, Zohary 1972), while reddish stems are found in many *Chamaesyce* species (see Boulos 2000, Haeupler & Muer 2000, Migahid 1978, Pils 2006). *E. forskalii* was later also recorded in Antalya (Mutlu & Erik 1999) and these prostrate plants have been identified with the help of “Flora Palaestina” (Zohary 1972; Birol Mutlu, pers. comm. 1.2007).

With the present key, Sümbül’s plant would be identified as *Chamaesyce canescens* (but deviating in leaf shape) or more likely, as *C. maculata* (of which erect forms are known). The characters of *E. forskalii* given in the key thus consider the descriptions in the references cited above as well as the herbarium material studied at B.

The necessary transfer of *Euphorbia forskalii* to *Chamaesyce* is proposed below; the leaves clearly show kranz syndrome. Because the “Flora of Turkey” account (Radcliffe-Smith, l.c.) lacks *Chamaesyce* synonyms, a short local synonymy (adopted from Benedí 1997) is included in the following key:

1. Plants erect or ascending-erect (very rarely procumbent); leaves 13-30(-45) × 6-10(-16) mm; cyathia (up to 10) in lax, ± terminal, corymbiforme cymes; capsules glabrous *C. nutans* (Lag.) J. K. Small
- Plants prostrate, rarely ascending (to erect); leaves 2-12(-16) × 1.5-6(-9) mm; cyathia (up to 5) congested into dense, axillary glomerules; capsules glabrous or not 2
2. Plants (stems and leaves) glabrous 3

- Plants (stems and leaves) pubescent or pilose 6
- 3. Plants fleshy; Mediterranean, preferably in (sub)saline habitats; leaves to 15 mm long, falcate-auriculate; capsules 3-4 × 4-5(-6) mm; seeds c. 2.5-3 mm, pyriforme, smooth
 *C. peplis* (L.) Prokh. [*Euphorbia peplis* L.]
- Plants not fleshy; naturalised in various, but usually non-saline habitats; leaves up to 11 mm long (but mostly distinctly shorter), not falcate-auriculate; capsules 1.2-1.8 × 1.2-1.8 mm; seeds c. 0.8-1.5 mm, oblong-conical or ovoid, quadrangular in transverse section, smooth or granulose-rugose 4
- 4. Leaves always entire; stipules united, triangular (dentate at apex), exceptionally laciniate or fimbriate; adventitious roots at nodes present; cyathia always ± solitary
 *C. serpens* (Kunth) J. K. Small [*Euphorbia serpens* Kunth]
- Leaves entire, crenate or serrulate; stipules distinct, laciniate, often filiform; adventitious roots at nodes absent; cyathia always ± solitary or in cymes 5
- 5. Leaves entire or crenate, incrassate at margin; seeds transversely granulose-rugose
 *C. canescens* (L.) Prokh. [*Euphorbia canescens* L., *E. chamaesyce* L.]
- Leaf margin serrulate, at least in upper half, not incrassate; seeds smooth
 *C. humifusa* (Willd.) Prokh. [*Euphorbia humifusa* Willd.]
- 6. Leaves always without a dark purple spot or markings; capsules pilose along keels (and at base), otherwise glabrous *C. prostrata* (Aiton) J. K. Small [*Euphorbia prostrata* Aiton]
- Leaves mostly with a dark purple spot or markings; capsules uniformly pubescent or quite glabrous 7
- 7. Leaves suborbicular-ovate to ovate-oblong, usually ± entire (or dentate-crenulate all over); capsules patently pubescent (but not crisp-hairy) or rarely glabrous; seeds ovoid-quadrangular, 1-1.5 mm, irregularly tuberculate-rugulose *C. canescens* (L.) Prokh.
- Leaves subfalcately elliptic-oblong 8
- 8. Leaves 6-12 × 2-6 mm, serrulate all along margin; capsules adpressed-pubescent; seeds ovoid-quadrangular, 0.8-1 mm, faintly transversely grooved, brown
 *C. maculata* (L.) J. K. Small [*Euphorbia supina* Raf.]
- Leaves 4-12 × 3-8 mm, obscurely serrate-crenate near apex; capsules patently white crispate-pubescent; seeds oblong-conical-quadrangular, 0.9-1.5 mm, transversely grooved, whitish pink *C. forskalii* (J. Gay) Parolly [*Euphorbia forskalii* J. Gay]

Chamaesyce forskalii (J. Gay) Parolly, **comb. nov.** ≡ *Euphorbia forskalii* J. Gay in Webb & Berth., Hist. Nat. Canaries 3(2, 3): 240. 1847.

= *Euphorbia aegyptiaca* Boiss., Cent. Euphorb.: 13. 1860, nom. illeg.

GREECE: In ins. Creta, *Sieberus* (det. G. Hügin, B).

CAPE VERDE ISLANDS: Santo Antão, N coast, between c. 1 km E of Cruzinhas and Lacacão (c. 5 km E Cruzinhas), c. 10-100 m, 24.12.1993, *Kilian 2904a* & *Leyens* (B); Rombos Isls., Ilheu de Cima, 2.2.1994, *Leyens CV-94-60* (B); Maio, Mte Batalha, mountain range in N-S-direction with gravelly to rocky slopes, c. 100-150 m, in small, dry stream bed, 3.1.1994, *Kilian 3000* & *Leyens* (B).

EGYPT: Boush, Beni Suef, 9.1952, *El Hadidi* (B); Baltim, 29.8.1968, *El Hadidi* (B).

ETHIOPIA: Dzeha Dzeha, *Schimper 185* (det. Gilbert, B, P, WAG).

NAMIBIA: Windhuk Bergland, Midgard, 1575 m, feuchter Ufersand, 3.5.1961, *Seidel 2829* (B).

G. Parolly

Chamaesyce nutans (Lag.) J. K. Small

≡ *Euphorbia nutans* Lag., Gen. Sp. Pl.: 17. 1816.

Type: Mexico; "Habitat in N[ova] H[ispania]" (MA; cf. Meikle 1985).

= *Euphorbia preslii* Guss., Fl. Sic. Prodr. 1: 539. 1827 ≡ *Chamaesyce preslii* (Guss.) Arthur in Torrey 11: 260. 1911.

Ic. – Benedí 1997: 296, t. 71; Coste 1937: 231, no. 3196 (sub *Euphorbia preslii*); Fiori 1933: 313, no. 2551 (sub *E. nutans*); Haeupler & Muer 2007: 343, no. 1860.

Erect or ascending (or very rarely procumbent), branched annual up to 60 cm. *Stems* slender, pubescent above when young, otherwise and later nearly glabrous, hairs mostly in rows; adventitious roots absent. *Leaves* elliptic oblong, 13-30(-45) × 6-10(-16) mm, obtuse, subacute or acute, somewhat asymmetrical at base, dentate, sparsely pilose above, often with a dark purple blotch, glabrous or glabrescent beneath; petiole 1-2 mm. *Stipules* 0.5 mm, triangular, free or partly connate, fringed. *Cyathia* (up to 10) laxly clustered into ± terminal cymes. *Glands* 4, transversely ovate, yellow to purplish, with small, pink appendages. *Capsule* 1.8-2.3 × 2-2.5 mm, rather deeply sulcate, smooth, glabrous. *Seeds* ovoid-quadrangular, 1.1-1.3 mm, irregularly rugulose, blackish under a grey coat.

An American species widely naturalised in the warmer parts of Europe and the adjoining parts of the Mediterranean countries. The record in Turkey nicely fills the gap between its occurrences in Lebanon, Cyprus and Greece (Haber & Semaan 2007, Meikle 1985). This is the first record of a member of *Chamaesyce* sect. *Hypericifoliae* (Boiss.) Hurus. in Turkey (all other species belong to the nominal section).

G. Parolly & R. Ulrich

TURKEY: C4/5 IÇEL: NNW Silifke, 130 m, limestone pavement, limestone rocks, NW-exp., 20.9. 1999, Ulrich (det. R. Ulrich, conf. I. Hedge; E).

Lamiaceae

Teucrium (sect. *Teucrium*) *pseudaroanium* Parolly, Erdağ & Nordt, **sp. nov.**

Holotype: Turkey, C2 Antalya, Kasaba, SE Dirgenler, Schlucht des [gorge of] Demre Çayı, 140 m, Kalkfelsen (Marmor) [limestone rock (marble)], NW-exp., 24.4.2006, Ulrich 6/5 (B; isotypes: AYDN, herb. Parolly) – Fig. 2-3, 4c-d.

Habitu *Teucrio aroanio* similis et nullo dubio hac specie proxima, sed imprimis differt pedicello et calyce adpresse eglanduloso-tomentosis (non glanduloso-puberulentis), floribus minoribus, antheris ochraceis (non purpureis) et verticillastris congestis capitulis 6-12-floribus (non 4-6-floribus).

Much branched, caespitose, erect to procumbent subshrub. *Rootstock* woody, branched, stout, 5-8 mm in diam. *Stems* slender, c. 1 mm in diam. at base, trailing, ascending or erect, 2-12(-18) cm, puberulent to white-tomentose. *Leaves* ± evenly spaced along stem, increasing in size upwards; distinctly petiolate, petioles (1.5-)2-5 mm long; lamina broadly lanceolate, widest at middle or lower third, (4-)10-20(-25) × (2-)5-10(-12) mm, obtuse to subacute, with entire or rarely somewhat sinuate-crenate, flat to slightly enrolled margins, strongly discolourous, sparsely arachnoid-lanate and dark green above, densely white-tomentose to canescent beneath. *Inflorescence* terminal, ovoid to oblong, up to 2.5 × 4 cm, lax to fairly dense, lowest-most verticillaster sometimes distant; verticillasters 2-flowered, crowded into head-like or raceme-like inflorescences of (2-)6-8(-12) flowers. *Bracts* leaf-like, decreasing in size upwards. *Pedicels* erecto-patent, 3-4 mm, adpressed-white-tomentose. *Calyx* actinomorphic, broadly campanulate, 3.5-5(-6) mm, divided to half or less, greenish or suffused purple; tube tomentose, densely covered by subsessile glandular trichomes and long eglandular, flexuous trichomes, more shaggily towards teeth; teeth 5, triangular to broadly triangular, (1.5-)2-3.5 mm, acute, mucronulate by the excurrent vein, indumentum outside as on tube, inside glabrescent, in fruit often shining. *Corolla* white to pale pinkish mauve, with darker magenta or purple streaks; tube pouched, 2-2.5 mm, exannulate; lower lip 10-15(-18) mm, deeply 5-lobed with oblong lateral lobes and obovate terminal lobe, all lobes ± cucullate, long bearded on main veins; upper lip absent. *Stamens* 4, long-exserted from corolla tube together with style; filaments arcuate, c. 14-18 mm, somewhat darker in colour than corolla, bearded at the very base, glandular-pubescent in lower 1/3; anthers reniform, yellowish brown when dry, c. 1-1.2 mm. *Style* filiform, as long as or longer than stamens. *Nutlets* obovoid, 2.5-3.5 mm long, reticulate-rugose, densely glandular and hairy in upper part, light brown.



Fig. 2. *Teucrium pseudaroanum* – in its natural habitat at the type locality. – Photograph by Ulrich, 26.3.2007.

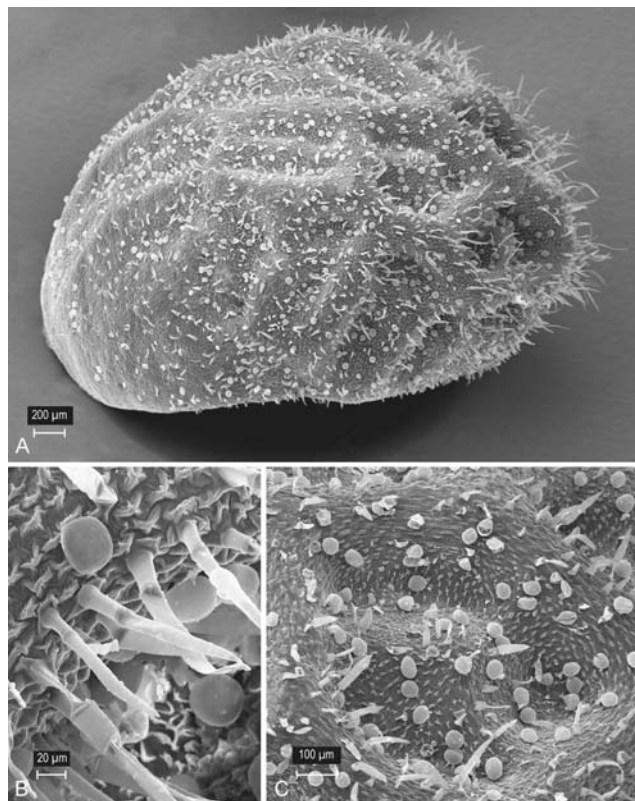


Fig. 3. *Teucrium pseudaroanum* – SEM micrographs of the nutlet – A: overview; B: indumentum at the apex with relatively short eglandular F5-trichomes with elongated apical cell, without micropapillae; C: sessile glandular B1-trichomes in the upper part. – Material: *Ulrich 5/1* (herb. Parolly).

Table 1. Differential characters of *Teucrium pseudaroanium* and the related *T. aroanium* and *T. alyssifolium* [data for the latter two species based on Contandriopolous & Quézel (1976), Ekim in Davis (1982), Tan & Iatroú (2001) and Strid & Tan (1996), supplemented and amended by the voucher specimens cited below].

| | <i>T. alyssifolium</i> | <i>T. aroanium</i> | <i>T. pseudaroanium</i> |
|---------------------------|---|---|---|
| Leaves increasing in size | upwards | towards base | upwards |
| Petiole | short, ± indistinct | short, distinct | (1.5-)2-5 mm, distinct |
| Leaf shape | lanceolate | ovate-oblong to broadly elliptic | broadly lanceolate |
| size [mm] | (5-)10-17(-25) × 3-7(-10) | 5-15(-20) × 4-12 | (4-)10-20 (-25) × 5-12 |
| apex | acute (to subacute) | obtuse | obtuse to subacute |
| margin | entire to subentire | ± sinuate to entire | entire to ± sinuate |
| colour | concolourous to weakly discolourous | distinctly discolourous | distinctly discolourous |
| indumentum | white adpressed-tomentose on both faces, sometimes more sparsely above | sparsely tomentose above, ± densely white-tomentose beneath | sparsely arachnoid-tomentose above, densely white-tomentose beneath |
| Inflorescence | verticillasters 1-2-flowered, crowded into heads of 2-6(-8) flowers | verticillasters 2-flowered, crowded into heads of (2-)4-6 flowers | verticillasters 2-flowered, crowded into heads of (2-)6-8(-12) flowers |
| Pedicel size [mm] | 2-4(-6) | 4-6 (-8) | 3-4 |
| indumentum/trichome types | adpressed white-tomentose; H (dom.) + B1 | glandular-puberulent; A1+ A2 (dom.) | adpressed white-tomentose; H (dom.) + B1 |
| Calyx shape | campanulate | tubular-campanulate | broadly campanulate |
| size [mm] | 5-7(-10), strongly acrescent in fruit | 6-8, weakly acrescent in fruit | 3.5-5(-6), weakly acrescent in fruit |
| indumentum/trichome types | adpressed white-tomentose, B1 (dom. inside) + H | glandular-puberulent, A1-A2 (dom.), scattered B1, few H | white-tomentose, B1 (dom.) + shaggy H outside, rarely inside glabrescent, shining |
| teeth shape | narrowly triangular, acute, strongly spine-tipped | ovate-triangular, acute, strongly spine-tipped | broadly triangular to ovate-triangular, acute, mucronulate |
| teeth size [mm] | 3.5-6 (-7) | c. 3-4 | 2-3.5 |
| Corolla tube [mm] | 2-3.5 | 1-2 | 1.5-2.5 |
| Lower lip [mm] | 13-15(-17) | 15-18(-22) | 10-15(-18) |
| Filament length [mm] | 16-18(-20) | 20-24 | 14-18 |
| colour | whitish-pinkish | lilac-purple | whitish-pinkish |
| indumentum | bearded at base + glandular-puberulent in lower half | bearded at base and glandular-puberulent in lower half | bearded at very base and glandular-puberulent in lower third |
| Anthers size [mm] | 0.8(-1) | 1-1.2 | 1-1.2 |
| colour | yellowish | lilac to purple | yellowish |
| Nutlet size [mm] | (3-)3.5-4 | 2.5-3 | 2.5-3(-3.5) |
| indumentum/trichome type | upwards densely with sessile glands (B1), tuft of short glandular F5 at top | densely with long + wiry glandular hairs (F5) in upper part, B1, few or 0 | densely with B1, F5 in upper part, very rarely A1 |

Notes. – When Robert Ulrich, Tübingen, communicated the first, fruiting gathering of this novelty to the authors, it appeared to be a chasmophytic limestone variant of the otherwise strictly serpentinophytic *Teucrium alyssifolium* Stapf (syn. *T. serpentini* Contandr. & Quézel). On closer inspection calyx characters and the leaves, especially the indumentum, looked different. More material collected over the next two years, in co-operation with the second author of the present contribution, revealed that an undescribed species was at hand.

Trichomes are among the most useful taxonomic characters in *Teucrium* and were studied both under the light microscope and the SEM (Fig. 4). The sectional classification and the trichome terminology follow Navarro & El Oualidi (2000a-b). For brevity, the abbreviation for the trichome types used by Navarro & El Oualidi (2000b) were used in Table 1 and are quoted below (alternative terminology in brackets). On pedicels, calyces and corollas of the species considered here, only unbranched trichomes of the following types occur:

- (1) Glandular hairs: A1: short clavate glandular trichomes with 2(-3) cells; A2: long clavate glandular trichomes with 3 (-4) cells; B1: subsessile glandular trichomes with one cell (bladder-like glands, sunken glandular dots, glandular capitate sessile glands or trichomes).
- (2) Eglandular hairs: F2: large, very thin-walled, 2-5-celled trichomes; F5: elongated and flexuous, thin-walled 3-7(-11)-celled trichomes; H: very long inter-twined trichomes, fibrous-like, sometimes coalescent.

Paratypes. – TURKEY: C2 ANTALYA: Type locality, 140 m, N- & NW-exp., 15.10.2004, *Ulrich 4/34* (in fr., B, herb. Parolly); *ibid.*, 90 m, 26.5.2005, *Ulrich 5/1* (in fr., B, herb. Parolly); *ibid.*, 130-140 m, 26.5.2006, *Ulrich 5/2-3* (in fr., herb. Parolly); WNW Kale, Schlucht des Demre Çayı, 200 m, Kalkfelsen (Marmor), W-exp., 26.4.2006, *Ulrich 6/7* (in fl., B, herb. Parolly); *ibid.*, 220 m, 26.3.2007, *Ulrich 7/1* (in fl., fragment plus photograph, herb. Parolly).

Distribution and site conditions. – *Teucrium pseudaroanium* is hitherto known from two localities in SW Anatolia that are only c. 6 km in air-line distance and situated in the thermo-Mediterranean belt (90-220 m) of the Demre Çayı valley near Kaş, Antalya. *T. pseudaroanium* dwells on N- and W-facing, sheer marble cliffs in gorge position, at the type locality together with a very few, but extraordinarily interesting and showy other plants such as *Erica sicula* subsp. *libanotica* (C. & W. Barbey) P. F. Stevens, *Stachys bombycina* Boiss., and, another co-discovery of Robert Ulrich, *Polygala peshmenii* Eren & al. at its second known station apart from its type locality (Eren & al. 2007). *E. sicula* subsp. *libanotica* is a very local taxon that grows bushily on limestone cliffs; in Turkey especially the Kesme Boğaz site is known (McClintock 1991, Stevens in Davis 1978: 97). The site of *T. pseudaroanium* at the type locality proper is directly above the river in the narrow valley, which widens at the second place to support extensive alluvial fans. Here, *Teucrium pseudaroanium* covers as the exclusive plant a cliff high above the water and a talus slope with scattered trees, while *E. sicula* subsp. *libanotica* is found on neighbouring rocks.

Teucrium pseudaroanium, unlike the related *T. alyssifolium*, is a real chasmophyte that colonises both strongly shady and sunny cliffs. Depending on the irradiation and humidity, it develops different habits: compact, cushion-like forms with short, erect stems in the sun (WNW Kale, *Ulrich 6/7*) and fairly lax plants with long, trailing to even pending shoots in the shade (type locality).

Phenology. – *Teucrium pseudaroanium* flowers from end of March till mid of May; at the end of May the first fruits can be obtained. Fruit-set is copious and only few nutlets appear to be abortive.

Recommended IUCN threat category. – There are several large marble quarries close by the sites of *Teucrium pseudaroanium*. Particularly one of them appears to threaten the type locality directly, and it can only be hoped that the marble quality of the *Teucrium* cliffs is not suitable for mining. Extending work to the cliffs would provide an immediate risk of extinction. Hence, we strongly recommend placing *T. pseudaroanium* in the IUCN category “Critically Endangered (CR)”, because the estimated whole range is less than 10 km² (criterion B2) and the population is very unequally distributed in two subpopulations (criterion C2; IUCN 2001): more than 500 mature individuals were counted WNW of Kale, while at the type locality the population size of the species is estimated to be lower than 50 individuals.

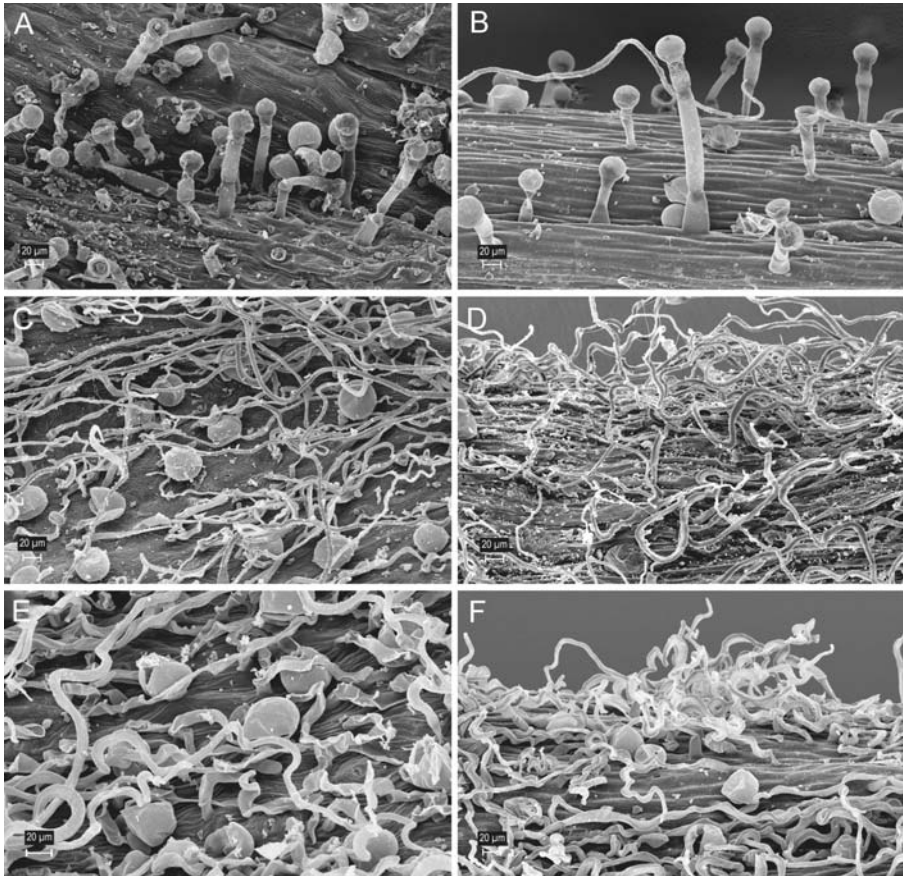


Fig. 4. SEM micrographs of the calyx indumentum (left column) and pedicel indumentum (right column) of the species of the *Teucrium aroanium* group – A-B: *T. aroanium* with predominantly short clavate glandular A1-trichomes and long clavate glandular A2-trichomes and a few, scattered subsessile glandular B1-trichomes and fibrous-like H-trichomes; C-D: *T. pseudaroanium* and E-F: *T. alyssifolium* with predominantly fibrous-like H-trichomes and subsessile glandular B1-trichomes. – Material (critical point dried): *T. aroanium* (*Orphanides*, B), *T. pseudaroanium* (isotype, *Ulrich 6/5*, B) and *T. alyssifolium* (*Ulrich 5/4*, herb. Parolly).

Taxonomy. – Characters such as (1) flowers not conspicuously secund and grouped in few-flowered verticillasters or axillary in upper leaves, (2) the campanulate, actinomorphic (not gibbous) calyx with \pm equal teeth, (3) the wide, lilac, white or white-blue short-tubed corolla with a spur in the tube (to which we refer in the description as “pouched”), and (4) the fairly large (in the section 3-5 mm long) and hairy nutlets (see Fig. 3) place *T. pseudaroanium* in *T. sect. Teucrium* (Ekim in Davis 1982: 56, Navarro & El Oualidi 2000a). We can confirm the observation of Navarro & El Oualidi (2000b: 285) for some other SW Anatolian species of *T. sect. Teucrium* (see the list at the end of the contribution) that “this is the only section studied with no glandular trichomes in the corolla”.

Within its section, the strongest affinities of *Teucrium pseudaroanium* are with the geographically close *T. alyssifolium*, endemic to a narrow ophiolite area in SW Anatolia (Ekim in Davis 1982), and *T. aroanium* Boiss. of the Chelmos, Killini, Taygetos, Koulochera, Parnonas and Chionovouni mountains of the Greek Peloponnese (Baden 1991, Kalpoutzakis & Constantinidis 2006, Tan & Iatrou 2001). The latter species is a chasmophyte of limestone cliffs.

For good illustrations of *Teucrium alyssifolium* (as *T. serpentina*) see Contandriopoulos & Quézel (1976: 425) and Pils (2006: 224), for *T. aroanium*, see Tan & Iatrou 2001: 285).

The three species share a number of characters, including (1) the low, suffruticose habit and the large flowers, (2) the adpressed-tomentose indumentum on leaves and stem (consisting mainly of H-trichomes), (3) the exannulate corolla tube, (4) the lower lip bearded by F2-trichomes, (5) the glandular-pubescent lower parts of filaments, and (6) the obovate, reticulate nutlets. Many character combinations of *Teucrium pseudaroanium* reappear in one of the other two species, giving the idea of three close, reticulately linked species and may also be evidence for reticulate evolution. Table 1 compares the features of the three species, which are treated here informally as *T. aroanium* group, which may, after more detailed studies, merit subsectional rank.

Teucrium alyssifolium matches the new taxon in (1) the leaf shape and leaf size increasing upwards on stem (not decreasing as in *T. aroanium*), (2) the indumentum type on pedicels and calyx (see Fig 4: a mixture of many subsessile glandular B1-trichomes and long eglandular H-trichomes, not mainly glandular-puberulent by A1 + A2-trichomes as in *T. aroanium*), (3) the size of the corolla, (4) the yellowish anthers (stamens of *T. aroanium* are pink to purple in all parts) and (5) the glandular and eglandular indumentum of the nutlets (the upper part of the nutlets of *T. aroanium* are densely covered by long eglandular trichomes). *T. pseudaroanium* and *T. alyssifolium* are easily told apart by the \pm concolourous leaves with acute apices, the different shape of the calyx (which is distinctly acresent in fruit) and the considerably longer and much narrower calyx teeth of *T. alyssifolium*.

Teucrium pseudaroanium resembles in habit most closely *T. aroanium*, hence the name, looking especially in floral characters (e.g., in the perfectly matching calyx shape) as a smaller and paler coloured version of the latter. The strongly discolourous, distinctly petiolate and mostly obtuse leaves also contribute to this view (in *T. alyssifolium* the leaf base tapers so gradually into the petioles that the limits towards the lamina are sometimes hard to assess). Besides the quantitative characters and those shared with *T. alyssifolium*, *T. pseudaroanium* differs from *T. aroanium* by its on average longer petioles, inflorescences with more flowers, weakly mucronulate calyx teeth and a filament indumentum confined to the lower third (Table 1). Within the *T. aroanium* group, *T. aroanium* has the comparatively broadest leaves.

To all appearances, the two limestone cliff plants *Teucrium aroanium* and *T. pseudaroanium* are geovivacious species, although the Greek endemic seems not to descend close to the sea-level (400–2000 m, see Kalpoutzakis & Constantinidis 2006: 280, Tan & Iatrou 2001). The biogeographical concept of the S Aegean arc (e.g., Greuter 1971) provides arguments for explaining this distribution pattern. Indeed, there are also a number of disjunctions at species or vicarious species pair level between the Peloponnese, the E Aegean Islands and SW Anatolia with and without a Cardaegaen distributional gap (Greuter 1971, see also Davis 1971 and Parolly & al. 2005).

The site conditions of *Teucrium alyssifolium* deviate in being “non rupicole et qu’il ne sort pas des substrats ophiolitiques” (Contandriopoulos & Quézel 1976). Phytosociologically, *T. alyssifolium* mainly grows in high montane to subalpine *Thuryion capitatae* communities (Quézel 1973 sensu Parolly 2004, *Astragalo-Brometalia* Quézel 1973), often at wind-exposed and rocky places or on serpentine scree (Parolly 2004, Parolly & Tan 2006). In spite of the obviously reticulate distribution pattern of characters we do not consider *T. pseudaroanium* to be hybridogenous, but we cannot exclude a certain degree of introgression of *T. alyssifolium* into *T. pseudaroanium*.

Teucrium sect. *Teucrium* has, after the addition of *T. pseudaroanium*, c. 30 species world-wide (Navarro & El Oualidi 2000a), eleven of them occur in Turkey (Duman in Güner & al. 2000: 197–198, Ekim in Davis 1982: 53–75). In Turkey, the genus *Teucrium* comprises now a total of 32 species, including the recently added *T. chasmophyticum* Rech. fil. (Dönmez 2006) and the long overlooked *T. krymense* Juz., recorded from Kars (Özhatay & Kültür 2006 and reference included therein). Anatolia, and here especially the southwestern part, is a major speciation centre for *Teucrium* sect. *Teucrium*. From the same area (C2 Antalya) and with matching ecological conditions, another local chasmophyte, *T. ekimii* H. Duman, was described some years ago (Duman

1998). The other two SW Anatolian endemic species of the section are *T. pestalozzae* Boiss. and *T. sandrasicum* O. Schwarz (Ekim, l.c.).

Specimens of Teucrium alyssifolium seen. – TURKEY: C2 DENIZLI: N Fethiye, nahe Tuzla Beli, 1460 m, Serpentinhang, S-exp., 25.5.2005, *Ulrich 5/4* (in fl., herb. Parolly); *ibid.*, 1480 m, 22.6.2005, *Ulrich 5/4a* (in fl., herb. Parolly); *ibid.* 1510 m, SE-exp., 22.6.2005, *Ulrich 5/5* (in fr., herb. Parolly). – C2 MUĞLA: Köyceğiz, Toparlar, Kazancı üzeri, 300 m, serpantin, 16.5.1992, *Güner & al. 10531* (GAZI, HUB); Sandras D. above Ağla, Akköprü Çögenli (= saddle between Altinsivri and Çiçekbaba T.), 37°03'N, 028°48'E, c. 1800 m, rocky slope with boulders, coarse and fine scree, 10-20°, ophiolite, wind-swept cushion community, 22.6.1999, *Döring, Parolly 6141 & Tolimir* (B, herb. Parolly); etwa 29 km NE Beyobaşı, 960-990 m, steile Serpentinhänge, W-exp., 15.6.2006, *Ulrich 6/14* (in fr., herb. Parolly).

Specimens of Teucrium aroanium seen. – GREECE: PELOPONNESE: in regione superiore m. Chelmos Graec., *Orphanides* (B); Massif du Khelmos, rocailles calcaires de l'étage silvatique dans la vallée du Styx, 1600-1700 m, 13.8.1906, *Maire & Petimengin 770* (B); Chelmos, Aroania Ore, E Hang, 5.1960, *Sorger 603-4-24* (B).

Specimens of Teucrium brevifolium Schreb. seen. – TURKEY: C2 ANTALYA: Kaş, Kekova, maki-lik, 0-50 m, 14.3.1994, *Ekim 9396* (GAZI, herb. Parolly).

Specimens of Teucrium ekimii seen. – TURKEY: C3 ANTALYA: Beldibi - Kemer, Kuruçay Dere, 40-50 m, Gölge uçurum kayalık, 10.6.1996, *Duman 6423, N. & E. Özhatay* (holotype: GAZI, iso: B, HUB); *ibid.*, 9.6.1997, *Duran 4208 & Ekici* (paratype; GAZI, herb. Parolly); *ibid.*, Göynük, 40 m, 3.8.1995, *Duman 6020* (GAZI).

Specimens of Teucrium pestalozzae seen. – Turkey: C3 BURDUR: Şehir yakamı, 5.6.1970, *Pamukçuoğlu & Quézel* (HUB); Bucak Boğazköy arası, 890 m, *Quercus coccifera* açıklığı, kalker kayalık, *Duman 4883 & Karaveliogulları* (GAZI, herb. Parolly). G. Parolly, A. Erdağ & B. Nordt

Papaveraceae

Corydalis haussknechtii Lidén

That the spring flora of SE Anatolia area is still insufficiently known is underlined by a geophyte that seems according to the new field observations to be closely linked to the “Kurdo-Zagrosian *Quercus brantii* forest belt” sensu Zohary (1973) in Iran, Iraq and Turkey. There is apparently only one localised record of *Corydalis haussknechtii* from Turkey, i.e. the type gathering from Detik, Mardin, that dates back to 1867 (Lidén in Güner & al. 2000: 24). In reality, this *Corydalis* grows in great abundance in the wider Mardin Da. range, sometimes next to *Zuvanda exacoides*. A Turkish plant of unspecified origin is illustrated by Pils (2006: 264).

TURKEY: C8 MARDIN: Mardin Da. zwischen Yeşilli und Ömerli, 37°22'47.7"N, 44°53'7.9"E, 1075-1100 m, Kalkfelsköpfe, Eichengebüsche (*Quercus brantii*) mit Niederwaldnutzung, Terra rossa, 19.3.2006, *Hauke & Parolly 06-41* (B, herb. Kürschner, herb. Parolly). G. Parolly

Ranunculaceae

Ranunculus peltatus Schrank

= *R. kastamonuensis* A. Dönmez, **syn. nov.**

Using the key for Turkish *Ranunculus* subg. *Batrachium* (DC.) A. Gray by Dönmez (2003) for the identification of a puzzling water crowfoot from Kızılcahamam National Park led to *R. kastamonuensis* A. Dönmez. This species is hitherto only known from the type gathering from the eponymous province. Our material fits for all but one of the discriminating characters: the weakly lobed lamina of the floating leaves of *Tarikahya & Parolly 06-158a* does not at all correspond with the strongly trisected (trifoliolate) lamina of *R. kastamonuensis*. Because the “Flora of Turkey” account (Cook in Davis 1965: 195-197) could also not solve this problem, we expanded the taxa considered for comparison to the whole species inventory of Europe and adjoin-

ing areas by consulting the standard floras of that area and the rich voucher collection of *Ranunculus* subg. *Batrachium* housed at B.

On this base, our gathering could be identified as the highly polymorphic *Ranunculus peltatus* s.str., which is not yet recorded for Turkey (Cook l.c., Davis & al. 1988, Güner & al. 2000, Seçmen & Leblebici 1996). *R. peltatus* is widely accepted to comprise three subspecies, viz. subsp. *baudotii* (Godr.) C. D. Cook, subsp. *fucooides* (Freyn) Muñoz Garm. (= *R. saniculifolius* Viv.) and subsp. *peltatus* (e.g., Cook 1986, 1993, Dahlgren 2002, Haeupler & Muer 2000, Wisskirchen & Haeupler 1998). A closer literature survey (e.g., Casper & Krausch 1981, Cook 1966, Nebel 1993, and references cited above) and the additional herbarium study brought a nearly complete break-down of the key characters used by Dönmez (2003, largely based on Cook 1964 and Cook in Davis 1965). For example, the strigose nutlet indumentum of *R. kastamonuensis* can also occur in *R. aquatilis* L. and *R. peltatus* s.str. (cf. the perfectly matching figures in Cook 1986 and Haeupler & Muer 2000: 66), while the petal size of *R. peltatus* subsp. *peltatus* can (with 3 mm in extreme forms) be as small as indicated for *R. kastamonuensis*. Moreover, *R. peltatus* s.l. is known to develop land forms or other dwarf plants with deeply divided leaves exactly matching those of *R. kastamonuensis* (see Cook 1986: 292, fig. 98, Fischer & al. 2005). Therefore, we consider with some reservation *R. kastamonuensis* as conspecific within the wide compass of *R. peltatus* subsp. *peltatus*.

The two gatherings discussed and cited below apparently represent the first records for *Ranunculus peltatus* subsp. *peltatus* for Turkey. They belong to a small-flowered form with large and fairly few nutlets and short peduncles and petioles – all characters that are influenced by the environment, for nutlet characters especially by the pollination situation (Cook 1966).

In contrast to *Ranunculus peltatus* subsp. *peltatus*, subsp. *fucooides* may not occur in the Euro-Siberian (including Xero-Euxine) areas, but is widespread in Mediterranean Turkey. In the neighbouring countries, *R. peltatus* subsp. *peltatus* is also known from Greece (Dahlgren 2002) and the Caucasian territories (Krechetovich 1937, as *Batrachium carinatum* Schur, *B. dichotomum* Schmalh. and *B. triphyllum* (Wallr.) Dum.).

TURKEY: A4 KASTAMONU: 18.5 km from Boyalı to Araç, Susuzyayla pasture, lake, 41°06'445"N, 33°19'095"E, 1650 m, 5.6.2001, Dönmez 9199 (type of *R. kastamonuensis*, holotype HUB, isotypes E, herb. Parolly). – B4 ANKARA: Kızılcahamam Soğuksu Milli Parkı, 1500 m, basalt and other mafic rocks, temporary (?) pool in clearings of the *Abies bornmuelleriana*-*Pinus sylvestris* forest, 18.6.2006, Tarikahya & Parolly 06-158a (B, Herb. Parolly). G. Parolly, Ö. Eren & B. Tarikahya

Monocotyledoneae

Alliaceae

Allium (sect. *Allium*) *antalyense* Eren, Çinbilgel & Parolly, **sp. nov.**

Holotype: Turkey, C3 Antalya, Teke Dağı, ascent to summit region from Belen Yayla (above Akçağal village), gappy *Elytrigia divaricata* swards with thorn-cushions, limestone, 36°34'983N, 30°23'417"E, 1980 m, 13.7.2004, Eren 272/04 & Çinbilgel (AYDN; isotypes: B, GAZI, herb. Parolly) – Fig. 5-6.

Allio reuteriano similis sed foliarum margine laevi (non scabro), corollis albis viride-fasciatis (non rutilantis vel atropurpureis), antheris albis vel ochroleucis (non purpureis), floribus majoribus (4-5.5 non 3-3.5 mm) et tepalis cristato-papillois (non leviter papillois) differt.

Bulb ovoid, 1.3-2 cm in diam.; outer tunics dark brown, membranous; inner tunics white; *bulblets* absent. *Stem* (8-)10-15(-18) cm, flexuous, smooth, rounded, hollow, slightly canaliculate, lower part finely striate, the upper ribbed. *Leaves* (1-)2(-3), usually exceeding, very rarely equaling or shorter than inflorescence; linear, fistulose, canaliculate, 1-2.5 mm wide, glabrous, suffused dark purple, sheathing the lower half to three quarters of the stem; sheaths smooth, dark purple at base. *Spathe* 2-valved, persistent, valves broadly ovate at base, narrowed to a slender



Fig. 5. *Allium antalyense* in its natural habitat (type locality). – Photograph by Ö. Eren, 13.7.2004.

beak c. 1 mm long. *Umbel* spherical, 2-2.5(-3) cm in diam., many-flowered and dense. *Pedicels* unequal, (4-)5-8(-11) mm long, elongating considerably in fruit, sharply winged, increasingly scabrid towards apex, shiny brown. *Perigon* narrowly ovoid-campanulate; segments white with a green mid-vein, outer and inner segments subequal in size and shape, saccate, widely lanceolate to narrowly ovate, (4-)4.5-5(-5.5) × 1.5-2 mm, acute, obtuse or retuse at apex, papillose all over the outer surface, the outer more strongly so and especially papillose in the central part, often forming a crest-like structure along the central mid-vein; outer tepals much more keeled than the inner. *Stamens* with conspicuously exerted anthers; anthers c. 1.6 mm long, white to yellowish before dehiscence; filaments smooth or slightly scabrid at base, white, keeled, the outer ones simple, triangular, the inner ones with anther-bearing cusp about a third as long as the widely expanded undivided basal part and about $\frac{3}{4}$ as long as the lateral cusp; lateral cusp well exerted from perigon. *Style* (2-)3(-4) mm long, densely papillose at margin, exerted. *Ovary* and immature capsule c. 3-4 × 2 mm, brown, densely papillose. *Seeds* 2-2.5(-3) mm long, angular, testa black, densely minutely papillose-verruculose.

Etymology. – The name refers to the province of Antalya in SW Anatolia, where the new species was first collected.

Note. – In July 2004, during the field studies related to the PhD thesis of the first author (Eren 2005), a very distinct, yet uncommon *Allium* L. was observed on Teke D. in the western Taurus. In “Flora of Turkey” (Kollmann in Davis 1984: 98-221), it keyed out as *A. curtum* Boiss. & Gaill. or *A. reuterianum* Boiss. but clearly differed in a number of important features. A comparison of the material with related taxa and checking the *Allium* accounts in the Floras of the neighbouring countries (Andersson 1991, Kollmann 1986, Meikle 1985, Mouterde 1966, Stearn 1980, Wendelbo 1971, 1985) revealed the novelty of the species from Teke D., bringing the total number of species of *Allium* sect. *Allium* known from Turkey to 56 (see also below, under *A. scabriflorum*).

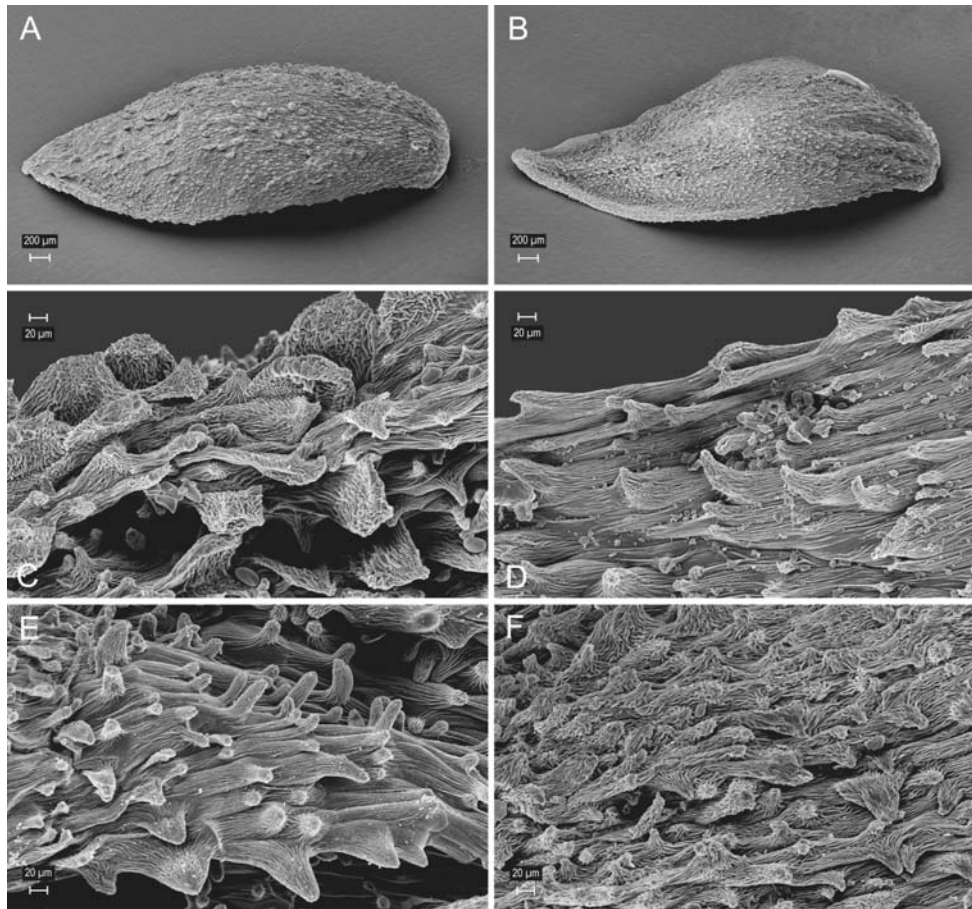


Fig. 6. *Allium antalyense* (A, C, E) and *A. reuterianum* (B, D, F). – SEM micrographs of the outer perigon segments. – Material: *A. antalyense*: holotype (AYDN), *A. reuterianum* (Eren 6021, B).

Distribution, site conditions and phenology. – *Allium antalyense* seems to be an extremely rare, neglected endemic of the Lycian Taurus and is hitherto only known from its type locality on Teke D. in the eastern Beydağları. This mountain range is known for its many narrow endemics, including recent discoveries; the new discovery underlines the potential of this area (Davis 1955, 1971, 1965-1985, Davis & al. 1988, Eren & al. 2004, Hartvig & Strid 1987, Parolly & al. 2005).

Putatively an E Mediterranean genoelement, *Allium antalyense* grows in various exposures preferably in dry, gappy limestone swards between 1900 and 2000 m. Subalpine grasslands with different proportions of dwarf-shrubs and thorn-cushions are among the most prominent and abundant formations of the xeric SW Asian high mountain ecosystems (Barbero & al. 1975, Kürschner 1986a, b) and the dominant vegetation of the Beydağları. Species associated with *A. antalyense* include *Ajuga chamaepitys* subsp. *glareosa* P. H. Davis, *Alkanna attilae* P. H. Davis, *Astragalus angustifolius* Lam., *Daphne oleoides* Schreb., *Elytrigia divaricata* (Boiss. & Balansa) Nevski, *Hieracium pannosum* Boiss., *Hypericum aviculariifolium* var. *bourgaei* (Boiss.) Robson, *Koeleria macrantha* (Ledeb.) Schult., *Pterocephalus pinardii* Boiss., *Satureja cuneifolia* Ten., *Sideritis libanotica* subsp. *linearis* (Benth.) Bornm., *Silene supina* subsp. *pruinosa* (Boiss.) Chowdh., *Tanacetum praeteritum* (Horw.) Heywood, *Teucrium polium* L. s.l., *Thymus sipyleus* Boiss. var. *sipyleus* and var. *davisanus* Ronniger.

Table 2. Differential characters of *Allium antalyense*, the related species of the *Sphaerocephalon* group and *A. artemisiatorum* [data based on Kollmann (1984), Mathew (1996) and specimens cited below].

| Character | <i>A. antalyense</i> | <i>A. reuterianum</i> | <i>A. stylosum</i> | <i>A. eldivanense</i> | <i>A. curtum</i> | <i>A. sphaerocephalon</i> subsp. <i>trachypus</i> | <i>A. nevsehirensis</i> | <i>A. artemisiatorum</i> |
|---------------------|---|---|--|-----------------------|--------------------------------------|---|---------------------------|--------------------------|
| Habit | procumbent to ascending | procumbent to ascending | erect | erect | erect | erect | erect | erect |
| Bulblets | absent | absent | present | absent | present | present | present or absent | present |
| Tunics | membranous | membranous | membranous | membranous | membranous | membranous | membranous | reticulately fibrous |
| Leaf margin | smooth, very rarely with a few scattered papillae | scabrid-papillose | slightly scabrid-papillose | glabrous | smooth or slightly scabrid-papillose | glabrous or slightly scabrid-papillose | smooth or scabrid-serrate | smooth |
| Pedicle length [mm] | (4-)5-8(-11) | 3-5 | 6-10 | up to 7 | 2-10 | 0.5-2(-3) | 5-13 | up to 10 |
| surface | increasingly scabrid towards apex | scabrid-papillose, sometimes only at the extreme apex | smooth or slightly scabrid-papillose, usually only at the extreme apex | smooth | smooth | scabrid-papillose | smooth | smooth |
| Umbel diam. [cm] | 2-2.5(-3) | 1-1.5(-2) | 2-3 | 1.5-2.5 | 1.5-3 | (1.5-)2(-3.5) | 1.5-3 | 1.5-3 |
| Perigon length [mm] | (4-)4.5-5.5 | 3-3.5 | 5(-6) | 4-5 | 3-5 | 3.5-6 | 3-4 | c. 5 |

Table 2, continued.

| | | | | | | | | |
|-------------------------------------|--|--|-----------------------------------|------------------------------|---|--|--------------------------|---|
| Colour of segments | white with green mid-vein | deep reddish purple or crimson | deep reddish purple, rarely white | purple | purple with pale or white margin or green with a white margin | white with a green median stripe | greenish yellow or green | white with a reddish or green mid-vein |
| Outer perigon surface | densely and strongly papillose, especially in the central part; papillae often forming crest-like structures | densely scabrid all over the outer surface, more coarsely so on the keel | minutely scabrid | slightly scabrid on the keel | smooth | scabrid-papillose | smooth | densely scabrid, papillae sometimes forming crest-like structure along keel |
| Colour of anthers before dehiscence | white to yellowish | purple | purple | purple | purple or yellowish | purple or reddish | yellowish | purple |
| Style [mm] | (2-)3(-4) | 4-5 | c. 7 | 4-5 | c. 2 | c. 5 | ? | c. 2 |
| Distribution | SW Turkey | W, SW Turkey, E Aegean Islands | W, SW & Central Turkey | N Turkey | S Turkey, Syria, Lebanon, Israel, Jordan (?), Cyprus, N Egypt | SW Turkey, mainland Greece, E Aegean Islands | Central Turkey | Israel, Jordan, Saudi Arabia, Egypt (?) |

The *Elytrigia divaricata* sward at the type locality of *Allium antalyense* grows on a stabilised scree slope; phytosociologically, it can be grouped into the Tanacetion praeteriti Quézel 1973 alliance and Astragalo-Brometalia Quézel 1973 order (Eren & al. 2004, Parolly 2004). *A. antalyense* flowers in July.

Recommended IUCN threat category. – We strongly recommend placing *Allium antalyense* in the IUCN category “Critically Endangered (CR)”, because the estimated whole range is less than 10 km² (criterion B2) and the population size of the species is estimated to be lower than 50 mature individuals (criterion D; IUCN 2001). The very small number of less than 40 individuals does not secure the unhindered survival of the species for a long time. Seeds of this rare and scattered plant should be collected and stored in a seed bank to safeguard its existence.

Relationship. – *Allium antalyense* fits in *Allium* sect. *Allium* that encompasses those species of *Allium* with well-developed bulb, stem (never basal) leaves, campanulate to cup-shaped (never stellate) flowers, filaments in two distinct whorls, the outer three nearly always simple and the inner three markedly tricuspidate (rarely 5-7 cuspidate), and ovaries with distinct nectariferous pores (Wilde-Duyfjes 1976, Stearn 1981, Mathew 1996). There is no phylogenetic classification below the sectional level available that could give some hints on the relationship of the new species. Within *Allium* sect. *Allium*, it clearly belongs to the informal *Sphaerocephalon* group (Mathew 1996) and seems to be most closely allied to *A. reuterianum*.

Allium antalyense can be distinguished from *A. reuterianum* on account of its (±) smooth leaf margins (not scabrid), white flowers with green mid-veins (not deep reddish purple), white to yellowish anthers (not purple) and the coarsely papillose indumentum all over the outer surface of the perigon segments, especially in the centre (Fig. 5 and 6). Groups of papillae tend to form crest-like structures (absent in *A. reuterianum*) along the central part of the mid-vein. In contrast to *A. reuterianum*, *A. antalyense* has sharply winged, shiny brown and longer pedicels, larger flowers (longer perigon segments), shorter styles and larger umbels (for figures of these quantitative characters, see Table 2). The combination of characters makes *A. antalyense* a distinct and easy-to-identify species. For a colour photograph of *A. antalyense* see the electronic supplement.

In the coarsely ornamented segments and the colour of the flowers, *Allium antalyense* resembles *A. artemisietorum* Eig & Feinbrun (see Mathew 1996: t. 15A) from Israel, Jordan and Saudi Arabia, which, however, differs clearly by its reticulate fibrous tunics and belongs to another informal group (*Scabriflorum* group sensu Mathew 1996). Further similar and related species are compared in Table 2.

Our taxonomic approach places considerable emphasis on the habit (procumbent-ascending versus erect stems, see Table 2), the ornamentation of the segments, as well as the colour of the flowers. It is noteworthy that *Allium antalyense* forms an exclusively white-flowered population. The deep reddish purple flowering *A. reuterianum* with its similar habit is in the Beydağları confined to ultramafic sites.

Allium sect. *Allium* provides much difficulties in its taxonomy. In the account for the “Flora of Turkey”, Kollmann (l.c.) recognised 46 species under this section. Since then, ten species were added (Davis & al. 1988, Ekim & al. 1999, Özhatay 1986, Özhatay & Mathew 1995, Özhatay & Tzanoudakis in Güner 2000: 224-232, Tan & Sorger 1987): *A. anatolicum* N. Özhatay & B. Mathew, *A. eldivanense* N. Özhatay, *A. enginii* N. Özhatay & B. Mathew, *A. fethiyense* N. Özhatay & B. Mathew, *A. goekyigitii* Ekim & al., *A. ilgazense* N. Özhatay, *A. koyuncui* H. Duman & N. Özhatay and *A. vuralii* Kit Tan) were newly described, while *A. erubescens* C. Koch was first recorded for Turkey. Finally, *A. tuncelianum* (Kollman) N. Özhatay & al. was upgraded to species level. In his taxonomic revision of *Allium* sect. *Allium*, Mathew (1996) accepted 114 species and several subspecies, all of which mainly occur naturally in Europe and Asia; only *A. dregeanum* Kunth and *A. alibile* A. Rich. occur in S Africa or Ethiopia, respectively. Turkey harbours c. 50 % of the species of *Allium* sect. *Allium* and has a high species endemism level (> 40 %), thus being a major centre of diversity and evolution in *Allium* sect. *Allium*. Further biosystematic and molecular studies will certainly drastically reduce the number of accepted taxa.

Specimens of Allium artemisietorum seen. – ISRAEL: Südliche Negev-Wüste, 5 km südwestlich von Biq'at Shizzaton, Steinwüste vom Wadi Araba beeinflusst, 450 m, 18.5.1998, *Rilke 1433* (B).

Specimens of Allium curtum seen. – IRAN: Western Persia, 20.6.1992, *Strauss 291* (B).

ISRAEL: Sharon Plain, Kefar Vitkin, sandy-loam soil, *Erogrostis-Centaurea* association, 18.5.1939, *Grizi & Schuster 724* (B).

Specimens of Allium reuterianum seen. – TURKEY: B1 IZMIR: Kemalpaşa Armutlu, Mahmut D., 1310 m, 18.7.1996, *Seçmen 4862* (EGE); Kemalpaşa, Nifdağı çıkışı, c. 1400-1500 m, 27.7.1996, *Seçmen 4920* (EGE); *ibid.*, Nifdağ, in pascuis summi cacuminis, solo lapidoso calcareo, c. 1800 m, 7.7.1933, *O. Schwarz 863* (B). – B1 MANISA: Sipylos mons Magnesia [Sipil D.], in lapidosis regionis alpinae, solo calcareo, 1200-1800 m, 12.8.1933, *O. Schwarz 1003* (B); *ibid.*, TV vericisi, Seyirtepe, c. 1400-1450 m, 8.7.1993, *Seçmen 4325* (EGE). – C3 ANTALYA: Beydağları, Bakırlı D. area, W of Saklıkent, between Sakilli T. and Kocapınar Çş., 1900-2000 m, 7.1998, *Eren 6021* (AKDU, B, herb. Parolly); *ibid.*, 12.7.1999, *Parolly & al. 6564* (B, herb. Parolly).

Specimens of Allium sphaerocephalon subsp. *trachypus* (Boiss. & Spruner) K. Richter seen. – TURKEY: C2 MUĞLA: Lycian Akdağları above Gömbe, around Yeşil Göl, scree slopes of different mobility, limestone, 1830 m, 28.6.1999, *Döring & al. 186a* (herb. Parolly).

Specimens of Allium stylosum O. Schwarz seen. – TURKEY: B1 IZMIR: in collibus calcareis fruticosis ad Bornova, 6.1933, *O. Schwarz 787* (holotype, B); in pinetis apertis, solo lapidoso calcareo, c. 1000 m, 6.1932, *Schwarz 343* (holotype of *A. reuterianum* var. *longicaule* O. Schwarz, B).

Ö. Eren & G. Parolly

Allium scabriflorum Boiss.

= *Allium vuralii* Kit Tan in Pl. Syst. Evol. 155: 102. 1987, **syn. nov.**

Our attempt to name a puzzling gathering of an *Allium* sect. *Allium* from the gypsum slopes facing Tuz Gölü near Şereflikoçhisar (*Parolly 06-146*), brought us into the thickets of taxonomy of the *A. scabriflorum* group sensu Mathew (1996). Initially, our plant appeared to be distinct from *A. scabriflorum* in many respects. What began as an approach to delimit the gypsophytic plant from *A. scabriflorum* proper, ended in the insight that the highly polymorphic *A. scabriflorum* deserves an emended description rather than the splitt-off of segregates. Completely unexpected, our study let us sink the halophytic *A. vuralii* in synonymy. This taxon was said to differ from *A. scabriflorum* especially on account of the shape and proportion of the inner filaments (see especially Fig. 2E & F in Tan & Sorger 1987; cf. Mathew 1996).

During our studies, *Allium vuralii* became more and more enigmatic. We had followed the convincingly simple idea that two closely allied taxa should not occur sympatrically in the same halophytic habitats. Hence, we expected that the plants from the saline plain of Tuz Gölü basin would all have the filament type of *A. vuralii*, as it is so clearly depicted in the drawing accompanying the protologue. The opposite was the case: all the many specimens, including the topotypes labelled as *A. vuralii*, showed uniformly typical *A. scabriflorum* filaments. We also failed to trace the only existing fragment of the type material ("*Kit Tan & Vural 1557a*, figure and fragment E", Tan & Sorger 1987) at E ("probably lost", pers. comm. Kit Tan 2.2007 and "we do not have any material of *Allium vuralii*", D. J. Harris, curator of E, in litt., 30.1.2007).

We observed much variation in the filament shape (outlines of basal parts, proportion of median to sterile lateral cusps) and in other characters. Sometimes, there are single flowers in the different collections coming from various substrates that have filaments with median cusps ± equalling the lateral cusps, as in *Allium vuralii*, and sometimes one of the two lateral cusps can show a somewhat widened lateral base. Should there be a pattern behind this, then it seems to be neither pedological nor spatial, but rather temporal. Stamens deviating from "typical" *A. scabriflorum* and slightly merging towards *A. vuralii* (we never saw a filament as figured in the protologue) are more often found in collections from fairly late in the year. Since the type of *A. vuralii* was gathered in mid-October, we consider it as a rare phenological variant of *A. scabriflorum* (autumn-flowering *Alliums* are the least known and it is certainly worth trying to col-

lect more material late in the season with a particular focus on seasonal dimorphism). The other characters that might be used to distinguish *A. vuralii* from *A. scabriflorum* (e.g., anthers creamy-white versus purple, perigon segments acute to subacute versus obtuse) also do not hold and already vary within the populations. Many individuals from saline places combine extremely acute segments with filaments perfectly matching Fig. 2F of *A. scabriflorum* (Tan & Sorger 1987).

The following amendments of the description of *Allium scabriflorum* (based on Mathew 1996) are largely due to the two collections of the gypsum slopes near Şereflikoçhisar. The lavishly growing, clump-forming individuals of this population have a unique appearance due to their tall size, the high number of the narrow leaves, the up to 50-flowered umbels with deep purple perigons showing no bluish hue, the larger, strongly crested-papillose perigon segments with distinctly fimbriate-papillose margins and the well-exserted, mostly yellowish anthers. However, these characters are, although never re-found in exactly this combination, also represented in other populations, so that we hesitate to describe a gypsophytic, subspecific taxon of *A. scabriflorum* and prefer to have it included in a widely circumscribed *A. scabriflorum*.

Emended description. – *Bulbs* ovoid, 0.7-2 cm in diam.; outer tunics in various shades of brown; strongly reticulate-fibrous. *Bulblets* absent, but replacement bulbs of the same size as the parent bulb often persisting within the same tunic and then plants clump-forming. *Stems* 10-35(-40) cm, smooth, rather slender (1-2 mm in diam. at base) and wiry. *Leaves* (1-)2-4(-5), mostly shorter than inflorescence but sometimes equalling or longer than it, filiform-terete, fistulose, shallowly canaliculate, 0.8-2 mm wide, scabrid-papillose or glabrous on the margin; sheathing the lower $\frac{1}{4}$ to $\frac{2}{3}$ of the stem; sheath smooth. *Spathes* ovate, acuminate or shortly mucronate, whitish, membranous, persistent, (1-)2-3-valved. *Umbel* fastigiate-hemispherical to hemispherical, 0.7-2.5(-3) cm in diam., dense, 5-40(-50)-flowered. *Pedicels* unequal, (2-)3-11 mm long, smooth. *Bracteoles* mostly present, white, membranous. *Perigon* campanulate. *Perigon segments* usually violet-blue or pale bluish-violet, sometimes deep purple, occasionally whitish, normally with a dark green or blackish midvein, 4-5(-6) mm long, ovate-lanceolate to obovate, tapering gradually to an acute, subacute, rounded or even retuse apex, the outer ones papillose on the outer surface and scabrid or conspicuously crested along the keel, sometimes nearly all over and also margins fimbriate-papillose, rarely very faintly verruculose to almost smooth, the inner ones smooth to papillose or crested. *Stamens* with anthers fully to partially exerted at anthesis; filaments smooth, papillose to slightly scabrid-ciliate at base, the outer ones simple, the inner ones with the anther-bearing cusp about $\frac{1}{3}$ as long as the widely expanded undivided basal part and about $\frac{1}{3}$ or $\frac{2}{3}$ as long as the lateral cusps, rarely cusps subequalling; lateral cusps slightly to well-exserted; anthers purple or creamy-white to yellowish before dehiscence. *Style* included to well-exserted. *Capsule* ovoid, c. 3 mm long. *Seeds* 2-2.5 mm.

TURKEY: B2 KÜTAHYA: Dumlupınar-Çalköy, Zafer T., c. 1150 m, 6.7.1996, *Seçmen 4848* (EGE). – B4 ANKARA: Şereflikoçhisar, cliffs and slopes 5 km N Şereflikoçhisar, 38°59'31"N, 33°28'58"E, 970-1050 m, rocky gypsum outcrops, gypsaceous steppe, 26.5.2006, *Parolly 06-146* (AYDN, B, herb. Kürschner, herb. Parolly); 20 km N Şereflikoçhisar, 960 m, 9.6.1978, Zwerggesträuche auf Gips, *Frey & Kürschner 86-2339* (herb. Kürschner); 30 km N Şereflikoçhisar, Tuz Gölü, 905 m, 22.6.1978, *Göttel & al. 5186* (det. Kollmann, herb. Kürschner). – B4 KONYA: In subhumidis salsis planitici Lycaonicae pr. Iconium, 6.1849, *Heldreich* (det. Kollmann, E); 18 km southeast of Konya, c. 1000 m, dry open saline plain, 16.7.1965, *Ledigham & 4354* (det. Kollmann, E); Cihanbeyli, in graminosis, 6.6.1962, *C. Regel / EGE no. 16435* (det. Kollmann, E); Cihanbeyli, 10 km from Halkeni to Cihanbeyli, 1000 m, salt steppe in sand, 17.6.1962, *Dudley D. 35930* (det. Kollmann, E); Yavşan Memlehası near Tuz Gölü, saline *Artemisia* steppe, 8.6.1952, *Davis 18714 & Dodds* (det. Wendelbo, E); Cihanbeyli, Yavşan Tarlası, 900 m, 18.7.1996, tuzlu topraklar, *Vural & al. 7554* (as *A. vuralii*, GAZI); Cihanbeyli, Yavşan Tuzlası, 850 m, 14.7.1990, *Koyuncu 8567* (as *A. vuralii*, GAZI); SW-Ufer des Terşakan Gölü, 15 km SE Cihanbeyli, 900 m, Halophytenflur, Solontschak, 11.6.1986, *U. Kramer 70* (herb. Parolly). – A5 AMASYA: 17 km from Merzifon to Havsa, 700 m,

sandstone slope, 2.6.1965, *Coode & Jones 1970* (det. Kollmann, E). – B4 NIĞDE: Tuz Gölü-S-Ufer, 910 m, Halophytenformationen, 30.6.1978, *Frey & al. 1862* (det. Kollmann, herb. Kürschner). – B6 MALATYA: E. outskirts of Darende, 1500 m, steppe adjacent to fertile river valley, dry stony hills and ridges of soft limestone, 6.6.1977, *Watson 5572* (det. Koyuncu, E). – C3 KONYA: Beyşehir, Doğanbey, Dalganlı, Karadağ T., 37°48'40"N, 31°56'52"E, 1500 m, open forest with *Quercus cerris*, *Q. infectoria* subsp. *boissieri* and *Juniperus oxycedrus*, *Kürschner & Parolly 05-22* (perigon segments very faintly verruculose to almost smooth, herb. Parolly). – C4 KARAMAN: Steppen bei Korasch im Lycanischen Taurus, 1700 m, 6.1912, *Siehe 511* (det. Kollmann, E).

G. Parolly, H. Kürschner & Ö. Eren

Colchicaceae

Colchicum figlalii (Ö. Varol) Parolly & Eren, **comb. nov.**

≡ *Merendera figlalii* Ö. Varol in Belg. J. Bot. 138: 89. 2005.

We provide here for all those who prefer, in line with Nordenstam (1998), Persson (1993) and Vinnersten & Reeves (2003), to include *Merendera* Ramond and *Bulbocodium* L. in *Colchicum* L., an alternative taxonomy for this recently described species and add some site-ecological notes. The additional gathering nicely confirms the diagnostic characters of *C. figlalii* against *C. caucasicum* (M. Bieb.) Spreng. (= *M. trigyna* (Adam) Stapf), except for the tunic neck length (given as 4-8 cm). The neck is sometimes only 2-3 cm and is thus within the range of *C. caucasicum*. The anther colour of *C. figlalii* was noted in the field to be violet (not black or greenish black when dry).

The protologue introduces *Colchicum figlalii* to inhabit on Sandras D. "serpentine rock clearings" at an altitude of 1900-2100 m, where it forms a very small population (Varol 1995). Fortunately, *C. figlalii* is, at the right time and right place, a quite abundant appearance in the summit region of that mountain range: On 20-21 June 1999, the first author found it scattered in the damp turf on the top of Altınsivri and in massive stands in steep meltwater runnels and snowbeds below the main summit of Sandras D. (Çiçekbaba T.). In phytosociological respects, *C. figlalii* is closely associated with the local Trifolio-Polygonetalia Quézel 1973 vegetation (hygrophytic meltwater and doline vegetation, see Parolly 2004) It is able to penetrate through the snow-cover and flowers in thousands of individuals amidst of the flowing meltwater. On Sandras D., it is certainly the most chionophytic plant of that vegetation type.

TURKEY: C2 MUĞLA: Sandras D. above Ağla, ascent from Çıralı to Çiçekbaba T. (main summit), 37°04'N, 028°49'E, 1900-2150 m, ophiolite, snowbed meadows and meltwater communities, 21.6.1999, *Döring, Parolly 6095 & Tolimir* (B, herb. Parolly).
G. Parolly & Ö. Eren

Acknowledgements

The editors are grateful to all contributors of the present instalment, as well as to the curators or owners of the following herbaria, who provided us freely with access to their material: AKDU, AYDN, B, E, EGE, GAZI, HUB, Dipl.-Biol. Peter Hein and Prof. Dr Harald Kürschner (both Berlin). Horst Lünser prepared Fig. 1. David Kikodze (Tbilisi) provided data on the distribution of *Draba imeretica* in Georgia. Prof. Dr Matthias Rillig brushed up the English of the manuscript. Gerald Parolly wishes to thank warmly pharmacist Mr Robert Ulrich (Tübingen, Germany) and his wife, Mrs Gertrud Ulrich, for providing him with specimens including their field notes and photographs of *Teucrium pseudaroanum*. During a visit of the senior editor at the GAZI herbarium, Prof. Dr Zeki Aytaç (Ankara) kindly presented him with specimens of *T. brevifolium*, *T. ekimii* and *T. pestalozzae*. Dr Ali Dönmez (Ankara) generously communicated an authentic specimen of his *Ranunculus kastamonuensis*, Dr Birol Mutlu (Malatya) data related to his record of *Euphorbia forskalii*. Özkan Eren's research was supported by the research foundation of the Akdeniz University, Antalya (project no. 2004.03.0121.002), a DAAD fellowship (grant no. A/05/24106, Institut für Biologie, Systematische Botanik & Pflanzengeographie, Freie Univer-

sität Berlin) and by SYNTHESYS (grant no. DE-TAF-2470, Botanischer Garten and Botanisches Museum Berlin-Dahlem (BGBM), Freie Universität Berlin). He wishes to thank Prof. Dr Harald Kürschner (Institut für Biologie), Dr Thomas Raus (BGBM) and Prof. Dr Mustafa Gökçeoğlu (Akdeniz University Antalya) for supervising his project both in Berlin and Antalya. A special thanks goes to the staff of the Institute and the BGBM.

References

- Andersson, I. A. 1991: *Allium* L. – Pp. 701-714 in: Strid, A. & Tan, K., (ed.), Mountain flora of Greece **2**. – Edinburgh.
- Askerova, R. K. 1985: *Zuvanda*, a new genus of the family *Brassicaceae*. – Bot. Zhurn. (Moscow & Leningrad) **70**: 522-524.
- Baden, C. 1991: *Teucrium* L. – Pp. 69-75 in Strid, A. & Tan, K. (ed.), Mountain flora of Greece **2**. – Edinburgh.
- Benedí, C. 1997: *Chamaesyce* Gray. – Pp. 286-297 in: Castroviejo, S., Aedo, C., Benedí, C., Laínz, M., Muñoz Garmendia, F., Nieto Feliner, G. & Paiva, J. (ed.), Flora iberica **8**. – Madrid.
- Bornmüller, J. 1941: Über eine neue *Camelina*-Art der vorderasiatischen Flora: *Camelina Stiefel-hagenii* Bornm. (sp. n.). – Repert. Spec. Nov. Regni Veg. **6**: 129-132.
- Boulos, L. 2000: Flora of Egypt **2**. – Cairo.
- Casper, S. J. & Krausch, H. D. 1981: *Pteridophyta* und *Anthophyta*, 2. Teil: *Saururaceae* bis *Asteraceae*. – In: Ettl, H., Gerloff, J. & Heynig, H. (ed.), Süßwasserflora von Mitteleuropa **24**. – Stuttgart & New York.
- Contandriopoulos, J. & Quézel, P. 1976: Contribution à l'étude de la flore du Taurus et de Amanus. – Bull. Soc. Bot. France **123**: 415-432.
- Cook, C. D. K. 1964: *Ranunculus* subgen. *Batrachium* (DC.) A. Gray. – Pp. 237-238 in: Tutin, T., Heywood, V. H., Burges, N. A., Valentine, D. H., Walters, S. M. & Webb, D. A. (ed.), Flora europaea, ed. 1, **1**. – Cambridge.
- 1966: A monographic study of *Ranunculus* subgenus *Batrachium* (DC.) A. Gray. – Mitt. Bot. Staatssammlung München **6**: 47-237.
- 1986: *Ranunculus* subgenus *Batrachium* (DC.) A. Gray. – Pp. 281-282 (key), 285-298 (species account) in: Castroviejo, S., Laínz, M., López González, G., Montserrat, P., Muñoz Garmendia, F., Paiva, J. & Villar, L. (ed.), Flora iberica **1**. – Madrid.
- 1993: *Ranunculus* subgen. *Batrachium* (DC.) A. Gray. – Pp. 285-286 in: Tutin, T. G., Burges, N. A., Chater, A. O., Edmondson, J. A., Heywood, V. H., Moore, D. M., Valentine, D. H., Walters, S. M. & Webb, D. A. (ed.), Flora europaea, ed. 2, **1**. – Cambridge.
- Coste, H. 1937: Flore descriptive et illustrée de la France, de la Corse et des contrées limitrophes **3**. – Paris.
- Dahlgren, G. 2002: *Ranunculus* subgen. *Batrachium* (DC.) A. Gray. – Pp. 64-69 in: Strid, A. & Tan, K. (ed.), Flora hellenica **2**. – Koenigstein.
- Davis, P. H. 1955: Turkish itineraries. – Notes Roy. Bot. Gard. Edinburgh **22**: 1-7.
- 1971: Distribution patterns in Anatolia with particular reference to endemism. – Pp. 15-27 in: Davis P. H., Harper P. C., Hedge I. C. (ed.), Plant life of South-West Asia. – Edinburgh.
- 1965-85 (ed.): Flora of Turkey and the East Aegean Islands **1-9**. 1965 (1), 1967 (2), 1970 (3), 1972 (4), 1975 (5), 1978 (6), 1982 (7), 1984 (8), 1985 (9). – Edinburgh.
- , Mill, R. R. & Tan, K. (ed.) 1988: Flora of Turkey and the East Aegean Islands **10** [Suppl. 1]. – Edinburgh.
- Dönmez, A. A. 2003: *Ranunculus kastamonuensis* sp. nov. (*Ranunculaceae*) from Turkey. – Nordic J. Bot. **22**: 219-222.
- 2006: *Teucrium chasmophyticum* Rech. f. (*Lamiaceae*): A new record for the Flora of Turkey. – Turk. J. Bot. **30**: 1-4.
- Duman, H. 1998: A new species of *Teucrium* L. (*Labiatae*) from SW Anatolia. – Karaca Arb. Mag. **4**: 125-130.

- & Watson, M. F. 1999: *Ekimia*, a new genus of *Umbelliferae*, and two new taxa of *Prangos* Lindl. (*Umbelliferae*) from Southern Turkey. – *Edinburgh J. Bot.* **56**: 199-209.
- Ekim, T., Duman, H. & Güner, A. 1999: A new *Allium* L. species from Anatolia: *Allium goekyigitii* Ekim, H. Duman & Güner. – *Karaca Arbor. Mag.* **5**: 27-34.
- Eren, Ö. 2005: Phytosociological study on high mountain vegetation of Antalya, Beydağları (Tahtalı, Teke, Çalbalı, Pozan, Uzunkarış, Özdemir and Kartal Dağları). – PhD Thesis, Antalya University.
- , Gökçeoğlu, M. & Parolly, G. 2004: The flora and vegetation of Bakırlı Dağı (W Taurus Mts, Turkey), including annotations on critical taxa of the Taurus range. – *Willdenowia* **34**: 463-503.
- , Parolly, G., Raus, T. & H. Kürschner, H. 2007: A new species of *Polygala* L. (*Polygalaceae*) from SW Anatolia. – *Bot. J. Linn. Soc.*: in press.
- Fiori, A. 1933: *Iconographia florae italicae*, ed. 3. – Firenze.
- Fischer, R., Adler, W. & Oswald, K. 2005: *Exkursionsflora für Österreich, Liechtenstein und Südtirol*, ed. 2. – Linz.
- Göktürk, R. S. 2002: Türkiye’ de yayılış gösteren *Cephalaria* Schrader ex Roemer & Schultes (*Dipsacaceae*) türleri üzerinde taksonomik bir araştırma. – PhD thesis, Akdeniz University Antalya.
- Greuter, W. 1971: Betrachtungen zur Pflanzengeographie der Südägäis. – Pp. 49-64 in: Strid, A. (ed.), *Evolution in the Aegean*. – *Opera Bot.* **30**.
- , Burdet, H. M. & Long, G. (ed.) 1986: *Med-Checklist* **3**. – Genève & Berlin.
- Güner, A., Özhatay, N., Ekim, T. & Başer, K. H. C. (ed.) 2000: *Flora of Turkey and the East Aegean Islands* **11** [Suppl. 2]. – Edinburgh.
- Haber, R. M. & Semaan, M. T. 2007: Two new records from Lebanon: *Chamaesyce nutans* (Lag.) Small (*Euphorbiaceae*) and *Eleusine indica* (L.) Gaertner (*Poaceae*). – *Turk. J. Bot.* **31**: 341-343.
- Haeupler, H. & Muer, T. (ed.) 2000: *Bildatlas der Farn- und Blütenpflanzen Deutschlands*. – Stuttgart.
- Hartvig, P. & Strid, A. 1987: New taxa and new records from the mountains of SW and SC Turkey. – *Bot. Jahrb. Syst.* **108**: 301-341.
- Holmgren, P. K. & Holmgren, N. H. 1998- (continuously updated): *Index herbariorum*. – Published on the Internet <http://sciweb.nybg.org/science2/IndexHerbariorum.asp>.
- Huber-Morath, A. 1962: Die Heimat von *Camelina stiefelhagenii* Bornm. – *Bauhinia* **1**: 62.
- IUCN 2001: *IUCN Red List categories and criteria*, version 3.1. – Gland & Cambridge.
- Kalpoutzakis, E. & Constantinidis, T. 2006: Additions and annotations to the flora of Peloponnisos (S Greece). – *Willdenowia* **36**: 271-284.
- Kharadze, A. & Mtskhvetadze, D. 1979: *Draba* L. – Pp. 143-161 in: Ketskhoveli, N. (ed.), *Flora Gruzji*, ed. 2, **5**. – Tbilisi.
- Kollmann, F. 1986: *Allium* L. – Pp. 74-99 in: Dothan-Feinbrun, N. (ed.), *Flora Palaestina* **4**. – Jerusalem.
- Krechetovich, V. I. 1937: *Batrachium*. – Pp. 325-350 in: Komarov, V. L. & Šiškin, B. K. (ed.), *Flora SSSR* **7**. – Moscow & Leningrad.
- Mathew, B. 1996: A review of *Allium* section *Allium*. – Kew.
- McClintock, D. 1991: The ericas of Turkey. – *Karaca Arbor. Mag.* **1**: 6-9.
- Meikle, R. D. 1977, 1985: *Flora of Cyprus* **1-2**. – Kew.
- Migahid, A. M. 1978: Migahid and Hammouda’s *Flora of Saudi Arabia* **1**. – Riyadh.
- Mouterde, P. 1966, 1986: *Nouvelle Flore du Liban et de la Syrie* **1-2**. – Beyrouth.
- Mutlu, B. & Erik, S. 1999: New floristic records from various squares in flora of Turkey. – *Ot* **6**: 45-56.
- Navarro, T. & El Oualidi, J. 2000a: Synopsis of *Teucrium* L. (*Labiatae*) in the Mediterranean region and surrounding areas. – *Fl. Medit.* **10**: 349-363.

- & El Oualidi, J. 2000b: Trichome morphology in *Teucrium* L. (*Labiatae*). A taxonomic review. – *Anales Jard. Bot. Madrid* **57**: 277-297.
- Nebel, M. 1993: *Ranunculaceae*. – Pp. 235-322 in: Sebald, O., Seybold, S. & Philippi, G. (ed.), *Die Farn- und Blütenpflanzen Baden-Württembergs*, ed. 2, **2**. – Stuttgart.
- Nordenstam, B. 1998: *Colchicaceae*. – Pp. 175-185 in: Kubitzki, K. (ed.), *The families and genera of vascular plants* **3**. – Berlin, etc.
- Özhatay, N. 1986: Two new *Allium* species from Turkey. – *Notes Roy. Bot. Gard. Edinburgh* **44**: 147-150.
- & Kültür, Ş. 2006: Check-List of additional taxa to the Supplement Flora of Turkey III. – *Turk. J. Bot.* **30**: 281-316.
- & Mathew, B. 1995: New taxa and notes on the genus *Allium* (*Alliaceae*) in Turkey and Arabia. – *Kew Bull.* **50**: 723-731.
- Parolly, G. 2004: The high mountain vegetation of Turkey. A state of the art report, including a first annotated conspectus of the major syntaxa. – *Turk. J. Bot.* **28**: 39-63.
- & Eren, Ö. (ed.) 2006: Contributions to the flora of Turkey, 1. – *Willdenowia* **36**: 823-844.
- & Nordt, B. 2001: *Seseli hartvigii* (*Apiaceae*) – a new name for *S. ramosissimum* Hartvig & Strid, and carpological and ecological notes on this species. – *Willdenowia* **31**: 87-93.
- & Tan, K. 2006: A new species of *Hesperis* (*Brassicaceae*) from SW Anatolia, Turkey. – *Willdenowia* **36**: 851-856.
- , Eren, Ö. & Nordt, B. 2005: *Lomelosia solymica* (*Dipsacaceae*), a new chasmophyte from the Western Taurus Mts, Turkey. – *Willdenowia* **35**: 107-115.
- Persson, K. 1993: Reproductive strategies and evolution in *Colchicum*. – Pp. 394-414 in: Demiriz, H. & Özhatay, N. (ed.), *Proceedings of the 5th Optima Meeting in Istanbul*, 8.-15. Sept. 1986. – Istanbul.
- Pils, G. 2006: *Flowers of Turkey. A photo guide. With 4153 species in colour.* – Linz.
- Radde, G. 1899: *Grundzüge der Pflanzenverbreitung in den Kaukasusländern von der unteren Wolga über den Manytsch-Scheider bis zur Scheitelfläche Hocharmeniens.* – Engler, A. & Drude, O. (ed.), *Vegetation der Erde* **3**. – Leipzig.
- Raju, V. S. & Rao, P. N. 1987: The taxonomic use of the basic stomatal type in the generic delimitation of *Chamaesyce* (*Euphorbiaceae*). – *Feddes Repert.* **98**: 137-142.
- Rechinger, K. H. 1964: *Flora of lowland Iraq.* – Weinheim.
- Schulz, O. E. 1927: *Cruciferae IV. Draba et Erophila.* – Engler, A. & Prantl, K. (ed.), *Das Pflanzenreich* **105**. – Leipzig.
- Seçmen, Ö. & Leblebici, E. 1996: *Türkiye sulak alan bitkileri ve bitki örtüsü.* – Ege Üniv. Fen Fak. Yayınları **158**.
- Sommier, S. & Levier, E. 1900: *Enumeratio plantarum anno 1890 in Caucaso lectarum.* – *Trudy Imp. S.-Peterburgsk. Bot. Sada* **16**.
- Stearn, W. T. 1980: *Allium* L. – Pp. 49-69 in: Tutin, T. G., Heywood, V. H., Burges, N. A., Moore, D. M., Valentine, D. H., Walters, S. M. & Webb, D. A. (ed.), *Flora europaea* **5**. – Cambridge.
- Stearn, W. T. 1981: The genus *Allium* in the Balkan Peninsula. – *Bot. Jahrb. Syst.* **102**: 201-213.
- Sümbül, H. 1991: Ten new species from Anatolia and two new records for the Flora of Turkey. – *Edinburgh J. Bot.* **48**: 27-40.
- Tan, K. & Iatroú, G. 2001: Endemic plants of Greece. The Peloponnese. – Copenhagen.
- & Sorger, F. 1987: Even more new taxa from S and E Anatolia II. – *Pl. Syst. Evol.* **155**: 93-103.
- Tolmachev, A. I. 1939: *Draba* L. – Pp. 371-454 in: Komarov, V. L. & Buš, N. A. (ed.), *Flora SSSR* **8**. – Moskva & Leningrad [English ed.: pp. 276-331, Jerusalem, 1970].
- Townsend, C. C. 1980: *Malcolmia* R. Br. – Pp. 1028-1031 in: Townsend, C. C. & Guest, E. (ed.), *Flora of Iraq* **4**. – Baghdad.
- Varol, Ö. 2005: *Merendera figlalii* (*Colchicaceae*), a new species from Southwestern Anatolia, Turkey. – *Belg. J. Bot.* **138**: 89-92.

- Vinnersten, A. & Reeves, G. 2003: Phylogenetic relationships within *Colchicaceae*. – Amer. J. Bot. **90**: 1455-1462.
- Wagenitz, G., Hellwig, F. H., Parolly, G. & Martins, L. 2006: Two new species of *Centaurea* (*Compositae, Cardueae*) from Turkey. – Willdenowia **36**: 423-435.
- Warwick, S. I., Francis, A. & Al-Shehbaz, I. A. 2006: *Brassicaceae*: Species checklist and database on CD-Rom. – *Pl. Syst. Evol.* **259**: 249-258. [[CrossRef](#)]
- , Sauder, C. A., Al-Shehbaz, I. A. & Jacquemoud, F. 2007: Phylogenetic relationships in the tribes *Anchonieae*, *Chorisiporeae*, *Euclidieae* and *Hesperideae* (*Brassicaceae*) based on nuclear ribosomal ITS DNA sequences. – *Ann. Missouri Bot. Gard.* **94**: 56-78.
- Wendelbo, P. 1971: *Allium* L. – Pp. 3-99 in: Rechinger, K. H. (ed.), *Flora iranica* **76**. – Graz.
- 1985: *Allium* L. – Pp. 137-177 in: Townsend, C. C. & Guest, E. (ed.), *Flora of Iraq* **8**. – Baghdad.
- Wilde-Duyfjes, B. E. E. D. 1976: A revision of the genus *Allium* (*Liliaceae*) in Africa. – *Meded. Landbouwhogeschool Wageningen* **76**.
- Wisskirchen, R. & Haeupler, H. 1998: Standardliste der Farn- und Blütenpflanzen Deutschlands. – Stuttgart.
- Yıldırım, Ş. 1998: A new combination and status, and typification for *Camelina* (*Brassicaceae*). – *Ot* **5**: 1-4.
- 2002: Two new species of *Draba* L. (*Brassicaceae*) from Turkey, *D. terekemensis* and *D. narmanensis*. – *Ot* **7(2)**: 1-6.
- Zohary, M. 1966, 1972: *Flora Palaestina* **1-2**. – Jerusalem.
- 1973: *Geobotanical foundations of the Middle East* **1-2**. – Stuttgart.

Addresses of the authors:

Dr Gerald Parolly, Institut für Biologie – Systematische Botanik & Pflanzengeographie, Freie Universität Berlin, Altensteinstraße 6, D-14195 Berlin, Germany; e-mail: gparolly@zedat.fu-berlin.de

Dr Özkan Eren, Adnan Menderes University Aydın, Faculty of Arts & Sciences, Department of Biology, 09010 Kepez-Aydın, Turkey, e-mail: ozkaneren@adu.edu.tr.