

## *Allium rumelicum*, sect. *Codonoprasum*, a new species from European Turkey

Neriman Özhatay, Mine Koçyiğit & Emine Akalın

Department of Pharmaceutical Botany, Faculty of Pharmacy, Istanbul University,  
34116 Beyazıt, Istanbul, Turkey, e-mail: nozhatay@istanbul.edu.tr;  
minekocyiğit@hotmail.com (coresponding author); akaline@istanbul.edu.tr

Received: April 06, 2010 ▷ Accepted: July 15, 2010

**Abstract.** *Allium rumelicum* M. Koçyiğit & N. Özhatay **sp. nov.** (sect. *Codonoprasum*) is described as a species new to science on the basis of material collected in the Yıldız Mountains from the European part of Turkey. The species is well distinguished with its dark-purple inner tunics and slightly ribbed outer tunics, subequal and slightly longer filaments, ovoid-ellipsoidal ovary and subglobose capsula. Morphologically, the new species is related to *A. sibthorpiatum*, which is an endemic species to Western Turkey.

**Key words:** *Allium* sect. *Codonoprasum*, European Turkey (Thrace), new species

Since the publication of the eighth volume of *Flora of Turkey and the East Aegean Islands* (Davis & al. 1984) further floristic explorations in Turkey have increased our knowledge of the representation and distribution of genus *Allium*. According to updated knowledge, this genus is represented in Turkey by 182 taxa, 23 taxa of which were discovered and described in the last 25 years (Davis & al. 1988; Güner & al. 2000; Özhatay & Kültür 2006; Demirelma & Uysal 2008; Özhatay & al. 2009; Koçyiğit & Özhatay 2010).

*Codonoprasum* Rchb. is one of the most complicated sections in the genus. It is represented by 46 taxa, 18 of which are endemic to the country. A PhD study by Mine Kocyiğit on the Turkish species of *Allium* sect. *Codonoprasum* is now in progress at the Department of Pharmaceutical Botany of Istanbul University. The European part of Turkey, called European Turkey, constitutes only a small portion of the country, with a surface area of 23.500 km<sup>2</sup> (Fig. 1). Approximately 2500 vascular plant taxa have been recorded from European Turkey (Özhatay 2001). In the NE of the region, the Yıldız Mountains (Istranca Moun-

tain) range extends to SE Bulgaria, with Mahya Hill (1035 m) as its highest point. This range borders on the Black Sea and is a low continuation of the Anatolia Northern Black Sea Mountains. During the field studies of the Yıldız Mountains Biosphere Project supported by EuropeAid/125289/D/SER/TR, about 2547 specimens were collected from the project area in the NW of European Turkey (Fig. 2), in the period May–October 2009. Eleven hotspots were identified there and Dupnisa Cave and its surroundings was one of them. Several *Allium* specimens were collected from this hotspot and identified as *A. saxatile* M. Bieb. (a new record for Turkey), *A. moschatum* L. (one of the rarest species in Turkey), along with other common species, such as *A. flavum* L. subsp. *flavum*, *A. paniculatum* L. subsp. *paniculatum*, *A. fuscum* Waldst. & Kit. and *A. scorodoprasum* L. subsp. *rotundum* (L.) Stearn. Another collected *Allium* specimen from the same locality showed such noticeable characters as ribbed and dark-purple tunics, along with some other remarkable morphological characteristics and was mostly related to an endemic species to Western Anatolia,

*Allium sibthorpiatum* Schult. & Schult. f., although there were some clear morphological distinctions that set it apart from the known species of this group. These specimens represent another species hitherto unknown to science. Therefore, it is treated here as a new species, named *A. rumelicum*. The new species apparently is local and belongs to a small population growing in calcareous rocky places above Dupnisa Cave.

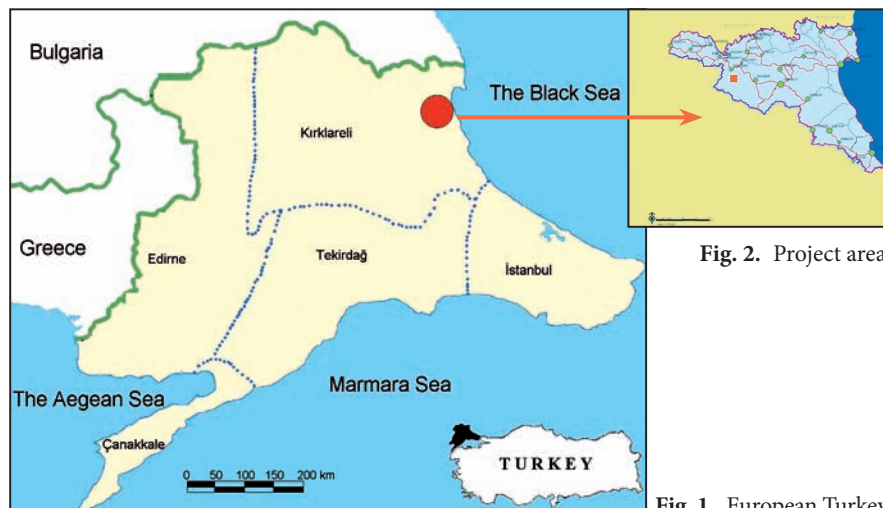


Fig. 2. Project area.

Fig. 1. European Turkey.

***Allium rumelicum*** M. Koçyiğit & N. Özhatay,  
**sp. nov.** (Figs. 3–5)

*Allium rumelicum* differt *A. sibthorpiatum* tunicis externis coriaceae, fusco-brunneae, leviter costatus tunicis internis coriaceae, fusco-violaceis, distincte costatus, stamina tepalis exsertis ovarium, ovoideacylindricum, chromosomatum numero tetraploidea.

**Type:** A1 (E): Kırklareli, Demirköy, above Dupnisa Cave, 27.07.2009, coll. E. Akalın, Y. Yeşil & U. Uruşak (**holo.** ISTE 86 112! **iso.** EDTU!).

Bulb oblong, 0.5 × 1.2 cm in diameter; outer tunics brownish, coriaceous, extended into a short collar, slightly ribbed, inner tunics dark-purple and coriaceous, distinctly ribbed.

Scape 5–15 cm, tall, cylindrical, glabrous, erect, covered up to ½–¾ of its length by the leaf sheaths. Leaves 3–4, almost terete, 0.5–1 mm wide, longer than or as long as scape, glabrous, margin of sheaths scabridulous. Spathe persistent, with two unequal valves, the larger one 2–3.5 cm long, the smaller one 1–2 cm long, attenuate from an ovoid base, as long as or longer than umbel, 4–5 veined, margin of valves crenulate. Umbel 1.5–2 cm in diameter, 4–12 flowered. Pedicels 0.7–1 cm, slightly unequal. Perigon shortly campanulate, 5–5.5 mm, tepals unequal, pink, midrib purplish, whitish at base, outer tepals oblong, smooth, 4–4.5 × 2 mm, apex obtuse-mucronate, inner tepals ovate, 4.5–5 × 1.5 mm, obtuse. Filaments equal to perigon, or slightly longer, 5–5.3 mm, pink, below connate into an annulus approximately 1 mm high. Anthers yellow, ovate, rounded-emarginate. Ovary elliptical-ovoid, 4 mm long, × 1.5–1.8 mm wide, with a slightly papillose apex. Style 3 mm ex-

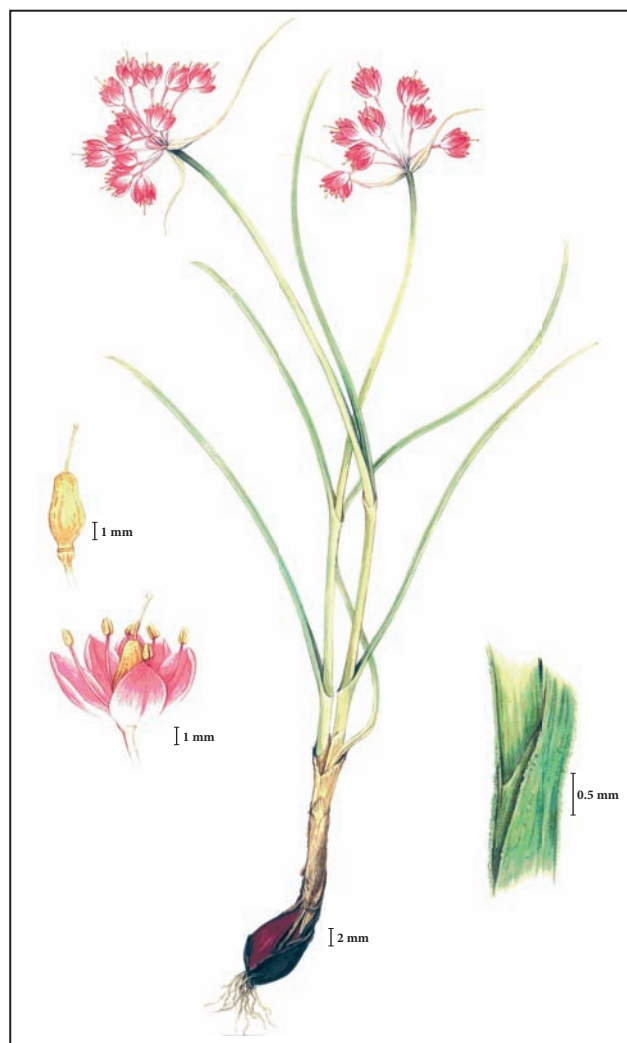


Fig. 3. *Allium rumelicum* (drawn from the holotype by Gülten Yeğenağa).

erted. Capsule subglobose, 4–4.2 × 3.7–4 mm, sessile, with a distinctly papillose apex, valves ovoid-oblong.

**Chromosome number:** 2n = 32 (ISTE 86114).

**Flowering time:** July–August.

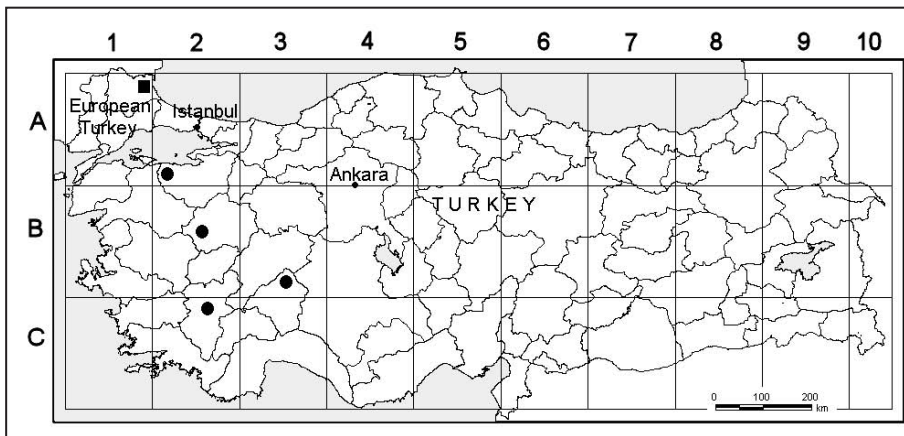
**Habitat:** Rocks, stony slopes, screes, 225–230 m.

### Specimens examined

*A. rumelicum*: A1 (E): Kırklareli, Demirköy, above Dupnisa Cave, 26.10.2009, E. Akalın, M. Koçyiğit & Y. Yeşil, ISTE 86114 (in fruiting stage).

*A. sibthorpiatum*: A2 (A): Bursa: Uludağ (holo. OXF); 2300 m, 10.07.1978, M. Koyuncu (AEF 6548); 13.08.1953, A. & T. Baytop (ISTE 1553); B1: Balıkesir: Kazdağı, 09.08.2004, T. Dirmenci (ISTE 81833); B2: Kütahya: Gediz, Murat Mountain, 1100 m, 22.07.1978,

A. Çırpıcı (ISTE 43952); ibid. (ISTF 32360); Domaniç, 1700 m, 20.08.1992, M. Koyuncu (AEF 17183); Darıtepe, Develik, 1600–1700 m, 20.08.1992, M. Koyuncu (AEF 17161); Bilelik 1700 m, 20.08.1992, M. Koyuncu (AEF 17168); B3: Eskişehir: Kavaklıdere, Türkmen Mountain, 1300 m, 9.07.1977, T. Ekim (ISTE 48163); Sündiken dağı, 03.07.1980, M. Koyuncu, H. Malyer & H. Başer (AEF 19468); Kütahya: Between Kütahya and Afyon, 1050 m, 03.08.1980, N. Özhatay, E. Tuzlacı, B. Çubukçu & A. Meriçli (ISTE 45608); C2: Denizli: Honaz Dağı, 1850 m, 24.08.1973, E. Tuzlacı; ibid. (ISTE 26671); Çivril, Akdağ, 1555 m, 21.07.2008, M. Koçyiğit (ISTE 87028); C3: Isparta: Barla, Gelinçik Mountain, 2000 m, 31.08.1976, M. Koyuncu (AEF 5592); 17.07.1983 M. Koyuncu (culture) (AEF 12875); 12.07.1977 M. Koyuncu (culture) (AEF 19466).

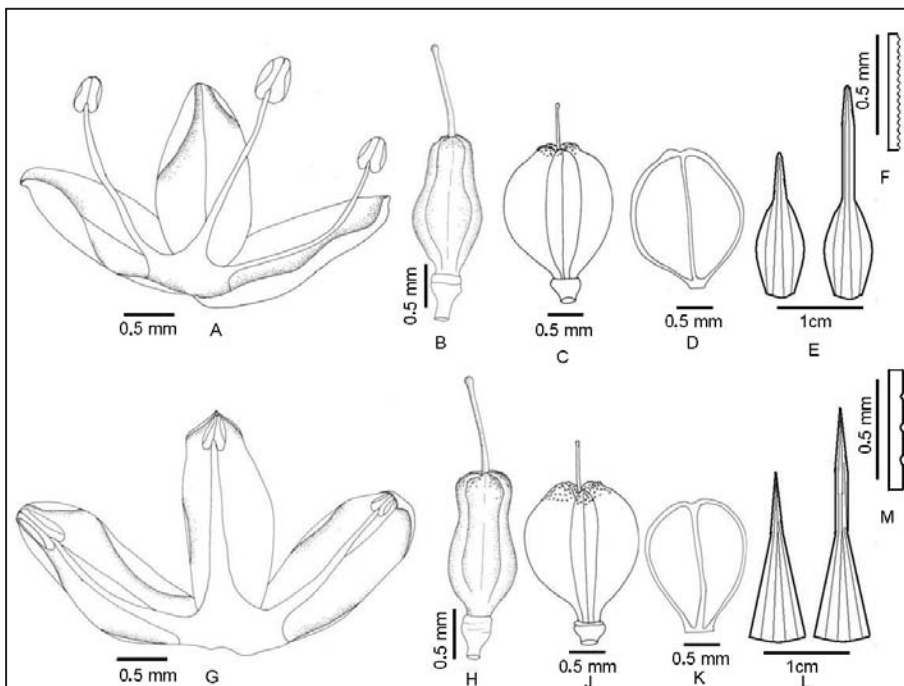


**Fig. 4.** Distribution in Turkey:

*A. sibthorpiatum* ●

*A. rumelicum* ■

(Data based on the examined specimens by M. Koçyiğit).



**Fig. 5.** *A. rumelicum* (ISTE 86114): perigon with stamens (A), ovary (B), capsule (C), valve of capsule (D), valves of spatha (E), margin of spatha valves (F).

*A. sibthorpiatum* (ISTE 87028): perigon with stamens (G), ovary (H), capsule (J), valve of capsule (K), valves of spatha (L), margin of spatha valves (M).

### Taxonomic relationships

The presence of a two-valved spathe, longer than the inflorescence, simple stamens and ovary with inconspicuous nectaries refer *Allium rumelicum* (Fig. 3) to sect. *Codonoprasum* Rchb., which includes many complex species.

*Allium rumelicum* shows certain taxonomical relations with *A. sibthorpiatum* Schult. & Schult. f. (Fig. 5), which is an endemic species to Western Anatolia (Fig. 4). Both species have in common a summertime flowering period, purple inner bulb tunics, campanulate perigon with pink tepals, and papillose ovary in the upper part. Nevertheless, *A. rumelicum* has some different morphological and karyological features (Table 1). *Allium sibthorpiatum* is characterized by distinctly ribbed outer bulb tunics, membranous inner tunics, perigon 5–6 mm, stamens slightly shorter than perigon, oblong ovary, channeled leaf cross section, and is diploid. On the other hand, *A. rumelicum* is characterized by slightly ribbed outer bulb tunics, coriaceous inner tunics, perigon 5–5.5 mm, stamens slightly longer than perigon, ovoid-ellipsoidal ovary, almost cylindrical leaf cross section, and is tetraploid.

The morphology and leaf anatomy of *A. sibthorpiatum* have been studied by Uysal (1999), but his results do not support our findings.

### Leaf anatomy

*Allium rumelicum* and *A. sibthorpiatum* have leaf blades characterized by epidermis with a developed cuticle and stomata distributed along the whole perimeter. The palisade tissue is regular and one-layered

along the whole surface. The spongy tissue is quite compact, with big cells in the central portion. Numerous secretory canals occur in the spongy tissue. The vascular bundles are 8–10 in both species. *Allium rumelicum* differs from *A. sibthorpiatum* by an almost terete leaf cross section, while the leaf of *A. sibthorpiatum* is channeled (Fig. 6).

### Karyotype

*A. rumelicum*:  $2n = 32$  (tetraploid), karyotype consists of five sets of metacentric and three sets of submetacentric chromosomes (ISTE 86 114) (Fig. 7-A).

*A. sibthorpiatum*:  $2n = 16$  (diploid), karyotype consists of six pairs of metacentric and two pairs of submetacentric chromosomes (ISTE 87 028) (Fig. 7-B).

### Ecology

The flora was an interesting mixture of rare species [*Acer pseudoplatanus* L., *Leontodon cichoraceus* (Ten.) Sanguin., *Satureja coerulea* Janka, *Sideritis scardica* Griseb. subsp. *scardica*, and *Achillea clypeolata* Sm.] and common forest species, such as *Quercus frainetto* Ten. and *Q. petraea* (Mattuschka) Liebl. subsp. *iberica* (Steven ex M. Bieb.) Krassiln. (Fig. 8).

### Etymology

The new species is named after “Rumelia” or “Roumelia” (rumeli in Turkish), a Turkish name used from the 15<sup>th</sup> century onwards for the South Balkan region of the Ottoman Empire. Presently, the word Trakya has mostly replaced Rumelia in Turkey, when referring to its European part (Edirne, Kırklareli, and Tekirdağ provinces, the northern part of Çanakkale province and the western part of Istanbul province).

**Table 1.** Morphological differences between *Allium rumelicum* and *A. sibthorpiatum*.

Features	<i>A. rumelicum</i> (Figs. 3, 5)	<i>A. sibthorpiatum</i> (Fig. 5)
Bulb	oblong, 0.5 × 1.2 cm	oblong, 0.7 × 1.5–2 cm
Outer tunics	brownish, prolonged into a short collar, slightly ribbed	greyish-brown, distinctly ribbed
Inner tunics	purple and coriaceous, distinctly ribbed	purple and membranous, distinctly ribbed
Scape length (cm) (bulb and inflorescence including)	5–15 cm	5–30 cm
Leaf	3–4, almost terete, length 8–13 cm (except sheath)	1–2 (–4) almost terete, channeled, length 7–15 cm (except sheath)
Sheath	½ of scape length	¾ of scape length
Spathe valves [short – long]	[0.7–1.5] – [2–3.5] cm	[0.7–1 (–2)] – [2–3.5 (–4)] cm
Inflorescence	5–12 flowered	5–20 flowered
Perigon length	5–5.5 mm, tepals unequal, pink, midrib purplish	5–6 mm, tepals unequal, pink, midrib purplish
Outer tepals	oblong, 4–4.5 × 2–1.5 mm	oblong, 5–5.5 × 2–3 mm
Inner tepals	ovate, 4.5–5 × 1.3–1.5 mm	ovate, 5.5–6 × 1.5–2 mm
Stamens	as long as perigon, or slightly longer, 5–5.3 mm, pink	slightly shorter than perigon, 5–5.2 mm, pink
Anthers colour	yellow	yellow
Ovary shape and length	ovoid-ellipsoidal, 4 mm	oblong, 4 mm
Style	3 mm	4 mm
Capsule	oblong-subglobose, 4–4.2 × 3.7–4 mm	globose-subglobose, 2–3 × 4–5 mm
Valves of capsule	oblong-subglobose	obovate
Chromosome number (2n)	32	16

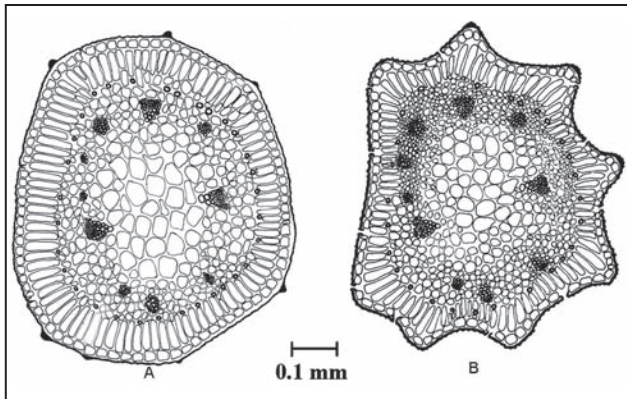


Fig. 6. Leaf cross section of *A. rumelicum* (A) (ISTE 86114) and *A. sibthorpiianum* (B) (ISTE 87028).



Fig. 8. The habitat of *A. rumelicum* (photo M. Koçyiğit).

### Conservation Status

The new species is endemic to Demirköy (Kırklareli) in European Turkey (Figs. 1, 2). The species is known only from one population in the type locality and its estimated area of occupancy is less than 10 km<sup>2</sup>. Therefore, the authors suggest for this new species to be placed in the IUCN category of Critically Endangered [CR] criterion B2, A4 (IUCN 2001).

**Acknowledgements:** The new species was collected during the field work on the “Protection and Sustainable Development of Natural Resources and Biodiversity in the Yıldız Mountains of Turkey” project financially supported by EuropeAid/125289/D/SER/TR. The Project was carried out under the supervision of Prof. Neriman Özhatay. The investigated region (Dupnisa Cave and surroundings, Mahya Mountain) was studied by Assoc. Prof. Emine Akalın and her team. The *Allium* specimens were collected by this team. The authors are grateful to Uğur Uruşak and Yeter Yeşil for their help during field work and to Gülten Yeğenağa for the excellent illustration.

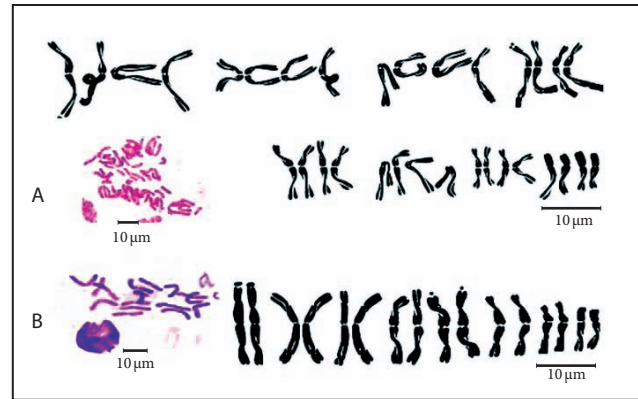


Fig. 7. *A. rumelicum* metaphasic plate ( $2n=32$ ) and karyogram (A); *A. sibthorpiianum* metaphasic plate ( $2n=16$ ) and karyogram (B).

### References

- Davis, P. H., Mill, R.R. & Tan, K. 1984. Flora of Turkey and the East Aegean Islands. Vol. 8, pp. 98-211. Edinburgh Univ. Press, Edinburgh.
- Davis, P.H., Mill, R.R. & Tan, K. 1988. Flora of Turkey and the East Aegean Islands. Vol. 10 (suppl. 1), pp. 221-223. Edinburgh Univ. Press, Edinburgh.
- Demirelma, H. & Uysal, T. 2008. A new *Allium* species (*Alliaceae*) from southern Turkey. – Nord. J. Bot., 20: 59: 22.
- Güner, A., Özhatay, N., Ekim, T. & Başer, K.H.C. 2000. Flora of Turkey and the East Aegean Islands, Vol. 11 (suppl. 2), pp. 224-232. Edinburgh Univ. Press, Edinburgh.
- IUCN. 2001. IUCN Red List Categories and Criteria. Version 3.1. IUCN Species Survival Commission. Gland & Cambridge.
- Koçyiğit, M. & Özhatay, N. 2010. A Contribution to the Genus *Allium* L. (sect. *Codonoprasum*) in Turkey. – Turk. J. Bot., 34: 391-395.
- Özhatay, N. 1984. Cytotaxonomic Studies on the Genus *Allium* in European Turkey and Around Istanbul. II. Sect. *Codonoprasum*. – J. Fac. Pharm. Istanbul, 20: 29-42.
- Özhatay, N. 2001. The Flora of European Turkey. – In: Özhatay, N. (ed.), Proc. 2<sup>nd</sup> Balkan Bot. Congr. Istanbul 2001. Vol. 1, pp. 37-46. Marmara Univ., Istanbul.
- Özhatay, N. & Kültür, Ş. 2006. Check-List of Additional Taxa to the Supplement Flora of Turkey III. – Turk. J. Bot., 30: 281-316.
- Özhatay, N., Kültür, Ş. & Aslan, S. 2009. Check-List of Additional Taxa to the Supplement Flora of Turkey IV. – Turk. J. Bot., 33: 191-226.
- Uysal, İ. 1999. Morphological, Anatomical and Ecological studies on the two Turkish endemic species collected from Kaz Dağı (B1 Balıkesir): “*Allium sibthorpiianum* Schultes & Schultes fil. and *Allium reuterianum* Boiss.” – Turk. J. Bot., 23: 137-148.

