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***Allium brachyspathum* (Alliaceae), a new species from the island of Karpathos (S Aegean area, Greece)**

Abstract

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Allium brachyspathum, a very rare geophyte occurring in rocky places of Karpathos island (S Aegean area, Greece), is described as new to science and illustrated. Its karyology, ecology, leaf anatomy and taxonomic relationships are discussed.

Introduction

During a visit to the island of Karpathos for a floristic and phytosociological study, a very rare new species of *Allium* was discovered. Due to some morphological characters, such as the spathe with two persistent valves, simple stamens, ovary with inconspicuous nectaries, this species belongs to *A. sect. Codonoprasum* Reichenb. On account of herbarium and literature data regarding the flora of Karpathos (Greuter & al. 1983, Turland & al. 1993, Jahn & Schönfelder 1995), any plant referable to this new species was never collected before. In fact, the only taxon of this section previously quoted in Karpathos was *A. tardans* Greuter & Zahar., which differs from our finding by its late flowering period (August-September), many morphological features and karyotype structure.

Materials and methods

The study was based on herbarium specimens and living material collected in some localities of Karpathos and cultivated in the Botanical Garden of Catania.

For the karyological study, mitotic metaphase plates were obtained from root tips of cultivated bulbs, which were pretreated with 0.3% colchicine water solution for 3 hours, fixed in ethanol-acetic acid (3:1) for 3-6 hours and stained according to the Feulgen method. Chromosome coupling and karyotypes were worked out by the Karyo95 program (Pavone & al. 1995). The chromosome classification follows the nomenclature of Levan & al. (1964).

The leaf anatomy was studied on cultivated material, fixed in Karpetschenko and embedded in paraffin; the transverse sections were stained with ruthenium red and lightgreen-yellowish.

Allium brachyspathum Brullo, Pavone & Salmeri, **sp. nova.** - Fig. 1A-G. - Typus: Greece, Karpathos, Oro Lastos, esemplare coltivato, 7.7.1997, *Brullo* (CAT; isotypi: CAT, FI).

Bulbus solitarius, tunicis membranaceis. Folia 4-6, filiformia, 10-25 cm longa, 0.5-1 mm lata. Scapus erectus, glaber, 6-25 cm altus, vaginis foliorum per 1/2-2/3 longitudinis tectus. Inflorescentia laxa, fastigiata, (3-)5-25 floribus, pedicellis inaequalibus. Spatha bivalvis, persistens, valvis erectis vel leviter divaricatis, umbella brevioribus, inaequalibus. Perigonium campanulatum, tepalis ellipticis, 5 mm longis, albo-viridis vel albo-roseis. Stamina perigonio subaequilonga vel leviter longiora, inaequalia, filamentis cunctis simplicibus, subulatis, albo-roseis superne, exterioribus 2.8-3 mm longis, interioribus 3-3.5 mm longis, antheris ellipticis, apice leviter apiculatis, 1 × 0.6-0.7 mm, albis vel albo-roseis, 4 maculis longitudinalibus roseo-purpureis. Ovarium cylindrico-obovoideum, superne papillosum, 3.2-3.8 mm longum. Capsula trivalvis, subglobosa, inferne leviter strangulata, 4.8-5 × 4.5-4.8 mm.

Bulb solitary, ovoid, 8-12 ~ 10-15 mm, with tunics membranous, the inner hyaline, whitish, the outer pale brown. Leaves 4-6, filiform, green, subcylindrical, glabrous, 10-25 cm long and 0.5-1 mm wide. Scape solitary, rigid, terete, glabrous, 6-25 cm high, 0.5-1 mm in diameter, covered by leaf sheaths for 1/2-2/3 of its length. Inflorescence lax, fastigiate, (3-)5-25-flowered; pedicels erect, 5-25(-30) mm long. Spathe persistent, 2-valved; valves free, erect or slightly divaricate, narrowed above into an appendage, shorter than umbel, unequal, the larger 12-20 mm long, 5-7-nerved, the smaller 8-16 mm long, 3-5-nerved. Bostryces 8. Perigon campanulate; tepals equal, elliptical, 5 mm long, 2-2.2 mm wide, rounded at apex, white-greenish to white-pinkish, with a brown-purplish mid-vein. Stamens subequal or longer than perigon, unequal, filaments simple, subulate, tinged with pink above, the outer 2.8-3 mm long, the inner 3-3.5 mm long, connate at base into an annulus 1-1.2 mm high, anthers elliptical, white to white-pinkish, with 4 vertical pink-purplish maculae, shortly apiculate at apex, 1 × 0.6-0.7 mm. Ovary cylindrical-obovoid, pale green below, papillose and dark green above, 3.2-3.8 × 1.2-1.8 mm. Style white, c. 2 mm long. Capsule with three valves, subglobose, slightly throttled at base, green, tinged with brown above, 4.8-5 × 4.5-4.8 mm. Seeds black.

Specimina visa - Greece, Karpathos, Akro Skopi, 30.8.1996, *Brullo & Guarino* (CAT); *ibid.*, Oro Lastos, 30.8.1996, *Brullo & Guarino* (CAT).

Ecology and distribution. - *Allium brachyspathum* occurs in the calcareous rocky places of inland mountains, where it is a member of *Sarcopoterium spinosum* (L.) Spach garigues. It is a very rare species known only from few localities of Karpathos (S Aegean area). Its flowering time in cultivation falls from late June to early July. Nevertheless, it is to be noted that the specimens collected in field in late August had wholly been dry for a long time.

Karyology. - *Allium brachyspathum* is a diploid species with a somatic chromosome number $2n=16$ (Fig. 1H). Its karyotype is rather regular and consists of 14 metacentric chromosomes, four of them are microsatellited, and 2 submetacentric microsatellited (Fig. 1I).

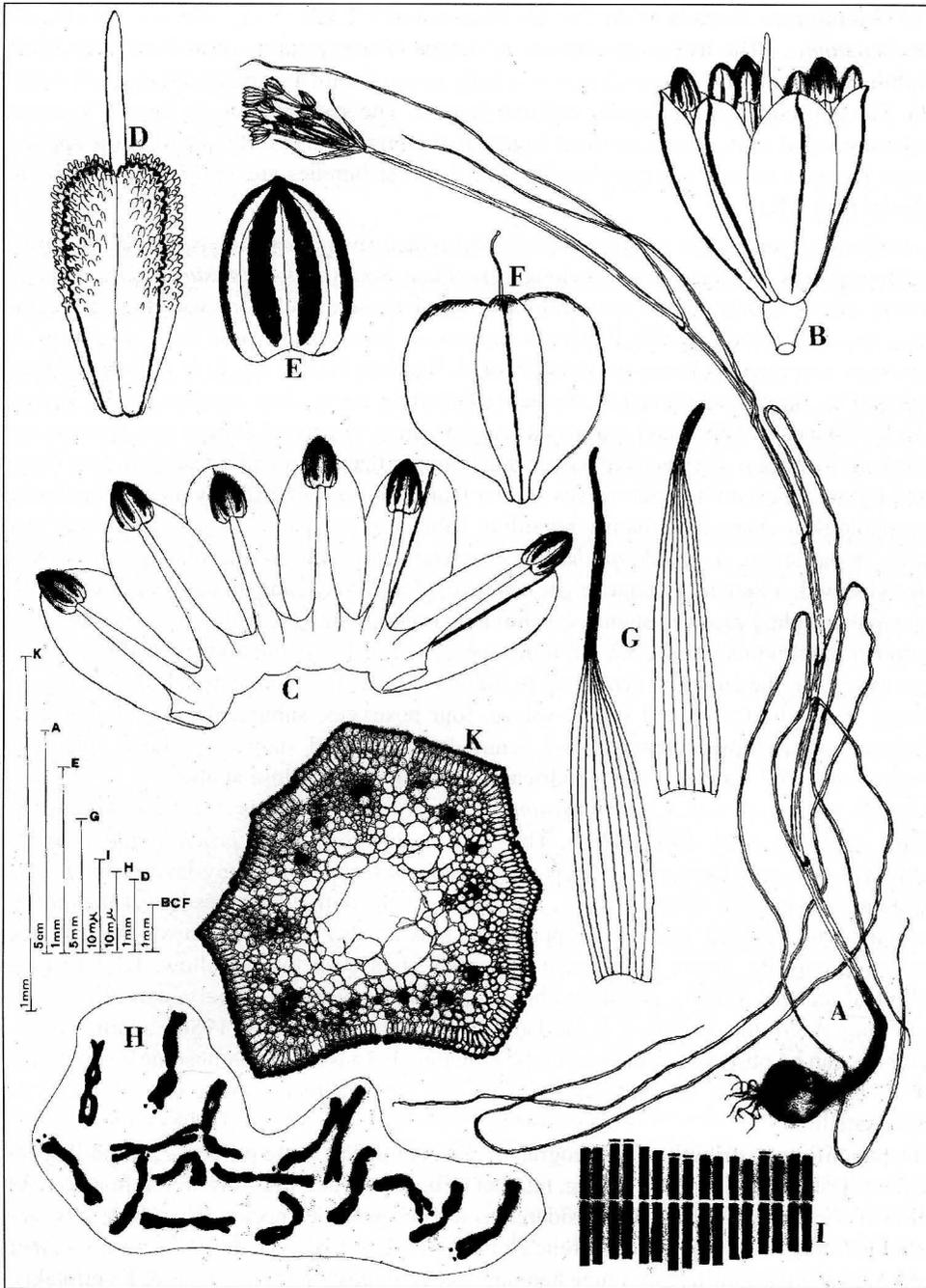


Fig. 1. *Allium brachyspathum* Brullo, Pavone & Salmeri. A: habit; B: flower; C: perigon with stamens; D: ovary; E: anther; F: capsule; G: spathe valves; H: chromosome complement ($2n=16$); I: idiogram; K: leaf cross section.

The chromosome formula is: $2n=2x=16: 10 m + 4 m' + 2 sm'$.

Leaf anatomy. - The leaf cross sections of *Allium brachyspathum* show a subcylindrical outline with some ribs. The epidermis is wholly covered with a serrulate cuticle with stomata. The palisade tissue is regular and one-layered. The spongy tissue is formed by more or less rounded cells, which are much bigger in the centre. The periferal part of the spongy tissue includes several secretory canals. The vascular bundles are 15-17, 5 of which are adaxial (Fig. 1K).

Taxonomic relationships. - The simple stamens and ovary with inconspicuous nectaries indicate that *A. brachyspathum* belongs to *Allium* Sect. *Codonoprasum* Rchb., but the spathe valves clearly shorter than inflorescence show some relations with the species of Sect. *Scorodon* Koch. Within this latter section, *A. brachyspathum* is more related to *A. sipyleum* described by Boissier (1844) from M. Sipylus (Manisa Dagħ) in Turkey and then reported by Stearn (1978) and Kollmann (1984) from many other localities of W Turkey and the islands of Chios and Astypalea (Aegean area). A careful comparison pointed out that both these two species have leaves much longer than stem and a fastigate few-flowered inflorescence with spathe valves shorter than pedicels, but differ by many remarkable morphological characters, mainly regarding habit, leaves, spathe valves and flower features. In particular, *A. brachyspathum* is characterized by linear-lanceolate spathe valves provided with a long appendage, eight bostryces, 5 mm long campanulate perigon, elliptical tepals, slightly exerted stamens, 1 mm long rounded anthers, white-pinkish with pink-purple longitudinal striae, 3.2-3.8 mm long cylindrical-obovoid and markedly tuberculate ovary. On the contrary, according to Salmeri (1998) the type material of *A. sipyleum* shows ovate shortly beaked spathe valves, four bostryces, suburceolate 6-6.5 mm long perigon, ovate-elliptical tepals, 1.3-1.5 mm long enclosed stamens, yellow, apiculate, anthers and 2.8-3 mm long subcylindrical ovary, slightly papillose at apex.

Another species of Sect. *Codonoprasum* occurring in Karpathos is *A. tardans* Greuter & Zahar. (Greuter & al. 1983, 1985). This species differs from *A. brachyspathum* by its autumnal flowering time and by many morphological features, as many-layered bulb coats breaking into parallel fibres or strips, 3-4 leaves, spathe with two valves longer than inflorescence and provided with a long appendage, pink tepals tinged with brown-purple, the outers oblong, the inners oblanceolate, stamens always enclosed, yellow, 1.3 mm long elliptical anthers, slightly papillose above and oblong-cylindrical ovary, capsula up to 4 mm long. According to Miceli & Garbari (1979) and Tzanoudakis (1986), additional differences can be observed in the karyotype structure, because the chromosome complement of *A. tardans* shows six metacentric pairs and two submetacentric, one of which is microsatellited.

The punctiform distribution, the geographical isolation and some primitive morphological features (viz. erect-divaricate spathe, number of bostryces and few-flowered inflorescence) allow *A. brachyspathum* to be considered as a paleoendemic species. Therefore, it is reasonable to regard this species as a relic element of the old Tertiary flora, the same as other rare Aegean taxa confined in refuge habitats, like *A. platakisii* Tzanoudakis & Kypriotakis, *A. chalkii* Tzanoudakis & Kollmann, *A. archeotrichon* Brullo, Pavone & Salmeri, *A. brulloi* Salmeri, *A. tardans* Greuter & Zahar., (Greuter 1979, Tzanoudakis & Kollmann 1991, Tzanoudakis & Kypriotakis 1993, Salmeri 1998, Brullo et al. 1999).

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References

- Boissier, P. E. 1844: Diagnoses plantarum orientalium novarum. — Lipsiae ser. 1, 5.
- Brullo, S., Pavone, P. & Salmeri, C. 1999: *Allium archeotrichon* (Alliaceae), a new species from Rhodos (Dodekannisos, Greece). — Nord. J. Bot. **19**: 41-46.
- Greuter, W. 1979: The origin and evolution of island floras as exemplified by the Aegean Archipelago. — Pp. 87-106 in: Bramweel, D. (ed.), Plants and Islands. — London & New York.
- , Pleger, R. & Raus, Th. 1983: The vascular flora of the Karpathos island group (Dodecanesos, Greece). A preliminary check-list. — Willdenowia **13**: 43-78.
- , Matthas, U. & Risse, H. 1985: Addition to the flora of Crete, 1973-1983 (1984). III. — Willdenowia **15**: 23-60.
- Jahn, R. & Schönfelder, P. 1995: Exkursionsflora für Kreta. — Stuttgart.
- Kollmann, F. 1984: *Allium*. — Pp. 98-211 in: Davis, P. H. (ed.), Flora of Turkey and the East Aegean Islands, **8**. — Edinburgh.
- Levan, A., Freda, K. & Sanberg, A. A. 1964: Nomenclature for centromeric position on chromosomes. — Hereditas **52**: 201-220.
- Miceli, P. & Garbari, F. 1979: Cromosomi ed anatomia fogliare di quattro *Allium* diploidi di Grecia. — Atti Soc. Tosc. Sci. Nat. Mem., s.B, **86**: 37-51.
- Pavone, P., Salmeri, C. & Scammacca, B. 1995: 'Karyo95' nuovo programma di gestione dei dati cariologici. — Giorn. Bot. Ital. **129**: 2.
- Salmeri, C. 1998: *Allium brulloi* (Alliaceae), a new species from Astypalea (Aegean islands, Greece). — Willdenowia **28**: 69-75.
- Stearn, W. T. 1978: European species of *Allium* and allied genera of *Alliaceae*: a synonymic enumeration. — Ann. Mus. Goulandris **4**: 83-198.
- Turland, N. J., Chilton, L. & Press, J. R. 1993: Flora of the Cretan area. — London.
- Tzanoudakis, D. 1986: Chromosome studies in the Greek flora. II. Karyotypes of four Aegean endemics of *Allium* sect. *Conodoprasum* (Liliaceae). — Willdenowia **16**: 203-211.
- & Kollmann, F. 1991: *Allium chalkii* (Liliaceae), a new species from the Eastern Aegean island of Chalki (Greece). — Israel J. Bot. **40**: 61-64.
- & Kypriotakis, Z. 1993: *Allium platakisii*, a new species of the Greek insular flora. — Fl. Medit. **3**: 309-314.

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