Allium brulloi (Alliaceae), a new species from Astypalea (Aegean Islands, Greece)

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Allium brulloi (Alliaceae), a new species from Astypalea (Aegean Islands, Greece)

Abstract

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Allium brulloi, belonging to *A.* sect. *Codonoprasum*, is described as a species new to science and illustrated. The new taxon occurs on calcareous rocks on Astypalea, a SE Aegean island. Its karyology, leaf anatomy and taxonomic relationships with other rare endemics of the E Aegean area are examined.

Introduction

During recent field work on the island of Astypalea (SE Aegean area), some specimens of a very rare taxon of *Allium* sect. *Codonoprasum* Reichenb. were collected. In their general habit they resemble *A. sipyleum* Boiss. (Boissier 1844) from M. Sipylos (Manisa Dagh) near Smirne (present day Izmir, W Turkey), today known from several localities of Asia minor and the Greek islands of Chios and Astypalea (Stearn 1978, Kollmann 1984).

A careful examination of herbarium specimens, however, revealed that the Astypalea populations indeed differ from *A. sipyleum* in several morphological characters, particularly in the spathe and flower features. The material is described in the present paper as a species new to science. I am pleased to dedicate this taxon to Salvatore Brullo, professor of botany at the university of Catania and one of the collectors of the investigated plants, in recognition of his numerous contributions to the study of the genus *Allium* in the Mediterranean flora.

Material and methods

The investigation was based both on herbarium specimens and living plants collected in some localities on Astypalea *(Brullo & Minissale A4, A5, A26)* and cultivated in the Botanical Garden of Catania.

For the karyological study, mitotic metaphase plates were obtained from root tips of *Brullo & Minissale A5 & A26*, pretreated with a 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 measurements and coupling were worked out by means of the Karyo95 program (Pavone

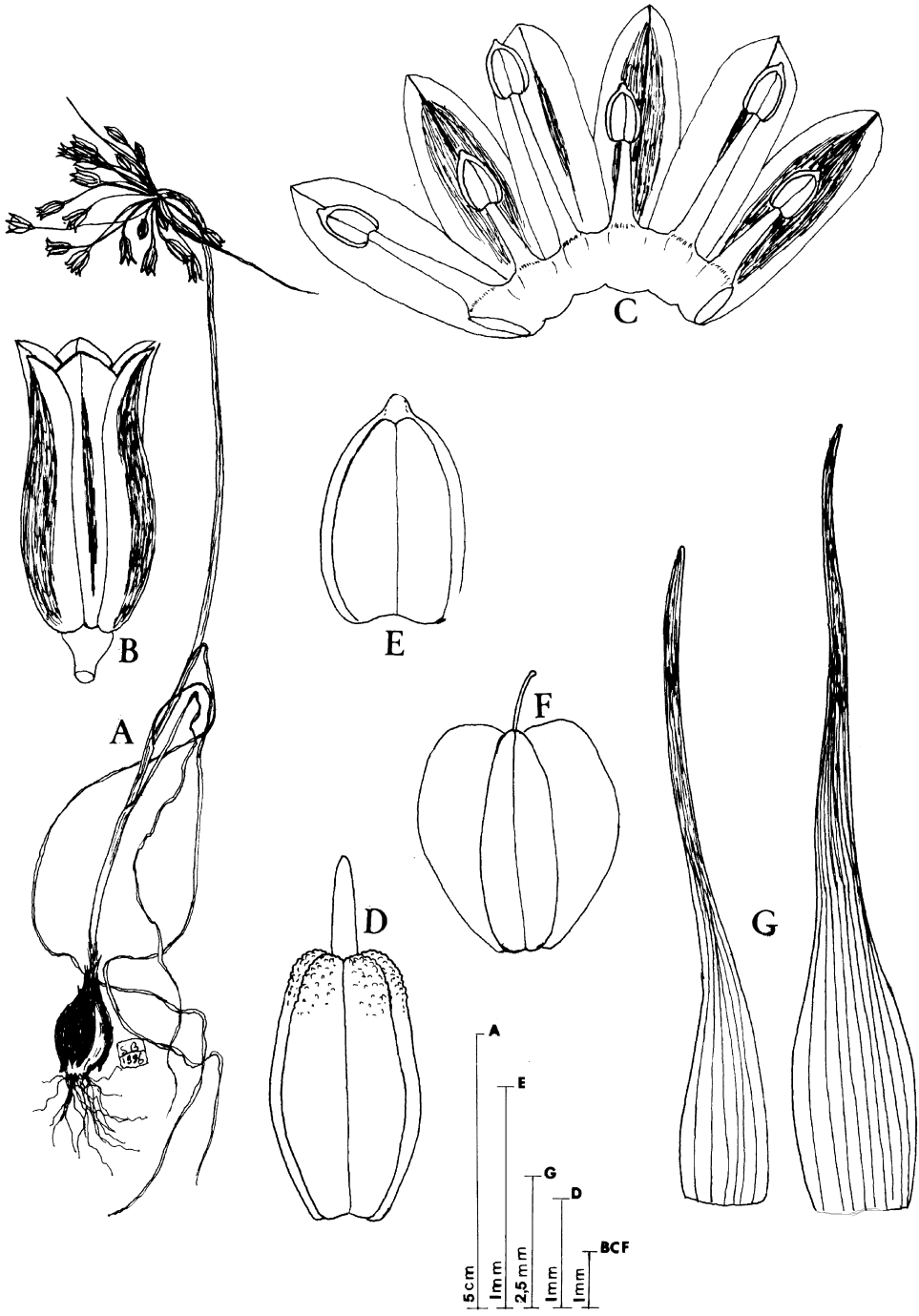

Fig. 1. *Allium brulloi* Salmeri – A: habit; B: flower; C: perigon with stamens; D: ovary; E: anther; G: spathe valves.

& al. 1995). Chromosome classification follows the nomenclature of Levan & al. (1964).

Leaf anatomy was studied on cultivated material fixed in Karpetshenko and embedded in paraffin; the transverse sections were stained with ruthenium red and lightgreen-yellow.

Allium brulloi Salmeri, **sp. nova** – Fig. 1.

Holotypus: Greece, Aegean area, Prov. Dodekanisos Isl., Astypalaea, Kastro Ag. Joanni, 7.6.1995, *Brullo & Minissale A4* (CAT; isotypi B, FI).

Bulbi aggregati, ovoidei, 1.2-1.8 × 0.8-1.2 cm, tunicis externis fusco-violaceis, fibrosis in fibras parallelas solutis, internis membranaceis, hyalinis. Folia 3-4, filiformia, plana, viridia, fistulosa, glabra, laevia, scapum subaequalia vel excedentia, 10-15 cm longa et 1.5-2 mm lata. Scapus solitarius, rigidus, erectus vel arcuatus apice, teres, glaber, 10-25 cm altus, c. 1 mm in diameter, vaginis foliorum per 1/2 longitudinis tectus. Inflorescentia laxa, pauciflora (10-30 floribus), pedicellis erectis, inaequalibus, 10-25 mm longis. Bostryces 4. Spatha bivalvis, persistens, valvis inaequalibus, erecto-divaricatis, longe appendiculatis, majore 25-60 mm longa, 7-9-nervata, umbella excedente, minore 13-25 mm longa, 5-nervata, umbella subaequilonga vel breviore. Perigonium cylindrico-suburceolatum; tepalis aequilongis, oblongo-ellipticis, 5 × 1.5 mm, apice subobtusiusculis, roseis, exterioribus e purpura suffusis, vena mediana purpurea. Stamina tepalis breviora; filamenta cuncta simplicia, subulata, exteriora breviora, 1.5-1.6 mm longa, interiora 2.5-3 mm longa, inferne cum tepalis per 1-1.2 mm in annulum coalita; antherae albo-roseae, e purpura suffusae, ovato-ellipticae, breviter apiculatae, 1-1.1 × 0.5-0.6 mm. Ovarium oblongum, viride, leviter papillosum superne, 2.2-2.5 × 1.3-1.4 mm. Stylus albus, 0.5-1 mm longus. Capsula trivalvis, sub-obovoidea, 4-4.2 × 3.5-3.6 mm. Semina nigra.

Specimina alia visa

GREECE: Prov. Dodekanisos Isl., Astypalaea, Agios Charalabos, 8.6.1995, *Brullo & Minissale* (CAT); ibid., Rupi di Patello, 8.6.1995, *Brullo & Minissale A26* (CAT); ibid., Livadia, 7.6.1995, *Brullo & Minissale A5* (CAT); ibid., esemplare coltivato, 29.5.1997, *Brullo* (CAT); ibid., islet of Kounopia, limestone cliffs, 1.6.1960, *Runemark & Nordenstam* (LD).

Ecology and distribution

Allium brulloi grows mainly in the crevices of mesozoic limestone together with other rare chasmophytes such as *Procopiana insularis* Pawl., *Scrophularia heterophylla* Willd., *Lactuca amorgina* Heldr. & Orph., *Dianthus fruticosus* subsp. *amorginus* Runemark, *Campanula laciniata* L., *Ptilostemon chamaepeuce* (L.) Less. and *Carum multiflorum* (Sibth. & Sm.) Boiss. Rarely, *Allium brulloi* occurs also in rocky garigues with *Sarcopoterium spinosum* (L.) Spach and *Euphorbia acanthothamnos* Heldr. & Sart. ex Boiss.

At present, *Allium brulloi* is known only from the island of Astypalea and the neighbouring islet of Kounopia. It flowers in June.

Karyology

Allium brulloi is a diploid species with a somatic chromosome number of 2n = 16 (Fig. 2). The chromosome complement consists of eight chromosome pairs; seven are metacentric, of which one is microsatellited on the short arms, and one is satellited submetacentric (Fig. 3). Occasionally, some specimens of the collection *Brullo & Minissale A26* showed metaphase plates with one B-chromosome. The karyotype formula is $2n = 2\times = 16: 12m + 2m^s + 2sm^s + 0\text{-}1$ B. The absolute length of the chromosomes ranges from 13.49 ± 1.17 to 8.43 ± 0.84 µm, while the relative length ranges from 8.02 ± 0.34 to 5.02 ± 0.34 µm. The chromosome complement of *A. brulloi* is thus quite homogeneous and symmetrical with chromosomes almost similar to each other except for the submetacentric pair.

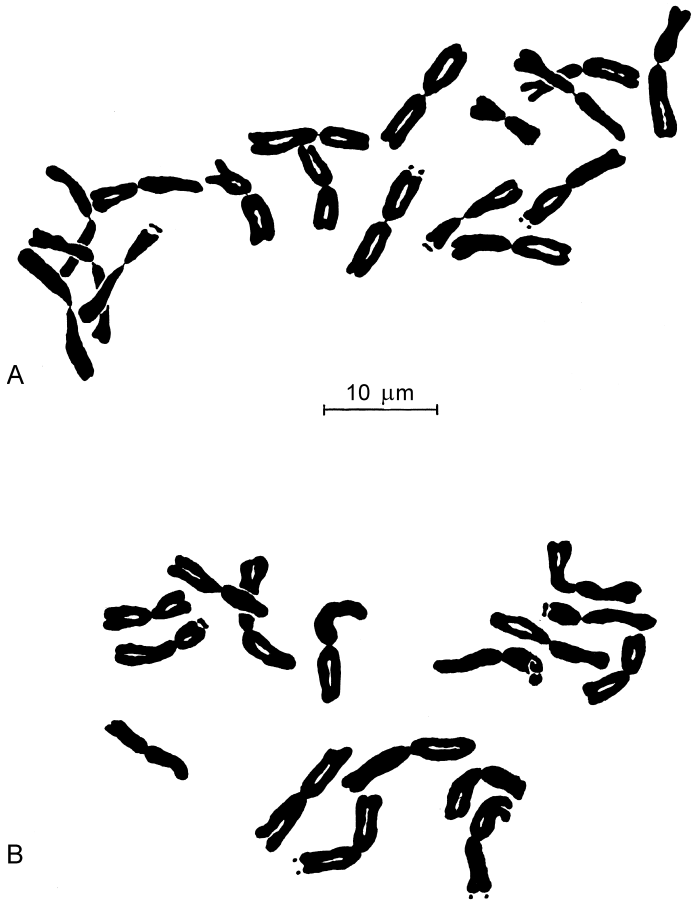

Fig. 2. *Allium brulloi* Salmeri – chromosome complements (2n = 16) from *Brullo & Minissale A26* (A) and *Brullo & Minissale A5* (B).

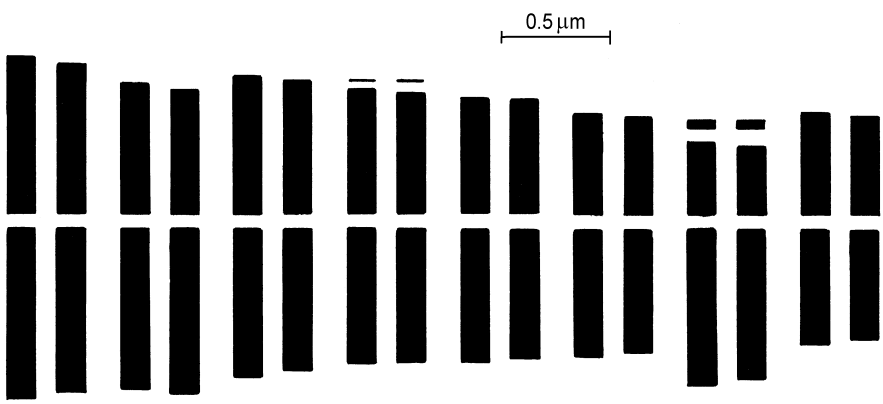

Fig. 3. *Allium brulloi* Salmeri – mean karyogram of all investigated plants.

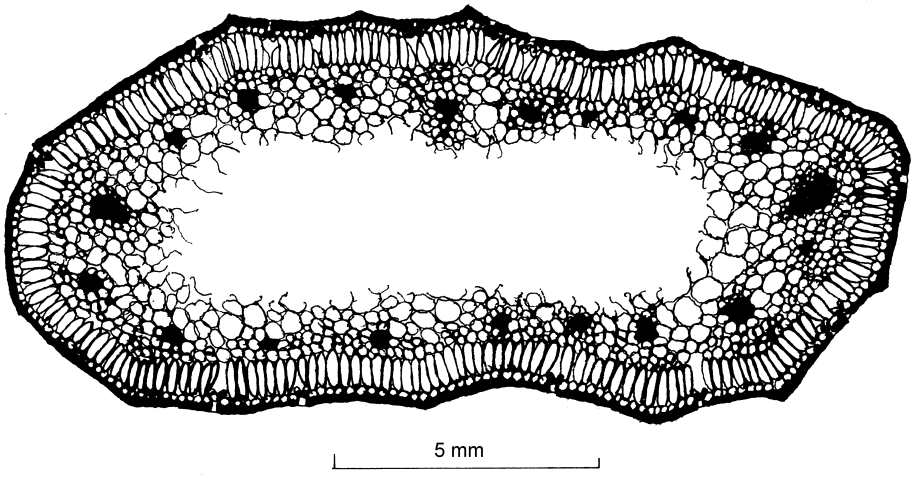

Fig. 4. *Allium brulloi* Salmeri – leaf cross section of a plant from the type locality.

Leaf anatomy

Cross sections of leaf blades show a flat outline. The epidermis is covered by a well-developed cuticle and the stomata are distributed over the whole surface. The palisade tissue is single-layered with long cylindrical cells. The spongy tissue in the periphery is irregular, ± lax, limited to a thin belt, in which several secretory canals occur, in the centre it is widely fistular. The number of vascular bundles is 16-20, of which 10-12 are abaxial and 6-8 adaxial (Fig. 4).

Relationships

The presence of a spathe longer than the inflorescence, stamens with simple filaments and an ovary with inconspicuous nectaries allows to place *Allium brulloi* into *A.* sect. *Codonoprasum* Reichenb. The species appears to be morphologically well differentiated from the other known taxa of this section. For its small size, the few-flowered inflorescence and its perigon features, *A. brulloi* shows relationships with *A. sipyleum* Boiss. A detailed examination of the type material of *A. sipyleum* (Sipylus [Manisa Dagh] in arenosis mobilibus supra Magnesiam, 6.1842, *Boissier* (G!)), however, revealed remarkable differences between these two species (Tab. 1).

Both the type specimen of *A. sipyleum* and the Astypalea plants were also compared with specimens from the island of Chios referred to *A. sipyleum* (specimens at CAT, G, G-BOISS). Differences between the Chios plants and those from the type locality of *A. sipyleum* were already observed by Boissier (1859), who described the Chios plants as the separate species *A. exile* Boiss. & Orph. Later, however, he considered *A. exile* again as conspecific with *A. sipyleum* (Boissier 1882). The investigations revealed that the Chios plants differ from the type material of *A. sipyleum* in several morphological features (Tab. 1). In the Chios plants particularly the spathe valves are longer than the inflorescence and are contracted into a very long apical appendage, the tepals are narrower and the ovary is shorter. Moreover, the Chios plants are, on the other hand, morphologically clearly distinct from the Astypalea plants, differing mainly in the shape and size of the spathe valves, perigon, ovary and capsule. Hence the taxonomic status of the Chios plants deserves further investigation.

Regarding the chromosome complement, no comparison with *A. sipyleum* from the locus classicus was possible, owing to the lack of literature data. There are, however, cytological investigations on some populations from the island of Chios (Karavokyrou & Tzanoudakis 1991, Tzanoudakis 1992) that show the same diploid chromosome number of 2n = 16 but revealed a somewhat different karyotype, due to the occurrence of two submetacentric pairs.

Tab. 1. Morphological differences between *Allium brulloi*, the type of *A. sipyleum* and *A. sipyleum* plants from Chios.

Features	*A. brulloi*	*A. sipyleum* (type)	*A. sipyleum* (Chios)
Leaf length [cm]	up to 15	up to 20	up to 28
Spathe valves, length [mm]			
shorter valve	13-25	10-14	20-50
longer valve	25-60	14-28	50-70
Perigon length [mm]	5.0	6.0-6.5	5.5-6.0
Tepals			
shape	oblong-elliptical	ovate-elliptical	linear-elliptical
width [mm]	1.5	2-3	2.0-2.2
Anthers			
colour	white-pinkish	yellow	straw coloured
length [mm]	1-1.1	1.3-1.5	1.0-1.2
Ovary			
shape	oblong	subcylindrical	ellipsoid-ovoid
length [mm]	2.2-2.5	2.8-3	1.8-2.0
Capsule			
shape	subobovoid	globose-ovoid	subglobose
size [mm]	4-4.2 × 3.5-3.6	4.8-5 × 5.2-6	4.5-5.0 × 4.0

For the low number of bostryces, the slender habit, lax inflorescence and urceolate perigon, *Allium brulloi* shows some resemblance with rare E Aegean endemics of *A.* sect. *Scorodon* Koch, such as *A. rhodiacum* Brullo, Pavone & Salmeri and *A. chalkii* Tzanoudakis & Kollmann (Brullo & al. 1992). These species, however, differ from *A. brulloi* in many relevant morphological features, in particular the unilateral inflorescence with a bifid spathe, the 6-7 mm long perigon, yellow anthers and the entirely smooth ovary (max. 1.8 mm long) provided with well developed nectaries. Ecologically, *A. chalkii* is linked to rocky calcareous habitats as is the case with *A. brulloi*, while *A. rhodiacum* grows on acidophilous ephemeral meadows. Further differences concern the chromosome complements: *A. rhodiacum* shows only metacentric pairs, six of which are microsatellited, while *A. chalkii* has longer, more or less metacentric chromosomes, with four microsatellited pairs.

The geographical isolation and primitive morphological features of *Allium brulloi* (viz four bostryces, erect-divaricate spathe valves and a few-flowered inflorescence) as well as its occurrence in rocky habitats that can be classified as refuge sites for Tertiary relics lead to the conclusion that this species is a paleoendemic, as other rare Mediterranean *Allium* species (viz *A. tardans* Greuter & Zahar., *A. platakisii* Tzanoudakis & Kypriotakis, *A. chalkii* Tzanoudakis & Kollmann) occurring in the rocky crevices of mesozoic limestones (Greuter 1979, Brullo & al. 1992, Tzanoudakis & Kypriotakis 1993).

Acknowledgement

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Reference

Boissier, P. E. 1844: Diagnoses plantarum orientalium novarum, ser. 1, **5.** – Lipsiae & Parisiis.
— 1859: Diagnoses plantarum orientalium novarum, ser. 2, **4.** – Lipsiae & Parisiis.

— 1882: Flora orientalis **5.** – Basileae, etc.
Brullo, S., Pavone, P. & Salmeri, C. 1992: *Allium rhodiacum (Liliaceae)*, a new species from Rhodos (Greece). – Willdenowia **22:** 89-95.
Karavokyrou, E. & Tzanoudakis, D. 1991: The genus *Allium* in Greece II. A cytogeographical study of the E Aegean species. – Bot. Hron. **10:** 777-784.
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.
Pavone, P., Salmeri, C. & Scammacca, B. 1995: 'Karyo95', nuovo programma di gestione dei dati cariologici. – Giorn. Bot. Ital. **129:** 2.
Stearn, W. T. 1978: European species of *Allium* and allied genera of *Alliaceae:* a synonymic enumeration. – Ann. Mus. Goulandris **4:** 83-198.
Tzanoudakis, D. 1992: Karyotype variation and evolution in the Greek *Allium.* – Pp. 305-320 in: Hanelt, P., Hammer, K. & Knüpffer, H. (ed.), The genus *Allium* – Taxonomic problems and genetic resources. Proceedings of an International Symposium held at Gatersleben, Germany, June 11-13, 1991. – Gatersleben.
— & Kypriotakis, Z. 1993: *Allium platakisii*, a new species of the Greek insular flora. – Fl. Medit. **3:** 309-314.

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