ALLIUM OPORINANTHUM (ALLIACEAE), A NEW SPECIES FROM THE NW MEDITERRANEAN AREA

by

SALVATORE BRULLO, PIETRO PAVONE & CRISTINA SALMERI*

Resumen

BRULLO, S., P. PAVONE & C. SALMERI (1997). Allium oporinanthum (Alliaceae), una nueva especie del Mediterráneo noroccidental. *Anales Jard. Bot. Madrid* 55(2): 297-302 (en inglés).

Se describe *Allium oporinanthum* de varias localidades del Mediterráneo noroccidental. La nueva especie pertenece a la sección *Codonoprasum* y normalmente se localiza en las rocas calizas umbrosas. Se trata de una especie otoñal con un número cromosomático tretraploide ($2n = 32$). Además se examina su posible origen y afinidades taxonómicas.

Palabras clave: *Spermatophyta*, *Alliaceae*, *Allium*, citotaxonomía, noroeste Mediterráneo.

Abstract

BRULLO, S., P. PAVONE & C. SALMERI (1997). Allium oporinanthum (Alliaceae), a new species from the NW Mediterranean area. *Anales Jard. Bot. Madrid* 55(2): 297-302.

A new species *Allium oporinanthum* is described from some localities of the NW Mediterranean area. The new species belongs to *A.* sect. *Codonoprasum* and is usually localized on limestone in shady rocky places. It is an autumnal species with a tetraploid chromosome number ($2n = 32$). Its old origin and its taxonomic relationships are examined too.

Key words: *Spermatophyta*, *Alliaceae*, *Allium*, cytotaxonomy, NW Mediterranean area.

INTRODUCTION

In the context of cytotaxonomic research on the populations belonging to *Allium* sect. *Codonoprasum* Reichenb. in the Mediterranean area, a very interesting autumn-flowering taxon has been found.

It has a scattered distribution and occurs only in a few localities of north-eastern Spain and southern France. The herbarium investigations revealed that it clearly falls within the *A. paniculatum* L. group, but remarkable morphological differences distinguish it from the other known species of this group. Therefore, it is treated here as a new species, named *Allium oporinanthum*.

Allium oporinanthum Brullo, Pavone & Salmeri, **sp. nov.** (fig. 1)

Planta bulbo ovoideo, tunicis exterioribus membranaceis, fusco-brunneis, scapo rigido usque ad 60 cm *alto, foliis* 4, *glabris, usque ad* 40 cm *longis et* 4-5 mm *latis, spatha erecta vel suberecta, unilaterali, duobus valvis longe caudatis, inflorescentia pauciflora, perigonio campanulato, tepalis viride-luteolis, brunneo-purpura striatis,* 5,5-6 mm *longis, staminibus tepalis brevioribus, antheris albidis, oblongis, apiculatis,* 1,4-1,5 mm *longis, ovario oblongo, leviter papilloso superne,* 3,5-4 mm *longo, capsula subglobosa,* 5-5,7 × 5-6 mm.

* Dipartimento di Botanica, Università de Catania. Via A. Longo, 19. I-95125 Catania.

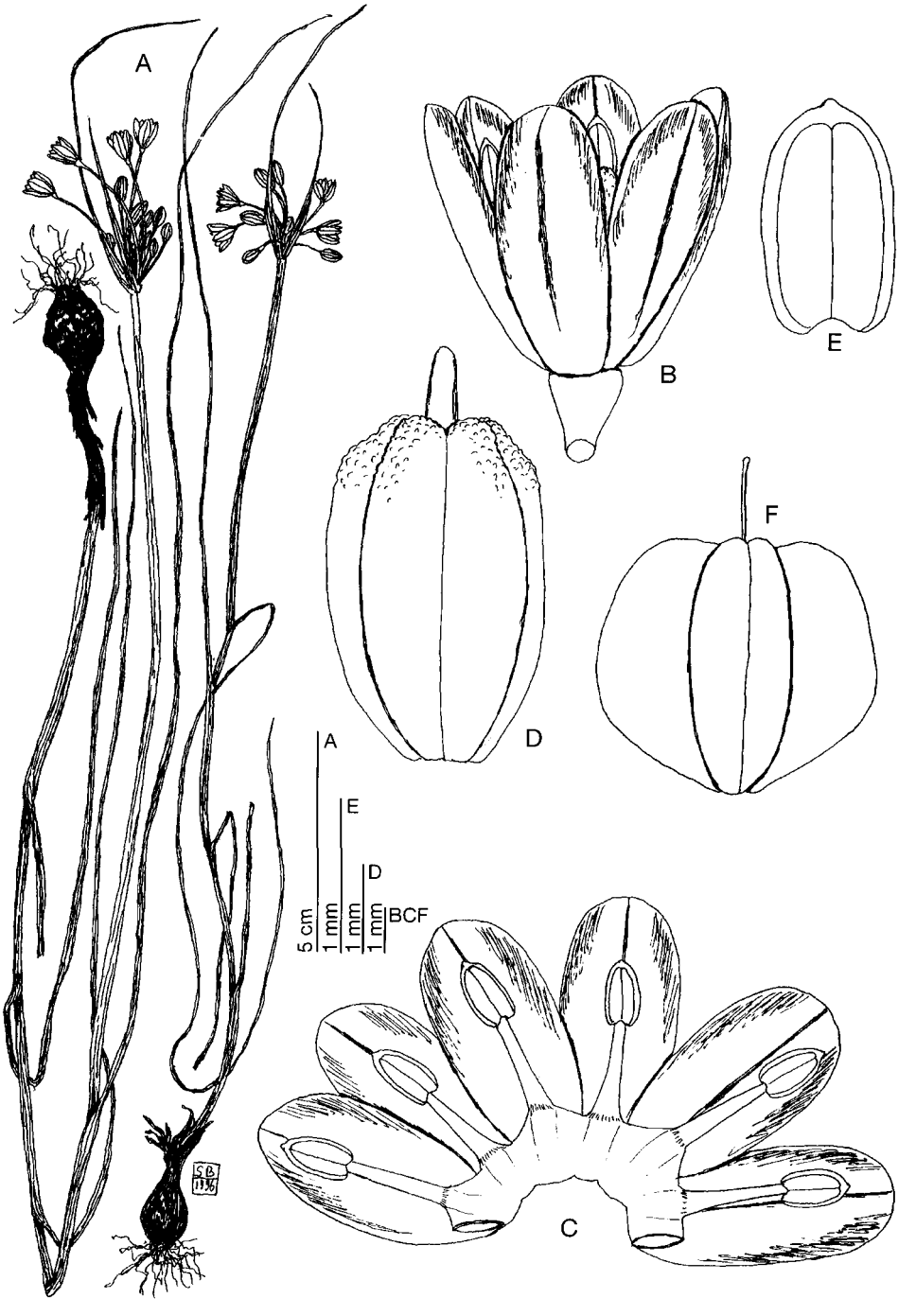

Fig. 1.– *Allium oporinanthum* Brullo, Pavone & Salmeri: A, habit; B, flower; C, perigon with stamens; D, ovary; E, anther; F, capsule.

Derivatio nominis: From Greek *oporinós* = autumnal and *ánthos* = flower.

Bulb ovoid, 10-18 × 8-13 mm, with outer tunics coriaceous, dark-brown, the inner ones membranaceous, whitish. Stem erect, cylindrical, rigid, 25-60 cm high, covered by the leaf sheaths 1/3-1/2 of its length. Leaves 4, flat to semicylindrical, not fistulous, ribbed, glabrous, 15-40 cm long and 4-5 mm wide. Spathe with two valves erect or suberect, usually unilateral, with a very long appendage, the bigger 7-nerved, 2.5-9(16) cm long, the smaller 5-nerved, 1.5-3(7) cm long. Inflorescence fastigiate, few-flowered (5-18 flowers), with pedicels pendent at the anthesis, then erect, 8-55 mm long. Bostryces 8. Perigon campanulate. Tepals green-yellowish with brown-purplish striae and a brown-purplish mid-vein, oblong-elliptical, rounded at the apex, 5.5-6 × 2.3-2.8 mm. Stamens unequal, included in the perigon, with simple and subulate filaments, the outer 2-2.3 mm long, the inner 2.7-3 mm long, at the base connate with tepals in an annulus 1.5-1.8 mm high; anthers whitish, oblong, slightly apiculate at the apex, 1.4-1.5 × 0.8-0.9 mm. Ovary oblong, green, slightly papillose in the upper part, 3.5-4 × 2-2.5 mm. Style white, 1-2 mm long. Capsule trivalved, subglobose, 5-5.7 × 5-6 mm.

Holotypus: Spagna, Cap de Sant Antoni, Denia, 20-IX-1992, *Brullo*, CAT.

Specimens examined

SPAIN. ALICANTE: Cap de Sant Antoni, Denia, 20-IX-1992, *Brullo*, CAT, MA; ibid., esemplare coltivato, 7-IX-1993, *Brullo*, CAT; ibid., 21-IX-1993, *Brullo*, CAT. Montegò pr. La Colonia supra Denia, 18-IX-1957, *A. & O. Bolòs*, BC. La Granadella, Fondalada marges herboses, 7-IX-1974, *Bolder*, BCF. BARCELONA: Anoia, 9-X-1977, *O. Bolòs*, BC. La Pobla de Claramunt, M. Mallons, 2-X-1977, *Nuet Badia*, BC. Santa Cecilia de Montserrat revolt de la Paella, 2-X-1984, *Nuez Badia & Panaseda*, BC. Montserrat, 22-IX-1996, *Brullo & Minissale*, CAT. Au peu del Castell de Queralt, Valle flumicelli Gaia, 11-IX-1948, *Batalla & Masclans*, BC. Bages, 15-IX-1914, *Font-Quer*, BC. TERUEL: Teruel, 1893, *Benedicto*, BC. Monreal del Campo en la parte umbría de la cerrada de la Hoz, 20-VIII-1869, *Benedicto*, BC.

FRANCE: La Saint Baume (Var) près du Cal du St. Pilon, 8-IX-1932, *Hibon 3848*, P. Saint Baume, rocce calcaree ombreggiate, 25-IX-1991, *Brullo & Minissale*, CAT. Saint-Tropez, bords de chemins aux canambiers, 2-VIII-1916, *Hibon 3848*, P. Landes de Guitary cont. de St. Luc, Basses Pyrénées, 3-X-1844, *Blanchet 1758*, K.

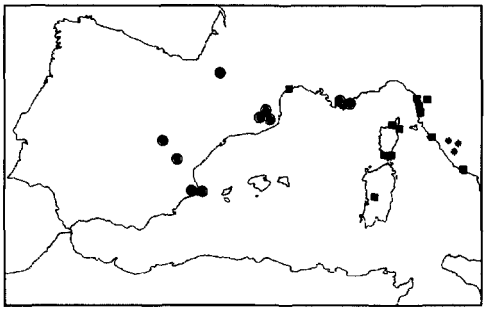

Fig. 2.–Geographical distribution of *Allium oporinanthum* (⊙), *A. savii* (■) and *A. anzalonei* (✳).

HABITAT AND DISTRIBUTION

Allium oporinanthum grows, together with other chasmophytes, on calcareous shady rocks or, more rarely, in semirupestrian places where it is a member of garigues. It occurs in some localities of the NW Mediterranean area, extending from Denia near Valencia to Saint Tropez near Toulon (fig. 2). Its populations are small, isolated and very localized, which gives support to a relictual character of this taxon at present.

KARYOLOGY

The karyological investigation was carried out on living material coming from Cap de Sant Antoni (Denia), Montserrat (Barcelona) and Saint Baume (Marseille). Bulb root tips were pre-treated with 0.3 % colchicine, fixed in Carnoy and stained using the Feulgen method.

All the examined populations of *Allium oporinanthum* have a tetraploid chromosome complement with $2n = 32$ (fig. 3). The karyotype analysis revealed that it is arranged in pairs instead of four chromosome sets.

The chromosome nomenclature follows LEVAN *& al.* (1964). Specifically, there are 15 metacentric pairs, the smallest of which is always macrosatellited on the short arm, and by one submetacentric macrosatellited pair; some metaphasic plates show 2-4

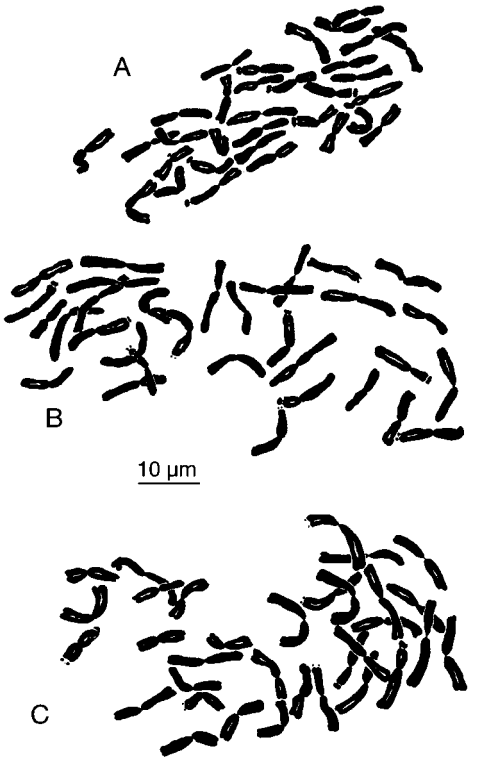

Fig. 3.–Mitotic metaphase plates of *Allium oporinanthum* from Cap de Sant Antoni (A), Montserrat (B) and Saint Baume (C). See specimens examined for details.

pairs microsatellited on the short arm or macrosatellited on the long arm too (fig. 4). This variance in the number of satellites may be due to the squashing technique, sometimes unable to reveal them.

On the whole, the chromosome complement of *A. oporinanthum* is quite homogeneous and symmetrical. This is also confirmed by computing the asymmetry degrees proposed by STEBBINS (1971), from which the karyotype of *A. oporinanthum* falls within the type 2A, as the difference between the largest and the smallest chromosomes is < 2:1 and the proportion of chromosomes with an arm ratio < 2 ranges from 0.06 to 0.12.

LEAF ANATOMY

The histological study of the *Allium oporinanthum* leaves was made on living material from Cap de Sant Antoni (Denia) and Saint Baume (Marseille); the transversal sections were fixed in Karpetschenko, embedded in paraffin and stained with ruthenium-red and yellowish-lightgreen.

The leaves have a semicylindrical outline and many ribs. The epidermis has bigger cells on the top of the ribs and is covered by a well developed cuticle. The stomata are distributed on the whole surface. The palisade tissue is regular and onelayered with cylindrical cells. The spongy tissue is compact with bigger cells in the centre; in the peripheral portion there are several secretory canals and 9-14 vascular bundles, 4-7 of which are adaxial (fig. 5).

TAXONOMIC RELATIONSHIPS

The occurrence of a two-valved spathe longer than the inflorescence, simple stamens and ovary with inconspicuous nectaries allow the inclusion of *Allium oporinanthum* into *A.* sect. *Codonoprasum* Reichenb. which includes many complex species, most of them taxonomically not well investigated up to now.

Moreover, for some remarkable morpho-

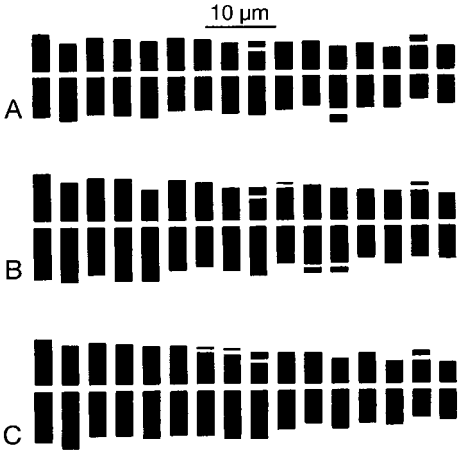

Fig. 4.–Idiograms of *Allium oporinanthum* from Cap de Sant Antoni (A), Montserrat (B) and Saint Baume (C). See specimens examined for details.

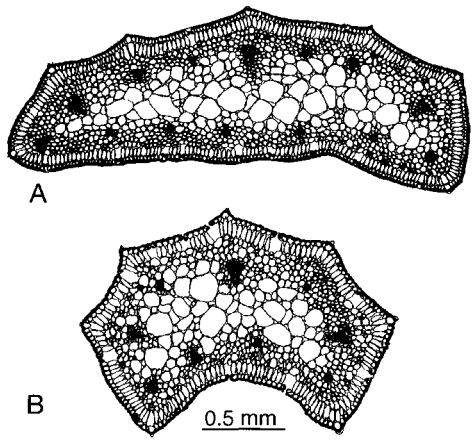

Fig. 5.–Leaf cross sections of *Allium oporinanthum* from Cap de Sant Antoni (A) and Saint Baume (B). See specimens examined for details.

logical features, such as the spathe valves with a long appendage, the campanulate perigon and the stamens not exserted from perigon, *A. oporinanthum* is more related to the taxa of *A. paniculatum* L. group. Within this group, it shows closer resemblance to two other autumn-flowering tetraploid species, distributed in the N Tyrrhenian area, namely *A. savii* Parl. and *A. anzalonei* Brullo & al. (BRULLO & *al.*, 1994, 1997). These three species share several morphological characters, such as big size, bulbiliferous bulbs, strong and erect stem, very long spathe valves, erect or suberect and often unilateral white oblong-elliptical anthers, apically papillose ovary, but they differ in the ecological requirements and some flower features. *Allium savii* occurs on marshes or damp soils and shows bulbs with fibrous outer tunics, 5-6 leaves, up to 25 cm long and 1-2 mm wide, 20-28-flowered inflorescence, larger spathe valve up to 16 cm long, the smaller one up to 11 cm long, perigon 6-7 mm long, white-pinkish to pink-purplish tepals, oblong ovary, obovate capsule. *Allium anzalonei* is a nemoral species which grows in underwood places and is characterized by 2/3 of the stem length covered by the leaf sheaths, fistulous leaves up 25 cm long and 1-2 mm wide, flower pedicels max. 20 mm long, 12 bostryces, by a spathe with 10-11-nerved larger valve, 7-14 cm long, and smaller one 6-9 cm long, by whitish tepals suffused with green, stamen annulus 1 mm high, apically rounded anthers, ovary up to 3.2 mm long, obovate-subglobose capsule 5 × 4 mm.

Significant differences also result from the chromosome complement analysis. In particular, *A. savii* has three submetacentric pairs and three satellited metacentric pairs, while *A. anzalonei* shows only one submetacentric pair and one satellited metacentric pair. As to the asymmetry degrees of their chromosome complements (STEBBINS, 1971) both species fall within the type A, like *A. oporinanthum*. The latter, however, is more closely related to *A. anzalonei* than to *A. savii*. In fact, the karyotype of *A. anzalonei* has a proportion of chromosomes with arm ratio < 2 equivalent to 0.06 (type 2A), while that of *A. savii* is more symmetric and can be included in the type 1A, having such value equivalent to 0.0.

These three species are circumscribed in the NW Mediterranean area, but have a distinct geographical distribution (fig. 2).

Allium oporinanthum appears to be taxonomically quite isolated from the Iberian taxa belonging in *Allium* sect. *Codonoprasum*, showing some resemblance only with *A. stearnii* Pastor & Valdes, on the basis of its big size, the very long spathe valves and the tetraploid chromosome number $2n = 32$ (PASTOR & VALDÉS, 1983; PASTOR, 1985). These two species, however, differ substantially in many morphological features as well as in ecology and flowering time. *Allium stearnii* has a dense globose inflorescence with patent spathe valves, white or rarely yellow-pinkish perigon 4-4.5 mm long and stamen filaments exserted from perigon. Moreover, it normally grows in synantropic habitats where it flowers in late spring.

In the E Mediterranean area there are other autumn-flowering *Allium* species, also related to the *A. paniculatum* group. They are *A. euboicum* Reich. fil., *A. tardans* Greuter & Zahar., *A. platakisii* Tzanoudakis & Kypriotakis and *A. tardiflorum* Kollmann & Schmida, all of them being diploids with

$2n = 16$ (cf. ZAHARIADI, 1975; STEARN, 1978; MICELI & GARBARI, 1979; TZANOUDAKIS, 1986; KOLLMANN & SCHMIDA, 1991; TZANOUDAKIS & KYPRIOTAKIS, 1993).

These autumn-flowering species are all characterized by a long vegetative phase and a very short or no dormancy, unlike most of *Allium* species which flower in late spring or early summer and have a long dormancy. This life cycle is linked to the quite arid climatic conditions, without well defined seasons, which occurred in the Mediterranean area during late Tertiary (GREUTER, 1979).

In this sense, these autumnal *Allium* species could be considered elements of the old Tertiary flora, a hypothesis supported by their relictual and sometimes scattered distribution at present (TZANOUDAKIS & KYPRIOTAKIS, *l.c.*; BRULLO & *al.*, 1994). As specifically regards *A. oporinanthum*, it could represent a paleopolyploid taxon (cf. FAVARGER, 1961, 1967) arisen, as *A. savii* and *A. anzalonei*, from a common autumn-flowering diploid ancestor probably extinct.

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