

Allium phthioticum: new species for the Bulgarian flora

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Abstract. *Allium phthioticum*, a new species for the Bulgarian flora is reported here. It is known so far to occur in Greece, Albania, Italy and Montenegro. The somatic chromosome number of the species $2n = 24$ is also given. The anatomical structure of stem and leaves has been studied. The species is the only representative of sect. *Molium* in Bulgaria.

Key words: *Allium*, anatomy, Bulgaria, chorology, chromosomes

Introduction

Allium phthioticum Boiss. & Heldr. was described from Greece (Boissier 1882). Halácsy (1904) described *A. neapolitanum* Cyr. var. *breviradium*, which later was ranked by Stearn (1978) as *A. breviradium* (Halácsy) Stearn. The latest nomenclature amendments were made by Andersson (1991), who included *A. breviradium* in the synonymy of *A. phthioticum*.

The difference between the two taxa is mainly in the length of their flower stems, size and shape of the perigon and availability or lack of bulbs in the raceme. The species is known from Greece (Boissier 1882; Andersson 1991), Albania (Stearn 1980; Andersson 1991), Montenegro (Pulević 1981), and Italy (Conti 1995). The present study expands its area northwards and adds further caryological and anatomical data. It is included in the European Red List under the category Rare (ECE 1991).

Material and methods

The species was characterised morphologically from fresh materials and herbarium specimens. The caryo-

logical study was carried out with root-tips fixed in ethyl alcohol and acetic acid (3:1) and stained according to Feulgen's method. Stems and leaves fixed in 75% ethyl alcohol were used for the anatomical analysis. The studied specimens are kept in the Herbarium of the Agricultural University (SOA), Plovdiv.

Results and discussion

Subg. *Allium*

Sect. *Molium* G. Don ex Koch

The bulb is ovate or almost rotund; external tunics often pitted. Leaves are with short epigeous sheath, flat, smooth or pubescent. The ovary has distinct septal glands.

There are two seeds in each loculus. The stigma is entire or short trilobite. Mediterranean section (one species extending into Iran) (Stearn 1978).

Allium phthioticum Boiss. & Heldr. in Boiss., Fl. Or. 5: 274 (1882); Halácsy, Consp. Fl. Gr. 3: 260 (1904); Hayek, Prodr. Fl. Penins. Balcan. 3: 52 (1932); Andersson, Mount. Fl. Gr. 2: 704 (1991); *A. neapolitanum* Cyr. var. *breviradium* Halácsy, Consp. Fl. Gr. 3: 260 (1904); Hayek, Prodr. Fl. Penins. Balcan. 3: 52 (1932); *A. brevi-*

radium (Halácsy) Stearn, Ann. Mus. Goulandris 4: 138 (1978) (Fig. 1).



Fig. 1. *A. phthioticum* (photo Yulian Marinov).

A perennial species. Bulbs ovoid to globose, 1.4–2.0 × 1.1–1.5 cm, with many white bulblets at the bottom under the covering tunics. Outer tunics grey, membranous. Stem (25-) 35–50 (-60) cm, bare, round, 2.5–3.2 mm thick. Leaves 3–4; lamina linear, flat, (5-) 8–10 mm wide, bare with papillary edge, 15–26 cm long; sheath 4–9 cm long with up to 3 cm epigeous stretch. Raceme fastigiate to hemispherical, with (7-) 10–20 (-25) flowers, occasionally with 1–3 aerial bulblis. Spathe 1-valved, membranous, in flow-

ering lacerating in 2–4 triangle parts, persistent, often infundibular at the bottom, 11–14 mm. Pedicels (8-) 10–16 (-22) mm long, in fruit up to 30 mm, after flowering fastigiate, more or less unequal. Perigon wide bell-shaped, white, glossy; segments 10×3 mm, the outer ones wide elliptic, obtuse or slightly mucronate; the inner ones lanceolate, mucronate. Stamens shorter than perianth, ca. 8 mm long, with simple filaments, the lower half slightly widened; the inner ones longer than the outer. Anthers yellow, 1.8–2.0 mm long. Ovary sessile, stylus as long as the perianth. Capsule spherical, 3–4 mm. Seeds black, angular, 2.2 × 1.5 mm.

Ecology. Flowering: May–June; fruiting: June–July. Grows in moist places, in open grass communities with dominance of the *Poaceae* species: *Deschampsia caespitosa*, *Agrostis capillaris*, *Anthoxanthum odoratum*, *Poa pratensis*, *Cynosurus cristatus*, *Festuca* sp., *Bromus* sp., *Phleum* sp., etc., often together with *Allium schoenoprasum*, *Filipendula vulgaris*, *Potentilla reptans*, *Arenaria serpyllifolia*, *Plantago media*, etc. On limestone.

Distribution in Bulgaria. The Balkan Range (Central), Shipka Divide, between peak Zli Vrah and peak Shipka, at 1260 m a.s.l., 42°45'04.9" N, 25°14'14.5" E, 18.06.2006; loc. Uzana – 25 km south of Gabrovo, 42°45'10.6" N, 25°14'28.6" E, 11.06.2008, with flowers, coll. I. Cheshmedzhiev & Yu. Marinov (SOA 059296 – 059299) (Fig. 2).

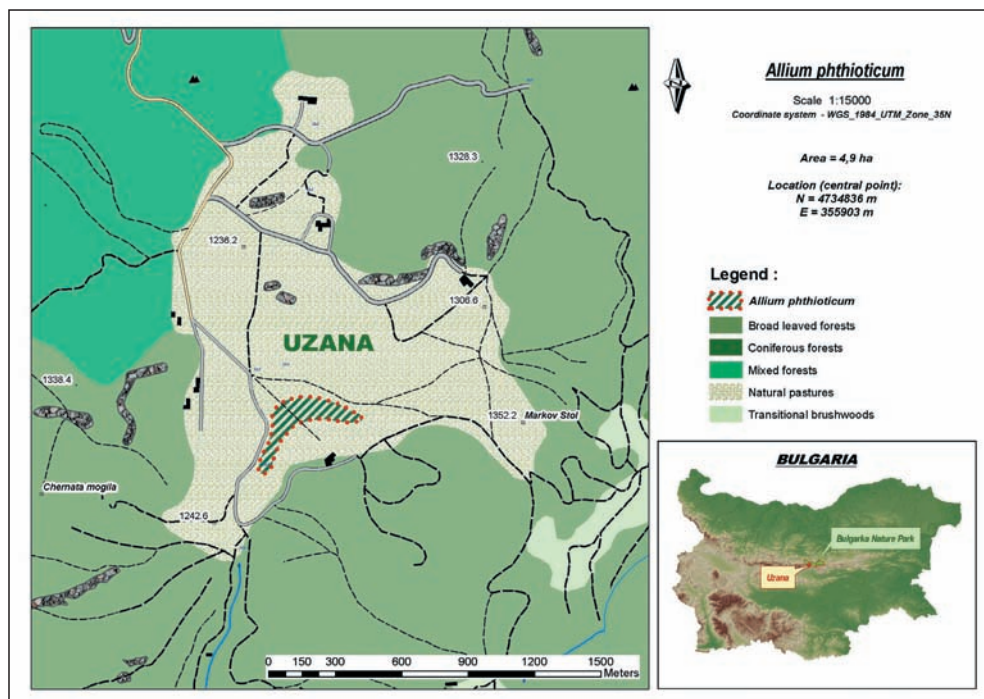


Fig. 2. Distribution map of *A. phthioticum* in Bulgaria.

General distribution. Greece, Albania (Stearn 1980; Andersson 1991), Montenegro (Pulević 1981), Italy (Conti 1995), Bulgaria. Recommended to be included for protection under the Biological Diversity Law and the Red Data Book of Bulgaria.

Caryology

The somatic chromosome numbers found were $2n = 2x = 16$, $2n = 3x = 24$ and some chromosome variations published from Greece (Tzanoudakis 1982, 1986), who investigated *A. phthioticum* s. str. and *A. breviradium* and found equal chromosome numbers and equal karyotypes. This justified Andersson (1991) in combining the two taxa. Our study confirmed a triploid species with $2n = 24$, as well as the types of the chromosomes. The karyotype was asymmetric and consisted of 15 metacentric with different length, six submetacentric, and three short acrocentric chromosomes. The

short acrocentric and the three short metacentric chromosomes serve as a relevant marker (Fig. 3).

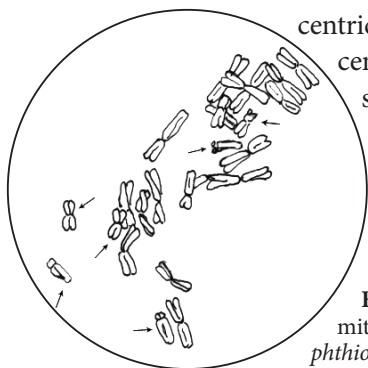


Fig. 3. Drawing of the mitotic metaphase plate of *A. phthioticum* ($2n = 24$).

Anatomy

Leaf. By its structure, the leaf blade is aequifacial, amphistomatic. Upper and lower epidermises alike. Basic epidermal cells much elongated. The long anticlinal walls are straight, usually parallel, and the short ones are oblique or perpendicular.

Stomata are wide ellipsoid to round, sunken, every second in the row of basic cells (Fig. 4.1).

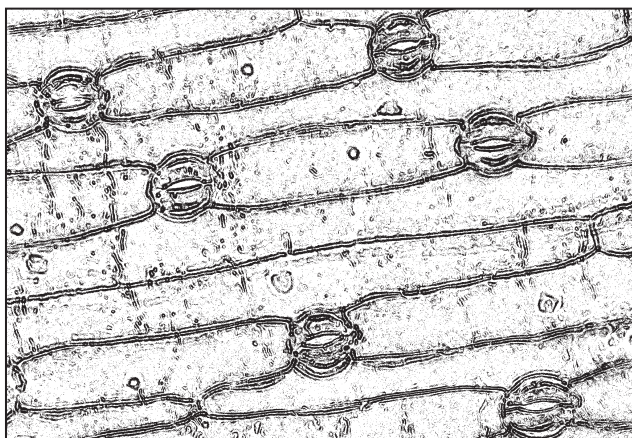


Fig. 4.1. Epidermis of *A. phthioticum* (ad).

Mesophyll is homogeneous (without differentiation in palisade and spongy tissue).

Cells are round, smaller towards the epidermis, with small intercellular gaps. Vascular bundles are in one row (average 17–21 pcs.). Each bundle is 1/3 of the lamina thickness (does not reach the epidermis). The subepidermal laticifers are similar to the intercellular gaps (Fig. 4.2). Fritsch (1988) had studied some species of section *Molium* (and other sections) with one row of vascular bundles, subepidermal laticifers and lack of palisade mesophyll.

Stem. The outer walls of the epidermis are much thickened, the stomata are sunken. The parenchyma cells of the primal bark are more or less round, in several layers. The sclerenchyma ring is well developed. The inward parenchyma cells are large, round. The inner part of the stem is fistular. The vascular bundles around the sclerenchyma ring, 14–16 in number, are small; the ones in the inner parenchyma are bigger, 5–6 in number. The bundles are surrounded by collenchymatous tissue. The laticifers are subepidermal (Fig. 4.3).

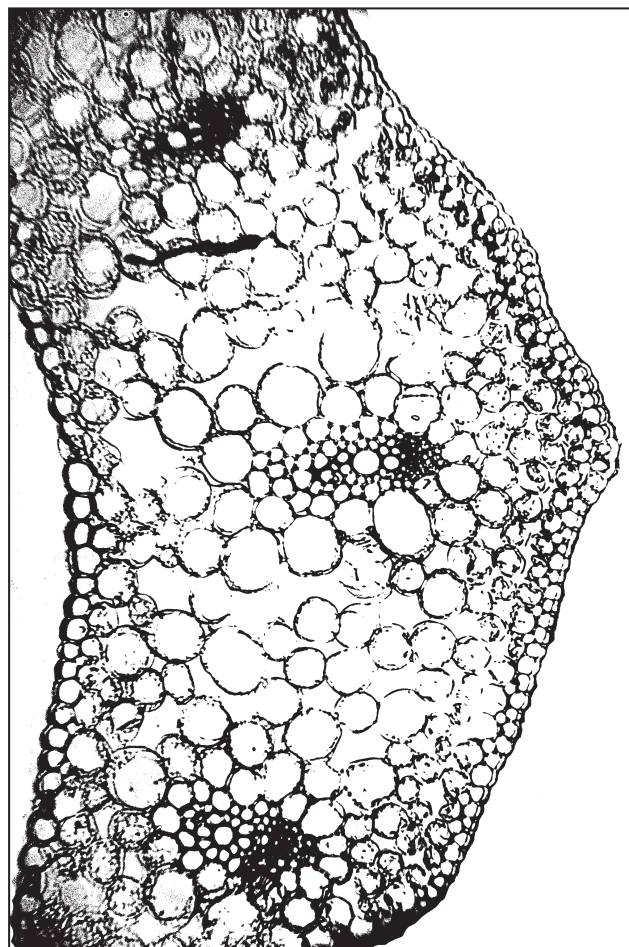


Fig. 4.2. Leaf of *A. phthioticum* (cross section).

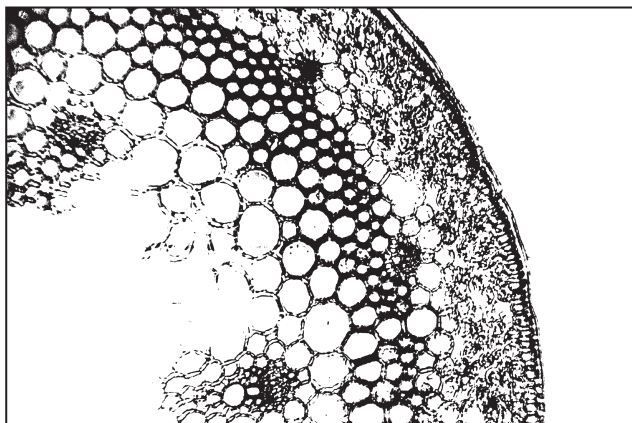


Fig. 4.3. Stem of *A. phthioticum* (cross section).

Finding *A. phthioticum* in the Central Balkan Range contributes to the list of wildlife representatives of genus *Allium* in the Bulgarian vascular flora. Thus the area of the species is expanded northwards in the Balkan Peninsula. Section *Molium* is new for Bulgaria. The caryological characteristic has been completed and the anatomic structure of the species has been studied.

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