

Notes on the distribution of *Hyacinthella leucophaea* subsp. *atchleyi* in Bulgaria

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Abstract. New data about the distribution of *Hyacinthella leucophaea* subsp. *atchleyi* in Bulgaria is presented. The subspecies is poorly known and was not included in the latest guides and general literature sources on the Bulgarian flora. After personal collection of material by the authors and revision of the herbarium specimens in the herbaria of the Institute of Biodiversity and Ecosystem Research with the Bulgarian Academy of Sciences (SOM) and Sofia University (SO), the distribution of the subspecies has been located only in the western part of the country.

Key words: *Asparagaceae*, Bulgarian flora, chorology, ecology, *Hyacinthaceae*, *Hyacinthella*, *Liliaceae* s.l.

Introduction

The species *Hyacinthella leucophaea* (K. Koch) Schur (*Asparagaceae*) occurs in Bulgaria (Vălev 1964; Petrova 1992; Popova 2003) in dry, calcareous areas with steppe vegetation. There is no data on the species variability at a higher level than ‘variety’ in the Bulgarian literature sources (cf. Vălev 1964; Popova 1972a, b, 2003; Petrova 1992; Karamfilova & Stoyanov 2015), nor in *Flora Europea* (Heywood 1980).

During the revision of genus *Hyacinthella* in the Balkan countries, Persson & Persson (2001) have accepted a new subspecies *Hyacinthella leucophaea* subsp. *atchleyi* (A.K. Jacks. & Turrill) K. Perss. & Jim. Perss. It was first recognized as a probable new taxon from Greece, but with a doubtful status (see Heywood 1980). Persson & Persson (2001) have reported also two localities of this subspecies from Bulgaria. However, the information on the distribution and other features of this new to Bulgaria taxon is still very poor.

The aim of this study was to specify the distribution of this taxon in Bulgaria on the basis of own data and revision of materials in the two registered herbaria in Sofia.

Material and methods

The study was based on own collections and revision of the existing herbarium specimens in the Herbarium of St. Kliment Ohridski Sofia University, Faculty of Biology (SO), and that in the Institute of Biodiversity and Ecosystem Research with the Bulgarian Academy of Sciences (SOM). A total of 17 herbarium exsiccates in SOM belong to *Hyacinthella leucophaea* subsp. *atchleyi* and, respectively, there are 19 herbarium exsiccates in SO as well. Additional information for the distribution of this species in Bulgaria was taken from the published data of the Herbarium of Agricultural University of Plovdiv (SOA) (Karamfilova & Stoyanov 2015). The localities and chorological data

are presented on a UTM grid map of Bulgaria, following the recommendations of Kožuharov & al. (1983).

Results

Hyacinthella leucophaea subsp. *atchleyi* is a bulbous spring-flowering plant. Leaves (4)5–15(17) mm wide, glabrous to scaberulous in margins; raceme oblong to ellipsoid; pedicels erecto-patent to less or more patent, usually 2–5 mm, perianth erecto-patent to patent, occasionally nodding, lively sky-blue to deep blue, 4.5–6.0(7.0) mm long, tubular-campanulate, with rather wide rounded base, lobes spreading (Persson & Persson 2001).

Persson & Persson (2001) published a key for determination of both subspecies of *Hyacinthella leucophaea*:

- Raceme narrowly cylindrical to short-oblong; pedicels usually 1–3 mm, perianth erect to erecto-patent, nearly white to pale-blue, tubular to campanulate-tubular.
 *Hyacinthella leucophaea* subsp. *leucophaea*

- Raceme oblong to ellipsoid; pedicels usually 2–5 mm, perianth erecto-patent to patent (to nodding), lively sky-blue to deep-blue, tubular-campanulate with spreading nodes.
 *Hyacinthella leucophaea* subsp. *atchleyi*

A comparison of both subspecies is seen on the photographs (Figs. 1 & 2). Both photographs present typical populations: from Pleven region (*H. l.* subsp. *leucophaea*, fig. 1) and Vrashka Chuka (*H. l.* subsp. *atchleyi*, fig. 2). The main distinguishing characters between the two species are presented in Table 1, based on the publication of Persson & Persson (2001) and the authors' personal observations from the fieldwork in Bulgaria and study of the herbarium material in SO and SOM.

Distribution worldwide

The total distribution area of *H. l.* subsp. *atchleyi* covers Bulgaria, Greece, Romania (under question), Serbia (Persson & Persson 2001), and Albania (Barina & al. 2010).



Fig. 1. *Hyacinthella leucophaea* subsp. *leucophaea* in Kaylaka Protected Area, Pleven region of the Danubian Plain floristic region (photo R. Tzonev).



Fig. 2. *Hyacinthella leucophaea* subsp. *atchleyi* in Vrashka Chuka, Vidin District of the Western Forebalkan floristic subregion (photo R. Tzonev).

Table 1. Main distinguishing differences between the two subspecies of *Hyacinthella leucophaea*.

<i>Hyacinthella leucophaea</i> subsp. <i>leucophaea</i>	<i>Hyacinthella leucophaea</i> subsp. <i>atchleyi</i>
✓ Leaves during flowering normally 5–10 mm wide, lanceolate to narrowly oblong-ellipsoid	✓ Leaves during flowering normally 10–15 mm wide, ellipsoid to wide oblong-ellipsoid
✓ Raceme narrowly cylindrical to short-oblong	✓ Raceme oblong to ellipsoid
✓ Pedicels usually 1–3 mm	✓ Pedicels usually 2–5 mm
✓ Perianth erect to erecto-patent, nearly white to pale-blue	✓ Perianth erecto-patent to patent (to nodding), lively sky-blue to deep-blue
✓ Perianth tubular to campanulate-tubular	✓ Perianth tubular-campanulate with spreading nodes

Distribution in Bulgaria

Persson & Persson (2001) reported *H. l.* subsp. *atchleyi* as a new to Bulgaria on the basis of two herbarium materials: **1).** Sofia – Beledie Han, 18.05.1954, coll. V. Velchev, and **2).** Vrashka Chuka (according to their data, wrongly referred to the region of Vratsa), 04.1890, coll. L. Adamović. They also mentioned the following localities recorded by Velenovský (1891) for Bulgaria: Kostinbrod, Buchina, Dragoman, Petrich, Lozen. But it is not clear why they decided that these populations belong to *H. l.* subsp. *atchleyi*.

Revision of the materials deposited in the herbaria of Sofia University (SO) and Bulgarian Academy of Science (SOM) has shown a wider distribution of the subspecies in Bulgaria. The subspecies is distributed in the following floristic regions: Forebalkan (*Western*), Balkan Range (*Western*), Znepole region, Sofia region, Vitosha region, West Frontier Mountains (especially in the lower parts of Mt. Osogovo), and Mt. Sredna Gora (*Western* – Mt. Lozenska) (Fig. 3).

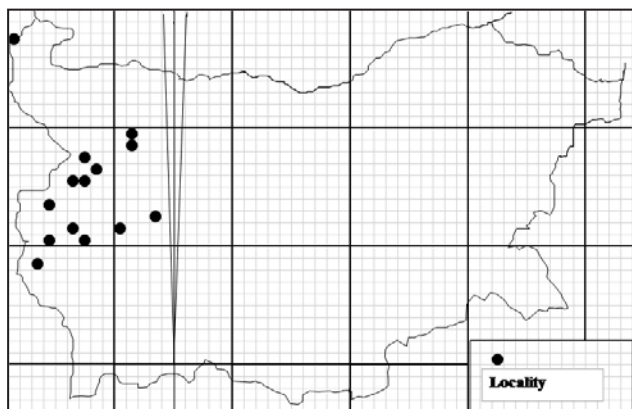


Fig. 3. Distribution map on UTM grid (10×10 km) of *Hyacinthella leucophaea* subsp. *atchleyi* in Bulgaria.

Some populations from the region of Vratsa town (Iskar Gorge and Veslets Hill) are more similar to *H. l.* subsp. *atchleyi*, while others to *H. l.* subsp. *leucophaea*. There are also specimens from the region of Lakatnik (Iskar Gorge), the pedicels of which are more similar to *H. l.* subsp. *leucophaea*, while the other morphology is more similar to *H. l.* subsp. *atchleyi*. This area may represent a hybrid zone between the two subspecies.

All material seen in the field and in the Bulgarian herbaria from the regions of Asenovgrad, Veliko Tarnovo, Lovech, Pleven, Beloslav, Balchik towns, and other parts of Central and East Bulgaria definitely belong to *H. l.* subsp. *leucophaea*.

Examined specimens of *H. leucophaea* subsp. *atchleyi*:

Forebalkan (Western): Vrashka Chuka, FP15, 19.03.2017, leg. & det. R. Tzonev & H. Panovska (SO 107759); Vratsa, Veslets, GN19, 20.03.1897, leg. I. Nejcheff, det. B. Davidoff (SOM 12987); **Balkan Range (Western):** Lakatnik, FN97, 23.03.1930, leg. & det. I. Buresh & G. Trifonov (SOM 12989); *loc. ibid.*, 17.03.1968, leg. L. Evstatieva, det. N. Vihodcevski (SO 12542); between the villages Iskrets and Breze, FN86, 31.05.1936, leg. & det. D. Jordanov (SO 12554); Petrohan Pass, FN77, 1910, leg. & det. I. Urumoff (SOM 13005); **Sofia region:** Beledie Han, FN75, 18.05.1954, leg. & det. V. Velchev (SOM 12534, 12978); Dragomanski Chepan, FN65, 20.03.1892 & 25.03.1892, leg. & det. S. Georgiev (SO 12549, 12547); Malovski Monastery, FN65, 09.05.1893, leg. & det. S. Georgiev (SO 12557, SO 12556); Chepan, Petrovski Krast, FN65, 26.03.1990, leg. & det. M. Anchev (SOM 149172); Mt. Ponor, peak Kreta, FN75, 10.05.1997, leg. & det. D. Stoyanov (SO 99559); Golema Rakovitsa, Elin-Pelin District, GN32, 25.03.1960, leg. & det. D. Jordanov & A. Yanev (SO 12541); **Znepole region:** Golo Bardo, Pernik, FN61, 25.03.1899, leg. & det. R. Filipov (SO 12544); *loc. ibid.*, 04.04.1899 & 09.04.1899, leg. & det. S. Kazandzhiev (SO 12555, 12564); Golo Bardo, peak Ostritsa, FN61, 21.06.2005, leg. & det. A. Asenov (SO 103616); *loc. ibid.*, 24.05.1955 & 05.06.1959, leg. & det. N. Vihodcevski (SOM 90699, 103206); Golo Bardo, Radomir, FN61, 07.04.1939 & 25.03.1937, leg. & det. B. Achtaroff (SOM 12995, 12984); *loc. ibid.*, 16.05.2005 & 01.06.2006, leg. & det. A. Asenov (SO 103479, 104120); *loc. ibid.*, 1986, leg. & det. Y. Koeva (SO 91198); *loc. ibid.*, leg. & det. D. Totev (SO 12537); Mt. Zemenska, peak Mechka, FN40, 27.04.1986, leg. & det. D. Stoyanov (SO 94593); Zemen,

FN40, 1911, leg. & det. *I. Urumoff* (SOM 13003); Charchat (now Lyalintsi), Tran District, FN43, 1908, leg. *I. Urumoff*, det. *B. Davidoff* (SOM 13007); *loc. ibid.*, leg. & det. *A. Tosheff* (SOM 13006); **Vitosha region:** Bosnek village, FN70, 21.06.2008, leg. & det. *S. Todorova* (SO 105630); **West Frontier Mts.:** Kyustendil, Hisarlaka, FM38, 1902, leg. & det. *I. Urumoff* (SOM 13004); **Mt Sredna Gora (Western):** Mt. Lozenska, peak Polovrak, GN01, 09.03.1990, leg. & det. *V. Velchev* (SOM 154405). There is also a herbarium specimen labeled only as *Bulgaria borealis*, Orehovitsa, 13.03.1896. leg. *I. Nejcheff*, det. *B. Davidoff* (SOM 12981), or *Bulgaria occidentalis*, but it is not clear where it came from.

Discussion

Summarized information for the distribution of *H. leucophaea* in Bulgaria has indicated some ecological and chorological features of the species. This species is a typical Eastern Submediterranean-Pontic species (see the range in Heywood 1980) distributed mostly in dry grasslands (steppes) in the Balkans, Romania, Ukraine, and Southern Central Russia. In Bulgaria, it is a strict calciphyte, inhabiting calcareous rocky substrates with sparse vegetation. In spite of the wide distribution indicated for the country in the references (see Vălev 1964; Petrova 1992; Popova 2003; Asyov & Petrova 2012, etc.), the species is restricted to several main parts of the country. They are mostly the Black Sea Coast (*North-ern*) and Northeast Bulgaria (Dobrudzha), southern parts of the Danubian Plain and the Forebalkan (Vratsa, Veliko Tarnovo, Lovech, and Pleven), calcareous parts of the Balkan Range (Iskar Gorge, Mala Planina, Beledie Han), low calcareous mountains of West Bulgaria (Zemenska and Osogovska Mts, Mt. Golo Bardo, southern parts of Mt Vitosha, and also calcareous foothills of the Rhodopes in the Thracian Lowland, and northernmost slopes of the Rhodopi Mts. This distribution was also confirmed by the inventory by Karamfilova & Stoyanov (2015) based on the material stored in the herbarium of the Agricultural University in Plovdiv (SOA). In some parts, e.g. the vicinities of Lovech town or Beledie Han, it may appear in early spring in the open, rocky places of the calcareous plateaus.

The species *H. leucophaea* is represented in Bulgaria by two geographically restricted subspecies with a narrow hybrid zone between them in the region of Vratsa town and the Iskar Gorge (transitional between the Forebalkan and the Balkan Range (*Western*). *Hyacinthella leucophaea* subsp. *atchleyi* is distributed in West Bulgaria (but not in its SW part), while *H. l. leucophaea* is distributed mostly in the central and eastern parts of the country, but in scattered localities under the steppe influences of the flora and vegetation of Bulgaria.

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