

New floristic data in North Macedonia with a first record of *Allium melanantherum* Pančić

Original Article

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Abstract:

The author discloses new data referring to chorology and habitats of 12 vascular plants in North Macedonia of which the Balkan endemic *Allium melanantherum* Pančić, recorded in the subalpine belt of Belasica Mt., is reported for the first time in the flora of the country. New locality or localities are presented for the following rare or doubtfully known taxa: *Asplenium cuneifolium* Viv., *Athyrium distentifolium* Opiz, *Centaurea scabiosa* subsp. *spinulosa* (Spreng.) Arcang., *Chaerophyllum bulbosum* L., *Crepis baldaccii* Halácsy, *Dioscorea balcanica* Košanin, *Epilobium alpestre* (Jacq.) Krock., *Eriophorum vaginatum* L., *Euphorbia peplus* L., *Orchis quadripunctata* Cirillo ex Ten. and *Thelypteris palustris* Schott. Literature data (if present) regarding the chorology of each of the treated taxa in the country are also provided and presented.

Key words:

Allium melanantherum, flora, species, distribution, North Macedonia

Apstract:

Novi floristički podaci za Severnu Makedoniju sa prvim nalazom vrste *Allium melanantherum* Pančić

Autor otkriva nove podatke vezane za horologiju i staništa 12 vaskularnih biljaka Severne Makedonije, od kojih je balkanski endemit *Allium melanantherum* Pančić, pronađen u subalpskom pojasu planine Belasica, po prvi put zabeležen u flori zemlje. Nov lokalitet ili lokaliteti su predstavljeni za sledeće retke ili malo poznate taksoni: *Asplenium cuneifolium* Viv., *Athyrium distentifolium* Opiz, *Centaurea scabiosa* subsp. *spinulosa* (Spreng.) Arcang., *Chaerophyllum bulbosum* L., *Crepis baldaccii* Halácsy, *Dioscorea balcanica* Košanin, *Epilobium alpestre* (Jacq.) Krock., *Eriophorum vaginatum* L., *Euphorbia peplus* L., *Orchis quadripunctata* Cirillo ex Ten. i *Thelypteris palustris* Schott. Literaturni podaci (ukoliko postoje) vezani za horologiju svakog ugroženog taksona u zemlji su takođe obezbeđeni i predstavljeni.

Ključne reči:

Allium melanantherum, flora, vrste, rasprostranjenje, Severna Makedonija

Introduction

With more than 3000 species, the vascular flora of North Macedonia is among the richest in Europe, particularly in regards to its relatively small area of 25713 km². Owing to the researches lasting more than 17 decades, a large amount of floristic data is already published making the flora of this country relatively well studied. However, the chorology of some taxa and taxonomic groups as well as the floristic composition of some parts of the country are still insufficiently known and numerous important

data are continuously published.

During the enthusiastic field work and performing some applicative projects in the recent years, the author had an opportunity to conduct certain floristic researches in many regions of North Macedonia. Thereby, an abundant herbarium material belonging to various taxonomic groups was collected and studied. In this work new data concerning some selected taxa are presented aiming to improve the knowledge for their chorology and ecology in the country and in their overall range of distribution.





Fig. 1. *Allium melananthrum*: a - inflorescence, b – bulb, c - habitat (Belasica Mt., Sečena Skala, photo A. Teofilovski), d - distribution in North Macedonia

Materials and Methods

During the field work appropriate plant specimens were collected and herbarized. They are stored in the private herbarium of the author, provided with labels containing data regarding the locality, habitat, size and condition of the population. Appropriate photographs of live plants are also taken. The plants were identified according to The flora of the Republic of Macedonia (Micevski, 1985, 2001, 2005), Flora Europaea (Tutin & al., 1964-1980) and some other regional floras and monographic works. Relevant literature was checked in order to provide the existing data for each of the treated taxa. Maps of distribution of most of the presented taxa are also given.

Results and discussion

Allium melananthrum Pančić (Amaryllidaceae) (Fig. 1)

Belasica Mt.: Sečena Skala, subalpine meadow, silicate, 1700 m, 41°20'29.28"N, 22°53'18.94"E, 18.8.2018, leg. A. Teofilovski & D. Mandzukovski, det. A. Teofilovski & Z. Nikolov.

This is a first record of this species in North Macedonia. Only a small population of no more than 30 individuals was found, spreading on an area of ca. 200 m². The species grows on a dry subalpine meadow on siliceous geological substrate, accompanied with the following herbaceous plants and shrubs: *Allium flavum* L., *Asperula aristata* L. f., *Euphorbia barrelieri* Savi, *Festuca* sp., *Genista carinalis* Griseb., *Hypericum olympicum* L., *Rosa* sp., *Scabiosa triniifolia* Friv., *Vaccinium vitis-idaea* L., etc.

Allium melananthrum is a rare Balkan endemic plant, which, beside in North Macedonia is distributed also in: Kosovo part of Šar Mountain (Šutman, Gora), several localities in E & SE Serbia, C & SW parts of Bulgaria, and NC & NE floristic regions of Greece (see Anačkov, 2009; Assyov et al., 2012; Dimopoulos et al., 2013). Having in consideration such distribution, its finding on the territory of North Macedonia is not a surprise. This *Allium* is considered generally a high-mountain species of open habitats, although in Bulgaria it occurs also in the medium mountain belt, between 900 and 2400 m, on meadows, forest clearings and shrubby

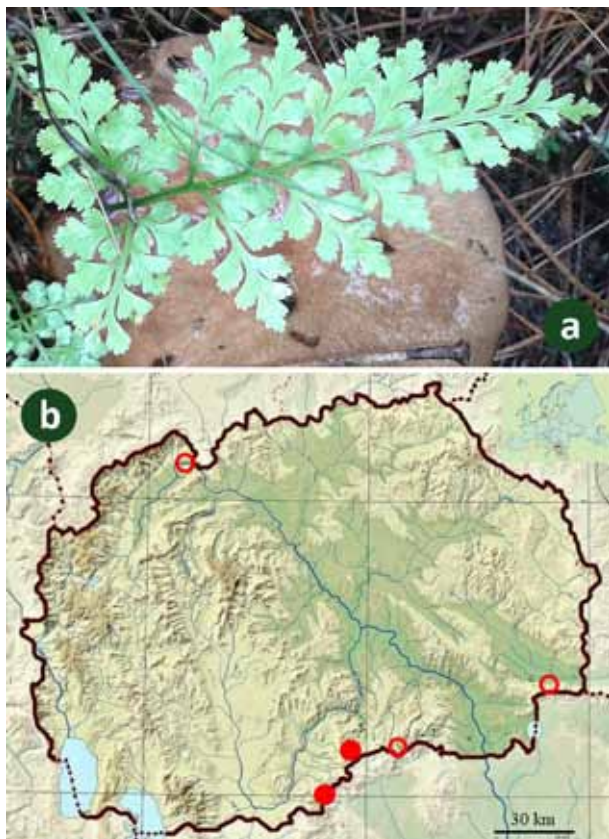


Fig. 2. *Asplenium cuneifolium*: a - (Kavadarci, Majdan village, photo A. Teofilovski); b - distribution in North Macedonia, solid circles - herbarium data of the author, rings – data from literature

places (Stojanov et al., 1966). Similarly, in Serbia it grows on high mountain xerophytic or mesophytic meadows and in Greece between 1500 and 1900 m, in meadows and rocky places (Andersson, 1991; Anačkov, 2009). The cited authors do not provide data on the geological substrate of the species habitat.

Description: Bulbs 1-1.5 cm in diameter; outer tunics membranous, with fine, close, parallel fibres separating at the top. Stem 13-40 cm. Leaves 1-3, up to 20 cm x 2 mm, filiform, sheathing the lower $\frac{1}{4}$ - $\frac{1}{2}$ of the stem; margins scabrid. Spathe 2-valved; valves unequal, one 0.5-2 cm, the other 1-6 cm, persistent, longer than the pedicels, narrowly ovate or lanceolate at base, abruptly contracted above into a filiform appendage. Umbel fastigiate, 3- to 25-flowered, with a few bulbils; pedicels 1-2.5 mm, unequal. Perianth cylindrical; segments 8-10 x 1-2 mm, pink, with red mid-vein, very narrowly oblong, obtuse. Stamens included; filaments c. 6 mm; anthers blackish; pollen yellow. Capsule 4 mm (Stearn, 1980).

Allium melanantherum belongs to *Allium* sect. *Codonoprasum* Reichenb. (Stearn 1981, Anačkov 2009). It is easy distinguishable from the other

representatives of this section occurring in the Balkan Peninsula (*A. carinatum* L., *A. flavum* L., *A. oleraceum* L., *A. paniculatum* s. lato, etc.) by the longer (7-10 mm) and obtuse perigon segments, stamens included in the perigon and dark blue (almost blackish) anthers.

Asplenium cuneifolium Viv. (Aspleniaceae) (Fig. 2)

Kavadarci: Majdan village, between the road to Kruša and Majdan river, serpentine, 1020 m, 41°9'10.53"N, 21°55'56.89"E, 5.9.2014, 8.10.2014, leg, det. A. Teofilovski.

A serpentinophytic species of *A. adiantum-nigrum* complex with insufficiently known distribution in North Macedonia. Micevski (1985) in *The flora of S.R. Macedonia* reported this species only from the serpentine area NW of Skopje, thereby questioning the previous reports from Dudica Mt. (Konjsko) (Bornmüller, 1928) and Belasica Mt. (Mokriev) (Stojanov 1921). Recently, it was reported also from Nidže Mt. (Dobro Pole) (Teofilovski, 2011).

On the locality near Majdan village this species occurs rather sparse on an area of several hectares, in *Pinus nigra* forests and forest openings, on serpentine geological substrate.

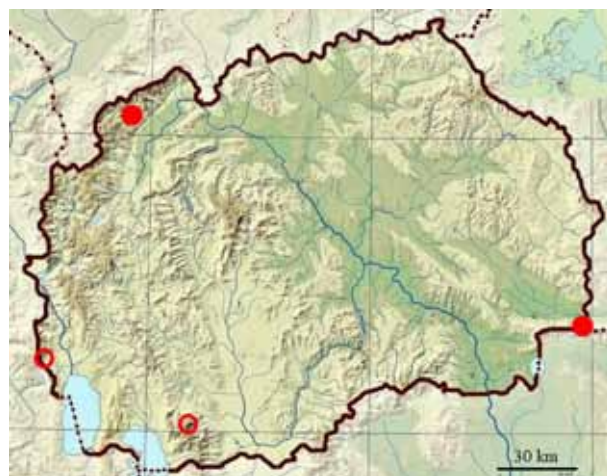


Fig. 3. Distribution of *Athyrium distentifolium* in North Macedonia, solid circles - herbarium data of the author, rings – data from literature

Athyrium distentifolium Opiz (Athyriaceae) (Fig. 3)

Šar Mountain: Otunje village, Ginov Kamen, near silicate rocks, 1632 m, 42°4'35.68"N, 20°59'19.73"E, 15.11.2017, leg, det. A. Teofilovski; **Belasica Mt.:** Tromegje, 1760 m, between large siliceous stones, 41°20'26.48"N, 22°55'34.06"E, 18.8.2018, leg. A. Teofilovski & D. Mandzukovski, det. A. Teofilovski.

A widely distributed species in the north hemisphere but very rare in the Balkan Peninsula

(Croatia, Montenegro, Romania, Bulgaria, North Macedonia) (Christenhusz et Raab-Straube, 2013). In North Macedonia following two localities were previously known, both of them referring also to siliceous substrate: Jablanica Mt. (Vevčani) and Pelister (Golemo Ezero) (Micevski, 1985). The recorded population on Belasica Mt. is only 200 m distant from the state border with Greece and thus the presence of this species could be expected also on the territory of this country.

***Centaurea scabiosa* subsp. *spinulosa* (Spreng.) Arcang. (Asteraceae) (Fig. 4)**

Delčevo: 2.6 km NE of Zvegor village, meadow, 1015 m, 41°58'30.18"N, 22°50'12.49"E, 26.6.2020, leg. A. Teofilovski & D. Mandzukovski, det. A. Teofilovski.

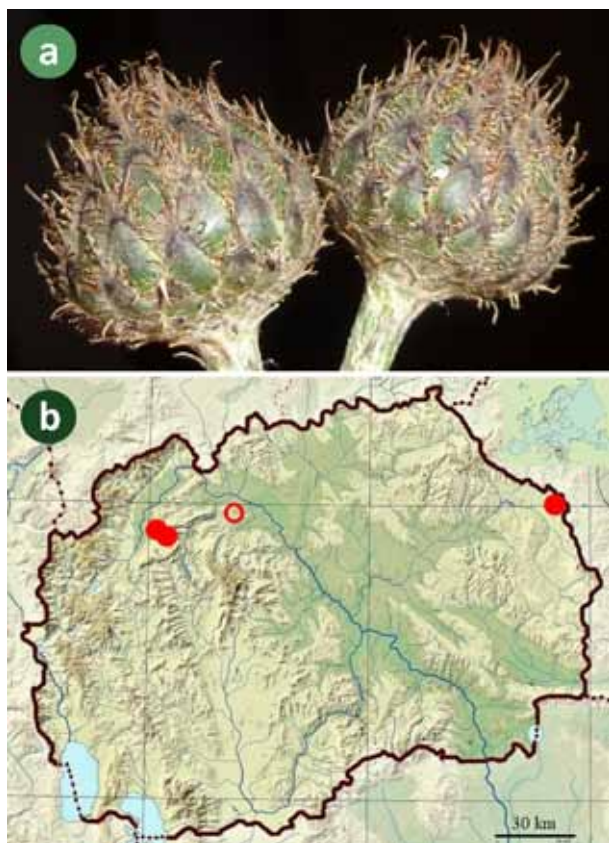


Fig. 4. *Centaurea scabiosa* subsp. *spinulosa*: a - capitulas (Delčevo, Zvegor village, photo. A. Teofilovski); b - distribution in North Macedonia, solid circles - herbarium data of the author, rings - data from literature

This subspecies was previously known only from the following localities in the northern part of the country: Vodno Mt. (Drenkovski, 1969) and Suva Gora Mt. (Lukovica, Sedlarevo) (Teofilovski, 2011). The only other report of *C. scabiosa* L. refers to the vicinity of Strumica (Rudski, 1943), but it is

unclear to which infraspecific taxon might it refer as another two subspecies [subsp. *scabiosa* and subsp. *fritschii* (Hayek) Hayek] also occur in this part of Balkan Peninsula (Greuter, 2006 +; Dimopoulos et al., 2013).

***Chaerophyllum bulbosum* L. (Apiaceae) (Fig. 5)**

Kičevo: Prostranje village, meadow, 940 m, 41°21'30.42"N, 20°59'43.92"E, 22.6.2020, leg. det. A. Teofilovski; **Makedonski Brod:** near

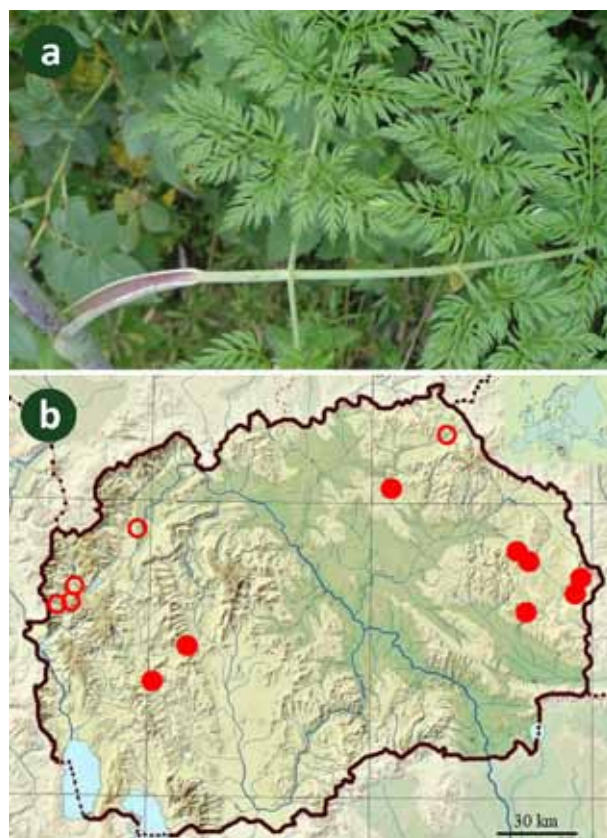


Fig. 5. *Chaerophyllum bulbosum*: a - (Kratovo, Grizilevci village, photo. A. Teofilovski); b - distribution in North Macedonia, solid circles - herbarium data of the author, rings - data from literature

the road to Suvodol, 550 m, 41°30'40.43"N, 21°13'45.09"E, 23.6.2020, leg. det. A. Teofilovski; **Kratovo:** NW-N of Grizilevci village, roadside, 1000-1100 m, 42°2'49.31"N, 22°8'36.54"E, 24.6.2017, leg. det. A. Teofilovski; **Vinica:** Osojnica river, alder forest, 785 m, 41°47'49.09"N, 22°40'33.59"E, 18.6.2019, leg. det. A. Teofilovski; Selska River, alder forest, 820 m, 41°47'4.82"N, 22°40'12.95"E, 18.6.2019, observ. A. Teofilovski; **Pehčevo:** near the road to Ramna Reka, 1010 m, 41°43'40.37"N, 22°55'28.46"E, 12.6.2019, leg. det. A. Teofilovski; **Berovo:** 2.8 km E of the dam, waste place, 1260

m, 41°40'5.06"N, 22°55'38.89"E, 28.6.2020, leg. det. A. Teofilovski; toward Prevedena, dump place, 41°37'13.35"N, 22°50'47.92"E, 1020 m, 2.8.2020, leg. det. A. Teofilovski.

The following few chorological data regarding this species are given in *The flora of the Republic of Macedonia*: Kriva Palanka (Urumov 1923), between Tetovo and Gostivar, and few localities in the lower part of Radika River basin (Volkovija, Jovan Bigorski, Bituše) (Micevski 2005). The new localities indicate a more frequent occurrence of this species, though the abundance of almost all documented populations is rather low.

Crepis baldaccii Halácsy (Asteraceae) (Fig. 6)

Bistra Mt.: Izvor village, near the road to Gorni Lopušnik, limestone rocks, 1340 m, 41°30'3.25"N, 20°45'5.24"E, 29.7 & 13.8.2020, leg. det. A. Teofilovski; **Jablanica Mt.:** Strižak, 1865 m, limestone rocks, 41°17'43"N, 20°32'14"E, 14.9.2016. leg. det. A. Teofilovski; Vevčanska Lokva, limestone rocks, 1835 m, 41°14'32.08"N, 20°32'21.55"E, 23.8.2016, leg. det. A. Teofilovski; Čuma, 1700-1950 m, limestone rocks, 41°13'32.71"N, 20°31'50.09"E, 19.7.2017, observ. A. Teofilovski (photo.); Labuniški Bačila, 41°16'5.53"N, 20°32'5.47"E, limestone rocks, 1900 m, 17.8.2017, observ. A. Teofilovski (photo.); Podgorečki Bačila, 1780 m, 17.8.2017, observ. A. Teofilovski (photo.).

A Balkan endemic species, which geographical range, beside North Macedonia, include the mountains of N, C & S Albania, E Kosovo and NW Greece (Gajić, 1975; Barina et al., 2017; Dimopoulos et al., 2013). In North Macedonia, previously it was known only from the peak of Crn Kamen on Jablanica Mt. (Černjavski, 1943, sub *C. baldaccii* subsp. *albanica* Jáv.), while the report from Šar Mountain (Ljuboten) (*C. baldaccii* subsp. *albanica*) (Teofilovski, 2015) is incorrect, based on specimens actually belonging to the closely related *C. macedonica* Kitanov.

According to the author's field observation, *C. baldaccii* is a frequent species in the subalpine belt of Jablanica Mt. and seems to be very rare on Bistra Mt. It grows in cervices of limestone rocks while near Podgorečki Bačila probably also on silicate ones. Curiously, despite its relatively wide occurrence on Macedonian part of Jablanica Mt., so far it is not reported from the part of this mountain belonging to Albania (Kitanov 1948, Barina & al. 2017).

Within *C. baldaccii* two subspecies (besides the typical one) are so far described - subsp. *albanica* Jáv. from N Albania and subsp. *carpini* Greuter from

NW Greece (Jávorka et al., 1926; Greuter, 1975). However, having in consideration the variations of the morphologic characteristic within the recorded populations on Jablanica and Bistra Mts., both subspecies seem cannot be easily distinguished from the typical *C. baldaccii*. Similar comments are also noted by Kamari (1991) in the treatment of the genus *Crepis* L. in the "Mountain flora of Greece".



Fig. 6. *Crepis baldaccii*: a - plant with details of fruits and capitula (Bistra Mt., road to Gorni Lopušnik, photo. A. Teofilovski); b - distribution in North Macedonia, solid circles - herbarium data of the author, rings – data from literature

Dioscorea balcanica Košanin (Dioscoreaceae) (Fig. 7)

Jablanica Mt.: Lukovo village, above the road to Debar, 710 m, 41°22'0.29"N, 20°36'10.64"E, 11.7.2016, leg. det. A. Teofilovski; Modrič village, near the road to Debar, 41°22'21.86"N, 20°35'45.68"E, 620 m, 15.6.2020, leg. A. Teofilovski & Z. Nikolov, det. A. Teofilovski; Drenok River gorge, 41°23'43.08"N, 20°34'43.46"E, 694 m, 16.6.2020, leg. A.



Fig. 7. *Dioscorea balcanica*, male specimen (Jablanica Mt., Modrič village, photo A. Teofilovski)

Teofilovski & Z. Nikolov, det. A. Teofilovski; Globočica hydropower plant, near the road to Debar, 41°23'59.53"N, 20°35'0.93"E, 595 m, 15.6.2020, leg. A. Teofilovski & Z. Nikolov, det. A. Teofilovski.

In the flora of North Macedonia this W Balkan endemic plant was reported only from a single locality on Jablanica Mt. (Lukovo village) (Rizovski, 1977), which represents the southernmost point of the species range. After the publication of this first record, no additional data regarding the chorology or ecology of this species in the country has been disclosed.

The new localities extends the known finding site near Lukovo village for 5 km toward north, to Drenok River and Globočica hydropower plant. The species thrives usually on shady places in thermo-mesophyllous deciduous forests and their margins, on carbonate geological substrate. At the bottom of the Drenok River gorge, it occurs within a relic forest community in which the following species participate: *Acer campestre* L., *Acer obtusatum* Willd., *Acer pseudoplatanus* L., *Aesculus hippocastanum* L., *Fraxinus excelsior* L., *Fraxinus ornus* L., *Hedera helix* L., *Juglans regia* L. (juv.), *Ostrya carpinifolia* Scop., *Sambucus nigra* L., etc.

***Epilobium alpestre* (Jacq.) Krock.**
(Onagraceae) (Fig. 8)

Stogovo Mt.: 3.9 km NW of Ehloec village, wet places near mountain stream, 1670 m, 41°26'6.54"N, 20°43'56.71"E, 30.7.2020, leg. det. A. Teofilovski.

This *Epilobium* has a wide distribution in C & S Europe and part of SW Asia, but becoming rare toward southernmost parts of Europe and the Balkan Peninsula. Among the countries neighboring North Macedonia it is known only from Bulgaria (Balkan

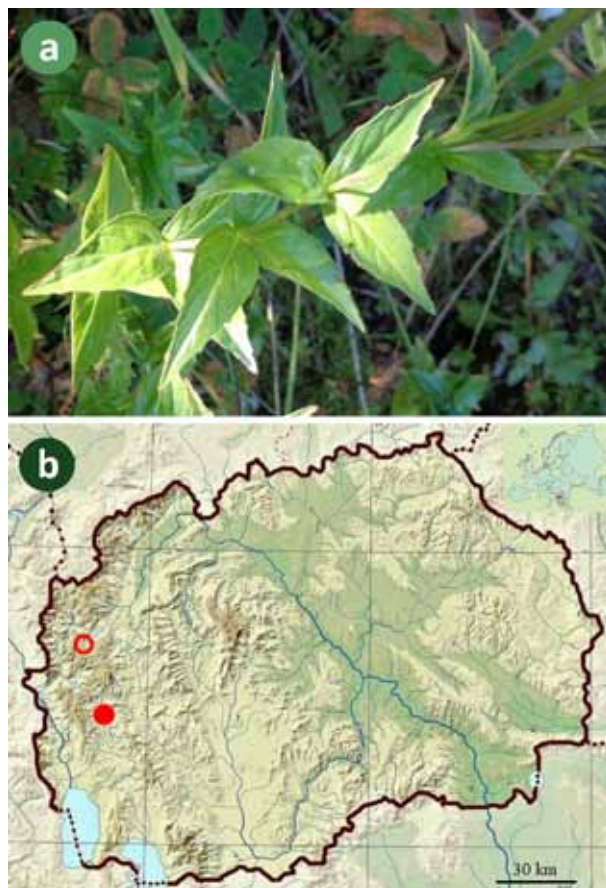


Fig. 8. *Epilobium alpestre*: a - (Stogovo Mt., photo A. Teofilovski); b - distribution in North Macedonia, solid circle - herbarium data of the author, ring - data from literature

Mts., Rila Mt., Vitoša Mt.) and Serbia (Kopaonik Mt., Golija Mt., Zlatibor Mt., Rakoš, Kosovo), while doubtfully present in Albania and missing from the flora of Greece (Diklić, 1973; Dimopoulos et al., 2013; Barina & al., 2018; Vladimirov, 2019). The only previous record of this species in North Macedonia originates from the upper mountain belt of Bistra Mt. (Careva Češma) (Micevski, 2001).

***Eriophorum vaginatum* L. (Cyperaceae) (Fig. 9)**

Maleševo Mountains: Čengino Kale, wet place, 41°43'15.09"N, 23°1'43.81"E, 1690 m, leg. A. Teofilovski & D. Mandzukovski, det. A. Teofilovski.

A wetland species with a wide Eurasian distribution but quiet rare in the flora of North Macedonia. It was previously known from a few rather old reports, lacking any recent confirmation: Jakupica Mt. [Salakovo Ezero (Košanin, 1911), Pepelak (Bornmüller, 1928)] and Šar Mountain (Lukovo Pole) (Horvat, 1953).

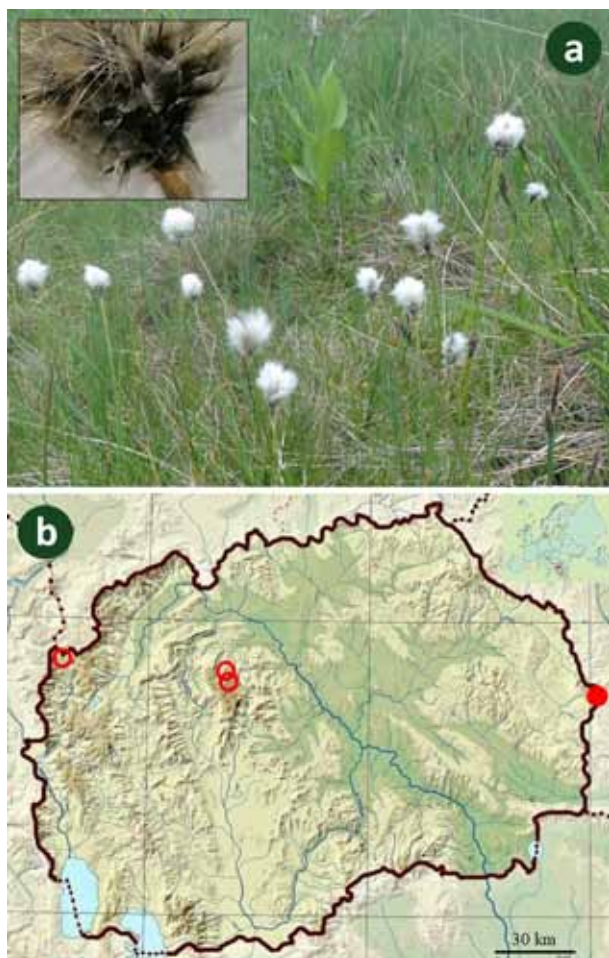


Fig. 9. *Eriophorum vaginatum*: a - habitat with a detail of a basal part of inflorescence (Maleševo Mountains, Čengino Kale, photo. A. Teofilovski); b - distribution in North Macedonia, solid circles - herbarium data of the author, rings – data from literature

***Euphorbia peplus* L. (Euphorbiaceae) (Fig. 10)**

Kičevo: 0.7 km SW of the city center, near a fence and on a concrete pavement, 41°30'27.20"N, 20°57'17.68"E, 22.6.2020, leg. det. A. Teofilovski; **Tetovo:** Blagoja Toska str., in concrete planters and between concrete blocks, 42°0'48.23"N, 20°58'48.74"E, 28.9.2020, leg. det. A. Teofilovski.

In the floristic literature this rare annual spurge is quoted only from two localities in the vicinity of Dojran [Dub Mt. (Cirimotić, 1958), Nikolić (Čarni et al., 2014)] and an unspecified locality between Veles and Gevgelija (Nikolovski & Cirimotić, 1958). Its occurrence was not confirmed in the *Flora of the Republic of Macedonia* (Micevski, 1998). The observed populations in the urban areas of Kičevo and Tetovo are rather small, inhabiting ruderal habitats associated with various concrete constructions.

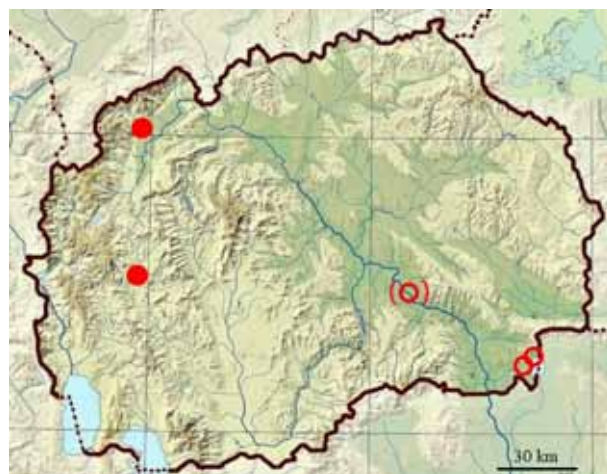


Fig. 10. Distribution of *Euphorbia peplus* in North Macedonia, solid circles - herbarium data of the author, rings – data from literature, ring in brackets – insufficiently specified locality from literature

***Orchis quadripunctata* Cirillo ex Ten. (Orchidaceae) (Fig. 11)**

Makedonski Brod: Zdunje village, near the bridge, thermophilous forest, limestone, 595 m, 41°46'31.68"N, 21°9'17.08"E, 12.5.2016, leg. det. A. Teofilovski.

The recorded population which consists of a few tenths of individuals, grows on shallow soil in a sparse thermophilous forest of *Quercus trojana* Webb.

This north-Mediterranean species was known only from a single old report referring to the hilly area near Radobil village (Prilep) (Bornmüller 1928). The new record confirms the poorly known presence of this orchid in the country flora, thereby, extending its general range of distribution more deeply toward the continental part of the Balkan Peninsula. Among the countries neighboring North Macedonia it occurs only in Albania (frequent in the southern part and scattered elsewhere) and Greece (in all floristic regions) (Dimopoulos et al., 2013; Barina et al., 2017).

***Thelypteris palustris* Schott (Thelypteridaceae) (Fig. 12)**

Tetovo: Jančiste village, alder forest, 400 m, 42°3'23.36"N, 21°7'12.13"E, 3.8.2018, leg. det. A. Teofilovski; **Ohrid:** Belčišta village, Sini Viroj, alder forest, 41°18'51.65"N, 20°48'57.68"E, 23.6.2020, leg. det. A. Teofilovski.

A wetland fern distributed throughout much of the north hemisphere but only with a rare occurrence in the country. In *The flora of the Republic of*

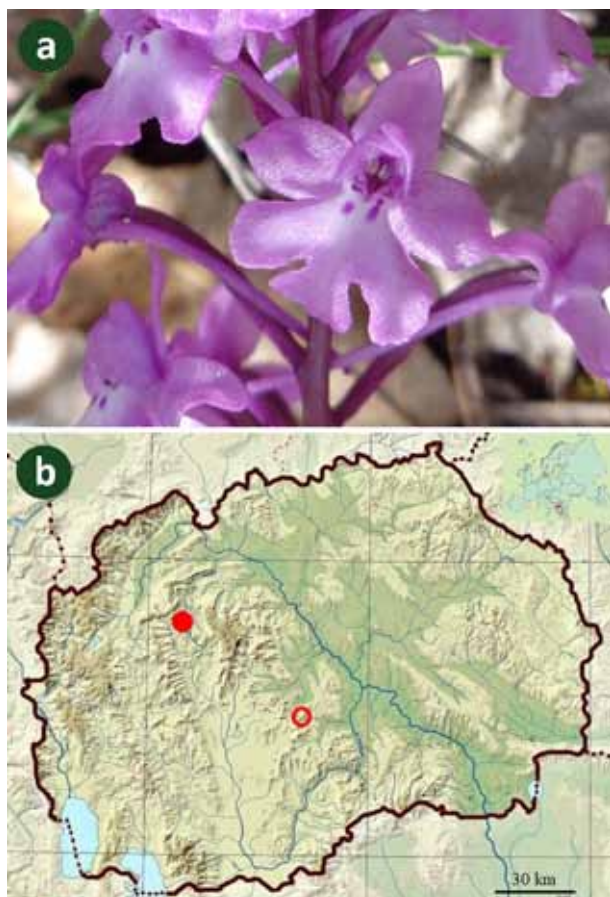


Fig. 11. *Orchis quadripunctata*: a - flowers (Makedonski Brod, Zdunje village, photo. A. Teofilovski); b - distribution in North Macedonia, solid circle - herbarium data of the author, ring – data from literature

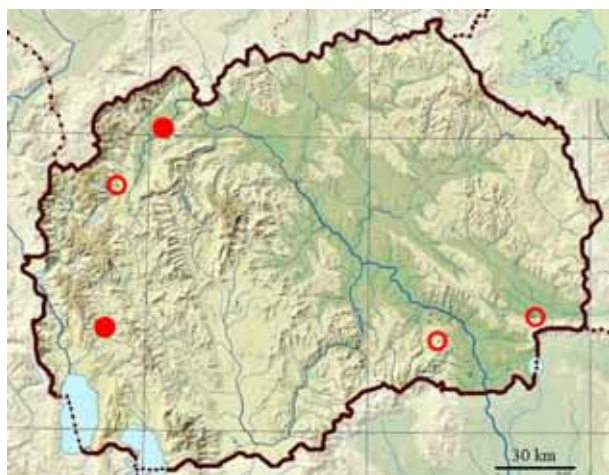


Fig. 12. Distribution of *Thelypteris palustris* in North Macedonia, solid circles - herbarium data of the author, rings – data from literature

Macedonia this species is reported from alder forests or wet habitats on three localities: Strumica (Bansko), Gostivar (Vranovci) and Kožuf Mt. (Visoka Čuka) (Micevski, 1985). Its actual presence on the cited

localities needs to be checked as such habitats are frequently being disturbed by the adverse human activities.

Conclusions

During the recent floristic researches new data regarding the chorology and habitats of 11 rare or poorly known plants and one species new for the country flora are recognized and presented in this work.

The Balkan endemic *Allium melanantherum* is recorded for the first time in the flora of North Macedonia, in the subalpine belt of Belasica Mt. (Sečena Skala). Considering its occurrence in E & SE Serbia, C & SW parts of Bulgaria, N Greece and Kosovo part of Šar Mountain, the finding on the territory of North Macedonia was expected in some extend.

Another one Balkan endemic *Crepis baldaccii*, previously known only from an old literature report from Jablanica Mt. (Crn Vrv), is confirmed on several new localities of the same mountain with addition of a first record on Bistra Mt. A previous report from Šar Mountain (Ljuboten) is revised and dismissed as an error.

Orchis quadripunctata, previously poorly known only from an almost one-century old literature data referring to Radobil village (Kavadarci), is confirmed for the country flora with its finding near Zdunje village (Makedonski Brod).

New locality or localities accompanied with data regarding the habitats, are added for eight rare plants which were previously known only from one or few localities: *Asplenium cuneifolium* - Kavadarci (Majdan village), *Athyrium distentifolium* – Šar Mountain (Otunje village), Belasica Mt. (Tromegje), *Centaurea scabiosa* subsp. *spinulosa* – Delčevo (Zvegor village), *Dioscorea balcanica* - Jablanica Mt. (Modrič village, Drenok river, Globočica), *Epilobium alpestre* - Stogovo Mt. (Ehloec village), *Eriophorum vaginatum* – Maleševo Mountains (Čengino Kale), *Euphorbia peplus* - Tetovo, Kičevo, *Thelypteris palustris* – Tetovo (Jančište village), Ohrid (Belčišta village).

The new localities of *Chaerophyllum bulbosum* from the vicinity of Kratovo, Pehčevo, Berovo, Kičevo and Makedonski Brod, indicate its wider distribution in North Macedonia then it was previously considered.

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