Macedonian Journal of Ecology and Environment
Vol. 23, issue 2
pp. 115 - 118
Skopje (2021)
ISSN 1857 - 8330 (on-line)
ISSN 0354-2491 (print)
Original scientific paper
Available online at www.mjee.org.mk

First confirmation of the presence of the species *Polygonum arenarium* Waldst. & Kit. (Polygonaceae) in the flora of the Republic of North Macedonia

Прва потврда за присуство на видот *Polygonum arenarium* Waldst. & Kit. (Polygonaceae) во флората на Република Северна Македонија

Sara Cvetanoska[1]*, Renata Ćušterevska[1], Mitko Kostadinovski[1], Cvetanka Cvetkoska[1], Angelina Stojkoska[3], Vlado Matevski[1,2]

[1]*Institute of Biology, Faculty of Natural Sciences and Mathematics, Ss. Cyril and Methodius University, Arhimedova 3, 1000 Skopje, Republic of North Macedonia*

[2]*Macedonian Academy of Sciences and Arts, Blvd. Krste Misirkov 2, 1000 Skopje, Republic of North Macedonia*

[3]*Primary school "Edinstvo", Oktisi, Struga, Republic of North Macedonia*

Abstract

The species *Polygonum arenarium* (fam. Polygonaceae) was registered in the vicinity of Prilep, during the field research that was conducted in the surroundings of this city. The first literature data on the presence of this species in the flora of the Republic of North Macedonia are given by Velenovsky (1922), in the surroundings of Prilep, but these data have not been confirmed yet. This species is considered to be an integral part of the Macedonian flora for decades, however, its later confirmation is due to its morphological similarity to the species *Polygonum arenastrum*. A brief description of the most important morphological features of the species and a description of the habitat where it was found are given.

Key words: *Polygonum arenarium*, new data, flora, first confirmation, description, Republic of North Macedonia

Апстракт

Со теренските истражувања во околината на градот Прилеп беше регистриран видот *Polygonum arenarium* од фамилијата Polygonaceae. Првите литературни податоци за присуството на овој вид во флората на Северна Македонија се наведуваат од Velenovsky (1922), но овие податоци досега не беа потврдени. Овој вид се смета дека со децении наназад е составен дел на флората на Македонија, меѓутоа, неговото подоцнежно потврдување се должи на неговата морфолошка сличност со видот *Polygonum arenastrum*. Даден е краток опис на најважните морфолошки карактеристики на видот и опис на хабитатот, каде што е пронајден.

Клучни зборови: *Polygonum arenarium*, нов податок, флора, прво потврдување, опис, Република Северна Македонија

Submitted: 20.04.2021
Accepted: 10.09.2021

* Author for correspondence: sara.cvetanoska159@gmail.com

Introduction

The genus *Polygonum* L. is the largest genus within Polygonaceae family with 243 plant species. In the flora of the Republic of North Macedonia, the family Polygonaceae is represented by four genera, of which the genus *Polygonum* is the largest with 15 species (Micevski 1995). For the presence of the species *Polygonum arenarium* Waldst. & Kit. on the territory of North Macedonia literature data of Velenovsky (1922) from the vicinity of Prilep, was not confirmed. During the field research of the flora in the surrounding of Prilep, this species was registered and thus confirmed the existing literature data. In the paper, new chorological data of the species *P. arenarium* for the flora of the Republic of Macedonia are presented.

Material and methods

The plant material that was collected during the field research was herbarized with a standard method and deposited in the Macedonian National Herbarium (MKNH) at the Institute of Biology at the Faculty of Natural Sciences and Mathematics, Ss. ,,Cyril and Methodius", in Skopje. The Flora of the Republic of Macedonia (Micevski, 1995), Flora Europaea (Tutin et al.1964), and other regional flora were used to identify the plant material. The taxonomy and nomenclature is consistent with Euro+Med Plant base. Flora Europaea 1 (Tutin et al.1964) and Euro + Med Plant base (Kurtto & Weber 2009) were used for global distribution of the species.

Figure 1. *Polygonum arenarium* – herbarium material stored at MKNH

Results

Nomenclature: *Polygonum arenarium* Waldst. & Kit., Descr. Icon. Pl. Hung. 1: 69 (1801)

Confirmed locality: Republic of North Macedonia Prilep: between the villages Krivogashtani and Vrbjani, along the banks of the river Blato (41.337847 N; 21.367586 E; 596 m a.s.l.; 20.11.2016; Habitat 3270 Rivers with muddy banks with *Chenopodion rubri* p.p. and *Bidention* p.p. vegetation) (leg. S. Cvetanoska) (MKNH)

Description:

Stems of the plant 20-50 cm tall, diffusely branched from the base, procumbent or ascending (Figure 1). Leaves linear-lanceolate, acute, usually caducous. Bracts small, inconspicuous. Simple perianth pink and white, conspicuous, with patent segments (Figure 2). Nut 2 mm. (Tutin et al.1964).

Distribution:

Polygonum arenarium grows mainly on cultivated grounds, especially on sandy soils. The species is mainly distributed in the northern hemisphere, in South and East Europe, East Russia, France, Czech, Hungary, Italy, Romania, Albania, Bulgaria, Greece, Croatia, Serbia (Webb & Chater 1964). According to Euro + Med Plant Base (Kurtto & Weber 2009), in addition to the listed countries, as a native species is also indicated for Austria, Georgia, Azerbaijan, Croatia, Belarus, Spain, Italy, Israel, Syria, Moldova, Caucasus, Sicily and Malta, Slovakia, Ukraine, Turkey. With the status of introduced species, it is present in Great Britain, Latvia, Denmark, Estonia, Sweden, and Poland.

The species *P. arenarium* for the territory of the Republic of North Macedonia was firstly mentioned in the vicinity of the city of Prilep (Velenovsky, 1922), but this data have not been confirmed so far. In this research, we confirm the presence of this species, which was found in the surroundings of Prilep, between the villages Krivogashtani and Vrbjani, near the river Blato. (Figure 3). It grows in the habitat 3270 Rivers with muddy bans within the *Chenopodion rubri* p.p. and *Bidention* p.p. vegetation, nitrophilous communities dominated by annual ruderal plants (Peev et al. 2015; Chytrý et al. 2016).

This river is located in the Pelagonija Valley, on an area where in the past there was a large bog. In order to increase the arable land, the soil was dehydrated by making the river Blato as a canal. The substrate of this area is sandy and ideal for the development of this species. *P. arenarium* has no specific affinity to a particular psammophitic plant association and it occurs in a wide range of pioneer psammophytic vegetation of

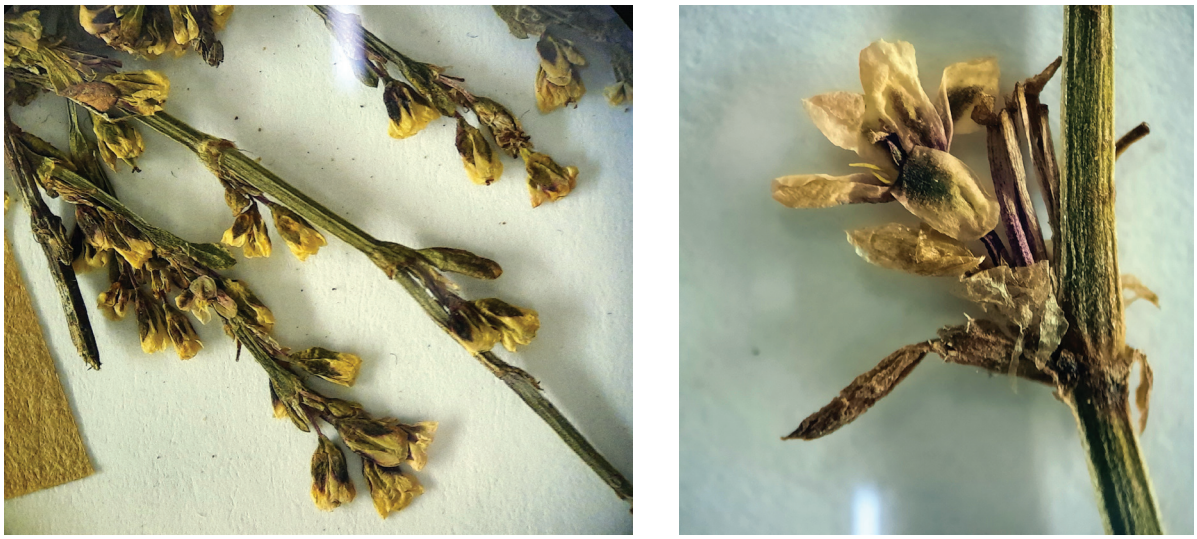

Figure 2. *Polygonum arenarium* - flowers and bracts (MK, Prilep, Krivogashtani, river Blato)

wind-blown sandy dunes and in semi-ruderal stands in abandoned sandy fields and sand pits (Eliáš et al. 2018).

Discussion

The species *P. arenarium* is widespread in Europe and is present in all countries of the Balkan Peninsula. Its presence in the flora of North Macedonia was considered insecure (Micevski 1995). Its late registration is considered to be due to its morphological similarity with the species *Polygonum depressum* Meisn., which is a very common species and widespread in the territory of North Macedonia (Matvejeva 1985, Micevski 1995). The key differences between the two species are the type and length of bracts and relation to the length of the perigon and the ripe fruit. In *P. depressum* the upper bracts on the stem are scaly and shorter than the flowers, while in *P. arenarium* the bracts are leafy and longer than the flowers. Both species prefer the same type of substrate, sandy soils, in addition to fields, in ditches, and other wet places that are trampled. The habitat in which the species *P. arenarium* was registered, is strongly modified under the strong anthropogenic influence, which led to a drastic reduction in the water levels in the river. In this type of habitat the communities can be replaced with other plant communities in case the hydrodynamic

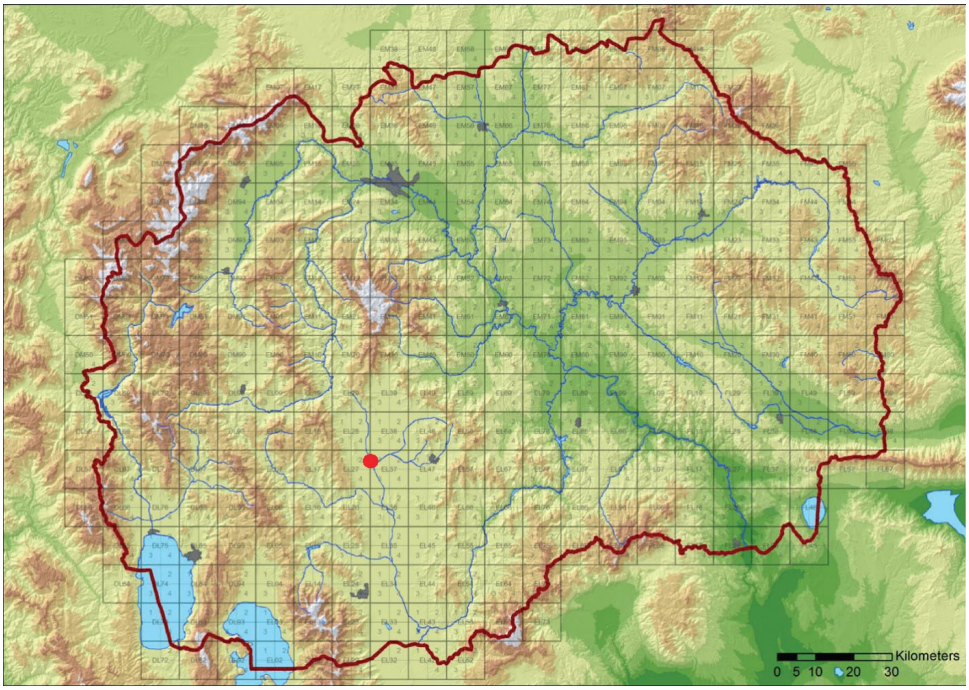

Figure 3 *Polygonum arenarium* – distribution in the Republic of North Macedonia

and geo-morphological conditions change. For instance, with reduction of water level and/or surfacing of a deposit of sediments, an area previously occupied by the *Chenopodion rubri* (Tüxen 1960) Hilbig et Jage 1972 communities may be colonized by communities of willow scrubland or large helophytes (Matevski et al. 2021). The species *P. arenarium* is still not endangered according to IUCN Red List in Europe. However, in some countries, such as Slovakia, this plant has status of endangered species (Elias et al. 2015), while in Croatia it is considered to be critically endangered (Nikolic & Topic 2005). In the Republic of North Macedonia, where the species has been registered so far on only one locality, it is strongly exposed to anthropogenic influence, because in its vicinity there are arable agricultural land. This species deserves to be assessed and given the appropriate threatened status, in order to take certain measures for its protection in the future.

References

Chytrý M., Hennekens M. S., Jiménez-Alfaro B., Knollová I., Dengler J., Jansen F., Landucci F., Schaminée H.J. J., Aćić S., Agrillo E., Ambarlı D., Angelini P., Apostolova I., Attorre F., Berg Ch., Bergmeier E., Biurrun I., Botta-Dukát Z., Brisse H., Antonio Campos J., Carlón L., Čarni A., Casella L., Csiky J., Ćušterevska R., Dajić Stevanović Z., Danihelka J., De Bie E., De Ruffray P., De Sanctis M., Bernhard Dickoré W., Dimopoulos P., Dubyna D., Dziuba T., Ejrnæs R., Ermakov N., Ewald J., Fanelli G., Fernández-González F., FitzPatrick U., Font X., García-Mijangos I., Gavilán G. R., Golub V., Guarino R., Haveman R., Indreica A., Işık Gürsoy D., Jandt U., A.M. Janssen J., Jiroušek M., Kącki Z., Kavgacı A., Kleikamp M., Kolomiychuk V., Krstivojević Ćuk M., Krstonošić D., Kuzemko A., Lenoir J., Lysenko T., Marcenò C., Martynenko V., Michalcová D., Erenskjold Moeslund J., Onyshchenko V., Pedashenko H., Pérez-Haase A., Peterka T., Prokhorov V., Rašomavičius V., Pilar Rodríguez-Rojo M., Rodwell S. J., Rogova T., Ruprecht E., Rūsiņa S., Seidler G., Šibík J., Šilc U., Škvorc Ž., Sopotlieva D., Stančić Z., Svenning J.-Ch., Swacha G., Tsiripidis I., Dan Turtureanu P., Uğurlu E., Uogintas D., Valachovič M., Vashenyak Y., Vassilev K., Venanzoni R., Virtanen R., Weekes L., Willner W., Wohlgemuth Th., Yamalov S. (2016): European Vegetation Archive (EVA): an integrated database of European vegetation plots. Applied Vegetation Science 19: 173–180.

Eliáš, P., D. Dítě, Z. Dítě, & L. Bakay. (2018). Distribution and habitat preferences of *Polygonum arenarium* subsp. *arenarium* (Polygonaceae) in Slovakia. Plant and Fungal Systematics 63(2): 23–30.

Eliáš, P. jun., Dítě, D., Kliment, J., Hrivnák, R. & Feráková, V. 2015. Red list of ferns and flowering plants of Slovakia, 5th edition (October 2014). Biologia 70: 218–228.

Kurtto, A. & Weber, H. E. (2009). *Polygonum*. In: Kurtto, A. (ed.), Polygonaceae. Euro + Med Plantbase. The information resource for Euro-Mediterranean plant diversity. Available from: http://ww2.bgbm.org/ EuroPlusMed/query.asp.

Matvejeva, J. (1985). Association *Leersio-Bidentetum* (W. Koch 1926) Poli et Tüxen 1960 in Macedonia. Contributions. Section of Natural, Mathematical and Biotechnical Sciences, MASA, 6(1-2): 33–36. (in Macedonian)

Matevski, V., Ćušterevska, R., Kostadinovski, M., Mandžukovski, D. (2021). Catalogue of habitat types of EU importance in the Republic of North Macedonia, MoEPP. 184 pp.

Micevski, K. (1995). *Polygonum*. In: Micevski, K. (ed.). Flora of the Republic of Macedonia, 3: 401–772. Macedonian Academy of Sciences and Arts, Skopje. 371 pp.

Nikolić, T. & Topić, J. (eds) 2005. Red Book of Vascular Flora of the Republic of Croatia. Categories EX, RE, CR, EN and VU. Ministry of Culture, State Institute for Nature Protection, Zagreb.

Peev, D., Petrova, A.S., Anchev, M., Temniskova, D., Denchev, C.M., Ganeva, A., Gussev, C., Vladimirov, V. (ed.) (2015). Red data book of the Republic of Bulgaria. Vol. 1. Plants and fungi. Bulgarian Academy of Sciences, Sofia. 881 pp.

Tutin, T., Heywood, V., Burges, N., Moore, D., Valentine, D., Walters, S., Webb, D. (1964), Flora Europaea, 1: 91-97. Cambridge University Press, Cambridge. doi:10.5281/zenodo.302862

Velenovsky, J. (1922). Reliquiae Mrkvickanae, Fr. Rivnac, Pragae, 32 pp.

Waldstein-Wartemburg, F. de P. von & Kitaibel, P., (1799-1802). Descriptiones et icones plantarum rariorum Hungariae. Vol. 1., 1: 69. Typis Matthiae Andreae Schmidt, Caes. Reg. Aul. Typogr., Viennae.