

***Centaurea rufidula* Bornm. (Asteraceae) in the flora of the Republic of North Macedonia**

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Abstract

The presence of *Centaurea rufidula* (Asteraceae), in the flora of North Macedonia, is confirmed. *C. rufidula* is a Macedonian endemic species described by Bornmüller in 1923, from the surrounding of Bogdanci (southern part of North Macedonia). Since then, no data of its occurrence in Macedonia was reported. In spite of Bornmüller's allegation (south of Bogdanci), the new locality is on the way, eastern of Bogdanci, toward the city Dojran. The specimens match the description of Bornmüller in all characteristics except the length of the pappus. However, in this case, this variation known also by other species is not of a bigger taxonomical significance. The only population of *C. rufidula*, that we have found, grows on arable or on abandoned arable land, in habitat with dominance of *Paliurus spina-christi*.

Key words: *Centaurea rufidula*, endemic species, confirmation, century-old data, North Macedonia.

Introduction

Centaurea rufidula Bornm. is a Macedonian endemic species, described by Bornmüller (1923), from the surrounding of the city Bogdanci. It belongs to the subsect. *Cylindracea* (Hayek) Dostal of the subgenus *Acrolophus* (Cass.) Dobroc [Sect. *Acrolophus* (Cass.) DC] (Dostal, 1976). This subsect. includes species with small involucre and capitula like *C. tymphaea* Hausskn., *C. orphanidea* Heldr. & Sart., *C. diffusa* Lam., *C. bovina* Velen. and *C. aemulans* Klokov (Dostal, 1976). According to the literature data, the following species from this subsection, among the above-mentioned, are present in the flora of the Republic of North Macedonia: *C. tymphaea* (Dimitrov, 1908; Bornmüller, 1928), *C. orphanidea* (Matevski et al., 2008) and, *C. diffusa* (Dimitrov, 1908; Jurišić, 1923; Bornmüller, J., 1928; Soška, 1938-1939a,b, 1941; Rudski, 1943).

In Bornmüller's protolog, there are no habitat's characteristics but, in the works of Hayek (1930) and Dostal (1976), *C. rufidula* is associated with rocky places.

Materials and methods

During the field-researches (2019-2021), six individuals of one very small and restricted population, were collected. The samples were dried up and labeled,

according to the commonly accepted procedures. The classification is made according to Dostal (1976). The main source, for the determination of the material, was Bornmüller's protolog (1923), then the works of Hayek (1930) and Dostal (1976). Voucher specimens are stored in the Herbarium of Natural History Museum under the following numbers: 14 581, 14 582, 14 583, 14 653, 14 654 and 15 164. Photos of habitat, general appearance of the plants in the locality as well as herbarized specimen, and illustration of the upper part of the plant are also given. Species distribution, including literature and new data from this study, is shown on a map of North Macedonia.

Results and discussion

Centaurea rufidula Bornm., Feddes Repert. 19: 103 (1923).

Macedonia centralis: "Doiransee-Gebiet, südlich von Bogdanci" (15-30.07.1916, Leg. cl. Burgeff; nr. 2158, 2160).

New locality

Bogdanci, the surroundings of the city, toward Doiran, 105 m a.s.l., 12.07.2019; Leg.: Z. Nikolov; Det.: Z. Nikolov/A. Teofilovski; 41°12'18.18"N, 22°35'58.15"E.

Description of the collected specimens

Biennial. Stem erect, 26-50 cm, in the lower and



Fig. 1. *Centaurea rufidula* Bornm.
- Habitus

upper part fastigiata (“*fastigiato-ramoso*”), indumentum, including the leaves, arachnoid, giving gray appearance of the whole plant. Leaves, except the highest and on the branches, pinatisect, the basal (lower) petiolate, the upper (stem leaves) sessile. Capitula solitary, small, oblong-cylindrical, (10)11-14 mm long (involucre and flowers), 3-4(5) mm wide. The bracts pale, both with appendages glandular-

puberulent, appendages 4-6 pairs, reddish-brown (“*rufidulo-coloratis*”), the apical spine longer than the last laterals, erect or a slightly patent. Flowers pale-pink, indistinctly radiant. Achenes small, c. 2 mm, covered with dense glands, the pappus variable in length, usually much shorter, c. 0.5 mm, rarely up to 1 mm or only exceptionally longer than 1 mm.

Distribution

During the field researches, in the surrounding of the city Bogdanci, a very small and restricted population of *C. rufidula* was found (Fig. 1; 3, a; 4, b; 8, 9). It was the first finding, after Burgeff's, in 1916. Later Bornmüller (1923), on the base of this Burgeff's material, described the new species. Bornmüller pointed that the plants were collected "südlich von Bogdanci" (south of Bogdanci). However, the new locality is situated eastern of Bogdanci, towards the city of Dojran. No other population, despite thorough research of the entire area of Bogdanci, has been found and for now, it is the only one of this species.

Habitat

C. rufidula grows on active (Fig. 3, a) and abandoned arable lands (Fig. 3 b), in an area with dominance of *Paliurus spina-christi* Mill, but also *Quercus pubescens* Willd., *Pistacia terebinthus* L. and *Carpinus orientalis* Mill. Bornmueller (1923) also reported *Centaurea diffusa* L. β *brevispina* Boiss. from the same location (südlich von Bogdanci), together with *C. rufidula*. We were not able to confirm the presence of *C. diffusa* but, we encountered another *Centaurea* species that unfortunately was not identified (Fig. 4, a).

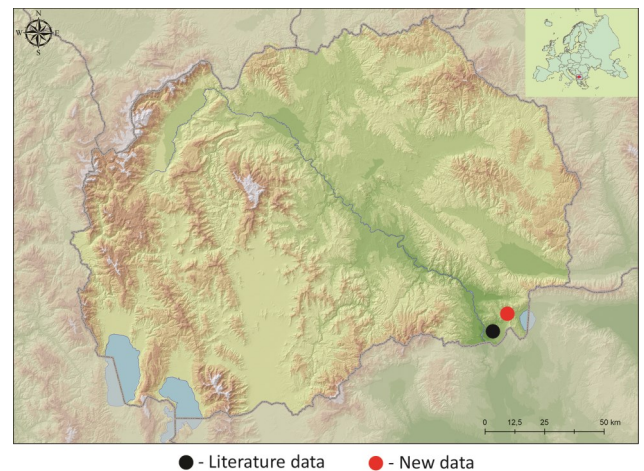


Fig. 2 Distribution of *Centaurea rufidula* Bornm. in North Macedonia

Main characteristics of *Centaurea rufidula*

The main characteristics of *C. rufidula* that make a clear morphological distinction from the closest *Centaurea* species (subsect. *Cylindracea*) are, first of all the "fastigato-ramosus" appearance and gray indumentum as a result of the arachnoid stem and leaves pubescence (Fig. 1, 5, a,b; 9), then the solitary, small and ovoid-cylindrical capitula (Fig. 6, a,b), the reddish-brown (*rufidulo-coloratis*) appendices (Fig. 6, a,b) and



Fig. 3. Habitats of *Centaurea rufidula* Bornm.:
a) Active arable land with *Diospyros kaki* b) Abandoned arable land



Fig. 4. a) *Centaurea* sp. b) *Centaurea rufidula* Bornm., withered

the small, dense-glandular achenes with, preferably, short pappus, up to 0.5 mm, rarely longer, up to 1 mm (Fig. 7, a,b). Exceptionally, the achenes can be longer than 1 mm (Fig. 7, b). In addition, the flowers are pale-pink, not or sometimes partially radial (Fig. 6, a,b).

In compare to the Bornmüller's description (1923), the variable length of the achene's pappus is the only difference. But, considering the fact that Bornmüller had only two samples (No. 2158, 2160) collected by Burgeff and, consequently, the limited amount of achenes, allowed us to reveal this pappus length variability (known also in other species like *C. deusta* Ten., *C. deustiformis* Adamović, *C. leucomala* Bornm.) as usual and acceptable, in the frame of the species, with no major taxonomical significance.

Conclusion:

- This is the first confirmation of the presence of *C. rufidula*, on the territory of North Macedonia, after Bornmüller's publication in 1923;
- The recent population, found on only one location in the surrounding of Bogdanci, is very small and restricted to an area of no more than 1000 m²;
- The plants completely match the description of

Bornmüller (1923), except for the variation in the pappus length. But, this difference, noticed also in other *Centaurea* species, has no large taxonomical significance in this case.

Dedication

This paper is dedicated to the passed professor and great botanist Ljupčo Melovski who initiated but, regrettably, didn't finish the project "Working together for Conservation of National Endemic Plants in Macedonia" (2019-2023, phase I), focusing on *C. rufidula* and four other species: *Astragalus physocallyx* Fisch., *Campanula debarensis* Rech. f., *Crocus jablanicensis* Randj. & V. Randj. and *Aesculus hippocastanum* L.

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Fig. 5. *Centaurea rufidula* Bornm.
a) Inflorescence b) Middle part of the stem, with leaves



Fig. 6. *Centaurea rufidula* Bornm. - capitulum
a) No radial flowers b) Partially radial flowers



Fig. 7. *Centaurea rufidula* Bornm.
a, b) Different lengths of the achene's pappus

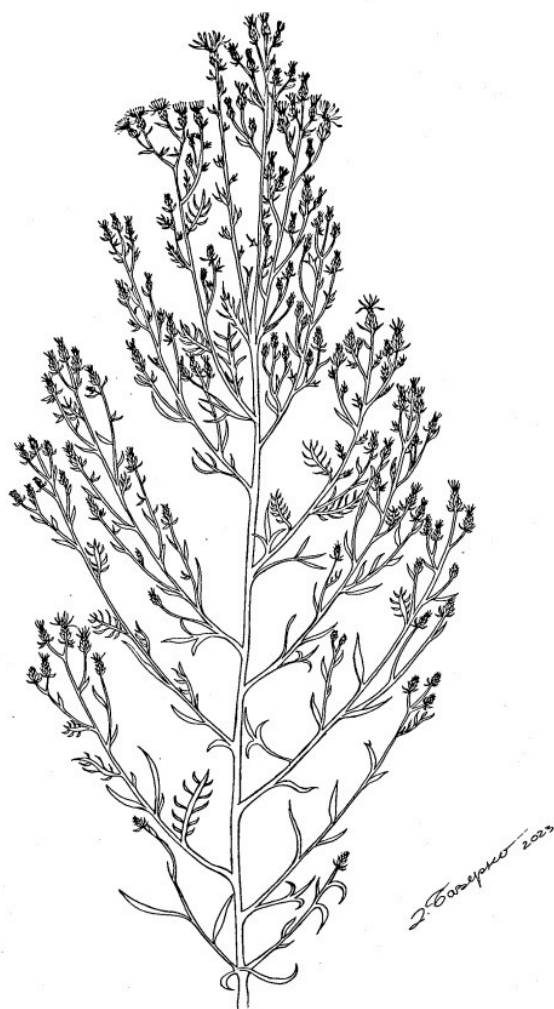


Fig. 8. *Centaurea rufidula* Bornm.
- The upper, branched part of the plant, with inflorescences
(Illustration, Darko Bazerko)

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Fig. 9. *Centaurea rufidula* Bornm.
- The herbarium's specimen (photo)

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