

***Dianthus pallidiflorus* Ser., another steppe-element in the flora of the Republic of North Macedonia**

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Abstract

Dianthus pallidiflorus, a steppe-element described from southern Russia, is recorded for first time, for the flora of the Republic of North Macedonia. The only, so far, known locality is "Tekijski rid", nearby the village Tekija (Skopje valley). A survey of different approaches and solutions, in the works of many authors, for the existence and taxonomic rank of another species – *Dianthus aridus* (described from Bulgaria) that concerns *D. pallidiflorus* (as separate species, synonym or included to *D. pallidiflorus*), is also given. Photos of the plants and the locality as well as drawings of taxonomic important parts of the flower are also presented.

Key words: *Dianthus pallidiflorus*, steppe-species, "steppe-like" vegetation, Flora, Republic of North Macedonia.

Introduction

Dianthus pallidiflorus is a steppe species, described by Seringe (1824) from southern Russia - in herbis ad Volgam [(in Krasnoarmeisk (Sarepta), Shishkin, 1935)].

The appearance of "steppe" and steppe elements, in the flora of the Republic of North Macedonia, has caused attention for a long time (Košanin, 1924; Černjavski & al., 1937; Micevski, 1971, 1978, 2001; Micevski & Matevski, 1987; Matevski & al., 2008). Whether "natural steppe" or not, was questionable for the vegetation that develops in the central part of the country, between the towns Veles, Štip and Negotino. Based on comparison and lack of some key elements that characterized the real, natural steppe, Micevski (1971) suggested the term "steppe-like" vegetation, as the most proper. Nevertheless, it didn't diminish the significance of this vegetation because of the presence of steppe species or species with semi-desert origin as relicts of the former steppe vegetation that developed on this territory (Micevski, 1971, 1978; Matevski & al., 2008). Within the steppe region, Matevski et al. (2008) recorded the following endemic and relict species: *Tulipa mariannae* Lindner, *Astragalus cernjavskii* Stoj., *Heptaptera macedonica* Micevski and *Salvia jurisicii*

Košanin, with very restricted distribution. Four more species, *Hedysarum macedonicum* Bornm., *Ferulago macedonica* Micevski, *Onobrychis megalophylla* Gris. and *Potentilla tridentula* Vel., are with somewhat wider distribution, but still limited to the territory of the Republic of North Macedonia (Matevski et al., 2008). Besides, two other steppe species: *Cardopatum corymbosum* (L.) Pers. and *Galatella villosa* (L.) Rchb. fil. are found only in this central steppe region in the Republic of North Macedonia, but are also distributed in other countries. The list of the species found only in the steppe-like region is supplemented by the following halophytes: *Artemisia maritima* L., *Krascheninikovia ceratoides* (L.) Gueldenst. *Camphorosma monspeliaca* L. and *Camphorosma annua* Pall. (Matevski et al, 2008). In the survey of the steppe species, the same authors recorded also *Astragalus parnassi* Boiss., *Morina persica* L. and *Convolvulus holosericeus* M.B. To this list of species of steppe origin, *Astragalus gracianinii* Micevski, found in the steppe-like locality "Krasta" (v. Pčinja, Kumanovo) should be added (Micevski, 1971, 2001).

Here we present the finding of another steppe species of plant, *Dianthus pallidiflorus* Ser., which is the first record for the flora of the Republic of North Macedonia.



Fig. 1. *Dianthus pallidiflorus* Ser.

a) Habitus

b) Flower with longer epicalyx scales (c. $\frac{2}{3}$ as long as the calyx)

c) Flower, with shorter epicalyx scales (c. $\frac{1}{2}$ as long as the calyx)

Materials and methods

The plants were collected from the locality “Tekijski rid”, in the vicinity of the village Tekija, eastern part of Skopje valley, c. 20 km from the capital. Voucher specimens are deposited in the herbarium of the Natural History Museum of the Republic of North Macedonia. Relevant literature sources were used for the determination of the material (Hayek, 1924; Shishkin, 1935; Stojanov, 1966; Petrova, 1992; Tutin & Walters, 1993).

Taxonomic status

Taxonomic status of *D. pallidiflorus* is stable, only the rank is different, by different authors. Seringe (1824) described this taxa as *D. pallidiflorus* sp. n. that was later accepted in the works of many authors: Lessing (1835), Boissier (1867), Shishkin (1936), Grossgeim (1945), Petrova (1992), Tutin & Walters (1993),

Fedorončuk & Čornei (2005), Petrova & Vladimirov (2009), Marhold (2011). Schmalhausen (1895), who changed the species-rank of *D. pallidiflorus* to subspecies of *Dianthus campestris* Bieb. (*D. campestris* subsp. *pallidiflorus*), found his followers in the works of Stojanov & Achtarov (1935), Stojanov (1966), Dimitrov (2002), Urušak & al. (2013).

Dianthus aridus Griseb., separate species or?

Grisebach (1873 ex Janka) described *Dianthus aridus* sp. n. from the territory of Bulgaria (Sliven). The appearance of this species didn't question the existence nor the taxonomic rank of *D. pallidiflorus*, but the dilemma whether this species should be treated as a separate (Hayek, 1924; Petrova, A., 1992; Zarkos & al., 2018), be included to *D. pallidiflorus* (Tutin & Walters, 1993) or synonymized (Marhold, 2011), still exists. The comparison of the original descriptions of *D. pallidiflorus* (Seringe, 1824) and *D. aridus* (Grisebach, ex Janka, 1873), even the one of Seringe is really short, reveals that the only reliable difference that actually separate these two species is the layout of the flowers. Namely, Seringe (1824) alleged “floribus solitarias”, while in Grisebach's diagnosis (1873) stands “flores fasciculati, fasciculi 3-4flori”. The solitary flowers stand on longer, the flowers in clusters, on shorter pedicels.

The existence or the taxonomic rank of *D. aridus* was treated differently, in the works of many authors that primarily concerned the flora from the Balkan Peninsula (Hayek, 1924; Stojanoff & Achtarov, 1935; Stojanov, 1966; Petrova, 1992; Tutin & Walters, 1993; Dimitrov, 2002; Assyov, Petrova, Dimitrov & Vasilev, 2012).

Hayek (1924), in his capitol work, alleged *D. aridus* for Bulgaria, Thracian and Macedonia. Regarding the layout and the color of the flowers, Hayek (1924) noticed: “flowers solitary vel 2-4-ni” and “lamina ochroleuca”. In Grisebach's original description, the flowers are “fasciculati: fasciculi 3-4 flori” and the lamina is “leucantha”. Consequently, plants with solitary flowers as well as plants with flowers in groups of 2-4 can be considered as *D. aridus*.

Stojanoff & Achtaroff (1935), in the detailed study of the genus *Dianthus*, for the territory of Bulgaria, alleged *D. pallidiflorus* as a subspecies of *D. campestris*. In spite of the data for the epicalyx length by Seringe (1824), the authors noticed that the epicalyx scales in subsp. *pallidiflorus*, that usually reach the half of the calyx, can sometimes reach even the base of the calyx teeth. In the frame of this subspecies, they separated



Fig. 2. *Dianthus pallidiflorus* Ser.
a) Habitus b) Flower (light-greenish below) c) Flowers (pale-pink below)

two varieties: *pseudoramosissimus* Stoj & Acht., with “solitary flowers, rarely 2-3; epicalyx scales 4; calyx 13-15 mm; flowers white to pale pink”, and var. *aridus* (Jka) Stoj. & Acht. (*D. aridus* Janka), with “flowers mostly 2-4; epicalyx scales 4-6; calyx 10-13 mm long; flowers white”. Apparently, the layout of the flowers is the main difference between these two varieties.

Stojanov later (1966) kept the same combination – *D. campestris* subsp. *pallidiflorus*, but this time he treated *D. aridus*, *D. aridus* var. *puberulus* and *D. campestris* var. *pseudoramosissimus* as synonyms of the subspecies *pallidiflorus*.

Petrova (1992), on the base of the habitus, layout of the flowers and the length of the pedicels, alleged *D. pallidiflorus* and *D. aridus* as separate species, for the territory of Bulgaria.

Tutin & Walters (1993) also recorded *D. pallidiflorus*, but they included *D. aridus* to *D. pallidiflorus*. The description of some characteristics is as following: flowers usually long-pedicelate; epicalyx-scales usually 4, $\frac{1}{2}$ - $\frac{3}{4}$ as long as calyx; calyx 10-14 mm; petal-limb 4-6 mm, white or pale-pink.

Dimitrov (2002), following the line of Stojanov (1966), recorded *D. campestris* subsp. *pallidiflorus*. But, in spite of Stojanov (1966), who synonymized *D. aridus*, Dimitrov included *D. aridus* to subsp. *pallidiflorus*.

Marhold (2011) accepted *D. pallidiflorus* and synonymized *D. aridus* Janka, *D. moeticus* Klokov and *D. campestris* subsp. *pallidiflorus* (Ser.) Schmal. In the distribution area of the species, he included Bu, Gr, Tu, U (K,U).

Uruşak & al. (2013), alleged *D. campestris* subsp. *pallidiflorus*, for the territory of European Turkey.

Finally, the data for the presence of *D. aridus* in Greece (Zarkos, Christodoulou, Tan & Vold., 2018), actualizes again the existence and the species rank of this taxa.

Description of the plants from the locality Tekijski rid (village Tekija), Skopje valley

Multicaulis, herbaceous perennial, with stout stock. Stem up to 60 cm, branched above, puberulent in the lower part. Basal leaves absent at anthesis, cauline 2-5 cm long, linear, acute, serrulate, glabrous, shorter than internodes. Leaf-sheaths, in the lower part of the stem c. 4 mm long. Flowers solitary, long pedicelate. Epicalyx scales 4, ovate-lanceolate with scarious margins, c. $\frac{1}{2}$, very rare $\frac{3}{4}$ of the calyx length, the inner scales shorter aristate, the outer varying, from shorter to longer aristate, sometimes reaching almost the base of the calyx teeth. Calyx (12)13-14(15) mm, glabrous, calyx teeth up to 6 mm, with scarious-ciliate margins. Petal-limbs dentate, bearded, white above and light greenish or rarely pale-pink, below.

Distribution

D. pallidiflorus is a steppe element, described by Seringe (1824), from southern Russia. Tutin & Walters (1993), extend the distribution area of *D. pallidiflorus* (including *D. aridus*) from S. E. Europe to S.E. Russia, including Bu, Gr, Rs (?C. W. K. E.). Data for the pres-

ence of *D. pallidiflorus*, on several localities in Ukraine, we find in the work of Fedorončuk & Čornei (2005). According to Marhold, (2011), the distribution area of this species (Syn. *D. aridus*) includes the territories of Greece, Bulgaria, Ukraine and Turkey.

Results and discussion

Dianthus pallidiflorus Ser. in DC. Prodr. 1: 358 (1824).

[Syn. *D. campestris* subsp. *pallidiflorus* (Ser.) Scmalh. in Ledeb., Fl. Ross. 1: 447. (1895); *D. maeoticus* Klok. in Scient. Magaz. of Biology:13 (1927)].

– Skopje: village Tekija, locality “Tekijski rid”, 300-350 m.a.s.l., 26.06.2015; Leg./Det.: Z. Nikolov.

– Skopje: village Tekija, locality “Tekijski rid”, 373 m.a.s.l., 28.07.2020; N: 41°59.850' E: 021°40.638'. Leg./Det.: Z. Nikolov.

The plants, collected from the locality “Tekijski rid” (village Tekija), match the description of *D. pallidiflorus* given by Seringe (1824), Boissier (1867), Shishkin (1935), Tutin & Walters (1993). The flowers are dominantly solitary (Fig. 1, a; Fig. 2, a,b), the corolla is white above, greenish or rarely pale-pink below (Fig. 2, a,b,c), calyx ± cylindrical (Fig. 3, a), epicalyx scales that are

sometimes with different length (Fig. 3, d,e), usually reach the half of the calyx length (Fig. 3, b), rarely the base of the calyx teeth (Fig. 3, c). The petals have tuft of hairs at the base (Fig. 3, f).

Vital and numerous population of *D. pallidiflorus* grows on dry grasslands (Fig. 4, a) with *Paliurus spinachristi* Mill. and *Quercus pubescens* Willd. as well as on former arable lands, following often the edges and the middle line of black roads. The flowering period lasts from the end of June to the end of August.

D. pallidiflorus is a new species for the flora of the Republic of North Macedonia and “Tekijski rid” (village Tekija) is so far, the only known locality (Fig. 4, b).

Micevski (1993), among the species of the genus *Dianthus* recorded in the literature but not confirmed during the researches for the Flora of the Republic of North Macedonia, alleged Hayek’s data for *D. aridus* Griseb. ex Janka (1924). Nevertheless, the match of our plants with the diagnosis of Seringe (1824), Boissier (1867), Shishkin (1935), Tutin & Walters (1993) allows us, without any doubt, to stay confirm that the population that grows on this locality belongs to *D. pallidiflorus*. The latest data from Greece (Zarkos, Christodoulou, Tan & Vold., 2018) that brought back *D. aridus* in focus of interest, will surely initiate new researches in

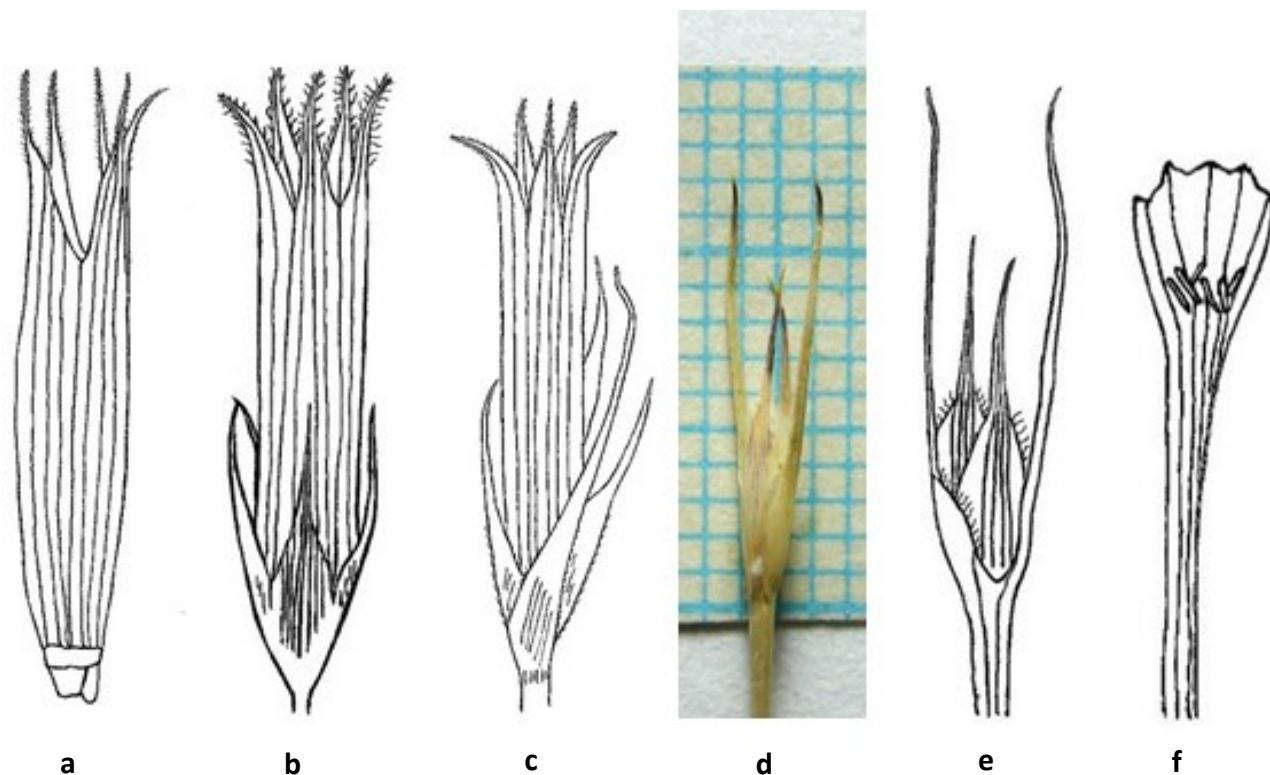


Fig. 3. a) Calyx b) Calyx with epicalyx (c. ½) c) Calyx with epicalyx (c. ⅔) d, e) Epicalyx (different length of outer and inner scales) f) Petal with tuft of hairs

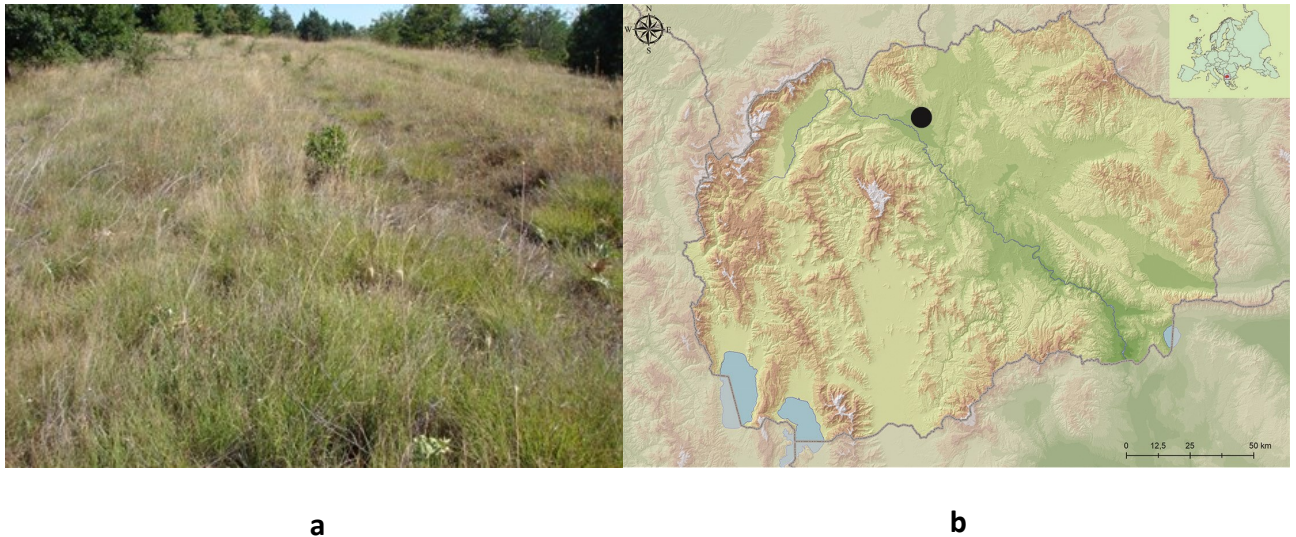


Fig. 4. *Dianthus pallidiflorus* Ser.
a) Locality "Tekijski rid" (village Tekija) b) Distribution map

order to justify or eventually dispute its status, as a separate species.

This finding of *D. pallidiflorus*, in the eastern part of Skopje valley (village Tekija), elongated the already existed list of steppe species and enriched the flora of the Republic of North Macedonia with one interesting flora's element, from the Russian steppes.

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