

***Bupleurum aequiradiatum* (Apiaceae) in the flora of the Republic of North Macedonia**

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Abstract

New data of *Bupleurum aequiradiatum*, a rare and little-known species in the Republic of North Macedonia, are presented. So far, it has been recorded only in the vicinity of Prilep village based on an old herbarium specimen dates back to 1937. Recently, a new locality was found in the area of "Tekijski Rid", nearby the village Tekija (Skopje valley). The key morphological characters of the closely-related species *B. aequiradiatum* and *B. commutatum* are illustrated and commented on.

Key words: *Bupleurum*, chorology, new data, rare species, *Umbelliferae*

Introduction

The difficulties in identifying of *Bupleurum* species, especially in the annuals of sect. *Juncea*, can be explained by the fact that the most important diagnostic characters are flower and fruit details which often are less than 1 mm large. Such is the case with *B. aequiradiatum* (H. Wolff) Snogerup & B. Snogerup, initially described as *B. commutatum* var. *aequiradiatum* H. Wolff by Wolff (1910). It became more recognizable *nowadays after the* monography of European annuals of *Bupleurum* (Snogerup & Snogerup 2001), in which it was raised in the rank of species.

Bupleurum aequiradiatum is absent in the most recent flora of the Republic of Macedonia (Micevski 2005), although a little earlier it was mentioned for Macedonia (Snogerup & Snogerup 2001) with a single locality based on a herbarium record in PR. Probably due to the lack of specimens of this species in the national herbarium of Macedonia (MKNH), the species has been neglected.

In this paper, we reported the finding of second locality of *B. aequiradiatum* and confirm the species for the flora of the Republic of North Macedonia.

Material 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 have been deposited in the herbarium of the Natural History Museum of the Republic of North Macedonia (HMMNH). Relevant literature sources were used for the determination of the plant material (Wolff 1910, Snogerup & Snogerup 2001, Stoyanov 2019).

Macro-photographs of some details of *Bupleurum* were done using the Trinocular Stereo Microscope Zeiss Stemi 2000-C (zoom 0.65x–5.0x) equipped with a Canon EOS 350D camera. Blue matt glass covered with a transparent plastic plate with a millimeter mesh was used as a background for the shooting.

Results and discussion

Bupleurum aequiradiatum (H. Wolff) Snogerup & B. Snogerup in Willdenowia 31: 302 (2001) ≡ *Bupleurum commutatum* var. *aequiradiatum* H. Wolff in Engler, Pflanzenr. 43: 84 (1910).

— Skopje: village Tekija, locality "Tekijski Rid", 400 m, 14.06.2009, leg. Z. Nikolov (HMMNH 7824–7825, sub *B. praealtum*);

— Skopje: village Tekija, locality "Tekijski Rid", 330–360 m, 23.06.2011, leg. Z. Nikolov (HMMNH 7780, sub *B. affine*);

— Skopje: village Tekija, locality "Tekijski Rid", 300–350 m, 26.06.2015, leg. Z. Nikolov (HMMNH 14220–

14221).

In the protologue, Wolf (1910) noted with uncertainty the occurrence of *B. commutatum* var. *aequiradiatum* for the geographical area of Macedonia, without a specific locality. Much later Snogerup & Snogerup (2001) for the first time reported *B. aequiradiatum* for the current territory of the Republic of North Macedonia based on revised specimen of *B. commutatum* Boiss. & Balansa (Prilep, montis supra vicum Pletvar, 25 July 1937, F. Weber, PR 872982).

In 2021, during the review of *Bupleurum* specimens stored in the Herbarium HMMNH we came across of several specimens of *B. aequiradiatum* (non-determined or misidentified as *B. affine* and *B. praealtum*), all collected recently in the vicinity of Tekija village, in Skopje valley (Fig. 1, 2). Their traits, such as almost equal, divergent umbel rays, up to 2 cm long, clearly corresponded with the diagnostic characters of *B. aequiradiatum* mentioned by Wolff (1910).



Fig. 1. *Bupleurum aequiradiatum* in the locality “Tekijski rid” (N: 42°00.013' E: 021°40.802'; 391 m a.s.l.) (Photo: Z. Nikolov)

The locality “Tekijski Rid” (Tekija village), where dominates dry grasslands (with *Paliurus spina-christi* Mill. and *Quercus pubescens* Willd.) and former arable lands, is also habitat of the recently discovered steppe-element *Dianthus pallidiflorus* Ser., in the flora of the Republic of North Macedonia (Nikolov 2020).

Bupleurum aequiradiatum and *B. commutatum* are similar to some extent, in the habit and having 5–8 rays in the top umbels, but are quite different in a number of other characteristics (Table 1), especially in their petals and mericarps (Fig. 3, 4).

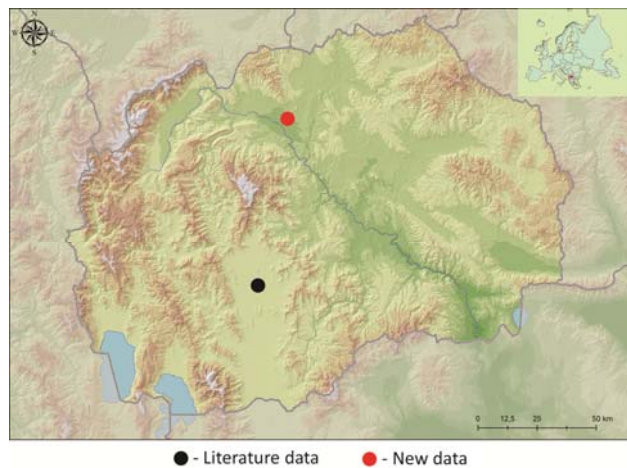


Fig. 2. Distribution of *Bupleurum aequiradiatum* in the R. of North Macedonia

Conclusion

Bupleurum aequiradiatum was confirmed for the flora of the Republic of North Macedonia with the finding of second locality of that species in the vicinity of Tekija village. The Macedonian, Serbian and Greek localities (according to Snogerup & Snogerup 2001) form the western limit of the species range that extends eastwards to south and east Bulgaria and Romanian Dobrogea (Stoyanov 2019).

References

- Micevski, K., 2005. The Flora of the Republic of Macedonia 1(6). Macedonian Academy of Sciences and Arts, Skopje, 1433–1715. (In Macedonian).
- Nikolov, Z., 2020. *Dianthus pallidiflorus* Ser., another steppe-element in the flora of the Republic of North Macedonia. ACTA Muzei Macedonici Scientiarum Naturalium, 23(1):39-44. Skopje.
- Snogerup, S. & Snogerup, B., 2001. *Bupleurum* L. (*Umbelliferae*) in Europe: 1. The annuals, *B.* sect. *Bupleurum* and sect. *Aristata*. Willdenowia, 31: 205

–308.

Stoyanov, S., 2019. Contribution to the taxonomy and distribution of *Bupleurum boissieri*, *B. aequiradiatum* and *B. gerardi* (Apiaceae) in the Balkans. *Phytotaxa*, 392(3): 197–216.

Wolff, H., 1910. *Umbelliferae-Apioideae-Bupleurum, Trinia et reliquae Ammineae heteroclitae*. In: Engler, A. (Ed.). *Das Pflanzenreich. Regni vegetabilis conspectus IV*. 228 (Heft 43). Wilhelm Engelmann, Leipzig.

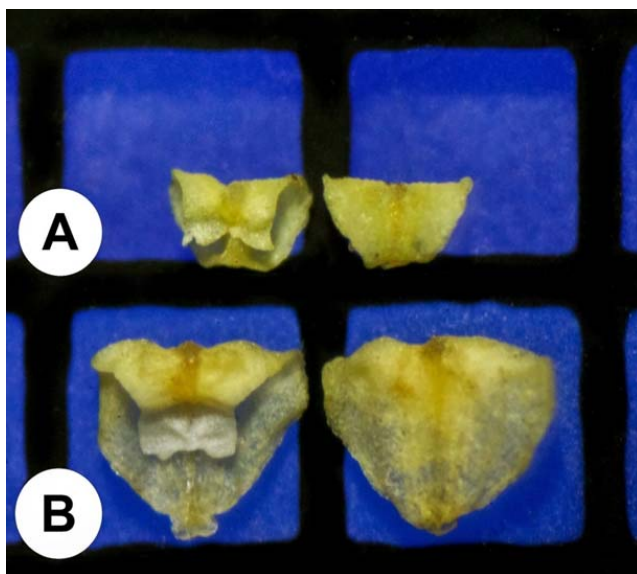


Fig. 3. Comparison of petals (inside and outside view) of *Bupleurum aequiradiatum* and *B. commutatum*. – A: *Bupleurum aequiradiatum*. – B: *Bupleurum commutatum*.

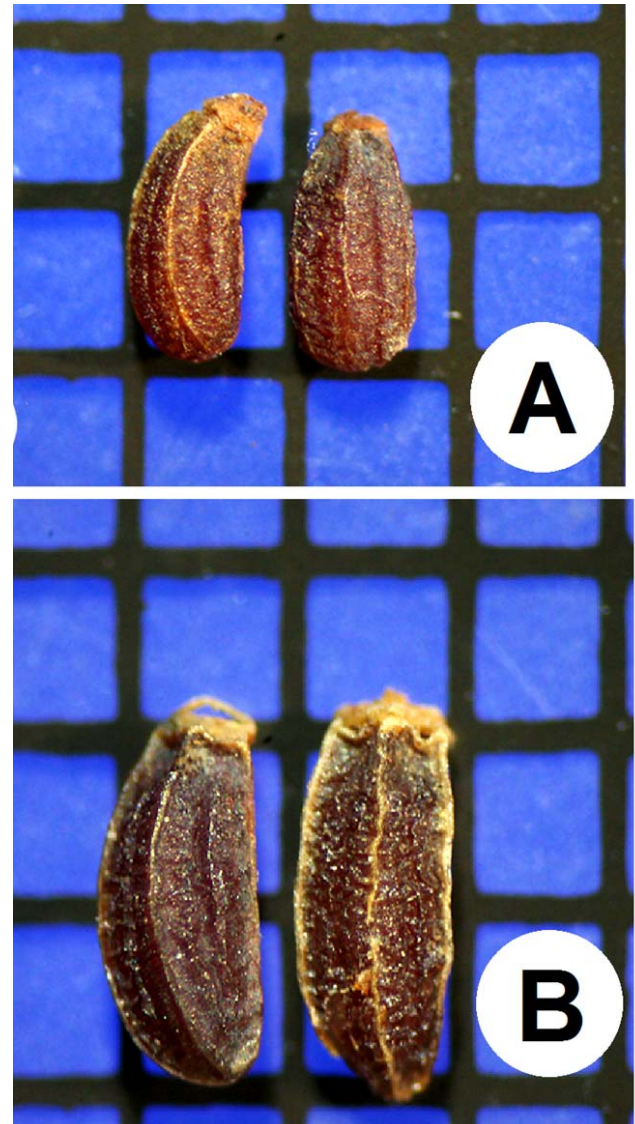


Fig. 4. Comparison of mericarps of *Bupleurum aequiradiatum* and *B. commutatum*. – A: *Bupleurum aequiradiatum*. – B: *Bupleurum commutatum*.

Table 1. Comparison of the key morphological characters of *Bupleurum aequiradiatum* and *B. commutatum*.

Characters	<i>B. aequiradiatum</i>	<i>B. commutatum</i>
Umbel rays	almost equal, the longest up to 2 cm, diver-	very unequal, the longest 4–5 cm, non-
<i>Bracts and bracteoles</i>	with finely serrulate margins	with entire margins or serrulate near apex
Petals	limb 0.4–0.5 mm wide, inflexed lobe at apex almost as wide as limb	limb 0.8–0.9 mm wide, inflexed lobe at apex two times narrower than limb
Fruits	1–1.5 mm long, styles 0.3–0.4 mm	2–2.5 mm long, styles 0.4–0.5 mm

