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Onobrychis alba subsp. *calcarea* (Fabaceae): typification of the name and first record for the Croatian flora

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ABSTRACT

Onobrychis alba subsp. *calcarea*, an endemic taxon known for central Balkan, is discovered for the first time in Croatia. Field investigations and herbarium researches have allowed to report its current occurrence in Dalmatia on Mt Mosor. Furthermore, the name *O. calcarea* is typified based on a specimen traced in PR.

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Introduction

Onobrychis Mill. is a subcosmopolitan genus distributed mainly in the north temperate regions that includes more than 160 species (Yildiz et al. 1999), some of which have been recently described or re-established (e.g. Ranjbar 2009; Amirahmadi et al. 2014; Ranjbar et al. 2018; Bernardo et al. 2020). *Onobrychis alba* (Waldst. & Kit.) Desv. is a species endemic to the Euro-Mediterranean area, and it is distributed in SE Europe and NW Africa (POWO 2022). Due to its high morphological variability it can be subdivided in six currently recognized subspecies: subsp. *alba* (SE Europe), subsp. *calcarea* (Vandas) P.W.Ball (endemic to the central southern Balkan Peninsula and European Turkey), subsp. *echinata* (Guss.) P.W.Ball (endemic to South Italy), subsp. *macedonica* Micevski (endemic to North Macedonia), subsp. *pentelica* (Hausskn.) Nyman (central-southern Italy and the Balkan Peninsula) and subsp. *mairei* (Širj.) Maire (endemic to North Africa, in Morocco and Algeria) (Širjaev 1925; Micevski 2001; Bartolucci et al. 2018; Bernardo et al. 2020; Del Guacchio et al. 2021; Conti et al. 2022). Currently in Croatia only *O. alba* subsp. *alba* is recorded (Nikolić 2019, 2020; Milović et al. 2021). In the past, *O. alba* subsp. *laconica* was reported (Širjaev 1925), whose occurrence deserves further investigation.

In this article, *O. alba* subsp. *calcarea* is recorded for the first time in Croatia. To support our identification, we have also proceeded to the typification of the name *O. calcarea* Vandas (basionym of *O. alba* subsp. *calcarea*), which, to the best of our knowledge, turns out not to be typified yet.

Materials and methods

This study is based on an extensive analysis of relevant literature, field surveys and examination of hundreds of herbarium specimens belonging to the known subspecies of *O. alba* (including the original material) preserved in APP, BRNU, IT, PR, PRC, ZA, ZAGR and WU (the acronym follows Thiers 2022). Description of the subsp. *calcarea* is based on literature (Širjaev 1925; Ball 1968) and modified after examination of 13 herbarium specimens. We performed a survey for original material for the name *O. calcarea* at PR and BRNU where the Vandas's main collection is housed and at BP, GB, PL, PRC, UPS, W and WU in order to trace further original materials (see Stafleu and Cowan 1986). The lectotype designation herein follows the Shenzhen Code (Turland et al. 2018, hereafter ICN).

Results

During some field research undertaken in Croatia in 2003, 2005, 2019 and 2021, we found a population in Mt. Mosor belonging to *O. alba*, but having little white flowers and not corresponding to any taxa until now recorded for the Croatian flora, in which only subsp. *alba* (Nikolić 2019, 2020) and subsp. *pentelica* (Širjaev 1925; under the name *O. laconica* Orph.) are known. According to the relevant literature (i.e. Ball 1968; Strid 1986), we were able to identify the plants collected (housed in APP, IT and ZAGR) as *O. alba* subsp. *calcarea*, which results as new to the vascular flora of Croatia.

Taxonomy and typification

Onobrychis alba (Waldst. & Kit.) Desv. subsp. *calcareo* (Vandas) P.W.Ball, Feddes Repert. 79: 41 (1968) \equiv *Onobrychis calcarea* Vandas, Sitzungsber. Königl. Böhm. Ges. Wiss. Prag., Math.-Naturwiss. Cl. 1888: 443 (1889).

Lectotype (designated here): [BULGARIA] Kostinbrod ad saxa calcarea, Jul 1887, Vandas & Velenovský (PR No. 375473, digital image!; isolectotypes PR barcode PR982345, WU No. 0125442 and PRC) (Figure 1).

Description: Perennial plant with several ascending stems up to 60 cm long. Leaflets of the lower leaves (4–)6–9 pairs, 4–15 \times 1–4 mm, linear to narrowly elliptical, acute-acuminate apex, glabrous above and appressed hairy beneath, opposites or subopposites. Racemes with 10–30 flowers, up to 9 cm long when fruiting. Calyx tube more or less pubescent, teeth 3–4 times as long as tube, with long spread hairs up to 1 mm, corolla 8–10 mm, white, legume 5–6 mm, the margin with 2–4(5) teeth up to 2 mm.



Figure 1. Lectotype (lower left-hand individual) of the name *Onobrychis calcarea* Vandas, preserved in PR (No. 375473; reproduced with permission of the National Museum in Prague, Czech Republic).

Distribution: *Onobrychis alba* subsp. *calcarea* was recorded in central southern part of the Balkan Peninsula (Ball 1968) where it is known from Bulgaria, Serbia, North Macedonia, Greece (Vandas 1889; Širjaev 1925; Strid 1986; Doumas et al. 2022), European Turkey (Aybeke and Dane 2007; Dimitrov 2013) and Croatia (this study). Its occurrence in Albania although reported by Pils (2016) is not proven according to Barina et al. (2018).

Nomenclatural notes: *Onobrychis calcarea* was validly described by Vandas (1889) from Bulgaria, providing a detailed description and quoting the following collection localities: "In saxis calcareis prope Kostinbrod copiose, etiam ad Konjavo prope Kistendyl in var. *echinata* m. ...". According to Vandas (1889), he visited the aforementioned places in western Bulgaria in the year 1887 with J. Velenovský. For this reason, we performed a survey for original material at PR, and BRNU where the Vandas's main collection is housed, and also in PRC where the Velenovský's collection is kept. In order to trace further original material we searched also in BP, GB, PL, UPS, W and WU. We were able to trace several herbarium specimens housed in PR, PRC and WU, which can be considered original material (Art. 9.4 of the ICN). These herbarium specimens are complete, well conserved and agree with the protologue and with the current application of the name (Širjaev 1925; Ball 1968). The lower left-hand individual of herbarium specimen in PR is selected here as lectotype for *O. calcarea*. The specimens kept in PR barcode PR982345 (In collibus calcareis supra Kostenbrod [Kostinbrod], Jul 1887, J. Velenovský), WU barcode WU0125442 (in saxosis calcareis supra Kostenbrod [Kostinbrod], Jul 1887, J. Velenovský) and PRC (in saxosis calcareis ad Kostinbrod pr. Sofia (29 km) copiose, Jul 1887, Vandas & Velenovský; in saxosis calcareis ad Kostinbrod prope Sofiam copiose, Jul 1887, Vandas & Velenovský) have the labels written slightly different from the lectotype selected here, but all the samples seem to belong to the same gathering.

Habitat: On Mt Mosor, *Onobrychis alba* subsp. *calcarea* was found from 750 to 850 m altitude, growing within eastern Adriatic dry rocky grasslands of the epi-Mediterranean vegetation zone belonging to the alliance *Saturejion subspicatae* (Horvat 1974) Horvatić 1975 of the order *Scorzonero villosae-Chrysopogonetalia grylli* Horvatić et Horvat in Horvatić 1963.

Taxonomic notes: *Onobrychis alba* subsp. *calcarea* is distinguished from *O. alba* subsp. *alba* by having calyx-tube more densely hairy, hairs on teeth patent to erect patent longer up to 1.5 mm, vs. hairs usually up to 1 mm erect to erect patent in subsp. *alba*, corolla smaller 8–10 mm long vs. 10–12 in subsp. *alba*.

Specimens examined: BULGARIA. Bei Loveć, 1897, *Urumoff* (PRC); in saxosis calcareis ad Konjavo. Jul 1887, *Vandas and Velenovský* (PRC, original material for *O. calcarea* f. *echinata*); CROATIA. M. Mosor, 750 m, pascoli sassosi, 23/05/2003, *F. Conti* (APP Nos 47268, 47269); *ibidem*, 02/08/2005, *F. Conti* (APP No. 47162); *ibidem*, presso Rif. Girometta, 33T 630357 4820773, 19/06/2021, *F. Conti & A. Stinca* (APP Nos 66128, 66129; IT Nos 3977, 3978); Mosor, near Umberto Girometta mountain house, rocky grassland, 05/06/2019, *S. Bogdanović*

s.n. (ZAGR Nos 75124, 75125); NORTH MACEDONIA. Vajtina, 30 Aug 1923, *Vandas* (PRC, sub *O. calcarea* f. *košanini*); saxosis mt. Keci-Kaja pag. Huma op Gevgelija, alt. 1900, Jun 1909, *Dimonie* (PRC); SERBIA. Serbia orientalis, in saxosis calcariis apricis in Sičevačka Klisura apum oppidum Niš, ca 300 m s.m., 12 Jul 1923, *Frant A. Novák* (PRC).

Conclusions

The discovery of *Onobrychis alba* subsp. *calcarea* in Croatia is particularly relevant because it provides a contribution to the knowledge on its distribution at the European level. Surprisingly, samples of this taxon collected in Croatia were already present in the herbaria consulted, but incorrectly identified. Therefore, our results confirm the essential role of herbaria in floristic and taxonomic researches (e.g. Wen et al. 2015; Besnard et al. 2018; Heberling 2022).

Being a cryptic taxon, distinguishable only by observation of some morphological traits in the laboratory, it is probable that in the Balkan area it is more widespread. Therefore, new field surveys are indispensable to define its effective distribution area in the Balkan Peninsula, where new floristic knowledge is continuously acquired by researchers, even on Mt Mosor (e.g. Conti and Uzunov 2006; Kučera et al. 2010; Vukojević et al. 2016; Mei et al. 2021; Terlević et al. 2021; Rat and Bogdanović, 2021) in order to protect local biodiversity.

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Disclosure statement

No potential conflict of interest was reported by the authors.

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