

First record of *Dorycnium haussknechtii* (*Fabaceae*) for the Balkans

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Abstract. *Dorycnium haussknechtii*, so far known for S Turkey (Anatolia) and NW Syria, is reported for the first time for the Balkan and European flora. The species was discovered in a single locality in the southernmost part of Mt Sakar, between Sladun and Varnik villages (SE Bulgaria, Svilengrad district). The article presents data on the morphology, distribution, habitat and population of this species. Since there has been no holotype assigned to *D. haussknechtii*, a lectotype is designated here. An updated dichotomous key to the Bulgarian representatives of the genus *Dorycnium* is also provided.

Key words: Balkan flora, Bulgaria, *Dorycnium*, *Leguminosae*, typification

Introduction

The genus *Dorycnium* Mill. comprises ca. 12 perennial and suffrutescent species distributed mainly in the Mediterranean region and Macaronesia (Slavik 1995). Rikli (1901) accepted three sections of this genus: (*Eu*) *Dorycnium*, *Bonjeanea* Rchb. and *Canaria* Rikli. The latest is endemic to the Canary Islands.

Historically, *Dorycnium* was segregated from *Lotus* L. and so far its taxonomic position has remained controversial. Some recent molecular studies revealed that it should be transferred back to the circumscription of *Lotus* s.l. and that its three sections remain well defined within *Lotus* (Allan & al. 2003; Degtjareva & al. 2006).

In the Bulgarian flora, *Dorycnium* has been represented so far by three species: *Dorycnium herbaceum* Vill., *D. germanicum* (Greml.) Rikli and *D. graecum* (L.) Ser. (Kuzmanov 1976). *Lotus strictus* Fisch. & C.A. Mey., which was subsequently classified as *Dorycnium* (Lassen 1986), is the fourth Bulgarian represent-

ative of this genus. The first three above-mentioned species belong to the section *Dorycnium*, while the last one, *D. strictum* (Fisch. & C.A. Mey.) Lassen, is the only member of the section *Bonjeanea*. *Dorycnium graecum* was placed earlier in section *Bonjeanea* (e.g. Rikli 1901, Demiriz 1970) but on the basis of molecular phylogenetic evidence Sokoloff (2003) suggested its placement in section *Dorycnium*. Subsequently, this treatment was confirmed by Degtjareva & al. (2006).

A new representative of the section *Dorycnium*, namely *D. haussknechtii* Boiss., is reported for the first time for the Bulgarian and Balkan flora. Along with five more taxa—*D. pentaphyllum* Scop., *D. gracile* Jord., *D. germanicum*, *D. herbaceum*, and *D. anatolicum* Boiss. & Heldr.—this species is considered as belonging to the polymorphic *D. pentaphyllum* aggregate, which occupies mainly the Mediterranean area. Its constituent taxa have more or less clear geographic delimitation and some authors have recognized them at subspecific rank (Ball 1968; Demiriz 1970; ILDIS

World Database of Legumes 2010). In this article, the authors prefer to treat these taxa as separate species as they were accepted by Kuzmanov (1976) and Slavik (1995).

Material and methods

The present study is based on analysis of the protologue, relevant literature, and herbarium specimens of *D. haussknechtii*, including its original material, from the following herbaria: BM, G, K, P, SAV, and SOM (acronyms according to Thiers 2008). Some collections, available as images in digital portals, were examined online.

Field survey and gathering of the plant material were carried out in June–July 2018. Bulgarian specimens of *D. haussknechtii* were deposited in the SOM Herbarium.

Macro photographs of some details of *D. haussknechtii* were made with the Trinocular Stereo Microscope Zeiss Stemi 2000-C (zoom 0.65×–5.0×) 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

In the summer of 2018, during a botanical trip in Southeast Bulgaria, Mt Sakar, between Sladun and Varnik villages (Svilengrad district), an unknown species of *Dorycnium* was collected. It was clearly distinguished from all currently known species of the genus in Bulgaria by its erect habit, glaucous stems and leaves, densely appressed-sericeous-pubescent stem and leaf indumentum, and linear-oblong leaflets of the upper leaves. After analysis of the relevant literature (Boissier 1872; Demiriz 1970), it was identified as *D. haussknechtii*, a new species to the Bulgarian and Balkan flora (Figs 1–2).

Dorycnium haussknechtii Boiss., Flora Orientalis 2: 163. 1872; *D. pentaphyllum* subsp. *haussknechtii* (Boiss.) Gams in Hegi, Illustrierte Flora von Mitteleuropa 4(3): 1378. 1923. **Lectotype** (designated here): Turkey. *Prov. Musch ad radices australes Bimgoell montis ad Gumgum in districtu Wardo lectae, in solo pingui ad Gumgum versus montes, 16.08.1859, Kotschy*

544 (G-BOIS 00330336, photo!), sub *Dorycnium kotschyianum* Boiss. (Fig. 3).

A glaucous erect suffrutescent, 40–60 cm high, with erecto-patent branches; stems and branches with dense appressed to subpatent sericeous hairs; leaves sessile, composed of 5–7 linear to oblong-oblong leaflets; leaflets 10–20(–25) × 1–3(–5) mm, acuminate, appressed-hairy, caducous; stipules minute, subulate, 1–2 mm, free; inflorescence a few-flowered subcapitate umbel, with (2–)5–10(–15) flowers; pedicels appressed-pubescent, ca. 1.5 mm long; bracteoles inconspicuous, 0.2 mm, reddish-brown; flowers white, occasionally purplish-tinged in keel; calyx 2–3 mm long, densely appressed-pubescent, the teeth shortly triangular, acute, unequal, slightly shorter or almost twice shorter than the calyx tube; standard ovate, 5–6 × ca. 3 mm, obtuse at the apex, glabrous; keel 4–4.5 mm, as long as wings; legume ovoid globular, 3–4 × 2–3 mm, glabrous, with a beak 1.5–2 mm, 1-seeded. Flowering in June, fruiting in July–August.



Fig. 1. *Dorycnium haussknechtii* in the wild – Kurtkaya Hill, between Sladun and Varnik villages, Svilengrad district, SE Bulgaria. (photo S. Stoyanov).

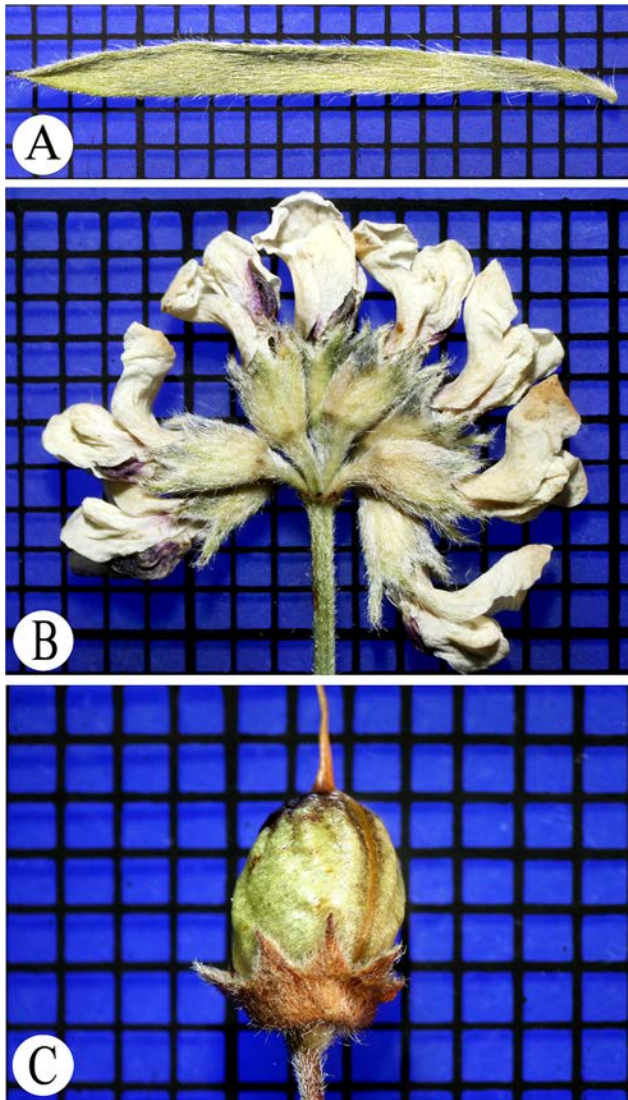


Fig. 2. *Dorycnium haussknechtii*: A – leaflet of upper leaves; B – inflorescence; C – legume.

Key to the Bulgarian species of *Dorycnium*

1. Flowers pale-yellow to cream; legume cylindrical, 25–40 mm long
..... *D. strictum* (Fisch. & C.A. Mey.) Lassen.
- 1*. Flowers white or partly tinged with pale-purple; legume globular to short ellipsoid, shorter than 10 mm 2.
2. Leaves with short rachis; legume short ellipsoid, 5–9 mm long *D. graecum* (L.) Ser.
- 2*. Leaves sessile; legume globular, shorter than 5 mm 3.
3. Plants glaucous, with erect stems and branches; stems and leaves with dense appressed sericeous hairs; leaflets of upper leaves linear-oblongate,

up to 2 mm wide, acuminate; calyx teeth slightly shorter or almost twice shorter than tube, wide triangular; inflorescence a subcapitate umbel, few-flowered, with (2–)5–10(–15) flowers
..... *D. haussknechtii* Boiss.

- 3*. Plants green, with \pm ascending stems and branches; stems and leaves with non-sericeous, appressed, subpatent to patent hairs; leaflets of upper leaves oblong-oblongate to oblong-obovate, 2–6 mm wide, acute to subobtuse; calyx teeth 2–3 times shorter than tube, narrowly triangular; inflorescence a dense capitulum, with 15–30 flowers 4.
4. Leaflets of upper leaves oblong-oblongate, 2–4 mm wide, with appressed to subpatent \pm dense hairs *D. germanicum* (Grenli) Rikli
- 4*. Leaflets of upper leaves oblong-obovate, 2–6 mm wide, patent-pubescent, with sparse crisped hairs *D. herbaceum* Vill.

Distribution

Dorycnium haussknechtii was found in a single locality in Bulgaria, in the southernmost part of Mt Sakar, on the Kurtkaya Hill (Wolf Rock), between Sladun and Varnik villages, Svilengrad district (Fig. 4). It was situated *ca.* 3 km off the Bulgarian-Turkish border, but so far the species has not been reported for the European part of Turkey.

Demiriz (1970) recorded *D. haussknechtii* (sub *D. pentaphyllum* subsp. *haussknechtii*) as an endemic species for Turkey, widespread in southern Anatolia, while according to Euro+Med Plantbase, it occurs also in Syria (ILDIS World Database of Legumes 2010).

Habitat and population

Dorycnium haussknechtii grows in calcareous dry grassy communities belonging to the habitat type 6210 Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia), according to the EU Habitats Directive, 92/43/EEC (1992). The habitat classification according to EUNIS is E1.4344 Helleno-Balkan andropogonid grass steppes (EUNIS 2007). These communities are composed mainly of *Poaceae* species, such as: *Chrysopogon gryllus*, *Bothriochloa ischaemum*, *Dactylis glomerata*, *Festuca valesiaca*, *Stipa capillata*,



Fig. 3. Lectotype of *Dorycnium haussknechtii* (G-BOIS 00330336) in the Herbarium of Conservatoire et Jardin botaniques Genève, Switzerland.

Triticum boeoticum etc. Co-occurring species: *Agrimonia eupatoria*, *Carex flacca*, *Centaurea thracica*, *Convolvulus cantabrica*, *Dorycnium herbaceum*, *Euphorbia apios*, *Knautia arvensis*, *Ononis arvensis*, *Sanguisorba minor*, *Scabiosa triniifolia*, *Sideritis montana*, *Stachys obliqua*, *Teucrium chamaedrys*, *T. polium*, *Xeranthemum cylindraceum*, etc.

The population of *D. haussknechtii* occupied an area of about 3 ha, with inclination 0–5° and south-southeast

exposition, in the central part of the Kurtkaya Hill. It consists of 5–6 patches, each with an area of 10 to 50 m² and high density. The total number of individuals is approximately 1000. There was a potential threat of having the place where the species was found ploughed up because of the flat terrain, easy access to hill ridge and favorable soil conditions. This urgently calls for declaring the site a protected area and including *D. haussknechtii* in the Bulgarian Biodiversity Act.

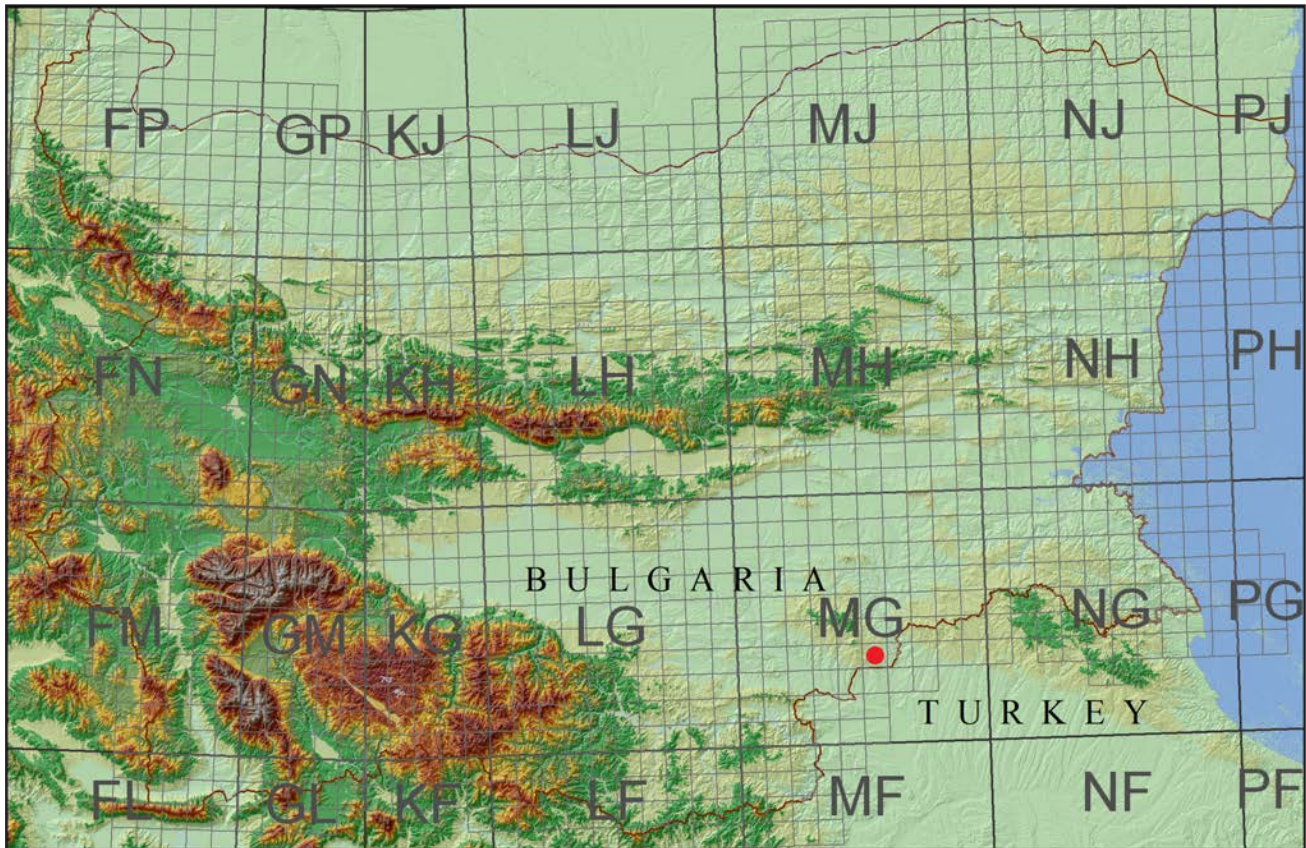


Fig. 4. Distribution map (10×10 km UTM squares) of *Dorycnium haussknechtii* (red solid circle) in Bulgaria.

Appendix. List of *specimina visa*

Specimens collected by the authors: Bulgaria. Mt Sakar: between Sladun and Varnik villages, Svilengrad district, in calcareous dry grassy places on the flat ridge of Kurtkaya Hill, 175 m, 41.85293°N, 26.48869°E, 22.06.2018, *Marinov & Stoyanov* (SOM 176471–176474); *loc. ibid.*, 41.85160°N, 26.48887°E, 03.07.2018, *Marinov & Stoyanov* (SOM 176475, 176476); *loc. ibid.*, 41.85098°N, 26.48923°E, 03.07.2018, *Marinov & Stoyanov* (SOM 176477).

Examined specimens for comparison: Turkey. Prov. Musch (Muş), ad radices australes Bimgoell (Bingöl) montis ad Gungum (Gümğüm) in districtu Wardo (Varto) lectae, in solo pingui ad Gungum versus montes, 16.08.1859, *Kotschy 544* (isolectotypes – BM 000901232, photo!; G 00380817, photo!; K 000880947, 000880948 photos!; P 02732027, 02732028, photos!); Prov. Gaziantep, Soff Dagh (Suf Dağı), in graminosis, 27.06.1865, *Haussknecht* (syntypes – BM 000901233, photo!; G-BOIS 00330335, photo!; K 000880949, photo!); Prov. Şırnak, district Ramorân Kurdistan

mediae, ad septentrionale de Ğeziret-ibn-Ômar (Cizre), ad radices montis Halakur-Dagh (Herekol Dağı) australes, in *Quercetis aridis*, 27.06.1910, *Nábělek* (SAV 0002579, photo!, Europeana collections); Prov. Hatay, sur le versant méridional du Kizil Dagh (Kızıldağ), 12.05.1939, *Dubertret* (P 02732030, photo!); **Syria.** Prov. Latakia, Slenfé (Slunfeh), 10.07.1937, *Louis* (P 02732024, 02732026, 02890431, 02890432, photos!); Prov. Aleppo, Petit Jebel Smân, 15.05.1939, *Gombault 4037* (P 02732029, photo!).

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