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Centaurea nemoralis and *C. nigra*, two recurrently introduced but often overlooked neophytes of the Austrian flora

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Abstract: *Centaurea nigra* agg. has been documented from at least ten localities in Austria. Two taxa of this aggregate were found: *C. nemoralis* (exclusively historical occurrences in Vienna, Styria and Carinthia, both historical occurrences and one recent occurrence in Lower Austria) and *C. nigra* s. str. (only one historical occurrence in Vienna), with some populations combining morphological characters of both. *Centaurea nemoralis* collected in 1931 is published here as new for the historical alien flora of Carinthia. At some sites, *C. nemoralis* became locally established and was collected repeatedly over up to 35 years. Hybrids between *C. jacea* and *C. nigra* agg. were found at four sites, at one of which this hybrid occurs even nowadays without *C. nigra* agg. Morphological characters and the determination of both taxa and the hybrids are discussed.

Key words: *Centaurea nigra*; flora of Austria; neophyte; distribution; hybridization

Zusammenfassung: ***Centaurea nemoralis* und *C. nigra*, zwei immer wieder eingeschleppte, aber häufig übersehene Neophyten der österreichischen Flora**
Centaurea nigra agg. ist aus Österreich von mindestens zehn Stellen dokumentiert. Zwei Taxa dieses Aggregates konnten gefunden werden: *C. nemoralis* (historische Vorkommen in Wien, der Steiermark und Kärnten, historische und rezente Vorkommen in Niederösterreich) und *C. nigra* s. str. (nur ein historisches Vorkommen in Wien), wobei in manchen Populationen morphologische Charaktereigenschaften von beiden Sippen auftreten. Eine *C. nemoralis*-Aufsammlung aus dem Jahr 1931 wird hier als neu für die historische Adventivflora Kärntens publiziert. An manchen Stellen konnte sich *C. nemoralis* lokal etablieren und wurde mehrfach über eine Spanne von bis zu 35 Jahren gesammelt. Hybriden zwischen *C. jacea* und *C. nigra* agg. konnten an vier Stellen gefunden werden, wobei an einer die Hybride auch heute noch ohne *C. nigra* agg. vorkommt. Morphologische Charaktereigenschaften und die Bestimmung beider Taxa und der Hybriden werden diskutiert.

Introduction

Centaurea nigra agg. is a taxonomically intricate complex in *C.* sect. *Jacea*, which is native to western and south-western Europe (Dostál 1976). One to several taxa have been reported from Central European countries: native occurrence in Switzerland (Info Flora 2023) and western Germany (e. g. Müller & al. 2021, FloraWeb 2023), and adventive occurrence in the eastern part of Germany and in Czechia (e. g. Štěpánek & Koutecký 2004, Kaplan & al. 2017). From Austria, taxa of *C. nigra* agg. have been known since the mid to late 19th century. Reichardt (1861) published a voucher of

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C. nigra from the late Alois Putterlick (1810–1845) collected in the vicinity of Vienna, i. e. in Lower Austria. This collection, however, was not accepted by Neilreich (1868: III–V, 51), but later by Hayek (1901) and Janchen (1958). Halácsy (1896) published an ephemeral occurrence of *C. nigra* in the Viennese Prater. In his monograph of *Centaurea* in Austria-Hungary, Hayek (1901) accepted Putterlick's voucher from Lower Austria as *C. nemoralis*, added a new locality of *C. nemoralis* near Vorau in Styria collected by himself, and accepted the Viennese collection of E. Halácsy from the Ausstellungsplatz as *C. nigra* s. str. These three localities were repeated in floras of the 20th century under *C. nigra* (Hegi 1928–1929) or *C. nemoralis* (Janchen 1958). Later, another site was found between Eichgraben und Rekawinkel in Lower Austria and published under the name *C. debeauxii* (Janchen & Neumayer 1942), and accepted in Janchen (1958). In a list of accompanying species, Melzer (1971) published a record of *C. nigra* s. lat. from a former railway site in Straßhof an der Nordbahn (Lower Austria), stating that it likely belongs to subsp. *debeauxii*. However, this record, published *inter alia*, has been overlooked in the floristic literature. Following Gutermann & Niklfeld (1973), Walter & al. (2002) listed the three historic records from Prater (Vienna), Vorau (Styria), and Eichgraben–Rekawinkel (Lower Austria) under *C. nigra* s. lat. and treated this casual species as missing for the alien flora of Austria due to the lack of (then) recent observations. As historic records of alien species are not necessarily listed in the three



Fig. 1: Involucres of members of *Centaurea nigra* agg. and its hybrids. **Left:** *C. nigra* (Czechia, Šumava Mts, Hojsova Stráž-Brčálník). Photo: P. Koutecký. **Middle:** *C. nemoralis* (Belgium, De Panne, De Westhoek nature reserve). Photo: A. Vydrová. **Right:** hybrid *C. jacea* × *C. nemoralis* (Belgium, Tielen). Photo: P. Koutecký. — **Abb. 1:** Hüllen (Involukra) der Sippen aus dem *Centaurea nigra* agg. und seiner Hybriden. **Rechts:** *C. nigra* (Tschechien, Böhmerwald, Hojsova Stráž-Brčálník). Foto: P. Koutecký. **Mitte:** *C. nemoralis* (Belgien, De Panne, Naturschutzgebiet De Westhoek). Foto: A. Vydrová. **Rechts:** Hybride *C. jacea* × *C. nemoralis* (Belgien, Tielen). Photo: P. Koutecký.

editions of the Austrian "Exkursionsflora" (e. g. Fischer & al. 2008), *C. nigra* s. lat. is underrepresented in Austrian literature. To fill this gap, we provide a brief description of *C. nigra* agg. and an overview of the available records from Austria.

Centaurea nigra agg. can be defined based on the following characters (see, for instance, Dostál 1976, Koutecký 2019, Müller & al. 2021) (Figs. 1 and 2): **(1)** The appendages of the middle involucral bracts are dark brown or black, large, more than 5 mm long, and cover the green parts of the bracts; **(2)** the appendages have an ovate to lanceolate central part that is 2–3 mm wide and a regularly fimbriate margin with fimbriae (teeth) more than 3 mm long, the terminal fimbria being shorter than the lateral ones; **(3)** the appendages are laxly appressed to the involucre or slightly recurved but never strongly recurved for more than half of their length; **(4)** the radiating marginal florets are often absent; **(5)** a pappus is usually present, although short (<0.5 mm). The other Central European species and species groups of *C.* sect. *Jacea* differ as follows: *C. jacea* s. lat. has rounded, entire to toothed, brown appendages; *C. jacea* subsp. *macroptilon* (Borbás) Hayek and *C. jacea* subsp. *oxylepis* (Wimm. & Grab.) Hayek differ by narrowly triangular appendages that are moderately to strongly recurved, brown to light brown, with the terminal fimbria being much longer than the lateral ones; *C. nigrescens* agg. differs by very small appendages (<4 mm long) that do not fully cover the green parts of the involucral bracts; *C. phrygia* agg. is distinguished by appendages that are narrowly lanceolate to linear and narrowed into a strongly recurved acumen. All taxa lack a pappus except for *C. phrygia* agg. where a pappus usually up to 1 mm long is present. Absence of radiating marginal flowers is a characteristic feature of *C. nigra* agg.; however, in some populations and individuals the radiating flowers are present. Hybrids between *C. jacea* s. lat. and the other taxa of the section can resemble *C. nigra* agg. in the overall shape of the appendages and short pappus, but they are distinguished



Fig. 2: Appendages of middle involucral bracts of *Centaurea nigra* **(left)**, *C. nemoralis* **(middle)** and the hybrid *C. jacea* × *C. nemoralis* **(right)**. Scale bars: 3 mm. N. B.: the deep splits in the appendage of the hybrid is an artefact resulting from pressing the originally slightly bent appendage. — **Abb. 2:** Hüllblattanhängsel der mittleren Involukralblätter von *Centaurea nigra* **(links)**, *C. nemoralis* **(Mitte)** und der Hybride *C. jacea* × *C. nemoralis* **(rechts)**. Maßstab: 3 mm. N. B: Die tiefen Einschnitte des Hüllblattanhängsels der Hybride sind ein Artefakt des Herbarpressvorgangs: Das Hüllblattanhängsel war ursprünglich leicht gebogen.

by irregular fimbriae that are of different length on one appendage and often connected in their basal parts in groups (Fig. 2)

The taxonomic classification of *Centaurea nigra* agg. is intricate. However, most literature sources agree in recognizing two widespread taxa, *C. nigra* L. s. str. (= *C. nigra* L. subsp. *nigra*) and *C. nemoralis* Jord. (= *C. nigra* subsp. *nemoralis* (Jord.) Gremli, C. *debeauxii* subsp. *nemoralis* (Jord.) Dostál), and several species or subspecies confined to France and the Iberian Peninsula (e. g. Devesa & al. 2014, Tison & Foucalt 2014, Stace 2019, Müller & al. 2021). *Centaurea nigra* s. str. is characterized by globose (i. e. about as long as wide) involucres more than 15 mm wide; dark brown to black appendages with ovate central parts and fimbriae that are about as long as the diameter of the central part; pappus present. *Centaurea nemoralis* has ovoid (distinctly longer than wide) involucres 10–14 mm wide; brown appendages with lanceolate central parts and fimbriae that are longer than the diameter of the central part; pappus absent or very short. Different degrees of branching of the stems (low vs. high, respectively) and thickening of the branches and capitula (present vs. absent, respectively) are also reported in the keys but these characters seem to be of little use: branching is much influenced by the growth of the plants (early-growing plants and plants resprouting after mowing are usually less branched), and a certain degree of thickening of the branches is observed in most specimens. The diagnostic value of other characters such as leaf width and division and presence of radiating flowers is unclear; in general, *C. nigra* tends to have wider and less divided leaves and the radiating marginal flowers are very short or absent, whereas the opposite is reported for *C. nemoralis.* However, occurrence of various intermediates between the two extreme types or plants combining the characters in various proportions are reported in the literature, even within a single population (e. g. Elkington & Middlefell 1972). Similarly, both diploids ($2n = 22$) and tetraploids ($2n = 44$) are reported for both taxa, and correlation with morphology is unclear; for records from Germany, see Paule & al. (2017). The whole *C. nigra* agg. requires taxonomic revision in its native range.

Hybridization is quite frequent in *Centaurea* sect. *Jacea* and seems to enlarge the variation observed within *C. nigra* agg. In Central Europe, populations of *C. nigra* agg. are particularly in contact with *C. jacea* L., which is the most widespread species of the section. Their hybrids are sometimes marked as *C.* ×*gerstlaueri* Erdner; however, the nomenclature of the hybrids is unresolved, especially when *C. nigra* s. str. and *C. nemoralis* are treated as different species. Hybrids within *C.* sect. *Jacea* are usually morphologically intermediate between the parents, although significant variation in the shape of the appendages of the involucral bracts can be observed even in the first generation (Koutecký & al. 2011). The hybrids between *C. nigra* agg. and *C. jacea* resemble the former in overall appearance (appendages of involucral bracts fimbriate, dark brown, the marginal radiating flowers sometimes absent), but the central part of the appendages is usually wider than in *C. nigra* agg. and the lateral fimbriae are irregularly developed, of different lengths, often basally connected to form groups (Fig. 2) (see also Marsden-Jones & Turrill 1954). Hybrids are at least partly fertile

and can produce backcrosses and advanced-generation hybrids that survive as half or full orphans or establish their own populations (Marsden-Jones & Turrill 1954). If characters of *C. jacea* prevail, such plants cannot be reliably distinguished from hybrids between other taxa, which look morphologically the same (such as *C. jacea* subsp. *jacea* × *C. jacea* subsp. *macroptilon*, which are widespread in Austria; Koutecký 2009). In *C.* sect. *Jacea*, differences in ploidy levels seem to be the main, if not the only, barrier to hybridization (Koutecký & al. 2011). Since *C. jacea* is mainly tetraploid in Central Europe (Koutecký & al. 2011), hybridization is likely to affect particularly tetraploid populations of *C. nigra* agg.

Methods

We revised *Centaurea nigra* agg. material from the herbaria GZU, LI, W and WU and the private herbarium of Walter Gutermann (1935–2023), deposited at the Department of Botany and Biodiversity Research, University of Vienna. A high-resolution scan of the voucher specimen from Vorau (Hayek 1901) was obtained from GB. Herbarium codes follow Index Herbariorum (Thiers 2023). Photos from the recent locality in Lower Austria are available on the iNaturalist website (https://www.inaturalist.org/); locality information was communicated by the collector. Localities of historical herbarium vouchers were transcribed and left largely unchanged. Unless indicated on the herbarium label, the quadrant of the floristic mapping scheme for Central Europe (Niklfeld 1971) has been added in square brackets.

The taxonomy and nomenclature of the *Centaurea nigra* agg. is complex and no modern and comprehensive reference work is available; therefore, we indicate nomenclatural authors in this paper where appropriate and list the most important synonyms. In other cases, we follow Fischer & al. (2008).

Results

Specimens of *Centaurea nigra* agg. from Austria are listed below, ordered by federal states, localities and collection dates.

Vienna

(1) Prater: Ausstellungsplatz

Centaurea nigra s. str.: In nemoribus Danubii Austr. inf. Prater von Wien [7764/3 or 7764/4]; June 1878: Eugen von Halacsy (WU-Hal-E 0125420), rev. P. Koutecký, 2016; originally determined as *C. nigra.*

Centaurea nigra s. str.: Prater [7764/3 or 7764/4]; 3 July 1881: Johann Wiesbaur (LI 80035, LI 80036, LI 80037), rev. P. Koutecký, 2022; originally determined as

C. nigra; only lateral branches (not the main stems), partly destroyed by insects; specimen on the right of LI 80037 seems to be introgressed by *C. jacea*.

Centaurea nigra s. str.: Prater bei Wien. Ausstellungsplatz [7764/3 or 7764/4]; 3 July 1881: Johann Wiesbaur (LI, ex Hb. M. Haselberger), rev. P. Koutecký, 2022; originally determined as *C. nigra*.

(2) Prater: Krieau

Centaurea nemoralis: Wien II: Prater, Krieau [7764/4]; 12 July 1911: Karl Ronniger (W 1965-5005), rev. P. Koutecký, 2016; originally determined as *Centaurea* sp.; might be slightly introgressed by *C. jacea* (appendages light brown, fimbriae slightly irregular).

Centaurea nemoralis: Wien II. Auf Wiesen in der Krieau im Prater [7764/4]; 4 July 1911: Ernst Korb (W 1954-7300, W 1954-7301), rev. P. Koutecký, 2016; originally determined as *C. nemoralis*.

Centaurea nemoralis: Auf Wiesen im Wiener Prater [7764/4]; 4 July 1911: [illegible collector's name] (W 1928-9204), rev. Petr Koutecký, 2016; originally determined as *C. nemoralis*; likely introgressed by *C. jacea*; two stamps are printed on the sheet, "Herb. E. Khek" and "Herbarium Louis Keller", but the collector's signature does not appear to belong to either of them.

Lower Austria

(1) Wienerwald

Centaurea nigra agg.: an Bergabhängen zwischen Gesträuchen um Wien; s. dat. [ca. 1832–1845]: Alois Putterlick (W), rev. P. Koutecký, 2016; originally determined as *C. nigra*; plant combining characters of *C. nigra* and *C. nemoralis*.

(2) Rekawinkel–Eichgraben

Centaurea nemoralis: Niederösterreich. Wienerwald. Am Bahndamm zwischen Rekawinkel und Eichgraben in ziemlicher Menge [7862/1]; 6 September 1931: Ernst Korb (W 1954-7369, W 1954-7378, W 1954-7379), rev. P. Koutecký, 2016; originally determined as *Centaurea* sp. or *C. nigra*.

Centaurea jacea × *C. nemoralis*: Niederösterreich. Wienerwald. Am Bahndamm zwischen Rekawinkel und Eichgraben in ziemlicher Menge [7862/1]; 6 September 1931: Ernst Korb (W 1954-7370), rev. P. Koutecký, 2016; originally determined as *Centaurea* sp.

Centaurea nemoralis: Niederösterreich. Wienerwald. Am Bahndamm zwischen Rekawinkel und Eichgraben noch in ziemlicher Menge [7862/1]; 2 September 1934: Ernst Korb (W 1954-7373, W 1954-7374), rev. P. Koutecký, 2016; originally determined as *C. nemoralis*; might be slightly introgressed by *C. jacea*.

Centaurea nemoralis: Niederösterreich. Zwischen Wien und St. Pölten nahe von Eichgraben reichlich auf der Südböschung der Westbahn westlich von Rekawinkel [7862/1];

30 August 1966: Helmut Melzer (W 1967-7811, GZU 270650, GZU 270661, GZU 270664, LI 653663), rev. P. Koutecký, 2016 (W), 2021 (GZU), 2022 (LI); originally determined as *C. nigra* subsp. *debeauxii.*

(3) Achau

C. nemoralis: Niederösterreich. Auf der Viehweide von Achau [7964/1]; 30 August 1937: Ernst Korb (W 1956-2133, W 1956-2134), rev. P. Koutecký, 2022; originally determined as *C. nemoralis*; slightly introgressed by *C. jacea*.

(4) Straßhof an der Nordbahn

Centaurea nemoralis; Niederösterreich: Marchfeld, bei Straßhof [Straßhof an der Nordbahn] auf einer Schotterfläche, vormals Gleisanlagen [7665/4]; 21 June 1970: Helmut Melzer (LI 635675), rev. P. Koutecký, 2022; originally determined as *C. nigra* subsp. *nemoralis*, later changed to *C. debeauxii* subsp. *nemoralis.*

(5) Weidling (Klosterneuburg municipality)

Centaurea jacea × *C. nigra* agg.: Niederösterreich, Nördlicher Wienerwald: Weidling bei Klosterneuburg, 800 m ESE vom Haschhof, 16°17′30″E 48°17′40″N (7763/2); 290 msm; mäßig trockene Magerwiese in Nordostexposition, über kalkreichem Flyschsandstein; 20 July 1977: Harald Niklfeld (WU, 20 duplicates), rev. P. Koutecký, 2022; originally determined as *C. jacea* subsp. *subjacea*; both *C. nigra* and *C. nemoralis* are potential parental species, and the exact parental combination cannot be determined with certainty because only hybrid specimens are available from this population. In 2022, this hybrid population was confirmed in the field, but again no pure plants of *C. nigra* agg. were found.

Centaurea jacea × *C. nemoralis*: Niederösterreich, Wiener Wald, Weidling SW Klosterneuburg: Sonnseite des Buchberg-Rückens 500 m SW Kote 338 [ca. 16°17′07″E 48°17′34″N] (7763/2); ca. 290 msm; mäßig trockene Wiese in Obstgarten; 17 October 1982: W. Gutermann (Hb. Gutermann), rev. P. Koutecký, 2016.

Centaurea jacea × *C. nigra* agg.: Niederösterreich, Flysch-Wienerwald: Weidling bei Klosterneuburg, 800 m ESE Kompostieranlage Haschhof, zwischen Elisabethgasse und Schmaler Graben, 16°17′32.1″E 48°17′38.0″N (7763/2); 300 msm; mäßig trockene, nordostexponierte Magerwiese über kalkreichem Flyschsandstein, dominiert von *Centaurea jacea* × *C. nigra* agg.; gemeinsam mit *Centaurea scabiosa*, *Bromus erectus*, *Briza media*, *Carex montana*, *Crepis praemorsa*, *Peucedanum alsaticum*, *Colchicum autumnale* u. a.; 28 September 2022: Clemens Pachschwöll CP1144 (CBFS 10038, WU 0148566, WU 0148567, WU 0148568, WU 0148569).

(6) Haugschlag

Centaurea nemoralis: Niederösterreich, Waldviertel: Haugschlag, vicinity of the golf resort ca 1.1 km W of the village centre, 15°02′35.2″E, 48°59′47.3″N (7056/1); 672 msm; dry to periodically wet ruderalized shore of an artificial pond established in

2007; 7 September 2023: Norbert Sauberer (Hb. Sauberer), rev. P. Koutecký, 2023, from the photos available at https://www.inaturalist.org/observations/182355502.

Styria

Vorau

Centaurea nigra agg.: Auf einer Wiese an der Straße von Vorau zum Kreuzwirt, wohl durch Grassamen eingeschleppt [8660/2, 8661/1 or 8561/3]; 30 August 1894: August von Hayek (GB 13310), rev. P. Koutecký, 2022; originally determined as *C. nemoralis*; the specimen cannot be reliably determined because it is heavily damaged by insects, no leaves are left and only immature capitula are present; the shape of the appendages of the involucral bracts corresponds more to *C. nemoralis.*

Carinthia

Eisenkappel-Vellach

Centaurea nemoralis: Kärnten. Eisenkappel. Am Rande der Straße von Bad Vellach auf den Seebergsattel [9553/3]; 29 July 1931: Ernst Korb (W 1954-7376), rev. P. Koutecký, 2022; originally determined as *C. nemoralis*.

Centaurea jacea × *C. nemoralis*: Kärnten. Eisenkappel. An der Straße von Bad Vellach auf den Seebergsattel [9553/3]; 29 July 1931: Ernst Korb (W 1954-7368, W 1954-7375, W 1954-7377), rev. P. Koutecký, 2022; originally determined as *C. nemoralis.*

Discussion

Centaurea nigra agg. has been collected in Austria at ten sites, of which the exact location of Putterlick's collection is unclear. Collections from the Viennese Prater (Ausstellungsplatz and Krieau) seem to come from different populations (*C. nigra* s. str. and *C. nemoralis*, respectively, with a c. 30 year gap between the collections). In Austria, *C. nigra* agg. has been considered a casual alien with no recent occurrences (Walter & al. 2002), historically known from Vienna, Styria and Lower Austria. However, one recent occurrence has been found in Lower Austria in 2023. A new, hitherto unpublished historical record of *C. nemoralis* for Carinthia comes from along the road from Bad Vellach to the Seebergsattel, collected in 1931.

Since *Centaura nigra* agg. is a long-lived perennial and quite robust plant, it might become locally established or even naturalized. An example is the population of *C. nemoralis* along the railway near Rekawinkel in Lower Austria, which was collected repeatedly over 35 years from 1931 to 1966, but has not been found since (also not during a dedicated search by CP in 2022). Similarly, *C. nigra* s. str. was repeatedly collected in the Viennese Prater, 1878 and 1881, the introduction possibly dating back to the 1873 Vienna World's Fair. Locally established *C. nigra* agg. populations are also known from

Czechia, where detailed records are available (Wild & al. 2019, www.pladias.cz); there are at least two populations that were first collected in 1966 and are still extant: Hojsova Stráž–Brčálník (6845/4) and Rybniště (5153/1).

Morphological variation of the Austrian material is consistent with data from other Central European countries (e. g. Koutecký 2019, Müller & al. 2021). Both taxa recognized in *Centaura nigra* agg. were recorded, with *C. nemoralis* prevailing over *C. nigra* s. str., the latter only collected in the Viennese Prater at the end of the 19th century. Some populations could only be determined to the level of the aggregate because the voucher specimens are not well preserved or because they combine characters of both taxa. Hybrids with co-occurring *C. jacea* were recorded at four sites, whereas the population in Weidling (Lower Austria) consisted only of hybrids. The Weidling population is particularly interesting as a mass collection was undertaken by H. Niklfeld in 1977. In 2022, this hybrid population was confirmed, whereas the morphological variation was only slightly shifted towards *C. jacea* after 45 years. The population is tetraploid (estimated using flow cytometry, P. Koutecký, unpublished data), similarly to *C. jacea*. Introgressive hybridization obviously leads to persistent hybrid populations like that in Weidling, even when pure individuals of *C. nigra* agg. are already absent.

Some specimens originally determined as one of the members of *Centaurea nigra* agg. have been misidentified. Most often these belong to hybrids within *C. jacea* agg., i. e. hybrids between *C. jacea* subsp. *macroptilon* and other taxa. They resemble *C. nigra* agg. by only slightly recurved appendages of the involucral bracts that have broadly lanceolate, triangular or ovate central parts and fimbriate or toothed margins. However, unlike *C. nigra* agg., the fimbriae are usually shorter than the width of the central part, are irregularly developed (merged into groups of different length) and the longest fimbriae are found in the uppermost part of an appendage, with the terminal one longer than the lateral ones.

Besides *Centaurea nigra* and *C. nemoralis* (at various ranks), another name appears on herbarium labels and in the literature (e. g. Janchen & Neumayer 1942, Janchen 1958, Melzer 1971): *C. debeauxii* Godr. & Gren. (= *C. nigra* subsp. *debeauxii* (Godr. & Gren.) Gugler). This is probably because *C. nemoralis* is sometimes treated as a subspecies of *C. debeauxii* (e. g. in "Flora Europaea", Dostál 1976). *Centaurea debeauxii* s. str. is confined to south-western France and northern Spain and differs from both *C. nigra* and *C. nemoralis* by smaller capitula with involucres less than 12 mm in diameter (vs. 10–14 mm in *C. nemoralis* and more than 15 mm in *C. nigra*) and much smaller appendages with central parts being only 0.8–1.5 mm wide (vs. 1.5–3 mm) and with 6–13 fimbriae on each side (vs. 11–20; Dostál 1976, Devesa & al. 2014). It seems that all Central European records of *C. debeauxii* can be attributed to *C. nemoralis*. To our knowledge, the only exception is found in a flora of former Czechoslovakia by Dostál (1989), who lists both *C. nemoralis* and *C. debeauxii*, but for the latter no localities are specified and no voucher material exists; thus, this record of *C. debeauxii* for Czechoslovakia is most likely erroneous (Kaplan & al. 2017).

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