

***Carex* × *ligniciensis* Figert – new to the flora of Romania**RADOMÍR ŘEPKA^{1*}, JAN ŘEPKA² & MARTIN ČERMÁK¹¹ Department of Forest Botany, Dendrology and Geobiocenology, Faculty of Forestry and Wood Technology,
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ŘEPKA R. *et al.* 2024: *Carex* × *ligniciensis* Figert – new to the flora of Romania. *Acta Musei Moraviae, Scientiae biologicae* **109(1–2)**: 55–61. – In the herbarium material of Moravian Museum in Brno (BRNM) one specimen no. 230 was found in the series of ‘Cyperaceae, Juncaceae, Typhaceae et Sparganiaceae Hungaricae Exsiccatae’, originally identified as *Carex buekii*, which, after a detailed study, the authors of the article determined as *Carex* × *ligniciensis*. It is new nothospecies for the territory of Romania.

Keywords. *Cyperaceae*, sedge, section *Phacocystis*, hybridization

Introduction

Carex × *ligniciensis* Figert is a nothospecies resulting from hybridisation of *C. buekii* Wimm. and *C. nigra* (L.) Reichard, first found and described from Prussian Silesia (now Poland) (FIGERT 1900: 38). The name was recently typified by WIECŁAW *et al.* (2023). These authors also provide a list of the countries in which this sedge has been observed so far (Poland, Czechia, Italy; also see KOOPMAN 2022). However, occurrence of this hybrid in Romania had not been known, and it is listed neither in the basic botanical work Flora of Romania (ȘERBĂNESCU & NYÁRÁDY 1966) nor in several keys to the Romanian flora (BELDIE 1979, CIOCÂRLAN 2009, SÂRBU *et al.* 2013) or POWO (2024). The name of the taxon is not mentioned in the checklist of the Romanian flora (OPREA 2005) either.

While studying the species *Carex buekii* from territories outside Czechia, we found a specimen from the series (centuria) ‘Cyperaceae, Juncaceae, Typhaceae et Sparganiaceae Hungaricae Exsiccatae’ no. 230, originally designated as *C. buekii*, which was revised by us as *C. ×ligniciensis*.

Material and methods

The rich herbarium material of sedges was studied in the BRNM herbarium (abbreviations of herbarium collections according to THIERS 2024–). The found herbarium specimen was documented using camera Canon EOS RP with Canon RF 100–400 mm lens. We documented utricles of the hybrid and selected specimens of parental species from the below mentioned herbarium specimen using an Olympus SZX 7 stereomicroscope with a Canon EOS 1100 D camera. We attach an image of mature utricles of both parental species for comparison.



Fig. 1. *Carex* $\times$ *ligniciensis*, village of Reci, Romanian Transylvania (BRNM 236547).

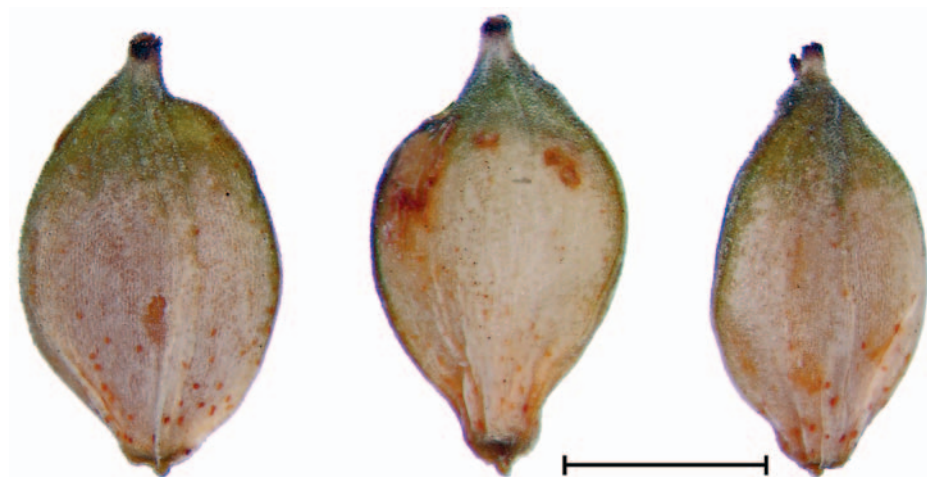


Fig. 2. Utricles of *Carex ×ligniciensis*, village of Reci, Romanian Transylvania, herbarium specimen BRNM 236547, scale bar = 1 mm.



Fig. 3. Utricles of *Carex buekii*, western margin of the city of Brno, southern Moravia (ŘEPKA 1984, BRNM 315072), scale bar = 1 mm.

Herbarium specimens studied

Carex ×ligniciensis: Com. Háromszék, ad ripas rivuli Beldipatak prope pagum Réty, sol. argill.-aren., alt. cca 500 m s. m., leg. J. ANDRASOVSKY, 20. 5. 1915 (BRNM 236547; Fig. 1) [in the series (centuria) 'Cyperaceae, Juncaceae, Typhaceae et Sparganiaceae Hungaricae Exsiccatae' no. 230 as *Carex buekii* Wimm.]. (whole plant). The site is

located in Romanian Transylvania, which belonged to the administration of the Austro-Hungarian Monarchy at the time the plant was collected, but currently part of the sovereign territory of Romania; the village is now named Reci and is situated in the county of Covasna.

Carex buekii: Southern Moravia, the town of Brno-Žabovřesky, banks of the Svatka river near the 1st Brno Engineering School (leg. ŘEPKA 1984, BRNM no. 315072) (utricles).

Carex nigra: Northern Moravia, distr. Jeseník, the village of Kobylá, forest meadow near the village (leg. ŘEPKA 1998, BRNM no. 817060); Southern Bohemia, distr. Třeboň, the village of Ponědrážka, Švarzenberk fishpond north of the village (leg. DOSTÁL 1954, PRC s. n.) (utricles).

Results

The plant of *Carex* $\times$ *ligniciensis* had the following characters:

- A tuft with a desiccating inflorescence in addition to two stems 52 and 50 cm long, respectively, with reddish brown, scaly basal sheaths, which are sparser than in *C. buekii*.
- The basal sheaths are relatively soft, short and at the main shoot base often only present as tiny shiny scales, lacking a distinct net. The base of the shoots also possesses grey elongated leaf-like sheaths, like those often present in the species *C. nigra*.
- The leaves are relatively broad, 8–10 mm wide when dry, green to grey-green, more similar to *C. buekii*.
- The inflorescences of the main tuft are 12 and 9.5 cm long, respectively, their structure rather resembling *C. buekii*, while the other inflorescence is very short. The lower bract is as long as the inflorescence, the lower spikelet is pedunculate and interrupted at the base as in *C. buekii*. The spikes are very slender, narrow, relatively small, the numbers of female spikes are 4 and 5, respectively, 12–45 mm long, the male spike is terminal, single (as in *C. nigra*). The spikes resemble *C. nigra* in their structure, but the female glumes and utricles are intermediate (see Fig. 2).
- The utricles of the hybrid are intermediate in shape and size between the two parental species (Figs. 2–5). The shape of the beak is rather similar to *C. buekii*, as is the number of papillae around the beak. Papillae are visible not only in the beak, but also in the entire upper half of the body of the utricle of *C. buekii*, while the hybrid and *C. nigra* have papillae all over the body of the utricle (Figs 2, 4, 5). In the hybrid, veins are rather visible in the lower part of the utricle (Fig. 2) in contrast to *C. buekii* (Fig. 3), which only has weak or no veins in the upper part, while *C. nigra* has veins over the entire length of the utricle body (Figs 4 and 5). The stipe of the utricle in the hybrid is intermediate between the two species.

Comment. The discovered herbarium specimen of *C.* $\times$ *ligniciensis* belongs to the nothoform morphologically closer to *C. buekii*, from which it differs mainly by weakly



Fig. 4. Utricles of *Carex nigra*, the Švarzenberk pond near the town of Třeboň, southern Bohemia (DOSTÁL 1954, PRC s. n.), scale bar = 1 mm.



Fig. 5. Utricles of *Carex nigra*, forest meadow near the village of Kobylá, northern Moravia (ŘEPKA 1998, BRNM 817060), scale bar = 1 mm.

developed scales lacking a net on the basal sheaths, smaller stem height (at maturity), shortened inflorescences, as well as shorter, very narrow female spikes, though interrupted at the base as in *C. buekii*. The glumes of female spikes occur in two shapes: the tops are pointed (as in *C. buekii*) or rounded (as is the case in *C. nigra*). The utricle of the hybrid contain mature achenes, and their size and shape is intermediate between the parental species (Fig. 2 and 3). A notable feature is the full fertility of the hybrid. However, hybrids in the *Phacocystis* section are often partially or completely fertile

(CAYOUEITE & CATLING 1992, JERMY *et al.* 2007). This contrasts with the report (KOOPMAN *et al.* 2018: 151) about Czech populations of *C. buekii* which are sterile or whose achenes ripen only in the lower female spikes, and moreover only on their bases. These populations require further study.

Although we have not personally visited the area around the village of Reci, there are several wet meadows which can still be noticed on satellite photographs (see <https://www.mapy.cz>). Here, both parent species could have met more than 100 years ago in the floodplain of the Râul Negru River. On the Virtual Herbaria website (<https://www.jacq.org>), a scan of one specimen of the same series Exsiccata no. 230 (PRC 407101) is available. Based on its examination, it is possible to state that the Exsiccate collection contained both the parental species *C. buekii* (see the above-mentioned specimen in PRC) and the hybrids of *C. ×ligniciensis*, which we found in the BRNM herbarium.

S o u h r n

Carex ×ligniciensis Figert – nový taxon pro květenu Rumunska

Carex ×ligniciensis Figert (= *C. buekii* Wimmer × *C. nigra* (L.) Reichard) byla mimo pruské Slezsko (nyní jižní Polsko), kde byla poprvé nalezena a posléze popsána, dosud známa jen z Česka a Itálie. Nález na území Rumunska nebyl dosud publikován. Při studiu materiálu *Carex buekii* v herbáři Moravského zemského muzea v Brně (BRNM) jsme našli doklad rozesílaný v rámci exsikátové sbírky Cyperaceae, Juncaceae, Typhaceae et Sparganiaceae Hungaricae Exsiccatae pod číslem 230. Na schedě jsou tyto údaje: „*Carex Buekii* Wimm., com. Háromszék, ad ripas rivuli Beldipatak prope pagum Réty, sol. argill.-aren., alt. cca 500 m s. m., leg. J. Andrasovszky, 20. 5. 1915” (BRNM 236547; obr. 1). Doklad byl sebrán na území Transylvánie v okolí obce Reci v župě Covasna. Po podrobném studiu této herbářové položky jsme došli k závěru, že se jedná o hybridní rostlinu, která patří *Carex ×ligniciensis*, k nothoformě morfologicky bližší *C. buekii*. Od tohoto rodičovského druhu se liší především slabě vyvinutými bazálními šupinovitými pochvami postrádajícími síťku, menší výškou stonku (ve zralosti jen 50–52 cm), zkráceným květenstvím (9–12 cm), stejně jako kratšími (12–45 mm) a nápadně úzkými samičími klásky. Vrcholový samčí klásek je jediný, jako u *C. nigra*. Klásky svojí strukturou připomínají *C. nigra*, samičí plevy a mošničky jsou naopak bližší *C. buekii*, avšak jejich vrcholy mohou být špičaté (jako u *C. buekii*) i zaoblené (jako je tomu u *C. nigra*). Mošničky křížence obsahují zralé nažky, jejichž velikost a tvar je intermediární mezi rodičovskými druhy. Pozoruhodným rysem je plná plodnost hybrida, oproti mošničkám *C. buekii*, které bývají sterilní, nebo jejíž nažky často dozrávají pouze na bázích spodních samičích klásků (situace v Česku).

Pro srovnání jsou k textu připojeny mikroskopické snímky mošniček všech 3 taxonů (obr. 2–5). Mošničky křížence tvarem a velikostí stojí mezi oběma rodičovskými druhy, tvar zobánku je spíše podobný *C. buekii*, stejně jako početnost papil v jeho okolí. Papily na povrchu mošničky *C. buekii* jsou viditelné nejen na zobánku, ale i v celé horní polovině těla mošničky, zatímco křížence a *C. nigra* mají papily po celém těle mošničky.

U křížence jsou žilky viditelné pouze ve spodní části mošničky, na rozdíl od mošniček *C. buekii*, která nemá na povrchu žádné žilky nebo jen slabě viditelné v horní části, zatímco *C. nigra* má žilky po celé délce těla mošničky. Morfologie stopky na bázi mošničky je přibližně mezi oběma rodičovskými druhy.

Na satelitních fotografiích místa nálezu u obce Reci (<https://www.google.com/maps>) jsou stále vidět mokřady a vlhké louky. Zde se oba rodičovské druhy mohly setkat v nivě řeky Râul Negru, obklopené horami s nadmořskou výškou 700–900 m. Je pravděpodobné, že do zmíněné centurie no. 230 mohly být sbírány jak rostliny rodičovského druhu *C. buekii*, tak i jedinci křížence *C. ×ligniciensis*.

References

- BELDIE, A. 1979: *Flora României Determinator. Ilustrat al Plantelor Vasculare. Vol. 2*. Editura Academiei R.S.R. București. 412 pp.
- CAYOUE, J. & CATLING, P.M. 1992: Hybridization in the genus *Carex* with special reference to North America. *The Botanical Review* **58**: 351–438.
- CIOCARLAN, V. 2009: *Flora ilustrată a României. Pteridophyta & Spermatophyta. Ed. 3*. Editura Ceres, Bucharest, 1141 pp.
- FIGERT, E. 1900: Botanische Mitteilungen aus Schlesien IV. *Allgemeine Botanische Zeitschrift für Systematik* **6**: 37–40.
- JERMY, A.C., SIMPSON, D.A., FOLEY, M.J.Y. & PORTER, M.S. 2007: *Sedges of the British Isles. Ed. 3. BSBI Handbook No. 1*. Botanical Society of the British Isles, London. 554 pp.
- KOOPMAN, J. 2022: *Carex Europaea. The Genus Carex L. (Cyperaceae) in Europe I. Accepted Names, Hybrids, Synonyms, Distribution, Chromosome Numbers, Ed. 3*. Margraf Publishers, Weikersheim, 808 pp.
- KOOPMAN, J., DAJOK, Z., WIĘCLAW, H., MARTINETTO, E., GRULICH, V., ŘEPKA, R. & JIMÉNEZ-MEJÍAS, P. 2018: Global distribution of *Carex buekii* (Cyperaceae) reappraised. *Phytotaxa* **358**(2): 139–161.
- OPREA, A. 2005: *Lista critică a plantelor vasculare din România*. Iași: Editura Universității “Alexandru Ioan Cuza”, Iasi, 668 pp.
- POWO 2023: *Plants of the World Online*. Facilitated by the Royal Botanic Gardens, Kew. <http://www.plantsoftheworldonline.org/> [Accessed 20 April 2024]
- SÂRBU, I., ȘTEFAN, N. & OPREA, A. 2013: *Plante vasculare din România. Determinator ilustrat de teren. Vol. 2*. Edit. Victor B Victor, București, 1326 pp.
- ȘERBĂNESCU, I. & NYÁRÁDY, E. I. 1966: *Carex* L. In: SĂVULESCU, T. (ed.): *Flora Republicii Socialiste România Vol. 11*. pp 690–848, Edit. Acad. Română, București.
- THIERS, B. 2024–: *Index Herbariorum: A Global Directory of Public Herbaria and Associated Staff*. New York Botanical Garden's Virtual Herbarium, continuously updated. <http://sweetgum.nybg.org/science/ih> (Accessed April 20, 2024)
- WIĘCLAW, H., ŘEPKA, R. & KOOPMAN, J. 2023: Lectotypification of two names of *Carex buekii* hybrids (Cyperaceae) and notes on their morphology, ecology and distribution. *PhytoKeys* **236**: 179–186.