

THE THIRD ADDITION TO THE SEDGE FLORA (*CAREX*, CYPERACEAE) OF THE CZECH REPUBLIC

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Abstract

The article presents three *Carex* nothospecies new to the flora of the Czech Republic found in 2024 directly in the field and through revision of specimens in the larger Czech herbaria. We found *Carex ×felixii* (= *C. acutiformis* × *C. elata*) at two localities and five more records by revising herbarium specimens. *Carex ×prahlia* (= *C. lasiocarpa* × *C. rostrata*) was found at three sites, and *Carex ×viadrina* (= *C. buekii* × *C. cespitosa*) is now also known from three localities. In addition, we publish here six more records of *Carex ×alluvialis*, a hitherto missing hybrid in the Czech Republic, which we found at two localities, while the other records are the result of a revision of herbarium specimens. The text of the article is accompanied by photographs of plants found in the field.

Keywords: sedges hybrids, *Carex ×felixii*, *Carex ×prahlia*, *Carex ×viadrina*, *Carex ×alluvialis*

INTRODUCTION

In 2024, after 14 long years of monk's work, the 9th volume of the comprehensive Flora of the Czech Republic was published. In this volume, the Cyperaceae family and particularly species of the rich *Carex* genus occupy an honourable position (Štěpánková *et al.*, 2024). This extensive last volume includes basic information on 87 sedge species and five heterotypic subspecies. In addition, 36 confirmed and documented interspecific hybrids from the territory of the Czech Republic are listed here. However, another 49 undocumented, assumed or incorrectly identified *Carex* hybrids from this territory must be added (Grulich *et al.*, 2024). Based on further study and field research, several hybrids from this last group can be newly considered as documented and confirmed for our territory.

However, we must also note that our knowledge of the genus *Carex* in the Czech Republic is constantly increasing, and further studies in the field and in herbaria are yielding new results. During the proofreading of the aforementioned book, none of the new findings could be added to the text, therefore

these additions will be published in a series of articles. In the first two parts of the additions to the Flora of Czech Republic Vol. 9, which were titled differently from this one, we published finds of *Carex* hybrids new to the Czech Republic. The first part included three new hybrids recognised in the field and herbaria, namely *Carex ×alluvialis*, *C. ×helenae*, and *C. ×ploegii* (Řepka, 2024). In the second part, detailed information on *Carex ×sooi* in the Czech Republic was published (Řepka *et al.*, 2024).

This article, which can be considered as the third part of the addition series, aims to publish another three interspecific *Carex* hybrids newly found in the Czech Republic both in the field and by study of specimens in the larger Czech herbaria during the last year of our work. Moreover, this article publishes the find of another nothospecies, which had been considered extinct from the Czech landscape.

MATERIALS AND METHODS

In the field. For field excursions in 2024, several sites rich in sedges (wetlands, wet meadows, fens, and peatlands) where species frequently involved



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in hybridization were selected. At some of these localities, hybrids new to the Czech territory were found. The iNaturalist project (www.inaturalist.org) was also used for inventions regarding the findings of sedge plants suspected of hybridization from various parts of our territory. Rich herbarium material was collected at natural sites and deposited in BRNL (Herbarium of the Dept. of Forest Botany, Dendrology and Geobiocoenology, Mendel University, Brno). The identified material was thoroughly studied, and the results are presented in the following text.

In herbaria. Specimens of species frequently involved in hybridization in the larger Czech herbaria were studied (BRNM, BRNU, PR, PRC, see NYBG, 2024). If suspected hybrid specimens were found, they were added separately to our field records and located. Morphological descriptions based on our finds as well as taxonomic notes in the chapter Discussion are attached to all new nothospecies (in the intentions of the Flora of the Czech Republic Vol. 9).

Herbarium labels originally written in Czech were translated into English, and the localities were georeferenced with GPS coordinates (WGS-84). Collection dates are given in the format YYYY-MM-DD.

RESULTS

In the following text, newly found and distinguished nothospecies for the territory of the Czech Republic are listed alphabetically. Except for *C. ×alluvialis* Figert, these taxa had not yet been found here.

1. *Carex ×felixii* L.C. Lambert, Bull. Acad. Int. Géorg. Bot. 16 (205–206): VII, 1906. [= *C. acutiformis* Ehrh. × *C. elata* All.]

Type

Original herbarium material of L.C. Lambert useable for typification is deposited in the P herbarium (Muséum national d'Histoire naturelle, Paris, France, see GBIF 2024).

Description

Plant forming loose tussocks with rather short creeping rhizome (up to 10 cm long). Basal sheaths scaly (shiny) or freely passing into leaf blades (matt), straw coloured or greyish to slightly reddish coloured. Scales of new shoots 2.5–4.0 cm long, light red or reddish orange. Stems 60–100(–110) cm long, smooth or rough under inflorescence only, obtusely triangular below, sharply rough above, leafy in lower part. Stem leaves with 11–38 cm long blades, greyish green above, grey beneath, often with reddish sheaths and sometimes a light brown net at margin. Leaves of sterile shoots 70–90 cm long, 6.0–9.5 mm wide, concolorous with stem leaves, smooth or rough beneath, with prolonged tip, keeled or plicate in cross-section, with prominent rough keel on underside. Inflorescence

(9–)12–16(–20) cm long, with 1(–2) male spikes at top, 2(–3) female spikes below. Bract shorter than inflorescence (up to 50%–75% of its length), as long as or slightly exceeding inflorescence, exceptionally significantly longer than inflorescence (up to 33% of its length), leaf-like, (7–)9–15(–24) cm long. Male spikes 1(–2), linear to narrowly fusiform, (12–)25–42(–63) × 4.0–5.5 mm, with rather long peduncle; scales oblong to lanceolate, brown with rounded tip, with narrow pale median stripe, sometimes with whitish membranous margin in upper part, 3.8–4.8 mm long. Female spikes 2(–3), short oval to oblong (cylindrical), shape intermediate between both parent species, straight, erect, sessile or lower one shortly pedunculate (up to 18 mm), (7–)15–31(–40) × (4–)5–6.5(–8) mm, rarely a minor proportion of male flowers at top of the highest spike, brown or greyish brown, upper ones supported by short bracts. Scales of female spikes reddish brown or darker, lanceolate or ovate-lanceolate with elongated tip, but mostly only pointed, with a narrow pale median stripe, shorter than utricles (then reaching half the length of the utricles or up to the base of the beak), or if with a long sword-like tip, reaching the top of the beak, 2.3–3.8 mm long. Utricles resembling *C. acutiformis*, but often wider, ovoid, almost biconvex, with 5–6 prominent veins in abaxial part, 3.2–3.8 mm long, with peduncle 1.5–2.0 mm long at base, grey-green, later grey to brown, abruptly tapering into 2–3 mm long beak with sharp teeth, or truncate with two small blunt teeth at apex. Utricles empty, with unripe dwarf achene. Stigmas 2 and 3 in one spike (Fig. 1).

Locations

Field records

- 1.1 Nymburk Distr., Lysá nad Labem, Hrabanovská černava Nature Reserve, sedge wetland along southern margin, 1.33 km N of Augustinian Monastery, 186 m a.s.l., GPS: 50°12'51.0"N, 14°49'58.8"E (2024-05-08, coll. R. Řepka, BRNL s.n.).
- 1.2 Nymburk Distr., Lysá nad Labem, Hrabanovská černava Nature Reserve, wetland with stagnant water near the dam, 10–50 m NNE of stream outlet, 1.4–1.45 km NNW of Augustinian Monastery, 186 m a.s.l., GPS: 50°12'50.9"N, 14°49'36.7"E (2024-05-08, coll. R. Řepka, BRNL s.n.).
- 1.3 Nymburk Distr., Lysá nad Labem, Hrabanovská černava Nature Reserve, peat wetland in northern part, 1.8 km NNE of Augustinian Monastery, 186 m a.s.l., GPS: 50°13'6.5"N, 14°50'18.7"E (2024-05-08, coll. R. Řepka, BRNL s.n.).
- 1.4 Pardubice Distr., village of Lázně Bohdaneč, peat wetland on NE bank of Matka pond, 1.458 km SW of crossroads in the village of Dolany, 220 m a.s.l., GPS: 50°5'58.3"N, 15°40'30.7"E (2024-04-27, coll. R. Řepka, BRNL s.n.).

Herbarium records

- 1.5 Bohemia meridionalis, Haklovy Dvory, peat meadows called Na Černýši (1933-06-05, coll. B. Jílek, PR no. 19519).
- 1.6 Bohemia centralis: Polabí, fen meadows near the village of Čečelice (1926-06-04, coll. B. Jílek, PR no. 19507).
- 1.7 Bohemia, village of Liblice (1892-06-26, coll. F. Czapek, PR no. 2058).
- 1.8 Bohemia centralis: in Hrabanov peatbog near the town of Lysá nad Labem, 180 m a.s.l. (1932-06-04, coll. J. Dostál 8108, PRC s.n.).
- 1.9 Jičín Distr., village of Boháňka, wet forest meadow in Jestřábek stream valley, 750 m NNE of the village, 300 m a.s.l., GPS: 50°22'19.4"N, 15°42'51.7"E (2024-06-14, coll. Z. Kaplan, herbarium Kaplan no. 24/70).



1: *Carex ×felixii* at southern margin of Hrabanovská černava Nature

**2. *Carex ×prahlia* Junge, Verh. Naturwiss. Vereins Hamburg 3 (14): 118, 1906.
[= *C. lasiocarpa* Ehrh. × *C. rostrata* Stokes]**

Type

Herbarium material of E. Figert useable for typification of this name is highly probably deposited in the Herbarium Senckenbergianum in Görlitz, Germany (GLM) (see GBIF 2024).

Description

Plants rather resembling *C. rostrata*. Rhizomes creeping, up to 15–20 cm long. Stems obtusely triangular to rounded in cross-section, completely smooth or sometimes weakly rough under inflorescence, (22–)32–53(–75) cm long, 4–7 mm thick at base, 0.7–1.3 mm thick above, slender, conspicuously erect, rigid. Basal sheaths mainly scaly, ash grey, becoming light brown to dark grey, burgundy to sharp red (bloody) at base of new shoots, higher ones with short blades or, in some plants, scaly sheaths completely absent, 30–120 mm long, mostly dull, in some plants shiny. Leaves of both sterile and fertile shoots conspicuously narrow, erect, fluted to almost flat in cross-section, 32–58 cm long and 2.5–4.0(–4.7) mm wide, markedly grooved beneath, often with anastomoses in lower half, smooth beneath, rough at margin only, grey green to green (in contrast to the grey in *C. rostrata*), tapering into a triangular elongated tip. Inflorescence straight, with 2(–3) male spikes at top and (1–)2(–4) female spikes below, axis rough, (86–)116–160(–210) mm long. In some plants, the lower node of inflorescence is shifted to the middle of the stem, where the lower spike is missing (Localities 2.1 and 2.2). Lower female spike supported by leafy bract 10–34(–41) cm long and 2.0–2.9 mm wide, pointing obliquely upward, exceeding the top of the inflorescence by 25%–33% of its length). Male spikes linear, 26.0–50.0 × 2.0–2.5 mm, erect, long pedunculate; scales lanceolate to ovate-lanceolate, pointed, reddish brown with narrow pale median stripe, sometimes with whitish hyaline margin at apex. Female spikes shortly cylindrical, usually dense but sometimes lax, sessile, erect, (10–)20–32(–46) × 6–9 mm, often with considerable proportion of male flowers at apex (up to half its length), only lower spike with 9–20 mm long peduncle. Female scales lanceolate with distinct tip, more often whitish hyaline along entire margin, with keeled pale central stripe, reddish brown to purple, almost reaching top of utricle or at least base of beak, or even shorter, i.e. extending to 2/3 of utricle length, 2.7–3.8(–4.2) mm long. Utricles resembling *C. rostrata*, ovoid, inflated, shiny or dull, with or without prominent veins, glabrous, 3.5–4.4 mm long and 1.8–2.6 mm wide, beak abruptly narrowed, 0.9–1.2 mm long, sharp beak teeth spreading to the sides, beaks pointing obliquely upward in spikes.



2: *Carex xprahlia* on peaty waterlogged clearing near southern bank of Břehyňský rybník pond near the town of Doksy, northern Bohemia

Plants with short hairs on the utricles recorded at Pančava (2.1) and Břehyně (2.2) localities only. Utricles mostly empty, soon turning yellow to brown when ripening, achenes ripening in lower female spikes in some plants, desiccating in other specimens. Ripe achenes obovoid, grey-green to light brown (Fig. 2).

Locations

- 2.1 Krkonoše Mts, Špindlerův Mlýn, mesotrophic W part of Pančava peatland, 400 m NNE of a site called „U Čtyř pánů“, 1,335 m a.s.l., GPS: 50°46'1.1"N, 15°32'17.2"E (2024-07-03, coll. R. Řepka and J. Řepka, BRNL s.n.).
- 2.2 Česká Lípa Distr., Doksy, Břehyňský rybník Nature Reserve, waterlogged peaty spruce forest admixed with pine near water channel flowing into SE bank of the pond, 1.27 km ENE of the Chapel of St Vavřinec in the settlement of Břehyně, 273 m a.s.l., GPS: 50°34'29.2"N, 14°42'37.5"E (2024-05-28, coll. R. Řepka and J. Řepka, BRNL s.n.).
- 2.3 Česká Lípa Distr., Doksy, Břehyňský rybník Nature Reserve, alder carr by channel near S bank of the pond, 570 m SE of the Chapel of St Vavřinec in the settlement of Břehyně, 273 m a.s.l., GPS: 50°34'17.9"N, 14°41'50.4"E (2024-05-28, coll. R. Řepka and J. Řepka, BRNL s.n.).
- 2.4 Šumava Mts, village of Bělá, mesotrophic peaty meadow below a strip of alder forest on Vltava floodplain margin, 670 m SSE of the village, 726 m a.s.l., GPS: 50°34'17.9"N, 14°41'50.4"E (2024-08-02, coll. R. Řepka, BRNL s.n.).

3. *Carex xviadrina* Figert, Allg. Bot. Z. Syst. 13: 3, 1907 [= *C. buekii* Wimm. × *C. cespitosa* L.]

Type

The name has not yet been typified and the place of deposition of a sample suitable for selection of type specimen is unknown.

Description

Plants forming hard tussocks. Stems 48–75 cm long, firm, pointing obliquely upward from the tussock, entirely sharply rough, sharply triangular in cross-section. Basal sheaths scaly, prominent, red-brown to dark brown (to blackish red), with a whitish net at the margins (but basal scale-like sheaths reddish brown with reddish brown net in plants closer to *C. buekii*), slightly shiny or shiny, (1.4–)2.9–5.5 cm long. Leaves of sterile shoots dark green when fresh, green above, grey-green beneath, stiff, rough, slightly deflexed after drying, keeled in cross section, 38–84 cm long and (2.6–)2.8–5.7(–6.0) mm wide. Leaf blade tip gradually elongated. Inflorescence 58–90 mm long, with 1(–3) male spikes at top, 2(–3) female spikes below. Male spikes linear to fusiform, 20–44 mm long, scales brownish dark red, oblanceolate, apex rounded or with blunt tip, sometimes with narrow whitish margin, 3.2–3.8 mm long, with narrow pale median stripe. Female spikes cylindrical, narrow, 18–40 mm long and 3–5 mm wide, sessile or more often lower female spike pedunculate (peduncle 4–14 mm long) and weakly interrupted at base, highest female spike with male part at top. Female scales ovate-lanceolate, black or dark brown, shorter than utricles, with wide median stripe. Inflorescence supported by variably long leafy bract, most often shorter than lower female spike, or slightly longer, less often reaching ½ inflorescence, or slightly exceeding it. Utricles resembles *C. buekii* (Locality 3.1 Plané loučky Nature Reserve), ovoid to elongated, 2.1–2.8 × 1.2–1.7 mm, without veins, biconvex (lenticular), greyish green, abruptly constricted into 1.5 mm long toothless beak. Achenes lenticular, almost round, light brown, ca 1.7 mm long. No achenes ripening at Locality 3.1, but about 50% of plants forming achenes at Locality 3.2 (Kačení louka Nature Reserve), though only 20% of them mature. On the date of collection, some plants had mature utricles, other plants had dry male or female spikes and did not form utricles at all (Fig. 4).



3: Inflorescence of *C. ×viadrina* at Plané loučky near the town of Olomouc



4: Habitat of *C. ×viadrina* in Plané loučky Nature Reserve (near Olomouc-Řepčín), growing here in the contact zone of populations of both parent species

Locations

- 3.1 Olomouc Distr., Olomouc-Řepčín, wet fen meadows in central part of the Plané loučky Nature Reserve, near Mlýnský potok stream, 0.965 km NE of Olomouc-Řepčín railway station, 214 m a.s.l., GPS: 49°37'20.8"N, 17°14'0.0"E ± 50 m (2024-05-04, coll. R. Řepka and J. Řepka, BRNL s.n.).
- 3.2 Olomouc Distr., Moravičany, margin of drying meadow in central and eastern part of Kačení louka Nature Reserve, 2.22–2.30 km ESE of Moravičany railway station, 244–245 m a.s.l. GPS: 49°45'2.8"N, 16°59'57.7"E and 49°45'4.2"N, 16°59'55.7"E (2024-05-01, coll. R. Řepka and J. Řepka, BRNL s.n.).
- 3.3 Svitavy Distr., village of Vranová Lhota, valley of Třebůvka river, wet meadow below road to Kozov, 1.35–1.39 km SE of the village church, 285 m a.s.l., GPS: 49°42'24.4"N, 16°49'53.8"E ± 50 m (2024-05-19, coll. R. Řepka and J. Řepka, BRNL s.n.).



5: Degraded habitat of *Carex* ×*viadrina* near the village of Vranová Lhota

4. Other localities of *Carex* ×*alluvialis* found in the Czech Republic

Carex ×*alluvialis*, a hybrid newly discovered for the Czech Republic, has been known from a single locality in this country, which is located near Záhlinice village in central Moravia (Řepka, 2024). In 2023 and 2024, the hybrid could not be found here by the authors of this paper. Thanks to further field research and study of herbarium specimens, we discovered other localities, which are listed below.

Field records

4.1 Distr. Olomouc, Moravičany, damp places in eastern part of Kačení louka Nature Reserve, 2.40 km ESE of Moravičany railway station, 245 m a.s.l., GPS: 49°45'5.0"N, 16°59'57.8"E (2024-05-01, coll. R. Řepka and J. Řepka, BRNL, s.n.) (Fig. 7).

This locality is a rather old fen on the margin of the Morava River floodplain with a surprising number of *Carex* hybrids. The rarest of them is *C. ×alluvialis*, which had been found only once and not found again to this day (see Řepka (2024)). In Locality 4.1 (Kačení louka Nature Reserve), this hybrid was abundantly represented (several dozen tussocks) in a hybrid swarm together with parent species *C. elata*. Unfortunately, the water regime of this locality is constantly deteriorating, and the hybrid, as well as other species, are gradually desiccating, dying and disappearing from the original community of wet fen meadows. This degradation has resulted in the expansion of nitrophytes and ruderal species from the surrounding, hence the site is severely threatened by the loss of species diversity. In addition to the mentioned rare hybrid,

C. ×allopepis, *C. ×csomadensis*, *C. ×prolixa*, and *C. ×viadrina* were also found here.

4.2 Pardubice Distr., village of Pohránov, in sparse alder forest on SW bank of Pohránovský rybník pond, 915 m SSW of village centre, 220 m a.s.l., GPS: 50°4'15.3"N, 15°44'26.1"E (2024-04-27, coll. R. Řepka, BRNL s.n.).

At the Locality 4.2 (Pohránovský rybník) this rare hybrid was found in just a single bunch (however, the long shore of the pond was not investigated thoroughly) together with *C. ×csomadensis*, *C. elata*, *C. ×sooi*, and *C. ×vratislaviensis*. At both Localities 4.1 (Kačení louka Nature Reserve) and 4.2 (Pohránovský rybník pond), we found plants of *C. ×alluvialis* that had prevailing morphological characters of *C. elata*. These hybrid plants had noticeably slender female spikes with a minor proportion of male flowers at the apex, bracts reaching the apex of the lower female spike or slightly exceeding it, and a lower female spike being conspicuously pedunculate, interrupted at the base, and even slightly pendulous in some inflorescences (Fig. 7).

Herbarium records

4.3 Olomouc: meadow near aqueduct (1942-05-31, coll. J. Otruba, PRC s.n.).

4.4 Olomouc: meadows near the village of Hlušovice, 220 m a.s.l. (1942-05-31, coll. J. Otruba, PRC s.n.).

4.5 Lysá [= Nymburk Distr., town of Lysá nad Labem] (1895, coll. J. Rohlena, PRC s.n.).

4.6 (4.6) Nymburk Distr., Ostrov, ditch along road from Blato to Úmyslovice (1997-06-02, coll. J. Rydlo, ROZ 72065, under *C. elata*).



6: Herbarium specimen of *Carex* ×*viadrina* from the locality near the village of Vranová Lhota (plants closer to *C. cespitosa*: elongated inflorescences, longer female spikes, the lower one being distinctly pedunculate, plants partially fertile; coll. R. Řepka and J. Řepka BRNL)



7: *Carex* ×*alluvialis* in Kačené louka Nature Reserve near the town of Moravičany

DISCUSSION

In the following text, morphological details given in the protologue, chorology and publication history from the Czech Republic of the nothospecies are discussed and confronted with our observations, in alphabetical order.

Carex ×felixii

There is almost no mention of this hybrid in the literature. It was described by L.C. Lambert from a site near the village of Avord, Cher Department (Centre-Val de Loire Region), central France, where it was found among both parental species. Lambert's original material shows a morphotype which is more similar to *C. elata* in vegetative characters, but its spikes is more reminiscent of *C. acutiformis* (e.g. L 1356392, MA 18454, P 01895053, see https://www.gbif.org/occurrence/gallery?taxon_key=2724982, GBIF, 2024). The protologue confirms more characters of parental species *C. elata* (Lambert, 1906).

The plants found by us at Locality 1.1 (Hrabanov) belong to the intermediate nothoform, but the length of the bract, the sessile, shorter female spikes, and the limited number of typical scaly sheaths at the stem base indicate influence of *C. elata*. In addition, they form laxer tufts including short projections, and we also observed pinkish (or orange) short, scaly basal sheaths (intermediate characters) in some plants. However, in the herbarium material, we found plants with vegetative characters (length and colour of leaves, lower sheath) closer to *C. acutiformis* (Locations 1.5, 1.6, 1.7). At Locations 1.1 and 1.4 where we found this hybrid, it grows in preserved (relict) fens, protected in a nature reserve. At Location 1.1 (Hrabanov), dozens of loose bunches were found in stagnant water, and at the other location (1.4 Lázně Bohdaneč) in a wetland with a water level (high) above the soil surface in a rather small polycormon near the bank of the Matka pond.

Outside of France, this hybrid has so far been found in Italy, Lithuania, and Latvia (Koopman, 2022). It is a new taxon for the Czech Republic, although its occurrence in the country was anticipated (see Dostál, 1989) but had not been found in the area or correctly identified in herbaria. It is likely that *C. ×felixii* will be found at more localities than we have recorded so far, as both parental species often grow together in peatland habitats. We can also confirm that both parental species need not be present at the site of the hybrid. The hybrid may be either sterile or partially fertile, and in the former case it survives at a site by clonal reproduction for a long time.

Carex ×prahljana

Carex ×prahljana was described from around the town of Haynau in Prussian/German Silesia (now Chojnów, Poland). The original description was published by E. Figert (1898), but the name in

hybrid formula only. When Junge (1906) added a binomial name and published it referring to Figert's description. Figert's description is quite detailed. When compared with our plants, we find similarities in the characters of the stems and basal sheaths. The width of the leaves is also the same compared to the protologue (2–4 mm) and the long, grey-green leaves of the sterile shoots are conspicuously rigidly erect and rise above the inflorescence. The bract in our plants reaches the inflorescence or even exceeds it. The most important are the features of the generative organs, which can again be considered as identical: female spikes 1–2(–3), lower shortly pedunculate, all of them cylindrical, yellow-green, later brownish. Male spikes 2, the upper one long, the lower one shorter, very narrow, light brown, darker when in flower. In Figert's protologue, the female glumes are lanceolate, shorter than the utricles, purplish brown with a broad pale median stripe, with a narrow whitish hyaline margin at the apex. The last feature does not agree with our plants. The features of utricles listed in the protologue are essential for identification: conical, suddenly narrowed into a slightly elongated, distinctive 2-toothed beak, yellow-green, later light brown, with 7 strongly prominent nerves on the outside, moderately hairy, inflated at the base. These utricle features suggest that the plants were mostly closer to *C. rostrata*, with the exception of the short hairs on the utricle surface. The characters correspond to the plants we found, but at 2 localities (2.1 Pančava and 2.2 Břehyně), where the plants were morphologically closer to *C. lasiocarpa*, hairs were observed on the surface of the utricles. In our plants, the height of the stems, the slenderness of the spikes, their colour, sterility, and the pedunculate lower female spikes agree well. The plants grow with both parents, and their morphology resembles both species. In the field, the colour of the basal sheaths (basal ones grey scaly and higher ones sharply blood-coloured) and the slender, rigid, upright stems with a very long pedunculate male spikelet are particularly striking. A distinctive feature of our plants is also the significant proportion of male flowers at the top of the female spikes (see Fig. 2).

Figert (1898) further mentions in his article that he found both parent species growing together at Pančava in the Krkonoše Mts, yet he was unable to confirm any hybrid of the two species there (we were successful in this regard in 2024). In 1892, he succeeded in doing so near the village of Reisicht in Silesia (now Rokitki, Poland). In a peaty place he found an intermediate form between the two parent species growing there, which looked like a slender form of *C. rostrata*. Upon closer observation he found the utricles to be hairy.

Junge (1906) found plants of *C. ×prahljana* at two localities in Holstein (Stormarn and Dithmarsche Districts, northern Germany). He stated that his plants differed from Figert's protologue: at the

former locality, the basal sheaths were brownish grey and not reddish brown, the number of male spikes was 4 instead of 2, the upper female spikes were shorter than the lower ones, the pointed female glumes were longer than the utricles, the female glumes corresponded in shape to the male ones, and the utricles were less hairy. These characters were observed in plants morphologically closer to *C. rostrata*. At the other location in Fiel-Nordhastedter Moor, the plants were closer to *C. lasiocarpa* (basal sheaths red to light red-brown, male spikes 1–2, lower and upper female spikes of \pm the same length). The cited article also mentions that R. Gross from Berlin collected plants in West Prussia morphologically identical to those found by P. Junge in Holstein.

Carex xprahlia has been reported from France, Germany, Poland, Slovakia, and Russia, and has also been found in Scandinavia (Norway, Sweden, Finland) (Koopman, 2022). In the Czech Republic, the discovery of this nothospecies at three localities means a new taxon for the country.

Carex xviadrina

This hybrid taxon was described from peat meadows in the floodplain of the Ohle River (now Oława) in Lower Silesia (wider surroundings of the city of Wrocław, Poland). The author of the protologue (Figert, 1907) mentions the find of several sterile clumps, but only one of them had a single fertile stem. According to Figert, the plant is well recognisable by its having characters from both parents, but when the author revisited the original locality, it was no longer found. This fact is confirmed by J. Koopman (pers. comm.), who was unsuccessful in his search for a herbarium specimen of this nothospecies in Polish and German herbaria. It is interesting to note that the name *viadrina* reflects the Latin name for the Oder River (Viadrus).

The set of morphological characters of the plants we found in the Czech Republic coincides more or less with the protologue. Morphologically intermediate plants were found at Locality 3.1 (Plané loučky Nature Reserve) in several clumps, having stems up to 60 cm high and a leaf width and

stem thickness intermediate between both parents (Fig. 3). The size of the spikes and the utricles shape lie between the two parents, but most utricles had dried up prematurely. The basal scaly sheaths were similar to those of *C. buekii*, but considerably smaller. Hybrids were found here in two places. The stands with the hybrid are partly mowed and the plants are currently not in danger of extinction (Fig. 4).

At Locality 3.2 (Kačení louka Nature Reserve), only a few clumps are present at two sites, which are very strongly threatened by permanent desiccation of the peat meadow, despite being included in a nature reserve in the Litovelské Pomoraví Protected Landscape Area. The morphotype found here rather belongs to a nothoform closer to *C. cespitosa*, similar to that at Locality 3.3 (Vranová Lhota).

At Locality 3.3, only a single morphologically intermediate cluster grew with a larger number of plants closer to *C. cespitosa*, in which the inflorescences and spikes were noticeably elongated, the lower spike pedunculated, in some plants nearly pendulous (Fig. 6). The utricles were drying, but some were ripening. The lower sheaths of these plants were noticeably elongated, scaly, and extremely dark coloured. This stand was accompanied by a rather large polycormon of *C. buekii*, and its margins touched the hybrid group with very narrow spikes and shortened inflorescences which did not mature. We believe this plant was already a product of hybridisation and morphologically closer to *C. buekii*. The plant community of this fen meadow is situated in a desiccating habitat significantly degraded and threatened by nitrophytes, hence there is a risk that this hybrid population goes extinct (Fig. 5).

Outside Poland, *Carex xviadrina* has so far only been found in Italy (Koopman, 2022). Koopman *et al.* (2018) reported that when searching for hybrids of *C. buekii* in the Odra River floodplain in southern Poland, this hybrid was again found with other hybrids (*C. xalluvialis*, *C. xvratislaviensis*). The discovery in the Czech Republic does not only mean a new taxon to our territory but represents also just one of three countries in Europe where this hybrid has been found.

CONCLUSION

In 2024, during an intensive floristic survey of selected localities, we found three *Carex* hybrids new to the Czech Republic. They are the following nothospecies: (1) *Carex xfelixii* [= *C. acutiformis* × *C. elata*] found in Hrabanovská černava Nature Reserve and Bohdanečský rybník and Matka pond Nature Reserve, (2) *C. xprahlia* [= *C. lasiocarpa* × *C. rostrata*] found at three localities (Břežný rybník pond, Pančavské rašeliniště peatbog, and alluvium of the Vltava River near the village of Nová Pec in the Šumava Mts), (3) *C. xviadrina* [= *C. buekii* × *C. cespitosa*] collected at three localities (Kačení louka and Plané loučky Nature Reserves, and alluvium of the Třebůvka River near the village of Vranová Lhota). The first of the mentioned hybrids is supplemented with revised herbarium specimens from the larger Czech herbaria. In addition, new finds of *C. xalluvialis*, both in the field and in herbaria, are added to these three new *Carex* nothospecies.

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