

# On the spread of the North American *Carex vulpinoidea* MICHX. (Cyperaceae) in Europe and particularly in Austria

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## Abstract

*Carex vulpinoidea* MICHX. (American Fox-sedge, Cyperaceae), an ephemeral alien plant (neophyte) of wet, usually disturbed habitats, native to North America, has recently been increasingly recorded in Western and Central Europe. It has been collected or reported from the following countries: Austria, Belgium, France, Germany, Great Britain, Italy, Liechtenstein, Netherlands, Poland, Romania, Russian Federation (Oblast Kaliningrad, eastern Prussia), Slovakia, Switzerland, and Ukraine. In Austria it was recorded from the federal states of Tyrol, Salzburg, Upper and Lower Austria, Styria, and Carinthia. A distribution map for Austria is included. A comprehensive overview of the European literature is given and herbarium specimens seen are cited.

**Key words:** *Carex vulpinoidea*, *C. moniezii*, American Fox-sedge, Cyperaceae, neophyte, neobiota, ephemeral alien plant, plant distribution, Flora of Austria.

## Zusammenfassung

*Carex vulpinoidea* MICHX. (Fuchssseggenähnliche Segge, Cyperaceae), eine ephemere, nordamerikanische Pflanze (Neophyt) feuchter, gewöhnlich gestörter Habitats, wird in letzter Zeit vermehrt aus West- und Mittel-Europa gemeldet. Mittlerweile wurde sie in folgenden Ländern gesammelt bzw. beobachtet: Belgien, Deutschland, Frankreich, Großbritannien, Italien, Liechtenstein, Niederlande, Österreich, Polen, Rumänien, Russische Föderation (Oblast Kaliningrad, Ostpreußen), Schweiz, Slowakei und der Ukraine. In Österreich tauchte sie in den folgenden Bundesländern auf: Tirol, Salzburg, Oberösterreich, Niederösterreich, Steiermark und Kärnten. Eine Verbreitungskarte für Österreich wird präsentiert. Ein umfassender Überblick der europäischen Literatur wird geboten und gesehene Herbarbelege werden zitiert.

## Introduction

*Carex vulpinoidea* MICHX. (American Fox-sedge) is placed within *Carex* subgenus *Vignea* (P.BEAUV.) KÜK. in section *Multiflorae* (J.CAREY) KÜK. According to MOHLENBROCK (1999), it is "one of the most widespread species of *Carex* in North America" It occurs in all but five states of the USA, in all southern states of Canada, and in the Mexican state Sonora (STANDLEY 2002). According to this author, section *Multiflorae* (which is not clearly distinguished from several other sections) comprises seven closely related species, namely *C. alma* L.H.BAILEY, *C. annectens* (E.P.BICKNELL) E.P.BICKNELL, *C. chihuahuensis* MACK., *C. densa* (L.H.BAILEY) L.H.BAILEY, *C. fissa* MACK., *C. triangularis* BOECKELER, and *C. vulpinoidea*. Judging from the identification key, the characters used to distinguish them seem to be quite insecure and unreliable and most likely some or all of these species represent just "kleinarten" (technical term used in German literature; = microspecies) within one large, variable species.

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According to STANDLEY (2002), *C. vulpinoidea* is quite variable and seems to be nearest related to *C. annectens* from which it is distinguished by "the flowering stems shorter than the leaves" (versus flowering stems longer), and "the pale brown, elliptic perigynia" with a beak  $\frac{1}{3}$ – $\frac{1}{2}$  of the length of the perigynium (versus perigynia orange-yellow, ovate to suborbicular with a beak only  $\frac{1}{3}$  as long). In comparison, *C. vulpinoidea* prefers wetter soils than the sister species.

*C. vulpinoidea* is, compared with the European sedges, most similar to *C. vulpina* L. and *C. otrubae* PODP., both of which are placed within section *Vulpinae* (HEUFF.) CHRIST. It has, however, thinner flowering stems, narrowly cylindrical, up to 10 cm long and 1.5 cm wide inflorescences, and smaller, 2–3.2 mm long perigynia (utracles). The membranous sheath fronts (velumentum) are markedly transversely rugose (cross-wrinkled) near the top (see fig. 43.77 in MEIJDEN 2005; BREITFELD et al. 2007), a feature which can only be seen in traces in *C. vulpina*. The proximal bracts are filiform (setaceous) and often much longer than the spikes, giving the inflorescences a somewhat bristly appearance. Identification keys are given, e.g., in POLAND & CLEMENT (2009), JÄGER & WERNER (2005), STANDLEY (2002), CHATER (1980), HESS & al. (1967), etc.

*C. vulpinoidea* has been introduced probably with fodder, as a seed contaminant or as a "wool casual" to Europe and to New Zealand as well (CLEMENT & FOSTER 1994, JERMY et al. 2007, JOHNSON 1998, STANDLEY 2002). In Europe it has been first discovered in the wild in 1856 in France (LAGRANGE 1857). According to NILSSON (1985), it has been also introduced to South Anatolia in Turkey, where it remained rare. He notes that the old references given for the Caucasian region may be also correct. KÜKENTHAL (1909) reported it from a páramo in Colombia. Expectations about the possible worldwide spread of the species in the future are presented in HENSEN et al. (2004–2011).

In Europe it is an ephemeral (casual) alien and has lately been increasingly recorded. According to many reports in literature, the findings usually consist of few or even single tussocks only, with the plants disappearing completely from the areas after a short time. Only few populations have been observed to be stable over the years.

It cannot be excluded that other kleinarten (microspecies) from section *Multiflorae* (see first paragraph) may have been also introduced to Europe and may be subsumed here under *C. vulpinoidea* due to their similarities. According to STANDLEY (2002), the proportion of the length of the flowering stems compared to that of the leaves is an important feature used to distinguish the species (see above). A photo taken from a living plant in the field (sent to me by F. Prosser from Italy, see below) shows very long flowering stems and apparently relatively short leaves! Very unfortunately, it was neither possible to see the herbarium specimens nor any photos of them. This collection needs further investigation.

According to STANDLEY (2002), *C. vulpinoidea* grows in America on "seasonally saturated or inundated soils in open habitats", in wet meadows, marshes, and was frequently found "as a weed in wet roadside ditches and fields" For habitats see also WENNERBERG (2004). In Europe it has been reported from similar, often disturbed places (e.g., CORPORAAL 1988, BIZOT et al. 2005, PILSL et al. 2008).

Drawings: e.g., BREITFELD et al. (2007), CLEMENT et al. (2005), MEIJDEN (2005: fig. 43.77), STANDLEY (2002), LANDOLT (2001), MOHLENBROCK (1999, 2005), HESS et al. (1967), ȘERBĂNESCU & NYÁRÁDY (1966).

**Color photos:** e.g., VERLOOVE (2012), KOOPMAN (2011), BOCHUMER BOTANISCHER VEREIN (2011), BANFI & GALASSO (2010), MEIEROTT (2008), BREITFELD et al. (2007), HILTY (2005–2012), BIZOT et al. (2005), AESCHIMANN et al. (2004), HAEUPLER & MUER (2000), SEBALD (1998). – Plenty of color photos are available in the Internet.

Note concerning the paragraphs "Specimens seen": data from herbarium labels are cited here in a standardized way. Additions to the label-data are given in brackets. The acronyms of herbaria are set according to THIERS (2012). – Abbreviations: n.s. = not seen; s.n. = without number; 2× = 2 sheets.

### *Carex vulpinoidea* in Europe

It has been recorded from the following countries (the listing of literature is most likely not complete):

**Belgium:** Marianne Pull was apparently the first to collect it in 1970 near Ostende. VERLOOVE (2012) found it in 2009 in Oostduinkerke. A new finding has recently been made between Moorsem and Aarschot (see <http://waarnemingen.be/waarneming/view/55290365> and <http://waarnemingen.be/waarneming/view/55844469>). According to BIZOT et al. (2005), the indication in the "Nouvelle Flore de la Belgique" (DE LANGHE et al. 1978 and subsequent editions) applies only to the nearby France.

Specimens seen: Ostende, Jul. 1970, **M. Pull s.n.** [W]; – Oostduinkerke, Hannecartbos (De Doolaege), 6 Aug. 2009, **F. Verloove 7704** [BR n.s. (dig. photo at: <http://www.br.fgov.be/RESEARCH/COLLECTIONS/HERBARIUM/detail.php?ID=473752>)].

**(Czech Republic):** According to Vít Grulich and Radek Řepka, it has to date not been found in the country (Jiří Danihelka via email, 29 March 2012) (see also PYŠEK 2003, and PYŠEK et al. 2002). As the species was found within the former Czechoslovakia in Slovakia only (DOSTÁL 1950, 1989, DOSTÁL & ČERVENKA 1992), KOOPMAN's (2011) indication is erroneous (compare also CHATER 1980).

**France:** *C. vulpinoidea* was first discovered in 1856 in France by Monsieur Moniez on the edges of ponds in Louhans (Saône-et Loire). Assuming that it belonged to a distinct entity, LAGRANGE (1857) described this collection under the name *C. moniezii* LAGRANGE. Erroneously, MAGNIER (1882) considered this taxon to represent the rare hybrid *C. vulpina* × *C. appropinquata*. POINSOT (1967) and BIZOT et al. (2005) compiled an overview of the spread of *C. vulpinoidea* in France. KÜKENTHAL (1909) saw specimens from the eastern and southern part of the country. TELA BOTANICA (2012) indicates it from the following regions in the north and east: Nord-Pas-de-Calais (department Nord), Lorraine (department Moselle), Bourgogne (Côte-d'Or and Saône-et-Loire), Franche-Comté (Jura), Rhône-Alpes (Ain, Haute-Savoie), and from Midi-Pyrénées (Tarn-et-Garonne) in the south. – Further literature: HUSNOT (1906); BOULY DE LESDAIN (1950): 1 new finding; JALLU (1969): 1 new finding; GUINOCHET & DE VILMORIN (1978); PROST (1989): 2 new findings; DUHAMEL (1998); RITZ & VERNIER (1999, 2001): 1 new finding; AESCHIMANN et al. (2004); BARDET et al. (2008): 3 records.

Specimens seen: Saône-et-Loire: bord d'un petit étang du terrain argileux de la plaine près de Bruailles, environs de Lauhans [= Louhans], 29 Jun. 1864 and 1 Jun. 1873, **Moniez s.n.** (F. Schultz, herb. norm., nov. ser. cent. 1, no. 162) [GZU n.s. (dig. photo), W 3×, WU 2×]; – same locality: end of Jun. 1864, **Lagrange s.n.** (F. Schultz, herb. norm., nov. ser. cent. 4, no. 364) [W]; – same locality: Jun. 1877, without collector

[W]; – same locality: au lieu dit le Moulin-des-Bois, Jun.–Jul. 1857–1881, **Moniez 145** [WU]; – Tarn-et-Garonne: ad ripas canalís inter "la Borde-Vieille" et "le Besson" prope "Lamagistère", Jun. 1898/1899, **E.J. Neyraut s.n.** (Herb. Norm. no. 3881) [W, WU 2×]; – same locality: 2 Jun. 1902, **E.J. Neyraut s.n.** [WU 2×].

**Germany**: Unfortunately, KÜKENTHAL (1909) did not indicate the date of collection of the specimens cited in his monograph. Therefore, it remains unclear when this species was first collected in the country. – Literature concerning the whole country: JÄGER & WERNER (2005); SCHULTZE-MOTEL (1967–1977); SUESSENGUTH (1939). – Schleswig-Holstein: KÜKENTHAL (1909); Stormarn near Hamburg; SUESSENGUTH (1939); – Mecklenburg-Vorpommern: HENKER & BERG (2006): 1 grid square; – Niedersachsen: ATLAS (2012): 2 grid squares; – Nordrhein-Westfalen: ABTS (1994): 1 finding; HAEUPLER et al. (2003): 6 grid squares; BOCHUMER BOTANISCHER VEREIN (2011): 1 finding; ATLAS (2012): 9 grid squares; – Rheinland-Pfalz: ATLAS (2012): 1–2 grid squares; – Saarland: ATLAS (2012): 1 grid square; – Hessen: SUESSENGUTH (1939); BUTTLER (2009); ATLAS (2012): 2 grid squares; – Thüringen: ATLAS (2012): 1 grid square; – Baden-Württemberg: KNEUCKER (1935); MÜLLER (1950); PHILIPPI (1971); SEBALD (1998) and WÖRZ et al. (2010): 5 grid squares; ATLAS (2012): 5–6 grid squares; – Bayern: VOLLMANN (1914); SCHÖNFELDER & BRESINSKY (1990): 6 grid squares; MEIEROTT (2008); DÖRR & LIPPERT (2001); GATTERER et al. (2003): 1 grid square; SCHEUERER & AHLMER (2003); BREITFELD et al. (2007): 1 finding; LIPPERT (2007): documented from 5 localities in the herbarium in Munich (M); AHLMER (2012): 6 grid squares; ATLAS (2012): 7 grid squares.

Specimen seen: Bayern, S München: Forstenrieder Park W Pullach im Isartal [bzw. E der Straße E-533], Parallelweg E Karolinengeräumt [= Forstweg], ca. 560 m, [7934/2 or 7934/4], Schotterböden, Holzabladepplatz im Fichtenforst, 28 Jul. 1995, **R. Karl s.n.** [Herb. Karl, W].

**Great Britain**: It has been first collected in the wild in 1880 in Surrey near London (LOUSLEY 1938, PRESTON et al. 2002). The latter indicate it for eleven 10-km squares on the map presented on CD-ROM. Six squares are situated in the south of England in the area between Gloucestershire, Hampshire and Kent; one square is in Yorkshire in Central England, and four squares are in North Ayrshire and in the Glasgow area in Scotland. JERMY et al. (2007) noted that it was "recorded from 10 vice-counties in England and Scotland" – Further literature: DUNN (1905); RYVES (1976); ANONYMOUS (1991: 435); CLEMENT & FOSTER (1994); SELL & MURRELL (1996); DICKSON et al. (2000); VERDCOURT (2000); CLEMENT et al. (2005).

**(Hungary)**: It has still not been detected and was not reported from the country as circumscribed today (Gergely Király via email, 29 March 2012). An old record applies to today's Slovakia (see there). KOOPMAN'S (2011) indication is, therefore, erroneous.

**Italy**: The first record was published, a year after PIGNATTI'S (1982) prediction, by ARGENTI (1983), and ARGENTI & LASÉN (1983). – Further literature: CONTI et al. (2005); CELESTI-GRAPPOW et al. (2010); AESCHIMANN et al. (2004); – Piemonte: SELVAGGI et al. (2005, 2009, 2011): in total 4 findings; – Lombardia: MACCHI (2005): 1 locality; ARDENGHI & PAROLO (2011): 2 findings, repeated by GALASSO (2012); BANFI & GALASSO (2010); – Trentino: BERTOLLI & PROSSER (2011): 1 finding; – Veneto: ARGENTI (1983) and ARGENTI & LASÉN (1983): 1 finding; – Friuli-Venezia Giulia: ORIOLO (1997): 1 finding; COSTALONGA & PAVAN (2002): 1 finding; POLDINI et al. (2002): 2 grid squares.

It was not possible to see the specimens cited by ARDENGHI & PAROLO (2011), SELVAGGI et al. (2005, 2009, 2011), and by BERTOLLI & PROSSER (2011). F. Prosser sent to me, however, photos taken in the field from the still living plants.

Specimens seen: **Veneto**, Provincia di Belluno: Belluno, Safforze, margine fossato, 380 m, 9 Jun. 1983, **C. Argenti s.n.** [Herb. Argenti 2× n.s. (dig. photos)]; – same locality: 390 m, 9839/1, 29 May 2009, **S. & C. Argenti s.n.** [Herb. Argenti 2× n.s. (dig. photos)]; – same locality: 380 m, 23 May 1998, **S. Costalonga s.n.** [Herb. Costalonga n.s. (dig. photo)]; – **Friuli Venezia Giulia**, Provincia di Pordenone: Polcenigo, nel Palù [del Livenza], 31 m, 9940/4, UTM: UL 98.99, 1 Jun. 2000, **R. Pavan s.n.** [MFU n.s., Herb. Costalonga n.s. (dig. photo)]; – same locality: 46°1'4.1" N, 12°28'38.5" E, 7 Jun. 2010, **S. Costalonga s.n.** [Herb. Costalonga n.s. (dig. photo)].

**Liechtenstein**: It was reported by WALDBURGER (1985, 2001) and WALDBURGER & STAUB (2006) and observed to spread [grid squares: 8723/1, 8723/3 or SW]. The corresponding specimens seem to be stored in the "Naturkundliche Sammlung des Fürstentums Liechtenstein". Although requested, digital photos of them have not been received.

**Netherlands**: first record: KLOOS (1932); further literature: SUESSENGUTH (1939); KERN & REICHGELT (1954): 2 records; CORPORAAL (1988): overview, 5 localities known; TAMIS (2005); DIRKSE et al. (2007): 1 finding.

**Poland**: KÜKENTHAL (1909) saw a specimen from the Buchheide near Stettin (today's Szczecin; then part of Germany). It was collected there by Winkelmann by the end of the nineties of the 19<sup>th</sup> century. This record has also been repeated by HOLZFUSS (1937), SUESSENGUTH (1939), and SCHULTZE-MOTEL (1967–1977) but it is missing in ZAJAC & ZAJAC (2001). There are no new records for the country as circumscribed today (URBISZ 2011, SZCZEPANIK-JANYSZEK & WOŹNICA 2001, Damian Chmura and Wojciech Solarz via email, April 2012).

**Romania**: reported from the county Maramureş (ŞERBĂNESCU & NYÁRÁDY 1966).

**Russian Federation, Oblast Kaliningrad**: It was found by the collector Lettau in 1915 in the "Ausstich nahe der Kleinbahn am Ziegeltor in Insterburg [now: Tschernjachowsk = Chernyakhovsk], zwischen Lycker und Thorner Bahndamm" E of Königsberg (now: Kaliningrad) in the northern part of the former German Eastern Prussia (Ostpreußen) (ABROMEIT et al. [1898–] 1940: 1041). This record is also given in an abbreviated form in SUESSENGUTH (1939) and SCHULTZE-MOTEL (1967–1977), and has astonishingly been overlooked by EGOROVA (1999a, 1999b). This is so far the only record of this species from the area of the Russian Federation as circumscribed today. KOOPMAN (2011) neither indicates the species for this country.

**Slovakia**: *C. vulpinoidea* was found by E.G. Nyárády on the 15<sup>th</sup> July 1910 along the railway near the village of Kakaslomnicz (today's Veľká Lomnica) in Szepes county which was then situated in the northern part of Hungary as circumscribed at the time of the Austro-Hungarian Empire. It was growing in large numbers in a ca. 15-meter long sector (NYÁRÁDY 1912). As extensive exsiccates were prepared and distributed to herbaria, it was most likely extirpated from that place. In fact its presence has never been reconfirmed since then (MEDVECKÁ et al. 2012, GOJDIČOVÁ et al. 2002, DOSTÁL & ČERVENKA 1992: 1308, DOSTÁL 1950, 1989: 1274).

Specimens seen: County **Kežmarok**: in fossis inundatis ad pagum Kakaslomnicz [= Veľká Lomnica], solo argilloso, ca. 640 m, 3 Aug. 1911, **E.G. Nyárády s.n.** (partly distributed as: Fl. Hung. exsic., Cent. V, no. 497) [GZU 2× n.s. (dig. photos), LI n.s. (dig. photos), W 3×, WU]; – same locality: 9 Aug. 1911, **E.G. Nyárády 28** [GZU 2× n.s. (dig. photos)]; – ad pedem montis Tatrae Magnae, apud pagum Kakaslomnicz, 9 Aug. 1912, **E.G. Nyárády s.n.** [W].

**(Slovenia)**: not yet recorded; see the note further down in the paragraph dealing with the record from "Steiermark (Styria)"

**Switzerland:** According to THEURILLAT et al. (2011), it has been first collected in 1937 in the canton of Aargau. HESS et al. (1967) mentioned only few localities. INFO FLORA (2012) presents a distribution map and indicates it in nine grid squares in the cantons of Genève, Ticino, Vaud, Zug and Zürich. According to DÉTRAZ-MÉROZ (2009), it was also found at Savouy near Vionnaz in the western part of the canton Valais. – Further literature: LANDOLT (2001); DRUART et al. (2002); WITTENBERG (2006); MOSER et al. (2007): 1 finding; MORET (2008): 3 records; CIARDO et al. (2011): 1 finding.

**(Ukraine):** FODOR (1974) reported it, probably only by assumption of its possible future incidence, from the western part (Transcarpathia) of the country. According to MOSYAKIN & FEDORONCHUK (1999) and EGOROVA (1999a), this record needs to be reconfirmed. As the species has also been reported from the nearby county Maramureş in Romania (ŞERBĂNESCU & NYÁRÁDY 1966), FODOR's record could be plausible.

### *Carex vulpinoidea* in Austria

Its occurrence in Austria has been published for the first time in an article from a newspaper (JACOBI 1936). ESSL & RABITSCH (2002) and FISCHER et al. (2008) are indicating it for the Austrian federal states of Tirol, Salzburg, Oberösterreich, Steiermark, and Kärnten. In the following compilation, literature references and specimens seen are given separately (going from west to east) for each federal state (Bundesland).

**Tirol (Tyrol):** It has been found only once in the northern part of the federal state. Its presence was detected and published by WALLNÖFER (1993, and subsequently also by POLATSCHKEK 2001). A second record can be added here.

Specimens seen: Inntal, Wörgl, Lahntal: lehmig-tonige, zeitweise überflutete Stelle am Wegrand zwischen dem Feuchtgebiet "Filz" und der Schottergrube Edenstrasser am nördlichen Hangfuß des Wörgler Berges, das ist ca. 2 km SW Wörgl, ca. 500 m, 8538/1, 10 June 1986, **P. Vergörer s.n.** [IBF]; – same place: July 1988, **P. Vergörer s.n.** [W]; – same place: July 1989, **P. Vergörer s.n.** [IBF 2×]; – same place: June 1993, **P. Vergörer s.n.** [Herb. Wallnöfer 6364, WU] (plants cultivated from this collection: 16 May 1994, **B. Wallnöfer 8547** [Herb. Wallnöfer]; 11 June 1994, **B. Wallnöfer 8571** [Herb. Wallnöfer]); – same place: May 1997, **P. Vergörer s.n.** [IBF n.s. (dig. photo)]; – same place: 18 Aug. 2008, **P. Vergörer s.n.** [IBF n.s. (dig. photo)]; – same place: 20 Aug. 2008, **P. Vergörer s.n.** [IBF n.s. (dig. photo)]; – Chiemgauer Alpen: Waidring N / Mautstraße Steinplatte, Unterlage: Dolomit, 900–1300 m, [8341/3 or 8441/1], 16 Aug. 2010, **A. Polatschek s.n.** [IBF n.s. (dig. photo)].

**Salzburg (federal state of Salzburg):** Overviews of the spread in the state of Salzburg are given in PILSL et al. (2002, 2008) and SCHRÖCK & al. (2004). The species has recently been increasingly recorded and is reported to be only ephemeral. It is dealt with in the following publications: JACOBI (1936), JANCHEN & NEUMAYER (1942), REITER (1947, 1964), LEEDER & REITER (1959), JANCHEN (1960, 1963), WITTMANN et al. (1987), WALLNÖFER (1993), STROBL (1994, 1997, 1999), and in SCHRÖCK et al. (2004). BRANDSTETTER (1998) reported it from the city of Salzburg: östliches Leopoldskroner Moor, 420 m, 8244/1, and HERRMANN et al. (2003) from the area of the Wolfgangsee: Blinkingmoos, 540 m, 8246/4. According to PILSL et al. (2004), the record published in PILSL et al. (2002) is based on a specimen whose identification was incorrect.

Specimens seen: Flachgau, BH Salzburg-Umgebung, Gem. Bürmoos, Bürmooser See, Ostufer, Streuwiese, 435 m, [47°59'15" N, 12°55'32" E], 8043/2, 6 Jun. 1998, **C. Schröck 198** [LI, Herb. P. Pils 10185]; – same locality and date: zerstreut in den Feuchtwiesen, 440 m, **C. Schröck 899** [LI]; – Flachgau, Bürmoos, E-Ufer des Wahasees, Schilfröhricht, 440 m, 8043/2, 20. Jul. 1992, **C. Eichberger s.n.** [SZU n.s. (dig. photo)];

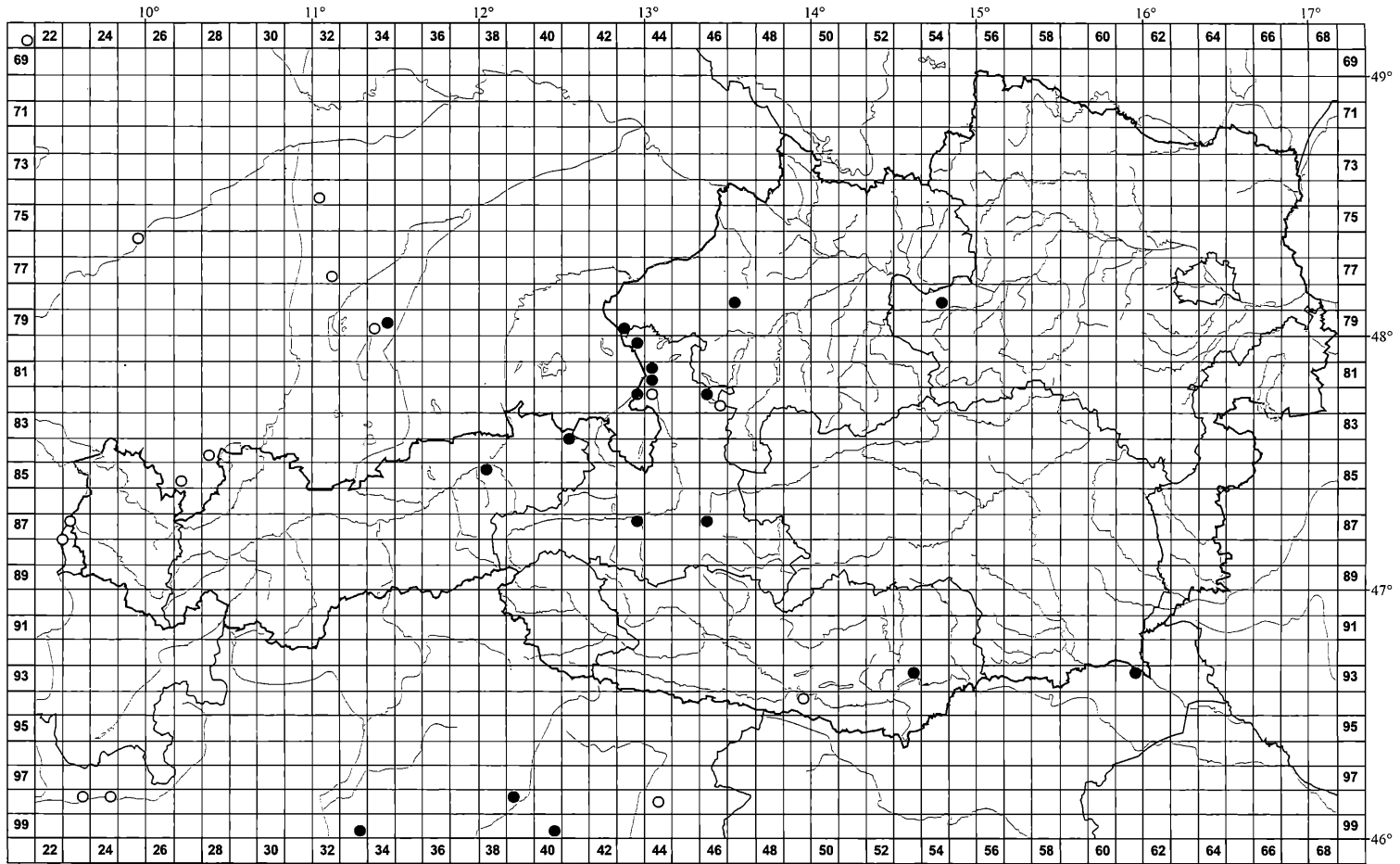


Fig. 1: Distribution of *Carex vulpinoidea* MICHX. in Austria and the surrounding area (specimens seen: ●, records from literature: ○ [Basemap provided by H. Niklfeld and L. Schratt-Ehrendorfer (Mapping the Flora of Austria, University of Vienna), modified by B. Wallnöfer].

– same area but: NE-Ufer des Waha-Sees, am Rand des Schilfgürtels, 11 Aug. 1993, **C. Eichberger s.n.** [Herb. Krisai, SZU]; – same locality: Ostufer, Wegrund, 6 Jun. 1998, **R. Krisai 1599** [Herb. Krisai n.s. (dig. photo)]; – Flachgau, Bergheim, Siggerwiesen, Schotterabbauf Flächen nahe des Lehener Baches, ruderal, 405 m, 8144/1, 15 Aug. 2002, **O. Stöhr 2408** [LI n.s. (dig. photo)]; – Siggerwiesen, Gelände der Müllverarbeitungsanlage, Schotterdeponie E der Müllhalde, Tümpel und Gräben, 410 m, 47°51'59" N, 13°00'02" E, 8144/1, 7 Aug. 2009, **P. Pilsl 19975** [Herb. Pilsl n.s. (dig. photo)]; – same area: 15 Sep. 2002, **C. Schröck & O. Stöhr 5378** [LI n.s. (dig. photo)]; – Söllheim bei Salzburg an der Ischler Bahn, [8144/3], Sommer 1935, **L. Kiener s.n.** [W: Herbarium Ronniger], mit der Notiz "übersandt von Pater Emil Jacobi"; – Maria Plain, Feuchtwiesenfleck nahe Straße, 0,3 km NW Plain-Linde, 500 m, [8144/3], 11. Aug. 1995, **W. Leopoldinger s.n.** [SZU]; – Salzburg-Stadt, Itzling, feuchte etwas ruderalisierte Wiese zwischen Autobahn und Heizkraftwerk-Nord, zwischen Lokalbahn und Salzach, 420 m, 47°49'42" N, 13°02'05" E, 8144/3, 18 Jun. 1999, **P. Pilsl 10497** [Herb. Pilsl]; – same collection: **P. Pilsl in Herb. C. Schröck 6153** [LI n.s. (dig. photo)]; – same collection: **P. Pilsl s.n.** [SZU 2× n.s. (dig. photo)]; – Großgmain, Freilichtmuseum, Streuwiesenrand, Diss-Fläche 25, 510 m, [47°45'07" N, 12°57'03" E], 8243/2, 6 Jun. 2007, **O. Stöhr 5768** [LI n.s. (dig. photo), Herb. Pilsl 18021 n.s. (dig. photo)]; – Pinzgau, Salzachtal, E von Taxenbach: beim Stollenfenster vor der Kitzlochklamm, am nass-lehmigen Straßenrand, nur ein Horst, Blattsprosse zahlreich, Blütensprosse 20–30, 780 m, [8743/2], 9 Aug. 1962, **M. Reiter s.n.** [GZU 2×, SZB]; – same locality: 6 Jul. 1963, **M. Reiter s.n.** [GZU, LI (Herb. L. Kiener)]; – same locality: 6 Jul. 1964, **M. Reiter s.n.** [SZB 3×]; – same locality: 10 Aug. 1965, **M. Reiter s.n.** [SZB n.s. (dig. photo)]; – Pongau, Radstädter Tauern, Tal des Bleißlingbaches zwischen Flachau und Tauernstunnel (Autobahntunnel), NNW der Zehenthofhütte, E der Latschenhütte, im Bereich einer aufgelassenen Schottergrube W der Querung der Autobahn über die Straße, 1080 m, 8746/1, [47.27107 N, 13.41207 E], 11 Oct. 2000, **A. Thomasser s.n.** [SZB n.s. (dig. photo)].

**Oberösterreich (Upper Austria):** The first record was published by GRIMS in SPETA (1980) and the second one by HOHLA (2009), (see also WALLNÖFER 1993 and HOHLA et al. 2009). Now a third record can be added.

Specimens seen: Kobernauber-Wald: unmittelbar am Ufer (aufgeschütteter Schotter) des Badesees bei Windischhub SE Pramet, 500 m, 7847/3, 25 Jun. + 8 Jul. 1979, **H. Forstinger s.n.** [LI 2×], nur 1 kleiner Horst mit 20–30 Stängeln; with an annotation made by F. Grims: "längst wieder erloschen! 6.3.2000"; – Innviertel, St. Pantaleon, Trimmelkam, feucht-ruderal am NW-Rand des Bahnhofes, am Rand eines Tümpels, 48°1'42" N, 12°51'36" E, [ca. 425 m], 7943/3, 17 Jun. 2008, **M. Hohla s.n.** [LI]; – plants cultivated from this collection: 5 Aug. 2009, **M. Hohla s.n.** [LI]; – Hausruckviertel, Scharfling, 0,3 km SW vom Egelsee, feuchtes Grabenufer, 500 m, 47°47'42" N, 13°23'34" E, 8246/1, 20 Jun. 2011, **G. Pflugbeil 3218** [Herb. Pilsl 22223 n.s. (dig. photo)]; – same collection: **G. Pflugbeil s.n.** [SZU n.s. (dig. photo)].

**Niederösterreich (Lower Austria):** The occurrence of this species in the federal state was hitherto unknown. It has been collected by Peter Buchner in 1977 during an intensive campaign of floristic mapping (project: "Mapping the Flora of Central Europe"). It was found in the western part of the state (Mostviertel) and was erroneously identified as *C. appropinquata*. The unlabelled specimen bears the name of grid square 7854/4 which is "Zeillern" [village W of the town Amstetten] on the folder. According to his memory, he seems to have collected it along the river Url east of the village Oehling. He seems to remember having seen there some hundreds [?] of tussocks (Buchner via email, 17<sup>th</sup> March 2012).

Specimen seen: Zeillern, [grid square:] 7854/4, **P. Buchner s.n.** [W].

**Steiermark (Styria):** It has been found only once near the border with Slovenia (JANCHEN & NEUMAYER 1942, JANCHEN 1964, WALLNÖFER 1993, MAURER 2006). MAYER (1952) indicates it (most likely based on the specimen cited below) for the geographical region called "Štajersko" which comprises also parts of Austria. The occurrence in nearby Slovenia is, therefore, only putative and needs confirmation. In fact, it is not mentioned in MARTINČIĆ et al. (1999). GUTERMANN (1973) indicates it based probably on MAYER (1952) erroneously for Yugoslavia.



Specimens seen: [Bad] Radkersburg: am Ufer des Bräuhausteiches in Plaschenau, [9361/2], 22 Jun. 1938, **E. Korb s.n.** [GZU 2×, W 3×, WU 2×], with the following annotations: "dreizehn vielstängelige Exemplare" and "Teil einer ca. 80-stängeligen Pflanze"

**Kärnten (Carinthia):** In the course of work on his thesis, KOWATSCH (1989) collected it in 1987 for the first time in this federal state. The specimen was correctly identified by H. Melzer in 1988 and published later by HARTL et al. (1992: 406). In 1988, Kowatsch collected in the same area another voucher that consists only of the inner leaves (with dark brown bases) of two sterile shoots. One year later H. Melzer (concerning him see ZERNIG 2010) recollected there a specimen in fruit. Astonishingly, the latter two collections were misidentified by Melzer and represented in reality *C. paniculata*. The fertile specimen shows, however, a quite anomalous, elongated infructescence!

In July 1994, it was collected by Erwin Hauser and in 1996 also by Franz Essl on an artificial island ("neu geschüttete Drauinsel") in the river Drau near Föderlach (9449/2) at 490 meters altitude. The herbarium vouchers are kept in Essl's herbarium, but very unfortunately, he has currently no access to them.

Specimens seen: Jauntal, Völkermarkt: Kreuzbergl, Mündung des Mühlbaches in den [Völkermarkter] Stausee, 391 m, [9353/2], 24 Aug. 1987, **J. Kowatsch s.n.** [Herb. Kowatsch n.s. (dig. photos)]; – the two specimens pertaining to *C. paniculata* are labeled: Jauntal, Völkermarkt: Kreuzbergl, Mündung des Wurlabaches in den Völkermarkter Stausee, Horst am Wasser, 392 m, [9353/2], 15 Aug. 1988, **J. Kowatsch s.n.** [KL n.s. (dig. photo)]; – SE Völkermarkt: am Ufer des Stausees nahe der Mündung des Wurlabaches am Ausgang des Mühlgrabens, ein kräftiger Horst, 25 May 1989, **H. Melzer s.n.** [LI n.s. (dig. photos)].

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