

Evidence that *Carex* × *deamii* may be derived from a cross between *C. squarrosa* and *C. shortiana*

PAUL M. MCKENZIE¹ AND BRUCE HENRY²

ABSTRACT. — The status and history of *Carex* × *deamii* are discussed, with detailed information on Missouri populations. Evidence for the role in *Carex squarrosa* in the parentage of this hybrid sedge is discussed.

Carex × *deamii* F.J. Hermann was first described by Frederick J. Hermann from specimens taken in Indiana in 1934 (Hermann 1938; see also Deam 1940 and Steyermark 1963) (Figure 1A). Subsequently, this taxon was collected from Missouri, Illinois, and Kentucky (Hess and Shildneck 1982; Mohlenbrock 1999; Ford and Reznicek 2002; Hill 2010). In Missouri, Steyermark (1963) reported *C. ×deamii* from Adair, St. Louis, Howell, and Barton counties. Notably, *C. ×deamii* is an intersectional hybrid as *C. shortiana* is in Section SHORTIANAE, while *C. squarrosa* and *C. typhina* are in Section SQUARROSAE. Ball and Reznicek (2002) commented that while a few intersectional hybrids are known in the genus *Carex*, most are between species in the same section.

Hermann (1938) postulated that the likely parents of *Carex* × *deamii* were *Carex shortiana* Dewey and *Carex typhina* L. (see Ford and Reznicek 2002), as both species were reported as associates at the type locality. Hermann (1938) did not comment on whether *C. squarrosa* L. was also present. Steyermark (1963) noted that *C. typhina* and *C. shortiana* occurred at most Missouri sites where *Carex* × *deamii* had been documented but also stated that *C. squarrosa* was present at most locations. Mohlenbrock (1999) reported that although *C. shortiana* and *C. typhina* were present at the Illinois sites for *Carex* × *deamii*, *C. squarrosa* also occurred. Subsequent authors (e.g. Yatskievych 1999; Cochrane 2002) have suggested that it is likely that one parent of the hybrid is *C. squarrosa* rather than *C. typhina*. Recent collections and observations by the authors in Reynolds County, Missouri while conducting a mark/recapture study involving the federally listed Hine's emerald dragonfly (*Somatochlora hineana*) provide strong evidence supporting this hypothesis.

On 20 June 2014, the senior author discovered one large clump of *Carex* × *deamii* at Onoclea Fen at Johnson's Shut-Ins State Park in Reynolds County, Missouri (Figure 1B). Voucher specimen: McKenzie 2552 (MO); <http://www.tropicos.org/Specimen/10085804>. Both *C. shortiana* and *C. squarrosa* were common and scattered throughout the fen. Searches throughout the fen failed to document *C. typhina* or any additional clumps of *C. ×deamii*.

¹ PAUL M. MCKENZIE — U.S. Fish and Wildlife Service, 101 Park DeVillie Dr., Suite A, Columbia, MO 65203. email: paul_mckenzie@fws.gov

² BRUCE HENRY — Missouri Department of Conservation, 2302 County Park Dr., Cape Girardeau, MO 63701. email: bruce.henry@mdc.mo.gov



Figure 1. A: Isotype of *Carex x deamii*, F.J. Hermann 6147, 5 June 1934 (MO); B: Inflorescence of *Carex x deamii*, Johnson's Shut-Ins State Park, Onoclea Fen, 20 June 2014, photo by Richard Day.

On 16 June 2015, the senior author discovered one large clump of *C. x deamii* at Centerville Slough Fen in Reynolds County, Missouri: *McKenzie 2596* (MO); <http://www.tropicos.org/Specimen/100858090>. This site is approximately 9.7 air miles southwest of the Johnson's Shut-Ins State Park fen. As at the first site, *C. shortiana* and *C. squarrosa* were present at the Centerville Slough site but *C. typhina* was absent (Figure 2). Further searches in the fen failed to yield any additional clumps of the hybrid.



Figure 2. Centerville Slough Fen, Missouri, 16 June 2015. **A:** Habit of *Carex* ×*deamii*; **B:** Inflorescence of *Carex* ×*deamii*; **C:** Comparison of *C. shortiana* (left), *Carex* ×*deamii* (center), and *C. squarrosa* (right). All photos by Garret Hargiss.

Subsequent to these discoveries, Henry discovered two additional clumps of *C. ×deamii*, approximately 400 m apart at Trolinger Fen in Reynolds County on 20 June 2016 (Figure 3). As with observations made in 2014 and 2015, *C. shortiana* and *C. squarrosa* were present at the 2016 locality but *C. typhina* was absent.



Figure 3. Inflorescence of *Carex ×deamii*, Trolinger Fen, 20 June 2016. Photo by Bruce Henry.

Superficially, *Carex ×deamii* is similar to *C. shortiana* in having subcylindric spikes that are thicker (7-8 mm) vs. 3.5-5.6 mm, and having perigynia similar to *C. squarrosa* but with more compressed bodies and perigynia beaks that are intermediate (~1-1.5 mm) between *C. shortiana* and *C. squarrosa* (Cochrane 2002; Steyermark 1963; Yatskievych 1999).

At the four recently documented sites of *C. ×deamii* from Reynolds County, Missouri *C. shortiana* and *C. squarrosa* were present but *C. typhina* was absent. A review of the Tropicos database (<http://www.tropicos.org/NamePage.aspx?nameid=9900072&tab=specimens>) reveals 91 records of *C. typhina* scattered across 34 Missouri counties. Notably, there are no documented records of *C. typhina* for Reynolds County. The co-occurrence of *C. shortiana* and *C. squarrosa* at the four recently discovered sites for *C. ×deamii* and the lack of records of *C. typhina* at these locations and Reynolds County provide strong evidence for the correct parentage of this uncommon hybrid as suggested by Cochrane (2002). It is still unknown if *C. ×deamii* can result from a cross between *C. shortiana* and *C. typhina* as suggested by Hermann (1938). Botanists who discover additional populations of *C. ×deamii* should determine if *C. squarrosa* and/or *C. typhina* co-occur with *C. shortiana*. Molecular studies may also be useful in further assessing the parentage of this rare hybrid.

LITERATURE CITED

- Ball, P.W. and A.A. Reznicek. 2002. *Carex*. In: Flora of North America Editorial Committee, eds. 1993+. Flora of North America North of Mexico. 20+ vols. New York and Oxford. Vol. 23, pp. 254-273.
- Cochrane, T.S. 2002. *Carex* L. sect. Shortianae. In: Flora of North America Editorial Committee, eds. 1993+. Flora of North America North of Mexico. 20+ vols. New York and Oxford. Vol. 23, p 520.
- Deam, C.C. 1940. Flora of Indiana. Indiana Department of Conservation, Indianapolis.
- Ford, B.A. and A.A. Reznicek. 2002. *Carex* L. sect. Squarrosae. In: Flora of North America Editorial Committee, eds. 1993+. Flora of North America North of Mexico. 20+ vols. New York and Oxford. Vol. 23, pp. 518-519.
- Hermann, F.J. 1938. New or otherwise interesting plants from Indiana. *Rhodora* 40: 77-88.
- Hess, W. J., and P. Shildneck. 1982. *Carex x deamii* Herm. (Cyperaceae) in Illinois. Transactions of the Illinois State Academy of Science. 75: 135-136.
- Hill, S.R. 2010. New and noteworthy sedge records in Illinois. Transactions of the Illinois State Academy of Science 103(3&4): 85-96.
- Mohlenbrock, R.H. 1999. The Illustrated Flora of Illinois. Sedges: *Carex*. Southern Illinois University Press, Carbondale and Edwardsville.
- Yatskievych, G. 1999. Steyermark's Flora of Missouri. Volume 1, revised ed. Missouri Department of Conservation, Jefferson City.