

CAREX AUSTRODEFLEXA (CYPERACEAE),  
A NEW SPECIES OF CAREX SECT. ACROCYSTIS FROM THE  
ATLANTIC COASTAL PLAIN OF THE SOUTHEASTERN UNITED STATES

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ABSTRACT

**Carex austrodeflexa** (sect. *Acrocystis*) is described from the coastal plain of the southeastern United States. This species inhabits distinctive wetland communities in streamheads and small-stream swamps, usually under seepage influence. It is the only wetland member of section *Acrocystis* found in the southern Atlantic and Gulf Coastal Plain. It may be told from the morphologically similar *Carex deflexa* on the basis of its loosely cespitose habit with long, slender, reddish rhizomes, papillose, glabrate, elliptic perigynium, longer perigynium beak, and longer staminate scales and spikes.

RESUMEN

Se describe **Carex austrodeflexa** (sect. *Acrocystis*) de la llanura costera del sureste de los Estados Unidos. Esta especie vive en comunidades de humedales en cabeceras de arroyos y pantanos de pequeños arroyos, usualmente bajo influencia de filtraciones. Es el único miembro de humedales de la sección *Acrocystis* que se encuentra en el Atlántico sur y la llanura costera del golfo. Puede diferenciarse del morfológicamente similar *Carex deflexa* por su hábito cespitoso con rizomas largos, delgados y rojizos, periginio papiloso, glabro, elíptico, pico del periginio más largos, y escamas estaminales y espigas más largas.

Botanical and ecological studies during the 1990s of the fire-maintained vegetation of the Atlantic and Gulf Coastal Plain of the Southeastern United States uncovered a distinctive species of wetland sedge in the genus *Carex*. Remarkably, this entity was independently discovered by the six authors of this paper. This unfamiliar *Carex* was clearly a member of the section *Acrocystis*, due to the combination of pistillate spikes produced on short, subradical peduncles and an elongate lower pistillate bract. In most characters it keyed to *Carex deflexa* Hornem. Closer examination of the material, combined with additional field and herbarium searches, revealed a number of distinctive features. It became apparent that this entity did not match any of the species descriptions in the most recent complete treatment of section *Acrocystis* (Crins & Rettig 2002). The new species is described as follows:

**Carex austrodeflexa** P.D. McMillan, Sorrie, & van Eerden, sp. nov. (sect. *Acrocystis*). (Figs. 1, 2). TYPE: U.S.A. NORTH CAROLINA. PENDER Co.: common to locally abundant in seepage influenced areas in ecotone of calcium-influenced *Pinus palustris*-mixed graminoid wet savanna and non-alluvial swamp forest, SE of Maple Hill and just S of Lee Road, 12 Apr 1998, P.D. McMillan 2788 (HOLOTYPE: NCU; ISOTYPES: MICH, US, USCH).

*Carici deflexae* Hornem. similis sed differt perigynii rostro longiore ac parietibus valde papillosis praeter rostrum aliter glabris et spica staminata longiore latiore.

Plants perennial, moderately to loosely cespitose by means of slender rhizomes (2.5–)6–9(–12) cm long, 0.7–1.1 mm thick, covered with red or maroon-red sheaths at time of flowering. Leaves predominantly basal, much exceeding culms, principal leaves 11–42 cm long, 1.1–2.4 mm wide, linear, acuminate, sca-

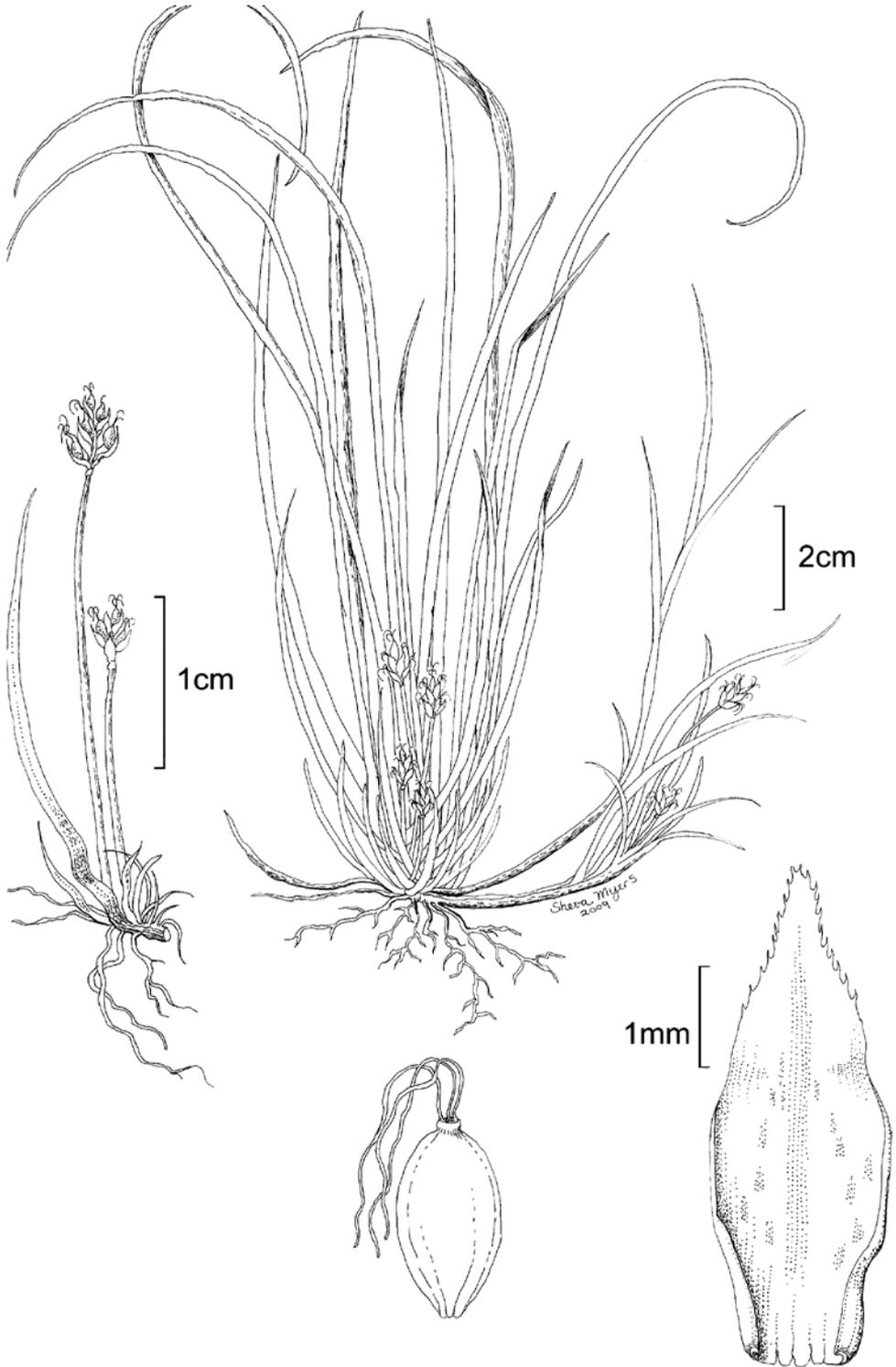


Fig. 1. *Carex austrodeflexa* plant; detail of culms with spikes; pistillate scale; achene. Drawing by Sheva Myers.

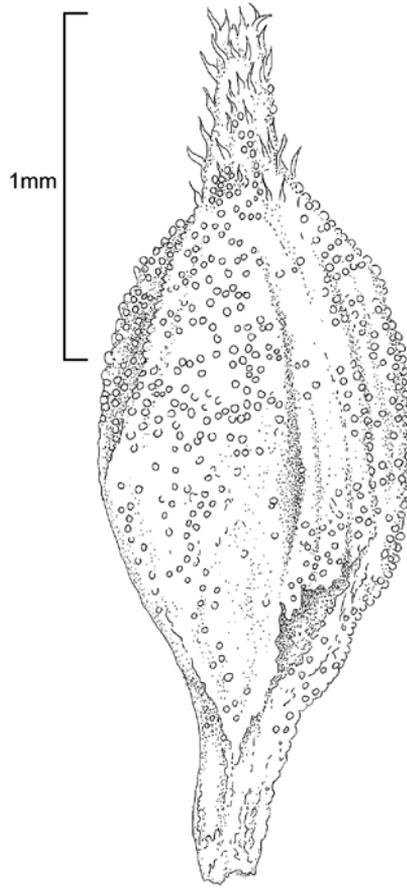


Fig. 2. *Carex austrodeflexa* perigynium. Drawing by Dot Wilbur.

bridulous on margins and weakly so on abaxial surface. Leaf sheaths loose, white-hyaline with red stripes, ligule 0.3–0.5 mm long, membranaceous, translucent. Fertile culms often surrounded by fibrous remains of previous years' leaves, but not densely so, erect to ascending, 3.4–11 cm tall, 0.3–0.9 mm wide, trigonous, somewhat compressed (especially proximally), margins scabridulous. Inflorescence with 1 terminal linear staminate spike, closely aggregated with (1–)2(–3) pistillate spikes; 1–2 additional pistillate spikes produced on slender basal peduncle(s) 3–11 mm long, these spikes exert 0–4 mm from leaf sheaths. Cauline pistillate bract shorter than, subequal to or exceeding staminate spike, 3.0–29 mm long, the margins antrorsely scabridulous. Pistillate spikes subsessile, broadly oblong to orbicular in outline, 4–8(–10)-flowered. Pistillate scales narrowly ovate, 2.1–4.2 mm long, 0.9–1.3 mm wide, short-acuminate to short-awned, awn antrorsely scabridulous, scale body stramineous or hyaline, sides often lightly reddish tinged, with prominent green midrib, midrib becoming somewhat keeled distally. Staminate spikes 3–9 mm long, 1–2 mm thick. Staminate scales lanceolate, 2.6–4 mm long, 0.9–1.4 mm wide, acute to short-acuminate, ranging in color from deep red to stramineous, nearly always red at anthesis, with prominent green midrib. Perigynia composed of a body, beak, and stipe-like base; body filled by achene, translucent, surface densely papillose, glabrate to glabrous, hairs minute and restricted to beak and distal end of perigynium. Perigynia 2.4–3 mm long, 0.7–1.1 mm wide, body elliptic to narrowly obovate, 1.3–1.5 mm long, tapering at both ends to a bidentate antrorsely

toothed beak 0.6–1 mm long and a stipe-like base 0.6–1 mm long. Achenes 1.2–1.4 mm long, 0.6–0.8 mm wide, ovoid, trigonous with convex sides, castaneous to caramel brown, surface faintly cancellate. Style exerted from perigynium beak up to 2 mm, stigmas 3, to 1.3 mm long, straight to curved but not coiled.

Additional specimens examined. BAS refers to personal herbarium of B.A. Sorrie, RJL refers to personal herbarium of R.J. LeBlond.

**ALABAMA. Baldwin Co.:** under powerline N of US 90, 2 mi W of Seminole, uncommon in wet seepage slope with *Aristida beyrichiana*, *Andropogon glomeratus*, *Lophiola americana*, 12 Mar 1996, BA Sorrie 8708 (AUA, NCU). **FLORIDA. Gadsden Co.:** streamhead of Lodge Creek, W of Lake Talquin, N of route 20, common under *Liriodendron tulipifera*, *Illicium floridanum*, *Magnolia virginiana*, *M. grandiflora*, *Ilex coriacea*, 27 Mar 2002, BA Sorrie 10845 (CLEMS, FSU, GH, NCU). **Okaloosa Co.:** Eglin Air Force Base, frequent in wet loamy sand in shaded steephead of Bull Creek under *Cliftonia* and *Illicium*, 12 Mar 1994, LC Anderson 14662 (FSU); Eglin Air Force Base, wet peaty sand in shaded *Cliftonia* thicket in Bull Creek steephead, with *Sarracenia rubra* and *Pinguicula primuliflora*, 12 Mar 1994, LC Anderson 14666 (FSU). **GEORGIA. Richmond Co.:** Fort Gordon, wet streamhead, 23 Apr 1995, B van Eerden 1289 (DUKE, GA, GH, NCU). **LOUISIANA. Lincoln Co.:** woods near US 80, 8 mi W of Calhoun, 16 Mar 1967, RD Thomas 1788 (NCU). **NORTH CAROLINA. Brunswick Co.:** Camp Branch Savanna, off of Myrtle Head Road (SR 1335), 1 May 2002, RJ LeBlond 5582 (NCU). **Cumberland Co.:** common in sphagnum of forested streamhead, Carver's Creek N of McCloskey Road, 26 May 2010, BA Sorrie 12589 (NCU). **Gates Co.:** pocosin, 3.7 mi NW of Eure on dirt road paralleling Chowan River, 9 May 1958, HE Ahles 40380 (NCU). **Harnett Co.:** Fort Bragg Military Reservation, wooded streamhead near powerline E of NC route 87, 18 May 2007, BA Sorrie 11954 (NCSC, NCU); SW of Reedy's Creek Swamp, streamhead pocosin, frequent over a distance of 150 m under *Nyssa biflora*, *Liquidambar styraciflua*, *Liriodendron tulipifera*, *Pinus serotina*, with leaf litter and sphagnum moss, 18 Jun 2005, BA Sorrie 11627 (NY, NCU); same place, 29 Mar 2006, BA Sorrie 11762 (DUKE, MICH, US). **Hoke Co.:** Fort Bragg Military Reservation, Rockfish Creek floodplain, 23 Apr 1994, B van Eerden 876 (FLAS, GH, NCU, NY, US); Rockfish Creek S of US route 401, E of Raeford, moist floodplain of blackwater stream under *Acer rubrum*, *Taxodium ascendens*, *Nyssa biflora*, *Pinus taeda*, 26 Apr 2004, BA Sorrie 11214A (FSU, NCSC, US); Fort Bragg Military Reservation, S side of James Creek, hardwood-loblolly pine swamp along blackwater creek, local on mossy root knolls with *Carex lonchocarpa*, 4 May 1997, BA Sorrie 9177 (BAS, SWSL); Fort Bragg Military Reservation, Rays Mill Creek, boggy floor of streamhead pocosin with *Arundinaria tecta*, 2 Jun 1994, BA Sorrie 8005 (BAS, GH, MICH, NCU). **Johnston Co.:** Little Divine Road, seepage savanna in powerline, 23 May 1999, PD McMillan 3333 (NCU); same place, 25 Mar 2000, PD McMillan 4398 (CITA, CLEMS, MICH, NCU, USCH). **Lee Co.:** Lemon Springs, seepage areas along railroad, 28 Mar 2000, PD McMillan 4400 (NCU). **Moore Co.:** headwaters of Nicks Creek, streamhead pocosin community, 26 May 2007, BA Sorrie 11958 (NCU); Weymouth Woods Sandhills Nature Preserve, tributary of James Creek, streamhead community dominated by *Nyssa biflora*, *Acer rubrum*, *Liquidambar styraciflua*, *Liriodendron tulipifera*, *Pinus serotina*, 5 Apr 1997, BA Sorrie 9144 (BAS, GA, Weymouth Woods herbarium); east-W tributary of the outlet creek from Pinebluff Lake, streamhead pocosin with numerous wet depressions, 29 Mar 1997, BA Sorrie 9142 (NY); W of Eastwood at NC 73 powerline, streamhead seepages, Apr 2000, PD McMillan 4399 (NCU). **Onslow Co.:** Flat Swamp, off of NC 50, 14 Apr 1995, RJ LeBlond 4193 (MICH); same place and date, BA Sorrie 8316.5 (NCSC); same place, 26 Apr 1996, RJ LeBlond 4458 (DUKE); same place, 7 May 1996, RJ LeBlond 4465 (NCU); Sandy Run Swamp, Cooleys Meadowrue Powerline Site, 13 Apr 1996, RJ LeBlond 4453 (BRIT); Sandy Run Swamp, Pine Plantation Survey Site, 29 May 1996, RJ LeBlond 4553 (NCU). **Pender Co.:** The Neck Savanna, off SR 1532, 11 Apr 1990, RJ LeBlond 1189 (specimen missing); same place, 27 Mar 1991, RJ LeBlond 1939 (RJL); same place, 13 Apr 1996, RJ LeBlond 4452 (VPI); same place, 7 May 1996, RJ LeBlond 4471 (NCU); SE of Maple Hill, seepage influenced ecotone of swamp forest, 11 Apr 1993, PD McMillan s.n. (NCU); Shaken Creek Savanna, hardwood drain along E side of Pactolus "Holy Grail" savanna, 26 Mar 2005, RJ LeBlond 6088 (NCU); **Richmond Co.:** Sandhills Game Land, Joes Creek at SR 1610 bridge, 26 Apr 1994, B van Eerden 877 (AUA, BRIT, MISS, NCSC, VPI, SWSL, WILLI); same place, 28 Mar 2000, PD McMillan 4401 (NCU); Sandhills Game Land, gasoline N of Tilley Street extension, streamhead community dominated by *Nyssa biflora*, *Magnolia virginiana*, and sphagnum moss, 6 July 2005, BA Sorrie 11639 (BAS); Sandhills Game Land, Clay Branch, boggy streamhead with *Carex collinsii*, 6 Jun 1994, BA Sorrie 8014 (BAS, NCU). **Scotland Co.:** Sandhills Game Land, Scotland Lane Annual Burn Site, 6 Apr 1994, B van Eerden 848 (NCSC, US); same place, locally abundant, 31 Mar 1997, PD McMillan 2130 (CLEMS, NCU, USCH); Sandhills Game Land, just N of Scotland Lane, 1 km SW of SR 1328, forming mats in streamhead pocosin, 18 Apr 2000, PD McMillan 4438 (BRIT, CLEMS, DUKE, FSU, GA, GH, MICH, MO, NCU, NY, PH, VPI); Sandhills Game Land, Bagget Lake Lane at Bones Creek, streamhead pocosin dominated by *Nyssa biflora*, *Chamaecyparis thoides*, *Liriodendron tulipifera*, *Magnolia virginiana*, in sphagnum moss with *Rhynchospora leptocarpa*, 4 Jun 2004, BA Sorrie 11266 (APSC, NCSC); Sandhills Game Land, Tower Branch S of Scotland Lake, streamhead pocosin, scattered on mossy banks of blackwater creek, 20 Mar 1997, BA Sorrie 9140 (BAS, DUKE); same place, 28 Mar 2000, PD McMillan 4402 (NCU); Sandhills Game Land, S of Gardner Farm Lane, uncommon on sphagnum knolls in Piney Pools, 24 Jun 1994, BA Sorrie 8054 (NCSC, NCU); Sandhills Game Land, branch N of Beaver Dam Creek, streamhead with *Arundinaria tecta*, *Rhynchospora leptocarpa*, 8 Apr 1994, BA Sorrie 7832 (BAS, FSU, GH, MICH, US); Sandhills Game Land, headwaters of Beaver Dam Creek, 19 Apr 1994, B van Eerden 873 (NCU, WILLI); Sandhills Game Land, branch S of Little Muddy Creek, common in sphagnum moss under *Arundinaria tecta*, 16 Mar 1994, BA Sorrie 7815 (BAS, NCSC). **SOUTH CAROLINA. Aiken Co.:** Savannah River Site, N of Road 8-1, floodplain on mossy hump by water, 30 Mar 1994, PE Hyatt 5810 (MICH); Tinker Creek at SC route 781, 12 Apr 1995, B van Eerden 1261 (APSC, CLEMS, DUKE, FLAS, GA, MO, NCU, NY, PH, USCH). **Aiken/Barnwell Cos.:** Tinkers Creek, streamhead bordering seepage forest, 12 Apr 1997, PD McMillan 2206 (NCU). **Barnwell Co.:** Savannah River Site, tributary to Meyer's Branch, hardwoods, 5 Apr 1994, PE Hyatt 5823 (MICH). **Chesterfield Co.:** Sandhills National Wildlife Refuge, Ham Creek, 23 Apr 1995, B van Eerden 1290 (CLEMS, FSU, GH, US, USCH); Sand Hills State Forest, Barefoot Seeps, 23 Apr 1995, B van Eerden 1271 (LSU, MICH, MISS, NCU, NLU, PH, TENN, USCH, VPI); Sand Hills State Forest, streamhead, 2000, PD McMillan 4403 (NCU, USCH). **Greenville Co.:** Little Pinnacle Mountain, locally abundant along

borders of cataract bog, associated with *Sarracenia purpurea*, *Parnassia grandifolia*, *Oxypolis rigidior*, *Fothergilla major*, 24 May 2001, PD McMillan 5146 (CLEMS, NCU). **VIRGINIA. Caroline Co.:** Fort A.P. Hill Military Reservation, sphagnum hummocks of forested seepage swamp, with *Carex scorsa*, *C. collinsii*, and *C. atlantica* ssp. *atlantica*, 1.1 mi SW of Eubanks Corner along headwaters branch of Mill Creek, 17 May 2006, GP Fleming 15354 with K Taverna (VPI); Fort A.P. Hill Military Reservation, sphagnum hummocks of sloping sand-bottomed forested seepage swamp, with *Carex styloflexa*, *Carex atlantica* ssp. *atlantica*, and *Helonias bullata*, 0.65 mi NE of jct Rtes 2 and 629 along spring branch tributary of Turkey Track Creek, 17 May 2006, GP Fleming 15355 with K Patterson (VPI). **Isle of Wight Co.:** Blackwater Ecological Preserve, locally common in upper reaches of tributary of river, almost always rooted in mats of bryophytes growing on bases of tree trunks, on old stumps, and similar hummock-type microhabitats, associated with *Liquidambar styraciflua*, *Liriodendron tulipifera*, *Acer rubrum*, *Clethra alnifolia*, *Lyonia ligustrina*, *Symplocos tinctoria*, *Arundinaria gigantea*, *Woodwardia areolata*, 19 Jun 2001, JF Townsend 2562 (WILLI).

#### DISCUSSION

Among eastern North American species of the section *Acrocystis*, the new species keys readily to *Carex deflexa*. Both species produce terminal staminate spikes closely associated with overlapping, subsessile pistillate spikes on the primary (distal) inflorescence and also produce pistillate spikes on short basal peduncles. Both species have long lower pistillate bracts on the primary inflorescence. *Carex austrodeflexa* may be separated from *C. deflexa* by its longer perigynium beak (0.6–1 mm vs. 0.4–0.8 mm) and papillose perigynia, which are normally glabrous or glabrate with a relatively sparse pubescence concentrated at the base of the beak (vs. the rather copious and widespread pubescence of *C. deflexa*). The staminate spike of *C. austrodeflexa* is longer and thicker than that of *C. deflexa* (3–9 mm long and 1–2 mm thick vs. 2–5 mm. long and 0.5–1 mm thick), and the staminate scales are also proportionately larger. The length of the lowest pistillate bract in *C. austrodeflexa* is subequal to the staminate spike, although it may vary from shorter than to greatly exceeding the staminate spike (vs. typically exceeding the staminate spike in *C. deflexa*). Finally, the ranges of *C. deflexa* and *C. austrodeflexa* do not overlap. The former is a plant of arctic-boreal and north temperate regions, in the east extending southward to southern New England and disjunctly to the high Appalachians of West Virginia, North Carolina, and Georgia; the latter is confined to the coastal plain from southeastern Virginia to northwestern Florida, southwestern Alabama, and northwestern Louisiana.

*Carex austrodeflexa* could be confused with two other coastal plain species of section *Acrocystis* that produce basal pistillate spikes, *Carex umbellata* Schkuhr ex Willd. and *Carex tonsa* (Fern.) E.P. Bicknell. They differ by perigynium shape and indument, staminate spike characters, rhizome length, pistillate bracts, and habitat. *Carex austrodeflexa* has elliptic to narrowly obovate perigynia, whereas *C. umbellata* and *C. tonsa* have globose to broadly ovoid perigynia. Perigynia of *C. austrodeflexa* are glabrous to glabrate and with a papillose surface; those of *C. umbellata* are densely puberulent, those of *C. tonsa* sparsely puberulent or sometimes glabrous; neither has a papillose surface. In its distal inflorescences *C. austrodeflexa* always has a staminate spike closely associated with two pistillate spikes, whereas in *C. umbellata* and *C. tonsa* the staminate spike is associated with one pistillate spike or is solitary. *Carex austrodeflexa* differs from *C. umbellata* in its long slender red rhizomes and matted habit (vs. the short reddish to brown rhizomes and distinctively cespitose habit of *C. umbellata*). From *C. tonsa*, *C. austrodeflexa* may be separated by its slender, red-sheathed rhizomes (vs. short, thick rhizomes). The lower pistillate bracts of *C. austrodeflexa* are typically much longer than those of *C. umbellata* and *C. tonsa*, which have bracts usually much shorter than the staminate spike. Both *C. umbellata* and *C. tonsa* inhabit dry to xeric situations, often in full sun, whereas *C. austrodeflexa* grows in wet shaded streamheads and margins of small-stream swamps.

Finally, *Carex austrodeflexa* may be confused with two other members of section *Acrocystis*, *Carex emmonsii* Dewey ex Torr. and *C. floridana* Schweinitz. *Carex austrodeflexa* shares the bright red sheath character with *C. emmonsii*, and the two species occasionally grow together, but they are easily separated by the long-creeping rhizomes and basal pistillate spikes of *C. austrodeflexa*. Some plants of *Carex floridana* produce short fertile culms as well as long ones and thus resemble *C. austrodeflexa*, but the former is a much coarser plant, has leaves twice as wide as those of *C. austrodeflexa*, has longer, much thicker rhizomes forming clonal patches, has perigynia covered with short pubescence but non-papillate (vs. glabrous and papillate), and occupies dry to dry-mesic habitats.

One morphological character deserves special mention: papillose perigynia surfaces. No other species in section *Acrocystis* has this feature so prominent; all others are non-papillate or have small papillae obscured by trichomes (Reznicek *in litt.*, Poindexter *in litt.*). Thus, strongly papillose perigynia is a unique character state, and when coupled with its southern coastal plain range, makes *C. austrodeflexa* a highly distinctive species.

KEY TO SOUTHEASTERN COASTAL PLAIN ACROCYSTIS

(Adapted from Weakley 2008; Crins & Rettig 2002; Werier 2006)

1. Some spikes borne well above the middle of the culm, and also some pistillate spikes borne on short or elongate peduncles from the base of the culm.
  2. Terminal staminate spike 3–9 mm long, always associated with sessile pistillate spikes; perigynia elliptic or narrowly obovate, surface papillose \_\_\_\_\_ **Carex austrodeflexa**
  2. Terminal staminate spike 5–15 mm long, solitary or associated with a pistillate spike; perigynia broadly ovate to globose, surface pubescent to glabrous but not papillose.
    3. Perigynia subcoriaceous, 3.5–4.5 mm long, the body very sparsely short-pubescent or glabrous; leaf blades thick, stiff, deep green, spreading at maturity, 2–4.5 mm wide; plants loosely caespitose with short-ascending rhizomes; achenes brownish at maturity, shining, pitted \_\_\_\_\_ **Carex tonsa**
    3. Perigynia membranaceous, 2.2–3.2 mm long, the body short-pubescent; leaf blades thinnish, not stiff, light green, erect or ascending at maturity, 1.5–3 mm wide; plants densely caespitose; achenes, brownish-black or black at maturity, either minutely pitted or obscurely and irregularly pitted \_\_\_\_\_ **Carex umbellata**
1. All spikes borne close together well above the middle of the culm; no pistillate spikes borne on separate peduncles from the base of the culm.
  4. Plants with long rhizomes, forming clonal patches.
    5. Achene body mostly 1.5–1.7 mm long; fertile culms 7–17 cm tall, usually much shorter than leaves; pistillate scales mostly 3–3.7 mm long \_\_\_\_\_ **Carex floridana**
    5. Achene body mostly 1.2–1.3 mm long; fertile culms 20–43 cm tall; equaling or exceeding leaves; pistillate scales mostly 2.6–3 mm long \_\_\_\_\_ **Carex physorhyncha**
  4. Plants caespitose, not forming clonal patches.
    6. Achene body mostly 1.4–1.6 mm long; fertile culms mostly 2–20 cm tall.
      7. Culm height (4.5–)6.6–38(–51) cm tall, widest leaf (1.9–)2.3–4.5 mm wide \_\_\_\_\_ **Carex nigromarginata**
      7. Culm height 1.9–9.9(–13.7) cm tall, widest leaf 1.2–2.2(–2.5) mm wide \_\_\_\_\_ **Carex reznicekii**
    6. Achene body mostly 1.2–1.3 mm long, fertile culms mostly 17–35 cm tall.
      8. Staminate spikes 8.4–11 mm long, scales from median portion of spike with weak midrib not extending to tip \_\_\_\_\_ **Carex albicans**
      8. Staminate spikes 5–8.4 mm long, scales from median portion of spike with prominent midrib extending to tip or even slightly aristate \_\_\_\_\_ **Carex emmonsii**

HABITAT, PHENOLOGY

A distinctive feature of *Carex austrodeflexa* is its habitat: it is the only species within section *Acrocystis* in the southeastern United States restricted to wetlands. Moreover, its wetland habitats are embedded within the fire-maintained longleaf pine ecosystem (Christensen 1988; Peet & Allard 1993; Platt 1999). Within areas currently managed with fire, habitats of the new sedge burn every 2–5 years. Without fire, populations may persist for many years (pers. obs.), but precise data are lacking. *Carex austrodeflexa* occurs in two wetland community types. First, it inhabits seepage-fed streamheads (termed baygalls or steepheads in the Gulf Coastal Plain) and their ecotones. These streamheads are forested with *Acer rubrum* L., *Chamaecyparis thyoides* (L.) B.S.P., *Liriodendron tulipifera* L., *Magnolia virginiana* L., *Nyssa biflora* Walt., *Pinus palustris* P. Mill., and *P. serotina* Michx. Shrubs include *Clethra alnifolia* L., *Ilex coriacea* (Pursh) Chapm., *Ilex glabra* (L.) A. Gray, *Lyonia lucida* (Lam.) K. Koch, *Morella caroliniensis* (P. Mill.) Small, and *Toxicodendron vernix* (L.) Kuntze. Vines of *Smilax laurifolia* L. and the coarse grass *Arundinaria tecta* (Walt.) Muhl. also occur. *Sphagnum* (may include *S. palustre* L., *S. affine* Reynaud & Cardot, and *S. tenerum* Sull.) and other mosses are nearly always present, and *C. austrodeflexa* is most abundant within moss patches. Herbaceous associates include *Carex atlantica* Bailey, *C. collinsii* Nutt., *C. lonchocarpa* Willd., *Chasmanthium laxum* (L.) Yates, *Eupatorium pilosum* Walt., *Eurybia paludosa* (Ait.) Nesom, *Rhynchospora cephalantha* A. Gray var. *attenuata* Gale, *R. leptocarpa*

(Chapm. ex Britton) Small, *Sarracenia purpurea* L. var. *venosa* (Raf.) Fern., *Sarracenia rubra* Walt., *Solidago patula* Muhl. ex Willd. var. *strictula* Torr. & A. Gray, and *Xyris platylepis* Chapm.

Second, *Carex austrodeflexa* inhabits non-alluvial swamp forest (also called small-stream swamp forest) and especially their ecotones with wet, grass-sedge-herb savannas. In the outer coastal plain of North Carolina, several populations of *C. austrodeflexa* occur in association with many globally rare and restricted species, such as *Carex lutea* LeBlond, *Parnassia caroliniana* Michx., and *Thalictrum cooleyi* Ahles. Common associates include *Acer rubrum*, *Carex atlantica*, *Carex leptalea* Wahlenb., *C. lonchocarpa*, *C. styloflexa* Buckley, *Liriodendron tulipifera*, *Morella cerifera* (L.) Small, *Osmunda regalis* L. var. *spectabilis* (Willd.) A. Gray, and *Taxodium ascendens* Brongn. In this habitat *C. austrodeflexa* may be a patch dominant in the herb layer.

*Carex austrodeflexa* flowers early, beginning in late February and often peaking in the first two weeks of March in the Sandhills region of the Carolinas and eastern Georgia. It reaches its peak fruiting period in early and mid April. The populations on the outer coastal plain of North Carolina and on the Gulf Coastal Plain reach floral peak one to two weeks earlier than those in the inland portion of its range.

#### RARITY AND CONSERVATION

*Carex austrodeflexa* is not a rare plant from a global perspective. In our opinion it is merely overlooked, as from a short distance flowering plants can appear to be merely vegetative and fruiting culms wither rapidly following maturation. In North Carolina new populations are found almost annually without directed searches. We believe that many more populations will be documented in other southeastern states, once botanists learn its morphology and habitat. That said, however, we believe that chances of finding *C. austrodeflexa* increase significantly within areas managed with controlled burns.

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