

KEYS AND DISTRIBUTIONAL MAPS FOR NEBRASKA CYPERACEAE, PART 1:

BULBOSTYLIS, CYPERUS, DULICHIMUM, ELEOCHARIS,

ERIOPHORUM, FIMBRISTYLIS, FUIRENA, LIPOCARPHA, AND SCIRPUS

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ABSTRACT

Keys and distributional maps are provided for 9 genera and 43 species of Cyperaceae documented from Nebraska (excluding *Carex*). Two species—*Eleocharis elliptica*, and *Fimbristylis vahlii*—are newly reported for the State, while seven species attributed to the State in the *Flora of the Great Plains* (Great Plains Flora Association, 1986)—*Eleocharis compressa*, *E. verrucosa*, *E. wolfii*, *E. xyridiformis*, *Scirpus georgianus*, *S. smithii*, and *S. torreyi*—are deleted based on re-identifications, lack of specimen evidence, or specimens of doubtful provenance in the State. Notes on local systematic problems within the family are also included.

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With 115 species in ten genera in Nebraska, the sedge family (Cyperaceae) is the third largest family of vascular plants in the State. Its members are found in a wide variety of habitats from rocky, arid prairie to rich, shaded woodland but are primarily associated with wetland habitats, where they frequently are the most common constituents. All but one of our species (*Cyperus fuscus*, of very limited occurrence) are native to North America, and only yellow nutsedge (*Cyperus esculentus*) tends to be weedy.

Despite its size, this family has often been regarded as economically unimportant (e. g., Jones and Luchsinger, 1979), although *Carex filifolia* and *C. nebrascensis* are important forage plants for grazing animals (Hermann, 1970). Bulrushes (*Scirpus* spp.) and other Cyperaceae are important foods for waterfowl, muskrats and other marsh-dwelling wildlife. With the increased emphasis on identification, preservation, and restoration of wetland habitats among government agencies, many employees and consultants have been forced to become more familiar with this large and

often difficult family.

The first published report for Nebraska Cyperaceae was the long-outdated "On the sedges of Nebraska" by Bates (1914) which compiles distributional data for 103 species, varieties, and forms, but lacks keys. Kolstad (1966) covered our species of *Carex* in his doctoral dissertation (University of Kansas, Lawrence) and later (1971) wrote keys for Nebraska Cyperaceae and Juncaceae while at Kearney State College (the latter lists 108 species of Cyperaceae for Nebraska). Unfortunately, neither was published. The most recent published treatment of all Nebraska Cyperaceae is that in the *Flora of the Great Plains* (Great Plains Flora Association, 1986) (hereinafter referred to as the *Flora GP*). The keys in that treatment are rather spare, often rely on characters which are difficult to observe, and do not accommodate many atypical specimens such as glabrous forms of normally pubescent plants, which are often collected. Most beginning students and many professionals are often frustrated when trying to identify Nebraska Cyperaceae and either have to turn to one of a very few authorities on local Cyperaceae, or all too often avoid collecting the family altogether.

A resurgence in systematic research in the Cyperaceae (*Carex* in particular) and in floristic research in Nebraska since the 1980s has resulted in numerous changes to the sedge family treatment published in the *Flora GP*. This paper includes two species (*Eleocharis elliptica* and *Fimbristylis vahlii*) newly reported for the State, and seven species (*Eleocharis compressa*, *E. verrucosa*, *E. wolfii*, *E. xyridiformis*, *Scirpus smithii*, *S. georgianus*, and *S. torreyi*) that are deleted based on re-identifications, lack of specimen evidence, or specimens of doubtful provenance in the State. A paper by Rolfsmeier and Wilson, covering the

genus *Carex* in Nebraska, is currently in press. Known distributions of all species within Nebraska were last compiled nearly 20 years ago in the *Atlas of the Flora of the Great Plains* (Great Plains Flora Association, 1977) (referred to hereinafter as the *Atlas GP*), and many have changed considerably since, due both to recent field work and to correction of many erroneous records plotted in the *Atlas GP*.

The objectives of this paper are to provide "user-friendly" keys to the Cyperaceae of Nebraska and up-to-date distributional maps for all our species and to point out local systematic problems based on field observations.

METHODS

The keys appearing here are original, but borrow much of their organization from the excellent treatments of the family in Steyermark (1963) and Voss (1972). Many of the characters employed are taken from these sources and treatments by Gleason and Cronquist (1991), Kolstad (1986), Larson (1993), and other works cited in the body of the paper. Original characters based on field and herbarium observations of Nebraska plants are also incorporated, particularly vegetative and floral characters, which are often left out of many keys. Descriptions of species are limited to the key; more complete descriptions are available in the *Flora GP*.

The maps were compiled wholly from observations of specimens, rather than from literature reports. The primary sources of data were the herbaria of the University of Nebraska-Lincoln (NEB), University of Nebraska at Omaha (OMA), University of Nebraska at Kearney, Chadron State College (CSCN), and my own personal collections. Additional data have been included from the herbaria of the University of Kansas (KANU), the Rocky Mountain Herbarium in Laramie, Wyoming (RM), the University of South Dakota (SDU) and the South Dakota State University (SDC), Wayne State College, Doane College, Cedar Point Biological Station of the University of Nebraska-Lincoln, Crescent Lake National Wildlife Refuge, Nebraska Game and Parks Commission, and the personal collection of Robert Kaul at UNL, all (from Wayne State on) in Nebraska. All distributional data are maintained by the author in a computerized database and were mapped directly from that database using MapMaker™ software.

KEYS TO THE CYPERACEAE OF NEBRASKA

The Cyperaceae are most likely to be confused with two other monocot families, the rush family (Juncaceae)

and the grass family (Poaceae), but they are distinguishable by floral and vegetative characters. The rushes have flowers which are borne individually (though sometimes clustered in sparse to dense heads) each with a perianth of 6 similar scalelike tepals and sometimes 1 or 2 inconspicuous bracts at the base. The flowers of the Cyperaceae and grasses lack the conspicuous 6-parted perianth of the rushes and are always subtended by 1 or 2 scalelike structures which completely cover or enclose the flower. In the grasses, each flower lacks a perianth (tiny rudimentary perianth parts are often present) and is subtended by 2 unequal bracts called the lemma and palea, whereas a perianth of scales or bristles may be present in the Cyperaceae and each flower is subtended by a single fertile scale. Both families have flowers arranged in groups called spikelets with sterile scales at the base. The grasses have 2 such scales (called glumes) whereas the Cyperaceae have 0-3 sterile scales per spikelet. Additionally, in most genera of the Cyperaceae the inflorescence is subtended by leaflike bracts (stemlike in some *Scirpus*, absent in *Eleocharis*), which are not present in grasses.

Vegetatively the Cyperaceae have commonly been distinguished from grasses by their 3-sided stems and 3-ranked leaves, although this character is useful only for most species of *Carex*, *Cyperus*, and some *Scirpus*. Most grasses and rushes have leaf sheaths which are at least partially open on the ventral face whereas all our Cyperaceae have closed sheaths. Additionally the culms (aboveground stems) of most grasses are hollow and have swollen nodes, whereas they are solid and lack swollen nodes in the Cyperaceae (except for *Dulichium*).

Members of the Cyperaceae have a reputation (only partly deserved) as notoriously difficult to key to species. One of the major reasons is that many collected specimens are incomplete or immature. Whenever possible, underground parts should be collected, since presence of rhizomes is a frequently-used character to separate species of *Carex*, although the reliance on this character in the keys is kept to a minimum. More importantly, specimens should be collected once the achenes have matured (but before they have fallen from the plants). Achene morphology is particularly important in identification of *Eleocharis*, and the perigynium surrounding the achene is a primary taxonomic feature in *Carex*. Immature specimens are the primary reason most Cyperaceae are misidentified, although whenever possible floral and vegetative characters are included in the keys in case mature material is not available. Measurements indicate length unless otherwise stated, and geographic notations are for Nebraska only.

KEY TO THE GENERA

- 1 Culms (aboveground stems) naked, without evident leaves, but bladeless sheaths may be present at the base
 - 2 Inflorescence of a single spikelet at the tip of the culm*Eleocharis*
 - 2 Inflorescence of 2-many spikelets, or if 1, then appearing to arise below the tip of the culm*Scirpus*
- 1 Culms with evident leaves, at least at base
 - 3 Flowers unisexual, the pistillate flower and achene enclosed in a saclike structure (perigynium). *Carex*
 - 3 Flowers bisexual, with a pistil and 1-several stamens; perigynium not present
 - 4 Spikelets with flowers arranged in 2 opposite ranks, the spikelet flattened at maturity
 - 5 Spikelets borne in the axils of short, stiff leaves along the length of hollow, jointed culms; achenes subtended by bristles*Dulichium*
 - 5 Spikelets borne in a terminal inflorescence subtended by several leaflike bracts; culms solid, not jointed; leaves arising from the base; achenes not subtended by bristles *Cyperus*
 - 4 Spikelets with flowers spirally arranged in several ranks, the spikelet cylindrical or cone-shaped, not flattened
 - 6 Inflorescence appearing to arise laterally below the tip of the culm (actually subtended by an erect bract that appears to be a continuation of the culm)
 - 7 Plants very slender, mostly less than 10 cm tall, with culms less than 0.5 mm thick; bristles absent at base of achene, but a small, translucent scale often present*Lipocarpa*
 - 7 Plants taller or with thicker culms (usually both); bristles 1-numerous, but no translucent scale evident at base of achene
 - 8 Achene subtended by numerous silky bristles much longer than the scale; rare in Sandhills fens*Eriophorum*
 - 8 Achene subtended by 1-8 bristles, not silky in appearance, shorter than the scale; widespread*Scirpus*
 - 6 Inflorescence arising from the tip of the culm
 - 9 Achene subtended by 3 slender bristles alternating with 3 petal-shaped scales ..*Fuirena*
 - 9 Achene subtended by 0-numerous slender bristles, petal-shaped scales absent
 - 10 Achene subtended by 1-numerous slender bristlesgo back to couplet 8
 - 10 Bristles absent at base of achene
 - 11 Style not swollen at the base; culms stout (over 3 mm thick 1 cm below inflorescence) and 3-sided; leaf blades over 5 mm wide*Scirpus*
 - 11 Style swollen at or near the base; culms slender (1 mm or less thick at 1 cm below inflorescence) and rounded; leaf blades under 3 mm wide
 - 12 Swollen style base persistent on the achene as a distinct tubercle darker than the achene body and set off from it by a line*Bulbostylis*
 - 12 Swollen style base deciduous, not present on mature achene*Fimbristylis*



Map of Nebraska counties

BULBOSTYLIS Kunth

Annual herbs with narrow, linear basal leaves. Perianth lacking. Base of style swollen and persistent as a minute tubercle atop the achene.

Bulbostylis capillaris (L.) Clarke: Wet, sandy soil along rivers and ponds. Scattered and probably overlooked in Nebraska, sparingly present in the Sandhills. This diminutive annual is very similar to the less-commonly collected *Fimbristylis autumnalis*, particularly in young

material. Flowering specimens of *Bulbostylis* can be distinguished by the pubescent fertile scales obtuse at the tip and by the bracts often with slender marginal hairs.

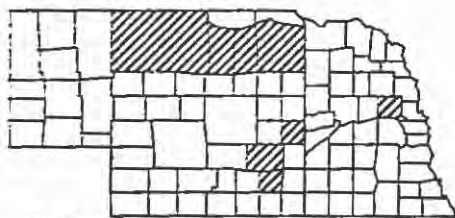
CYPERUS L. (FLATSEGE)

Annual or perennial herbs. Culms 3-angled. Spikelets distichous (borne in 2 ranks on opposite sides of the rachilla) in a terminal inflorescence.

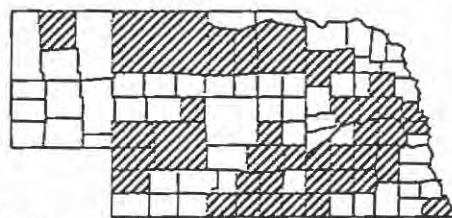
Botanists in the tropics often split *Cyperus* into several segregate genera. If these changes become more widely accepted, two of our species (*C. lupulinus* and *C. schweinitzii*) would be transferred to the genus *Mariscus*.

1. Tips of scales curved conspicuously outward; spikelets in dense hemispherical to nearly globose clusters; stamen 1; sweet-scented annuals
 2. Scales with a conspicuous outwardly-curved awn 0.5–1 mm, and 3–4 prominent nerves on each side; plants usually reddish at the base *C. squarrosus*
 2. Scales with a narrow, outwardly-curved point, without a conspicuous awn, with 1 strong but often inconspicuous nerve on each side at the edge of the broad green midrib; plants usually greenish or straw-colored at the base *C. acuminatus*
1. Tips of scales not conspicuously curved; spikelets in loose subglobose clusters or cylindrical spikes; stamens 2 or 3; annuals and perennials, not sweet-scented
 3. Styles 2, achenes lens-shaped (with 2 convex sides); scales usually at least partly purple-brown pigmented; spikelets in loose subglobose clusters
 4. Styles persistent and conspicuously exerted 2–4 mm beyond the tips of the scales at maturity, divided nearly to the base; scales with a narrow purple-brown marginal band along each side (usually widest at the tip), the center of each side not pigmented *C. diandrus*
 4. Styles not persistent and usually exerted no more than 1 mm, united for ½ of their length from the base; scales pigmented (sometimes faintly) in the center of each side, especially toward the base (sometimes unpigmented) *C. bipartitus*
 3. Styles 3, mature achenes clearly 3-sided; scales pale green or yellow to orange brown at maturity (except in the rare *C. fuscus*, which has dark purple-brown scales); spikelets variously arranged
 5. Scales dark purplish-brown (nearly black) at maturity; spikelets in loose subglobose clusters; rare plants of sandy soil along the Platte River *C. fuscus*
 5. Scales lighter in color (pale straw-colored to orangish brown); spikelets not arranged in loose subglobose clusters (densely subglobose in *C. lupulinus*); widespread
 6. Spikelets closely arranged on the axis of the inflorescence and appearing to arise in clusters of several to many, at least the uppermost spikelets strongly ascending at maturity; perennials with a bulbous thickening at the base of the culm (below ground level); most often in well-drained uplands (occasionally in meadows and lawns)
 7. Bracts at the base of the inflorescence strongly ascending at maturity, the inflorescence usually arranged in loose clusters of 1–4 ascending spikelets; scales with a short mucronate tip at least 0.3–1.5 mm and with 4–6 distinct nerves on each side; culms usually scabrous below the bracts; achenes 2.2–2.6 mm; common in sandy soils *C. schweinitzii*
 7. Bracts at the base of the inflorescence widely spreading to reflexed at maturity, the inflorescence usually of 1–several dense hemispheric to subglobose heads with many spikelets; scales narrowed to a point, occasionally with a very short mucronate tip less than 0.3 mm, and with 2 faint nerves on each side; culms glabrous below the bracts; achenes 1.2–2.2 mm; frequent in a variety of soils *C. lupulinus*
 6. Spikelets pinnately arranged on the axis of the inflorescence, forming short-cylindrical spikes, most spikelets spreading at nearly a right angle to the axis when mature; annuals and perennials not bulbous-thickened at the base (usually with a cormlike thickening in *C.*

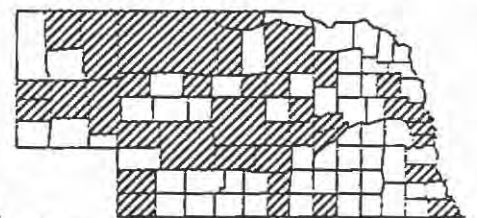
- strigosus*); most often in moist ground and wetlands, sometimes in disturbed ground and lawns
8. Scales 1–1.5 mm, golden-brown to copper-colored when mature; achenes ivory to pale tan and smooth and shiny at maturity, 0.6–0.8 mm *C. erythrorhizos*
 8. Scales 1.7–4.5 mm, golden-yellow to reddish-brown; achenes tan to brown and minutely cellular-roughened under magnification, 1.1–2.3 mm
 9. Scales 3–4.5 mm, with yellowish-golden sides; achenes less than ½ the length of the scales; perennials with a thickened cormlike base (plants will often flower the first year before this structure has formed)..... *C. strigosus*
 9. Scales 1.7–2.7 mm, usually tinged with reddish or brown; achenes more than ½ the length of the scales; annuals or perennials with slender rhizomes
 10. Perennials with numerous scaly rhizomes scarcely thicker than the roots, but distinguishable from them by the presence of non-overlapping scales (rhizomes ultimately producing edible tubers at the tips); rachilla of the spikelets remaining intact and dropping from the plant as a single unit at maturity; scales pale yellowish-brown to pale brown or straw-colored (paler than the following); mature anthers 0.8–1.5 mm; a weed of disturbed ground and moist places *C. esculentus*
 10. Fibrous-rooted annuals; rachilla of the spikelets readily breaking between the achenes into segments consisting of a single achene and scale; scales yellowish-brown to brown or reddish-brown; anthers 0.2–0.6 mm; moist places
 11. Scales yellowish-brown to brown, not overlapping on the same side of the spikelet, the tip of one scale not reaching the base of the scale directly above it; achenes narrowly cylindrical, 1.7–2.0 mm; uncommon in the Sandhills *C. engelmannii*
 11. Scales reddish-brown to brown, the tip of each one overlapping with the base of the scale immediately above on the same side; achenes obovoid-short cylindrical, 1.0–1.4 mm; common, widespread *C. odoratus*



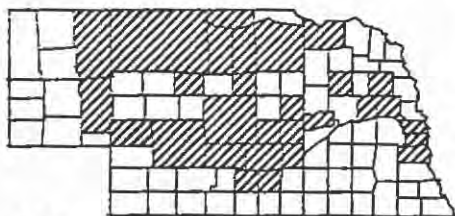
Bulbostylis capillaris



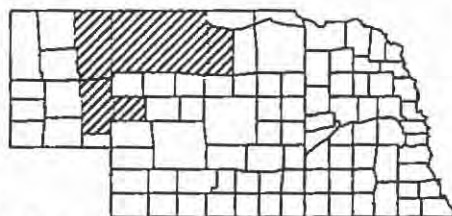
Cyperus acuminatus



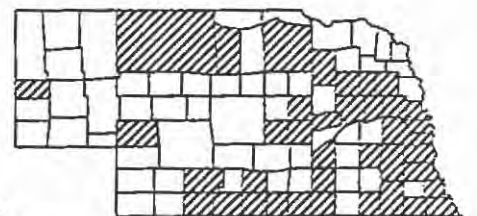
Cyperus bipartitus



Cyperus diandrus



Cyperus engelmannii



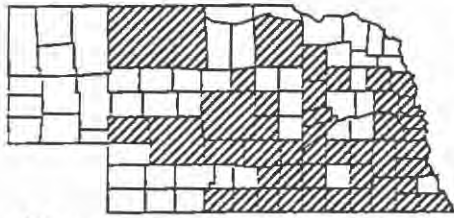
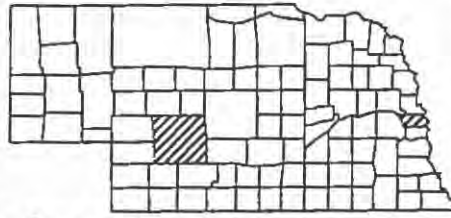
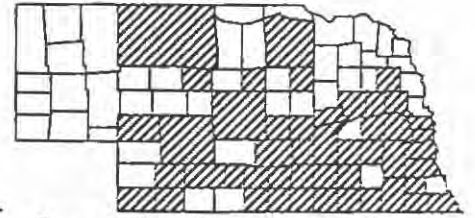
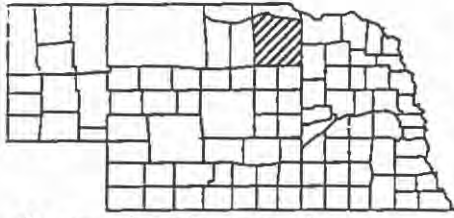
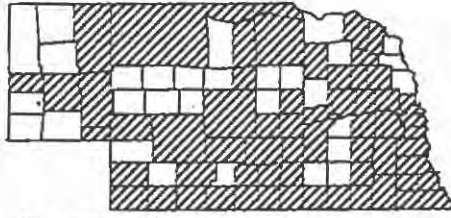
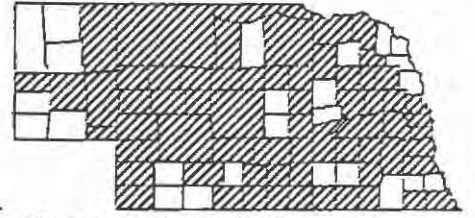
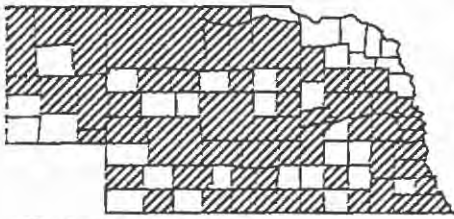
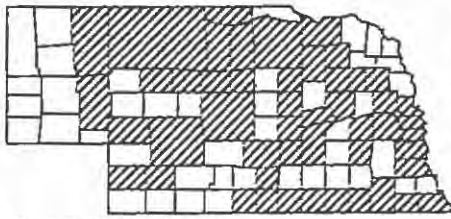
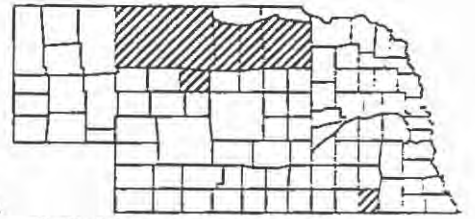
Cyperus erythrorhizos

Cyperus acuminatus Torr. & Hook. ex Torr.: Sandy or muddy margins of ponds and streams, frequently in playas and other temporarily wet areas. Statewide but less common in w, and never exceptionally abundant. Dried specimens of this and *C. aristatus* frequently have a pleasant sweet odor described as similar to that of dried sweetclover (*Melilotus* sp.).

Cyperus bipartitus Torr., brook flatsedge [*C. rivularis* Kunth]: Wet, sandy shores and margins of rivers and ponds. Widespread in appropriate habitats throughout. Occasionally forming mats of threadlike culms of which

many are sterile, resembling *Eleocharis acicularis*; usually some fertile culms present in these populations, though they frequently bear only a single spikelet.

Cyperus diandrus Torr.: Wet, sandy shores and banks, frequently along rivers. Widespread in Nebraska along the Platte, Loup, and Elkhorn rivers and elsewhere in the Sandhills, less common westward. Frequently growing with *C. bipartitus*, which it resembles, but distinguishable by the "shaggy" appearance of its spikelets, due to the long-exserted styles, and the coloration of the scales.

*Cyperus esculentus**Cyperus fuscus**Cyperus lupulinus lupulinus**Cyperus lupulinus macilentus**Cyperus odoratus**Cyperus schweinitzii**Cyperus squarrosus**Cyperus strigosus**Dulichium arundinaceum*

Cyperus engelmannii Steud.: Sandy shores of lakes in the Sandhills. Apparently uncommon, though perhaps overlooked. Resembles an aberrant form of the much more common *C. odoratus* and is distinguished from it by its non-overlapping scales which often point outward toward the tip and slightly expose the rachilla, giving the spikelets a jagged, zig-zag appearance, especially in dry material. Some authors have lumped this species with *C. odoratus*, though it is maintained here because of its geographic integrity within the State. For a discussion of this problem, see Mears and Libby, 1995.

Cyperus erythrorhizus Muhl., red-rooted flatsedge: Muddy or sandy shores and stream margins. Widespread but not particularly common in the e portion, uncommon westward and apparently absent from the Panhandle. Often collected immature and superficially resembling *C. odoratus*, with which it often grows, but distinguishable by its shorter scales, even when young. Mature specimens are easily recognized by the rich copper-colored scales which are very densely grouped on the rachilla.

Cyperus esculentus L., yellow nutsedge: Moist, often muddy shores, ditches, banks; more often a weed of roadsides, waste ground and yards. Common in the e $\frac{2}{3}$, rare to absent in the w $\frac{1}{3}$. Most easily distinguished by the slender, scaly rhizomes among the roots. If the underground parts are not collected it may be confused with *C. odoratus*, which is quite similar. It can be distinguished from that species by the larger anthers, pale brown to straw-colored scales, and spikelets noticeably separated on the rachis (those in *C. odoratus* are densely crowded).

Cyperus fuscus L. A rare sedge known only from two widely separated locations along the Platte River (In Lincoln and Douglas counties) but to be expected at intervening

locations.

Cyperus lupulinus (Spreng.) Marcks [*C. filiculmis*, in part]: Dry ground in upland prairie and open woods, often where sandy. Generally restricted to sandy meadows westward. Occasionally in lawns. Two subspecies are present in the State:

1 Scales 2.5–3.5 mm, loosely covering and surpassing the achene; spikelets densely to loosely clustered, with 6–22 flowers. The common subspeciessubsp. *lupulinus*

1 Scales 1.8–2.5 mm, fitting firmly over and scarcely longer than the achene; spikelets densely clustered, with 3–7 flowers. Rare ..subsp. *macilentus*

Subspecies *lupulinus* is the common subspecies in Nebraska, found throughout the range of the species, while subsp. *macilentus* (Fern.) Marcks was collected only once from Ewing, Holt County in 1897. In e Nebraska, subsp. *lupulinus* is frequently found with *C. schweinitzii*, and intermediates are generally common. Reports of *C. houghtonii* in the *Atlas GP* (a species reportedly derived from hybridization between subsp. *macilentus* and *C. schweinitzii*) are probably based on these apparent hybrids. These plants will likely key to *C. schweinitzii*; see comments under that species.

Cyperus odoratus L. [*C. ferruginescens* Boeck.]: Wet sandy and muddy soil, shores, riverbanks, marshes. Probably our most common, widespread species, though rare to absent in the Sandhills and the w $\frac{1}{2}$ of the Panhandle. Most likely to be confused with *C. engelmannii*, *C. erythrorhizus*, or *C. esculentus*; see comments under those species.

Cyperus schweinitzii Torr.: Sandy soils in upland prairie or along rivers. Statewide and common in the w and c

parts, uncommon in the s-e and apparently also the w ½ of the Panhandle. This species commonly grows with *C. lupulinus* subsp. *lupulinus* and intermediates are not uncommon. These plants often resemble *C. schweinitzii*, but have fewer inflorescence branches, leafy bracts that are more broadly spreading, and culms that are slightly scabrous. They are frequently found with the parent species, and although seed set is lower in the hybrids, backcrossing appears to result in a continuum of intermediates in some populations (Marcks, 1974), particularly in the e ½.

Cyperus squarrosus L. [*C. aristatus* Rottb.]: Usually sandy, but sometimes muddy soil of banks, shores, and moist depressions, infrequently in disturbed prairie and wet lawns. Statewide, often quite common. Sometimes found growing with *C. acuminatus* and distinguishable from it, even when immature, by the reddish coloration at the base of the plant.

Cyperus strigosus L.: Wet ground in marshes and along margins of ponds. Widespread, though uncommon to absent in the Panhandle. Our largest species, it is generally not confused with other flatsedges when mature.

DULICHIMUM Rich. ex Pers.

Rhizomatous perennial. Culms hollow, terete to obtusely 3-angled. Spikelets distichous (borne in 2 ranks on opposite sides of the rachilla), axillary.

Dulichium arundinaceum (L.) Britt. Marshes and fens.
In n Sandhills and Jefferson County.

ELEOCHARIS R. Br. (SPIKERUSH, SPIKESEDGE)

Tufted annuals or rhizomatous perennials. Culms naked, though bladeless sheaths present at base. Inflorescence a terminal spikelet subtended by 0–3 sterile scales but no leaflike bracts. Achene with an apical caplike tubercle (in most species).

1. Some culms arched over and rooting at the tips; plants of s-w*E. rostellata*
1. Culms erect or ascending, never rooting at the tips
 2. Styles 3-branched, achenes with 3 sides or 3-angled (rarely 2-sided)
 3. Tubercle of achene poorly differentiated, appearing as a beaklike continuation of the achene body (though often differently colored than the body), not set off at the base by a line or constriction
 4. Tubercle of achene broadly deltoid, set off from the body by an inconspicuous line or constriction (often not apparent on immature achenes); annuals forming conspicuous tufts; wide-spread species of muddy, drying sites*E. ovata*
 4. Tubercle of achene beaklike and confluent with the achene body (best observed in fully mature achenes), without a line or constriction at the base; perennials with rhizomes or stolons; of limited distribution in Nebraska
 5. Culms short and slender, 1–3 dm tall and < 1 mm wide, not flattened; spikes short (4–8 mm), usually with < 10 flowers, and without a sterile scale at the base; rarely collected from fens in the n Sandhills*E. quinqueflora*
 5. Culms taller and broad, 4–10 dm tall and 1–2 mm wide, somewhat flattened at least below the spike; spikes longer (8–13 mm), with mostly 10–20 flowers and subtended by a sterile scale. Infrequently collected, though locally abundant in the Republican River drainage in s-w*E. rostellata*
 3. Tubercle of achene well differentiated, set off from the body of the achene by a line or a conspicuous constriction and appearing as a distinct apical cap
 6. Culms very slender and threadlike, 0.1–0.4 mm wide; plants often forming matlike colonies; achenes white to pale gray, with conspicuous longitudinal ridges and numerous, minute, parallel cross-bars*E. acicularis*
 6. Culms broader, 0.5–2 mm wide; plants sometimes tufted, but not forming matlike colonies; achenes straw-colored to golden yellow or olive to dark brown, smooth to roughened and without longitudinal ribs or cross-bars
 7. Tufted fibrous-rooted annuals (rarely with inconspicuous rhizomes among the tufted roots); achenes smooth and 2-sided (although styles 3-branched), straw-colored to olive or dark brown, tubercles broad-based, ¾ as broad as the achene body or broader, and short, flattened, and scarcely constricted at the base; frequently on shores or other temporarily wet sites*E. ovata*
 7. Strongly rhizomatous perennials with scattered to loosely-clustered culms; achenes reticulate-roughened and 3-sided, golden-yellow to brown, tubercles not-broad-based,

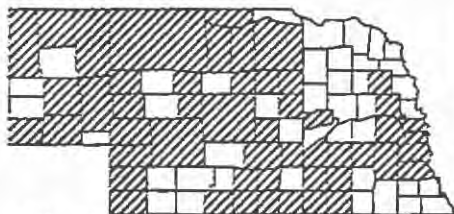
- flattened to deltoid and set off from the achene body by a conspicuous constriction; typically in wet meadows and seeps, sometimes in upland prairie*E. elliptica*
2. Styles 2-branched, achenes with 2 sides or 2-angled
 8. Tufted fibrous-rooted annuals (rarely with inconspicuous rhizomes); achenes 0.5–1.5 (1.7) mm (including tubercle); anthers 0.3–0.8 mm; shores and temporarily wet sites
 9. Mature achene dark purplish to black, tubercle minute; rare*E. atropurpurea*
 9. Mature achene pale yellow to olive or brown, tubercle conspicuous, broad, and flattened; frequent*E. ovata*
 8. Rhizomatous perennials; achenes 1.5–2.8 mm (including tubercle); anthers (1) 1.3–2.5 mm. Marshes and other wet areas including temporarily wet sites
 10. Spikelet with a single sterile scale at the base, completely encircling the culm or nearly so; scales at least halfway up the spikelet obtuse or rounded to slightly acute at the tip; culms 0.5–1.5 mm wide (when pressed)*E. erythropoda*
 10. Spikelet commonly with 2 or 3 sterile scales at the base (some culms may have only 1), the lowermost usually not encircling the culm; scales at the middle of the spikelet acute to acuminate (rarely obtuse) at the tip; culms 0.5–5 mm wide (when pressed)*E. palustris*

Eleocharis acicularis (L.) R. & S., hairgrass: Sandy to muddy shores of ponds and moist depressions, often forming dense mats. Common statewide. *Eleocharis parvula* (R. & S.) Link ex Bluff & Fingerh. has been reported from all the states bordering Nebraska with the exception of Wyoming. It resembles a diminutive *E. acicularis* but has a beaklike tubercle not constricted at the base, and will probably key to *E. quinqueflora*. It is often reported from wet saline or alkaline sites, and could show up in the appropriate habitat statewide. *Eleocharis wolfii* (Gray) Patt. was reported for Nebraska in the *Atlas GP* and may be separated from *E. acicularis* by its flattened culms 1–2 mm wide and scales about 3 mm long as opposed to 2 mm in *E. acicularis*. The specimens which

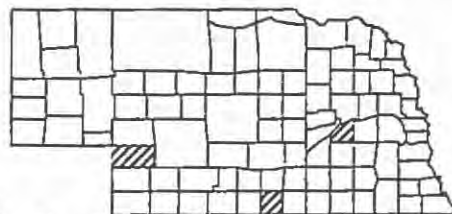
were the bases of these reports are indistinguishable from *E. acicularis* except for the presence of a few slightly flattened culms in a few specimens. It appears that *E. wolfii* is very rare in the Great Plains, if present at all.

Eleocharis atropurpurea (Retz.) Kunth: Sandy to muddy shores, playas, and other drying sites. Collected fewer than 6 times from widely scattered localities. This species was last collected in 1972 from a pond in Polk County. Previous collections were made by William Tolstead in 1941. This tiny, inconspicuous species looks like a dwarf *E. ovata*, and should be sought particularly in playa and rain basin habitats in s Nebraska.

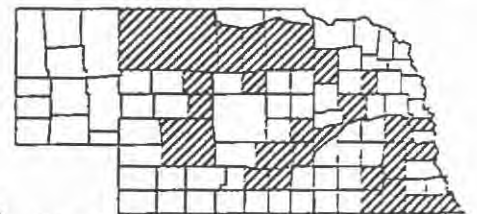
Eleocharis elliptica Kunth [*E. tenuis* (Willd.) Schultes var. *borealis* (Svenson) Gleason, *E. compressa* Sulliv. of Ne-



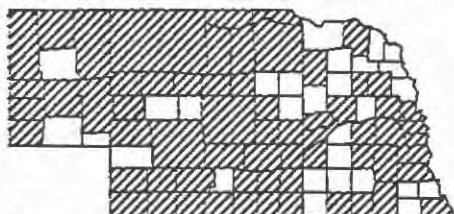
Eleocharis acicularis



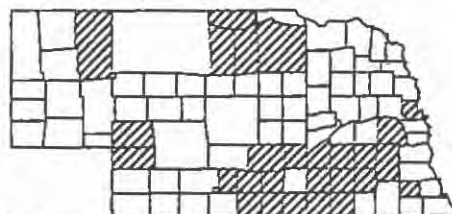
Eleocharis atropurpurea



Eleocharis elliptica



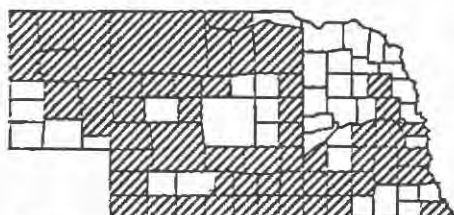
Eleocharis erythropoda



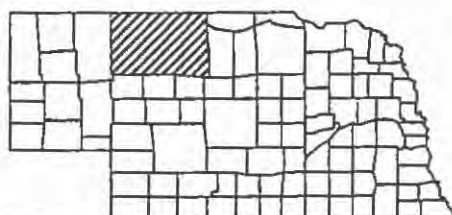
Eleocharis ovata engelmannii



Eleocharis ovata obtusa



Eleocharis palustris



Eleocharis quinqueflora



Eleocharis rostellata

braska reports] Low prairie, marshy ground, sometimes in upland prairie. Widespread, though less common westward. Apparently never common with us. For many years, our specimens of this variable and apparently poorly understood entity were known as *E. compressa*, a species whose taxonomic disposition over the years has been anything but certain. Svenson (1957) distinguished that species on the basis of its flattened culms and whitened, bifid acuminate scale tips, characters best developed in plants from the e and s-e portion of its range. Specimens from Ohio and Tennessee are easily identified by broad, distinctly-flattened culms and pale brown, deeply bifid scales, and are usually found growing on limestone. Our plants have wiry culms slightly flattened at best, and dark purple-brown, slightly bifid scales which fit Svenson's description of *E. compressa* more closely than that of *E. elliptica*, with which, he states, *E. compressa* intergrades along the edge of its range. In fact, with the exception of these acuminate, bifid scale tips, our plants are indistinguishable from typical *E. elliptica*, and a few collections I have seen from the Sandhills lack the acuminate scale tips altogether. In several more recent works such as Drapalik and Mohlenbrock (1960), Voss (1972), and Gleason and Cronquist (1991), the shape and number of vascular bundles in the culms (9-14 in *E. compressa*, 4-8 in *E. elliptica*) is considered the primary diagnostic feature rather than shape of the scales. Hence the name *E. compressa* is here reserved for the flat-stemmed eastern plants, whereas our material is considered *E. elliptica*. This problem might be resolved in the forthcoming *Flora of North America*. In our area, *E. elliptica* is most likely to be confused with *E. erythropoda* or a small *E. palustris*. It is easily distinguished from both species even when immature if the underground parts are collected. *E. elliptica* has stout rhizomes with strongly overlapping scales, whereas *E. erythropoda* and *E. palustris* have slender stolon-like rhizomes with distinctly separated scales. When extremely mature, the golden achenes often stay attached to the plant even after the scales have fallen. Reports of *E. verrucosa* (Svens.) Harms (as *E. tenuis* var. *verrucosa*) in the *Atlas GP* were probably based on *E. elliptica*. *E. verrucosa* is a s-e species which could possibly show up in the s-e corner, and is distinguished from *E. elliptica* by its slender, capillary culms and achenes with irregular, wartlike bumps on the surface.

***Eleocharis erythropoda* Steud.:** Wet areas, marshes, low prairie, seepages and along streams. Likely our most common species. *E. erythropoda* is a member of the notoriously difficult *E. palustris* complex. In recent years, most manuals have treated our North American representatives as either a complex of wildly intergradient species or as one broad, unwieldy entity. I agree with Mohlenbrock and Drapalik (1960) that it is best to recognize *E. erythropoda* as a separate species on the basis of a relatively stable combination of a single sterile scale at the base of the spike and reddish-purplish brown scales (when not infected with smut) with rounded tips. Cronquist et al. (1977) commented that there are no clear ecogeographic correlations between segregate species, although at least in Nebraska, *E. erythropoda* appears most commonly in sites that are not subject to widely

fluctuating water levels, while the others are often common in playas, rain basins, irrigation ditches and other frequently-inundated sites to the exclusion of *E. erythropoda*. It may be wise to recognize this species as a variety of *E. palustris*.

***Eleocharis ovata* (Roth) R. & S. [*E. obtusa* (Willd.) Schultes]:** Often in muddy soil in drying sites, lake margins, wet ditches. Common in s-e and s-c Nebraska, scattered n and w. The name *E. ovata* has priority over *E. obtusa* as used in the *Flora GP*. Two relatively distinct varieties are present in Nebraska:

- 1 Tubercle depressed-deltoid, mostly less than $\frac{1}{4}$ as long as the achene body; perianth bristles usually absent (be careful not to mistake the bristles for the filaments, which sometimes persist), when present shorter than the achene (including tubercle); spikelet oblong-cylindrical to ovate, scales usually pale brown var. *engelmannii*
- 1 Tubercle deltoid, $\frac{1}{2}$ - $\frac{1}{3}$ as long as achene body; perianth bristles usually longer than achene (including tubercle) or rarely absent; spikelet ovate to oblong, scales usually reddish-brown var. *obtusa*

Variety *engelmannii* (Steud.) Britt. [*E. obtusa* var. *ovata* (Roth) Drapalik & Mohlenbrock, of Great Plains reports] is common in drying sites, rain basins, playas. State-wide, but most commonly collected from s-c, rare to absent in the Sandhills and Panhandle. Occasional specimens may have some achenes with tubercles resembling those of var. *obtusa*. Var. *obtusa* (Willd.) Kükenth. ex Skottsbo. is occasional along shores, streams, drying sites, primarily in the e $\frac{1}{2}$, most commonly collected s and e of Lincoln. Intermediates with var. *engelmannii* are occasionally collected in the Lincoln area. Typical var. *ovata* is found to the n and e of Nebraska.

***Eleocharis palustris* (L.) R. & S. [*E. macrostachya* Britt., *E. smallii* Britt., *E. xyridiformis* Fern. & Brackets, of Nebraska reports]:** Wet places, marshes, lake margins, playas and wet ditches. Common throughout except in the e $\frac{1}{2}$. As here treated, *E. palustris* consists primarily of two species recognized in the *Flora GP*: *E. macrostachya* and *E. smallii*, which are supposedly the principal w and e phase of *E. palustris* in North America. The characters used to separate the two are extremely variable, and occur in all combinations. Traditionally, plants having narrow, firm, wiry culms, spikes with acute tips, and acuminate fertile scales have been called *E. smallii*, while plants with broad, soft, often flattened culms, spikes with acuminate tips, and fertile scales ovate to acute at the tip have been segregated as *E. macrostachya* (Fernald and Brackett, 1929; Svenson, 1957; and Steyermark, 1963). In our area, plants referable to *E. macrostachya* vary greatly in culm width and spike characters and appear to intergrade completely with *E. smallii*, while those referable to *E. smallii* sometimes appear to approach *E. erythropoda*. Likewise, scale shape does not correlate with either culm width or spike shape in most specimens. Gilly (1946) and Mohlenbrock and Drapalik (1960) reported similar intergradation in Iowa and Illinois respectively. Efforts to clarify the situation in the Great Plains have unfortunately added to the confusion. Harms (1968) recognized *E. macrostachya* and *E. smallii* as separate species based on chromosomal data but he

did not reliably correlate cytological differences to morphology. His key separates *E. macrostachya* from *E. smallii* on the basis of sharply oblique tips and prominent V-shaped sinuses at the tips of the bladeless leaf sheaths. All material I have seen from Nebraska has leaf sheaths truncate to slightly oblique with shallow, obscure sinuses and should therefore key to *E. macrostachya*. Furthermore, he described *E. smallii* as having soft culms, and *E. macrostachya* with firm culms, opposite the traditional treatment (although Svenson (1957) allowed for these exceptions in his key). Treatments of this complex by Great Plains botanists since 1968 (Kolstad, 1986; Larson, 1993) have tended to follow Harms. There appears to be no geographical nor even populational integrity between these purportedly vicariant species in Nebraska. Another member of the *E. palustris* complex, *E. xyridiformis*, has added to the confusion. Harms (1968) reported this species as widespread in the Great Plains and separable from other members of the complex by its flattened stems. This condition, however, is very common in *E. macrostachya*. In fact, the description of *E. xyridiformis* in the *Flora GP* virtually matches Steyermark's concept of *E. macrostachya* in Missouri. In Fernald & Brackett's (1929) original description of *E. xyridiformis* it is considered to have only a single scale at the base of the spike, rather than the two described in the *Flora GP*. Furthermore they considered it a s-w species found only as far n as Kansas, and warned against confusing it with flat-stemmed forms of *E. mamillata* (later called *E. macrostachya*). It appears our reports of *E.*

xyridiformis in Nebraska represent a distinctive and widespread race of *E. macrostachya* which Bates (1914) recognized as *E. palustris* f. *compressa*. In light of the confusion, it seems wisest to combine our reports of *E. macrostachya*, *E. smallii*, and *E. xyridiformis* into a single, broadly-defined species until further studies can straighten out the situation.

Eleocharis quinqueflora (Hartman) Schwartz [*E. pauciflora* (Lightf.) Link.]: Wet, sandy, often boggy ground. Apparently restricted to fens in the Sandhills. Collected twice from Cherry County, in 1973 and 1982. It may be common in Sandhills fens but is very easy to overlook, appearing somewhat similar to a depauperate *E. erythropoda* but with long scales, giving the spikes a "jagged" appearance. *E. parvula* may key here. See note under *E. acicularis*.

Eleocharis rostellata (Torr.) Torr.: Wet meadows, streambanks, marshy ground and seeps. Locally common in the Republican River drainage in s-w, possibly elsewhere. This spikesege was collected along the Frenchman River in Chase County in 1992. All previous collections were made by William Tolstead in 1941. This plant is probably not uncommon, but it is easily overlooked. Fertile culms look like robust *E. palustris*, but the presence of arching sterile culms with roots at the tip give it away. The ones I saw were rooting just under the surface of the water, but they may also root in soil, forming loops which may catch the feet of unwary collectors.

ERIOPHORUM L. (COTTON-GRASS)

Perennial herbs. Perianth of numerous silky or cottony bristles, much exerted from the fertile scale at maturity.

- 1. Leaves 1-2 mm wide, triangular-channeled for their entire length; inflorescence subtended by a single, erect, slender bract shorter than the umbel, so that the inflorescence appears to arise from the side of the stem*E. gracile*
- 1. Leaves 2-6 mm wide, triangular-channeled only in the upper ¼; inflorescence subtended by 2 or more bracts of which at least one is as long as the umbel (the bracts may break off in age), which appears to arise from the tip of the stem*E. angustifolium*

Eriophorum angustifolium Honck. [*E. polystachion* L., *nomen ambiguum*], thin-scale cotton-grass: Sandhill fens. Known from Cherry and Grant counties.

Eriophorum gracile Koch, slender cotton-grass: Sandhill fens. Known from Cherry, Grant, and Thomas counties. Both species are often found in the same fen.

FIMBRISTYLIS Vahl

Annual or perennial herbs. Perianth absent. Styles basally thickened and deciduous at maturity.

- 1. Style 3-parted; achene 3-sided; fibrous-rooted annuals with reddish- to golden-brown scales
 - 2. Scales pubescent at least near the base, the tips rounded to obtuse, sometimes with a slight mucronate tip; achenes sharply triangular in cross section, with conspicuous cross-ridges and a small but distinct bump-like tubercle at its tip which is darker than the achene body; bracts with tufts of long slender hairs at the tip of the expanded sheathlike portion near the basego to *Bulbostylis*
 - 2. Scales glabrous, acuminate at the tip with a short, often slightly outcurved awn; achenes rounded in cross section with faint longitudinal ribs and transverse cross-bars, lacking a tubercle; bracts glabrous to scabrous, without long slender hairs along the margins*F. autumnalis*

- 1 Style 2-parted; achene 2-sided; plants either perennial, or annual with greenish-white scales
- 3 Spikelets borne singly on pedicels; tall (2-10 dm) slender perennials with culms solitary or a few together from a bulbous-thickened base or rhizomes; scales pale to dark brown*F. puberula*
- 3 Spikelets borne in clusters at the end of pedicels; short (0.1-1.5 dm) annuals with culms usually in small tufts; scales pale green to greenish-white*F. vahlii*

Fimbristylis autumnalis (L.) R. & S.: Wet, sandy shores of ponds and rivers. Collected only three times from widely separated localities in the e ½.

Fimbristylis puberula (Michx.) Vahl: Moist, lowland prairie and meadows. Most commonly collected from the Platte River Valley, but nearly statewide. Two varieties in Nebraska:

- 1 Base of culm with a bulblike thickening often clothed by the fibrous remains of old leaf sheaths, arising from a thick rhizome; longest bract below inflorescence usually shorter than inflorescence; scales ciliate. Uncommonly collected, known from scattered sites in e ½var. *puberula*

- 1 Base of culm without a bulblike thickening (rarely present), arising from numerous slender rhizomes; longest bract usually shorter than the inflorescence; scales glabrous. Widespreadvar. *interior*

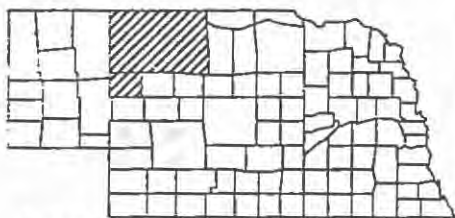
Variety *interior* (Britt.) Kral is widespread, found throughout the range of the species. Var. *puberula* is uncommon, collected from a few widely scattered sites in e. More robust than the preceding.

Fimbristylis vahlii (Lam.) Link: Wet, sandy shores. Known from a single collection from Hitchcock County in 1992. Extremely inconspicuous, probably introduced sporadically in the State.

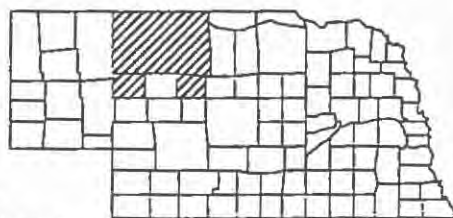
FUIRENA Rottb. (UMBRELLA-GRASS)

Annual herbs (ours). Perianth of 3 petal-shaped scales alternating with 3 bristles.

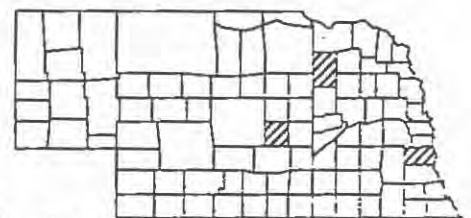
Fuirena simplex Vahl: Moist, sandy soil. Occasional in the Platte River Valley from c Nebraska eastward. Our plants are annuals and are assignable to var. *aristulata* (Torr.) Kral.



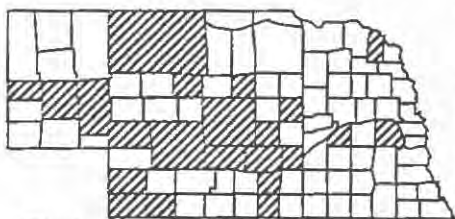
Eriophorum angustifolium



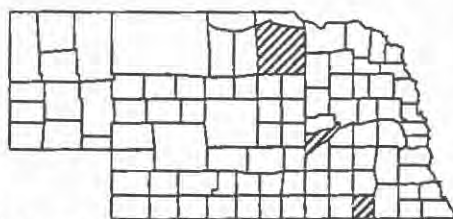
Eriophorum gracile



Fimbristylis autumnalis



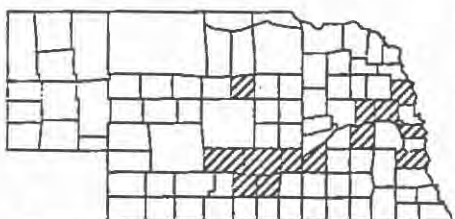
Fimbristylis puberula interior



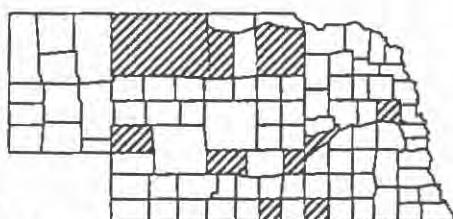
Fimbristylis puberula puberula



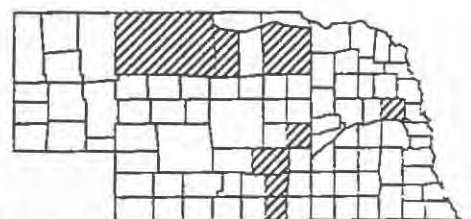
Fimbristylis vahlii



Fuirena simplex



Lipocarpha aristulata



Lipocarpha drummondii

LIPOCARPHA R. Br. (including **HEMICARPHA** Nees & Arn.)

Tufted annuals. Leaves few and slender. Inflorescence appearing to arise laterally from culm. A single inconspicuous scale-like bract opposite the fertile scale, or lacking.

- 1 Achene subtended by a thin membranous, usually translucent scale-like structure on the side opposite the scale, this inner scale as long as to longer than the achene and often partly enclosing it at the top.
 - 2 Awns of scales at middle of spikelets clearly awned, $\frac{1}{2}$ to fully as long as the body of the scale; inner scale unpigmented and lacking veins; mature achenes dark reddish-brown to nearly black ***L. aristulata***
 - 2 Awns of scales at middle of spikelets inconspicuous (< 0.2 mm long), though a few scales at the base of the spikelet may be long-awned; inner scale sometimes brownish pigmented and usually with 3–5 veins visible under 20 \times magnification; mature achenes pale yellowish-brown to tan or light gray ***L. drummondii***
- 1 Inner scale less than $\frac{1}{2}$ as long as achene, often very inconspicuous or lacking ***L. micrantha***

Lipocarpa aristulata (Coville) G. C. Tucker [*Hemicarpha drummondii* Nees, in part (of Great Plains reports)]: Wet, sandy shores in c. part. Occasionally found growing with the next species. Most of our specimens were mapped as *Hemicarpha drummondii* in *Atlas GP*.

Lipocarpa drummondii (Nees) G. C. Tucker [*Hemicarpha drummondii* Nees]: Wet, sandy shores in c. part. Some authors have questioned whether this species is distinct

from *L. micrantha*, though it has been more commonly confused with *L. aristulata* in Great Plains herbaria. It may be wise to recognize all our species as varieties under *L. micrantha* (cf. Friedland, 1941).

Lipocarpa micrantha (Vahl) G. C. Tucker [*Hemicarpha micrantha* (Vahl) Pax]: Wet, sandy shores of the Missouri, Elkhorn, and lower Platte rivers (w to Fremont) in e Nebraska.

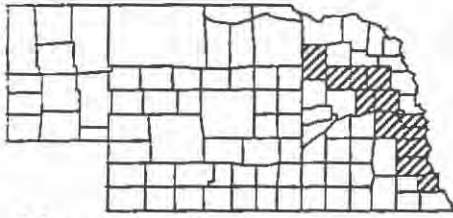
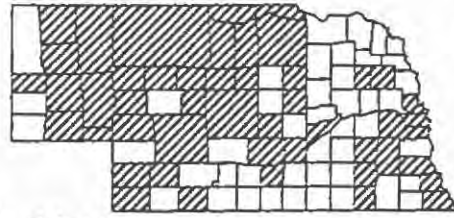
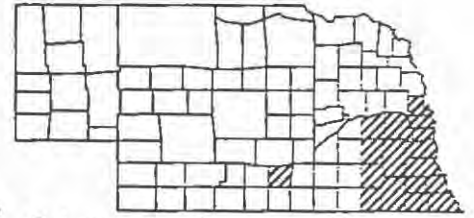
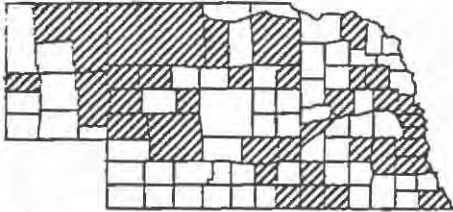
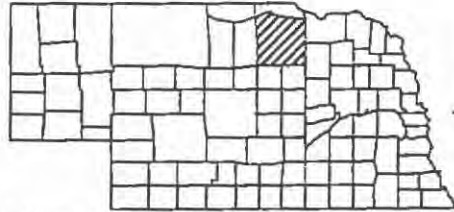
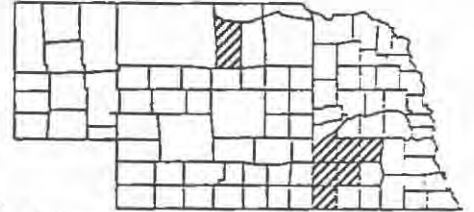
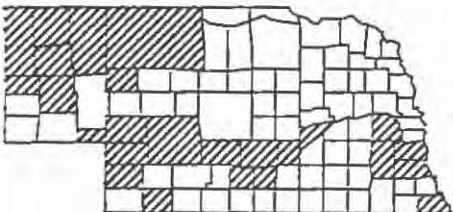
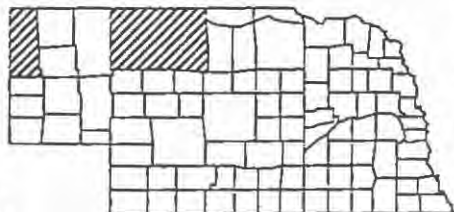
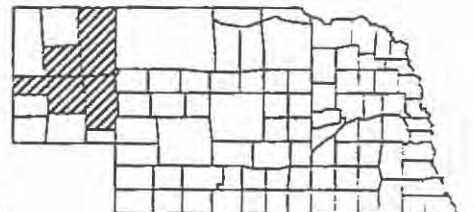
SCIRPUS L. (BULRUSH)

Annual or perennial herbs. Culms triangular or rounded, leaves present or reduced to bladeless sheaths. Perianth of bristles (rarely absent).

As traditionally treated, the genus *Scirpus* is evidently a paraphyletic group and will probably be split into several natural segregate genera in the forthcoming *Flora of North America*. Our plants will be placed in three genera: *Amphiscirpus*, *Schoenoplectus*, and *Scirpus*. The traditional, broad concept of *Scirpus* is maintained here until the criteria for recognizing these genera appear in print. Synonyms are provided in the text.

- 1 Inflorescence appearing to arise from the side of the stem, with a single erect to slightly spreading bract appearing to be a continuation of the culm (other smaller bracts may also be present at the base of the inflorescence)
 - 2 Inflorescence subtended by 1 or 2 small leaflike bracts in addition to the erect bract; flowers and achenes not subtended by bristles, though a single tiny scale may be present; minute annuals of wet, sandy habitats **go to *Lipocarpa***
 - 2 Inflorescence not subtended by leaflike bracts (scalelike bracts resembling the scales of the spikelets may be present); flowers and achenes subtended by bristles; annuals and perennials
 - 3 Spikelets distinctly pedicelled in a branching inflorescence (which is sometimes very compact in *S. acutus*); culms terete (round in cross section), tall and stout, usually over 1 m tall and 5–20 mm broad at the base
 - 4 Most pedicels with only a single spikelet; scales whitish to pale straw-colored; styles 3-branched and mature achenes triangular in cross-section and subtended by 2–4 bristles of irregular length, some shorter than the achene; infrequently collected, though not rare ***S. heterochaetus***
 - 4 Most pedicels with 2–8 spikelets (if only 1, then the scales reddish- to golden-brown); styles 2-branched and mature achenes 2-sided in cross-section and subtended by 6 bristles as long as or longer than the achene; common
 - 5 Most pedicels with 2 spikelets (occasionally 1, rarely 3) in an open, lax, usually drooping inflorescence; spikelets ovoid (about twice as long as wide) to short-cylindrical, with scales golden- to reddish brown, contrasting prominently with the green midrib, the tips usually entire; culms pale blue-green and easily compressed when fresh, with several large air chambers visible when cut transversely ***S. validus***
 - 5 Most pedicels with 3–8 (or more) spikelets (rarely some with 1 or 2) in a condensed, stiff,

- often ascending inflorescence; spikelets ovoid to cylindrical (at least 2.5 × longer than wide) with dull, whitish to pale brown scales (orange-brown in possible hybrids with *S. validus*), with scattered reddish vertical bars and flecks, not prominently contrasting with the midrib, frequently split on either side of the midrib at the tip and appearing bilobed; culms dark olive green and firm when fresh, with many small air chambers giving the stem a spongy appearance when cut transversely*S. acutus*
3. Spikelets not pedicelled (rarely one may have a short pedicel) and appearing to be clustered directly from the culm (or bract); culms triangular or flattened, if terete, then slender (less than 5 mm thick) and under 1 m tall
 6. Fibrous-rooted annuals with soft, slender, tufted culms; achenes strongly cross-ridged. Rare plants of drying sites
 7. Style 2-branched; achenes 2-sided*S. hallii*
 7. Style 3-branched; achenes 3-sided*S. saximontanus*
 6. Rhizomatous perennials with firm, wiry culms arising singly or in small tufts.; achenes smooth to minutely reticulate
 8. Culms sharply triangular; scales light brown to reddish brown and divided along either side of a short awnlike tip at least 0.5 mm; spikelets ovoid to lance-ovoid. Common, widespread in a variety of wet habitats*S. pungens*
 8. Culms terete to flattened and slightly twisted; scales dark glossy brown and acute to obtuse and undivided at the tip; spikelets often more elongate than in the preceding. Uncommon, restricted to alkaline wetlands in the Panhandle*S. nevadensis*
 1. Inflorescence clearly arising from the tip of the stem, subtended by 2–several similar, spreading to reflexed leaflike bracts
 9. Bristles absent at base of ovary and achene, and bracts at base of inflorescence less than 1.5 mm wide .
.....go to *Fimbristylis*
 9. Bristles present at base of ovary and achene, or if absent, bracts at base of inflorescence more than 1.5 mm wide
 10. Culms sharply triangular; spikelets large, 10–50 mm long and 5–12 mm thick; achenes 2.5–5 mm.; scales somewhat puberulent; rhizomes with cormlike thickenings
 11. Styles 2-parted; achenes 2-sided, 3–4 mm with 2–6 poorly-developed deciduous bristles shorter than the achenes and obscurely barbed; bracts at base of inflorescence 1 or 2 (rarely 3) and leaf sheaths truncate to shallowly U-shaped at the summit; inflorescence compact and congested. Typically in saline and alkaline soils*S. maritimus*
 11. Styles 3-parted; achenes 3-sided, 4–5 mm with 6 persistent bristles at least as long as the achene and distinctly barbed; bracts at base of inflorescence 3–5 and leaf sheaths rounded or convex at the summit; inflorescence more open. Typically in freshwater sites ...*S. fluviatilis*
 10. Culms obtusely 3-sided; spikelets smaller, 2–10 mm long and 1–4 mm thick; achenes 0.7–1.5 mm; scales glabrous; rhizomes without cormlike thickenings
 12. Spikelets borne singly or in clusters of 2–5 on each pedicel; bristles crinkled and curled at maturity, longer than the achene, and without barbs or with a few poorly-developed upwardly-pointing ones (don't confuse the bristles with the filaments, which may persist for a while); plants forming dense clumps, not rhizomatous. Infrequently collected at scattered locations in the e ½*S. pendulus*
 12. Spikelets borne in dense, rounded clusters of 5–25 or more spikelets at the tips of the pedicels (rarely as few as 3); bristles (sometimes absent) straight or with 1 or 2 slight kinks, at most slightly longer than the achene, and with conspicuous downward-pointing barbs; culms arising singly or a few together from strong rhizomes
 13. Styles 2-parted; achenes 2-sided; sheaths of basal leaves usually red-tinged. Rare in extreme n-w and Cherry County*S. microcarpus*
 13. Styles 3-parted; achenes 3-sided; leaf sheaths all green. More common and widespread
 14. Spikelets densely arranged in large globelike clusters 9–15 mm in diameter; scales blackish on the sides with a distinct short awn 0.4 mm or more. Occasional to common statewide*S. pallidus*
 14. Spikelets loosely arranged in small clusters 3–7 mm in diameter; scales dark green to brownish on the sides and acute with a short (0.1–0.2 mm) tip. Frequent in the e ½, rarely westward*S. atrovirens*

*Lipocarpha micrantha**Scirpus acutus**Scirpus atrovirens**Scirpus fluviatilis**Scirpus hallii**Scirpus heterochaetus**Scirpus maritimus**Scirpus microcarpus**Scirpus nevadensis*

Scirpus acutus Muhl. ex Bigelow [*Schoenoplectus acutus* (Muhl. ex Bigelow) Löve & Löve], hardstem bulrush: Marshes, and ponds. Common statewide, less so in the e and s. Sometimes considered indistinct from *S. validus*, the two species are rarely confused in our area. Galen Smith has labelled some specimens at NEB hybrids. Many of these resemble *S. acutus* in overall appearance but have reddish-brown scales. The hybrids are not mapped.

Scirpus atrovirens Willd., dark-green bulrush [*S. georgianus* Harper, of Nebraska reports]: Marshes, streambanks, wet meadows. Occasional to frequent in the e $\frac{1}{2}$, rarely scattered w to c. Plants are occasionally found which have achenes without bristles or with up to 3 poorly-developed ones. These have been collected sporadically in the Blue River drainage and at Minden and were mapped as var. *georgianus* (Harper) Fern. in the *Atlas GP*. Schuyler (1967) separates this variety from the typical variety in that it lacks cross-partitions between the veins of the sheaths, in addition to the lack of bristles. All our specimens identified as var. *georgianus* (including some seen by Schuyler) have these partitions and are only reliably separated from var. *atrovirens* by the lack of bristles. Although the bristle character seems to be consistent within a population, the range of var. *georgianus* given in the *Flora GP* is within that of var. *atrovirens*, and I have chosen not to recognize this variety in Nebraska until some consensus as to the taxonomic value of bristle number in *Scirpus* is reached.

Scirpus fluviatilis (Torr.) Gray [*Schoenoplectus fluviatilis* (Torr.) M. T. Strong], river bulrush: Marshes, shores. Occasional to frequent statewide, except s-w and s $\frac{1}{2}$ of Panhandle.

Scirpus hallii Gray: Sandy, drying sites. Collected twice from along U. S. 281 s of O'Neill in 1941 and 1971. All

reports of this species for Nebraska in the *Atlas GP* with the exception of that for Holt County are *S. saximontanus*. This species will probably be transferred to the genus *Schoenoplectus* in *Flora of North America*, but no combination has yet been published in that genus.

Scirpus heterochaetus Chase [*Schoenoplectus heterochaetus* (Chase) Sojak]: Rain basins, lake margins. Collected at several localities in the rain basins of s-c Nebraska (where it is locally common) and twice in the n Sandhills. Doubtless more common than our collections indicate. This species is widespread throughout South Dakota and should be sought across n Nebraska and elsewhere. It is probably overlooked because of its resemblance to two more common bulrushes. In shallow water it usually has very narrow, firm dark olive-green stems and resembles *S. acutus*. In deeper water the stems are thicker and soft, and with its drooping inflorescence it resembles *S. validus*. A survey of several rain basins in s-c Nebraska in 1994 revealed *S. heterochaetus* to be occasional to common at each site, while *S. acutus* and *S. validus* were absent.

Scirpus maritimus L. [*Schoenoplectus maritimus* (L.) Lye]: Riverbanks, sandbars, saline and alkaline meadows. Occasional in w $\frac{1}{3}$ and eastward in the Platte and Missouri River valleys and in the e saline marshes.

Scirpus microcarpus Presl: Low areas along streams. Collected a few times in the Hat Creek basin in Sioux County and once from Cherry County.

Scirpus nevadensis S. Wats. [*Amphiscirpus nevadensis* (! Wats.) Oteng-Yeboah]: Shores and basins in strongly alkaline soils. Locally common in the Sandhills and the n Platte River floodplain in the Panhandle. The report of *S. smithii* from Sheridan County in the *Atlas GP* is based on a sheet of *S. nevadensis* at KANU. This species is often

abundant in the appropriate habitat, but has rarely been collected, possibly due to its resemblance to the ubiquitous *S. pungens*.

Scirpus pallidus (Britt.) Fern. [*S. atrovirens* Willd. var. *pallidus* Britt.]: Marshes, pond margins, in similar habitats to *S. atrovirens*. Occasional to common statewide, though much less common where its range overlaps with *S. atrovirens*. Obviously related to and in our area morphologically distinct from *S. atrovirens*, even in mixed populations.

Scirpus pendulus Muhl.: Marshes, wet meadows, rarely on uplands. Not common anywhere in the State, but most likely encountered in the s-e. Within the last 15 years this bulrush has been collected from widely scattered locations to the w and n-w of s-e Nebraska.

Scirpus pungens Vahl [*S. americanus* Pers., misapplied, *Schoenoplectus pungens* (Vahl) Palla]: Marshes, wet ditches, moist meadows, tolerant of alkali. Statewide, probably our commonest species. *S. torreyi* Olney was reported from Dodge County in the *Atlas GP* based on two misidentified sheets of *S. pungens* at NEB.

Scirpus saximontanus Fern. [*Schoenoplectus saximontanus* (Fern.) Raynal]: Shores, drying sites. Most collections from the rain basins of s-c, but also from the s-w playas and the Sandhills. Cronquist (1991) considers this species a variety of *S. supinus* (along with *S. hallii*), since style number and achene shape seem to be the only characters separating the two. Our few collections suggest that *S. saximontanus* is more frequent in heavier soils. Most of our collections were made by William Tolstead in 1941 and our most recent collection was made in 1944 prior to its discovery in Dawes County in 1995.

Scirpus validus Vahl, [*Schoenoplectus tabernaemontani* (Gmel.) Palla] softstem bulrush: Marshes, lake margins. Found in similar habitats as *S. acutus* but more frequent in mucky soils. Statewide and common, except less so in the Sandhills. Some authors submerge our material into Eurasian *S. tabernaemontani*, and our plants will probably be recognized as a subspecies under *Schoenoplectus tabernaemontani* in *Flora of North America*. There is, however, some question as to whether the epithet

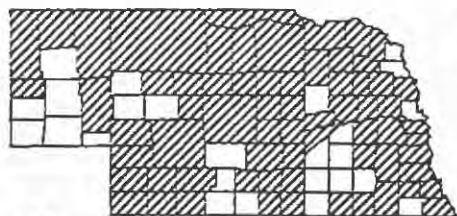
"*validus*" applies to North American material. Nonetheless I have decided to maintain our plants under the traditional name (*Scirpus validus*) until this issue is resolved. This species forms apparent hybrids with *S. acutus* (see note under that species), some of which may resemble *S. validus* but with longer, narrower spikes and more congested inflorescences.

ACKNOWLEDGMENTS

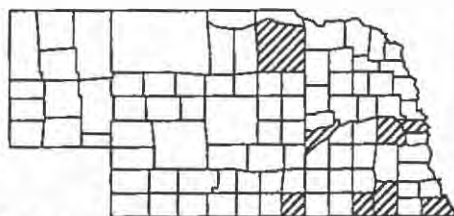
I would like to thank Drs. Gary Larson, Ronald McGregor, and Anton Reznicek for helpful comments on this portion of the manuscript and Drs. Robert Kaul and David Sutherland for their suggestions and patience through numerous revisions and also to David Sutherland for putting together the maps. I would also like to acknowledge the curators and staff of the institutions listed in the introduction for allowing me access to their facilities.

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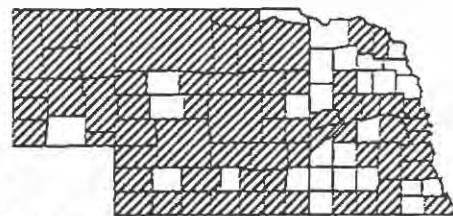
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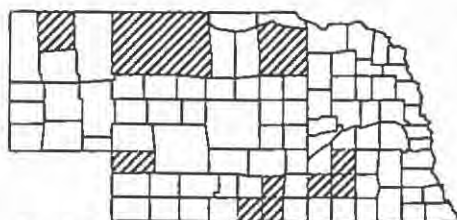
Scirpus pallidus



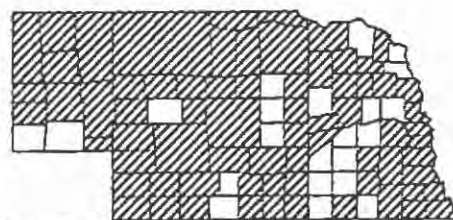
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KEYS AND DISTRIBUTIONAL MAPS FOR NEBRASKA CYPERACEAE,

PART 2: CAREX AND SCLERIA

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ABSTRACT

Keys and distributional maps are provided for the 71 species and one hybrid of *Carex* and single species of *Scleria* documented for Nebraska. Six species—*Carex albursina*, *C. melanostachya*, *C. mesochorea*, *C. umbellata*, *C. utriculata*, and *Scleria triglomerata*—and a hybrid—*Carex laeviconica* × *C. trichocarpa*—are newly reported for the State, while eight species attributed to the State in the *Flora of the Great Plains* (Great Plains Flora Association 1986) are deleted—*C. crinita*, *C. festucacea*, *C. haydenii*, *C. muehlenbergii* var. *enervis*, *C. normalis*, *C. siccata* (as *C. foenea*), *C. stricta*, and *C. trichocarpa*—based on re-identifications or on specimens of doubtful provenance in the State. Notes on local systematic problems within the genera are also included.

† † †

With 71 species, the sedges (*Carex*) are the largest genus of vascular plants in Nebraska and are common constituents of prairie, woodland and wetlands. All but one (*C. melanostachya*) are native to North America, and several (e. g. *C. filifolia*, *C. nebrascensis*) are economically important range plants. The genus *Scleria* was not documented from Nebraska until the discovery of a population of *S. triglomerata* in 1997, and its occurrence in the State is reported here for the first time. All other Cyperaceae were treated by Rolfsmeier (1995) as Part 1.

Floristic and systematic research on Nebraska Cyperaceae since the publication of the *Flora of the Great Plains* (Great Plains Flora Association 1986) (hereinafter referred to as the *Flora GP*) has resulted in numerous changes to the treatment published there. Six species are newly reported for Nebraska: *Carex albursina*, *C. melanostachya*, *C. mesochorea*, *C. umbellata*, *C. utriculata*, and *Scleria triglomerata*, four of which were newly collected since publication of the *Flora GP*. Additionally, the sterile hybrid *Carex laeviconica* × *C. trichocarpa* is newly reported for the State. Seven species attributed to Nebraska in the

Flora GP are deleted based on misidentifications: *Carex festucacea*, *C. haydenii*, *C. muehlenbergii* var. *enervis*, *C. normalis*, *C. siccata* (reported as *C. foenea*), *C. stricta*, and *C. trichocarpa*; and an eighth (*C. crinita*) is deleted based on a specimen which is part of a collection mistakenly attributed to the State. Numerous nomenclatural changes have also been made in *Carex* by researchers preparing treatments for the *Flora of North America*; these are included here wherever possible. Distributional maps for Nebraska Cyperaceae were last published in the *Atlas of the Flora of the Great Plains* (Great Plains Flora Association 1977) (hereinafter referred to as the *Atlas GP*), and are here updated to reflect numerous changes as a result of 20 years of field work and of corrections of numerous erroneous records published in the *Atlas GP*.

The objectives of this paper are to provide up-to-date distributional data for all the unisexual-flowered Cyperaceae in Nebraska, and to present updated “user-friendly” keys that rely as little as possible on characters that are difficult to observe, and accommodate atypical variants of our species.

METHODS

The key is adapted from the second author’s unpublished key to *Carex* of eastern Nebraska and southwestern Iowa, which was organized following the excellent treatment of Steyermark (1963). The keys presented here also borrow from Gleason and Cronquist (1991), Kolstad (1986), Larson (1993) and Voss (1972), along with other works cited in the body of the paper. Original characteristics are included based on observations of Nebraska material and on numerous suggestions made by Dr. A. A. Reznicek of the University of Michigan. Descriptions of species are limited to the key; more complete descriptions are available in the *Flora GP* and other sources.

The maps were compiled wholly from observations of specimens rather than from literature reports. The primary sources of data were the herbaria of the University of Nebraska-Lincoln (NEB), University of Nebraska at Omaha (OMA), University of Nebraska at Kearney, Chadron State College (CSCN), and University of Kansas (KANU). Additional data have been included from the Rocky Mountain Herbarium (RM) in Laramie, Wyoming; the University of South Dakota

(SDU) and South Dakota State University (SDC); and, in Nebraska, Wayne State College, Doane College, Cedar Point Biological Station of the University of Nebraska, Crescent Lake National Wildlife Refuge, Nebraska Game and Parks Commission, and the personal collection of Robert Kaul. All distributional data are maintained by the first author in a computerized database.

KEY TO THE GENERA

1. Culms (aboveground stems) naked, without evident leaves, but bladeless sheaths may be present at base
 2. Inflorescence of a single spikelet at the tip of the culm(*Eleocharis*)
 2. Inflorescence of 2-many spikelets, or if 1, then appearing to arise below the tip of the culm(*Scirpus*)
1. Culms with evident leaves, at least at base
 3. Flowers unisexual; achene either enclosed in a sac-like structure (perigynium) or hard, bony, whitish, and spherical
 4. Pistillate flower (except for protruding style) and achene enclosed in a loose or tight sac-like structure (perigynium); achene usually flattened or angled (unless infected with gall) and yellowish to dark brown; common*Carex*, p. 7
 4. Pistillate flower and achene not enclosed in a perigynium; achene bony, spherical, and whitish; rare*Scleria triglomerata*, p. 25
 3. Flowers bisexual, with a pistil and 1-several stamens; achene neither enclosed in a perigynium nor spherical
 5. Spikelets with flowers arranged in 2 opposite ranks, the spikelet flattened at maturity
 6. Spikelets borne in the axils of short, stiff leaves along the length of hollow, jointed culms; achenes subtended by bristles(*Dulichium*)
 6. Spikelets borne in a terminal inflorescence subtended by several leaflike bracts; culms solid, not jointed; leaves arising from the base; achenes not subtended by bristles(*Cyperus*)
 5. Spikelets with flowers spirally arranged in several ranks, the spikelet cylindrical or cone-shaped, not flattened
 7. Inflorescence appearing to arise laterally below the tip of the culm (actually subtended by an erect bract that appears to be a continuation of the culm)
 8. Plants very slender, mostly less than 10 cm tall, with culms less than 0.5 mm thick; bristles absent at base of achene, but a small translucent scale often present(*Lipocarpa*)
 8. Plants taller or with thicker culms (usually both); bristles 1-numerous, but no translucent scale evident at base of achene
 9. Achene subtended by numerous silky bristles much longer than the scale; rare in Sandhills fens(*Eriophorum*)
 9. Achene subtended by 1-8 bristles, not silky in appearance, shorter than the scale; widespread(*Scirpus*)
7. Inflorescence arising from the tip of the culm
 10. Achene subtended by 3 slender bristles alternating with 3 petal-shaped scales(*Fuirena*)
 10. Achene subtended by 0-numerous slender bristles, petal-shaped scales absent
 11. Achene subtended by 1-numerous slender bristlesgo back to couplet 9
 11. Bristles absent at base of achene
 12. Style not swollen at the base, culms stout (over 3 mm thick 1 cm below inflorescence) and 3-sided; leaf blades over 5 mm wide(*Scirpus*)
 12. Style swollen at or near the base; culms slender (1 mm or less thick at 1 cm below inflorescence) and rounded; leaf blades under 3 mm wide
 13. Swollen style base persistent on the achene as a distinct tubercle darker than the achene body and set off from it by a line(*Bulbostylis*)
 13. Swollen style base deciduous, not present on mature achene(*Fimbristylis*)

KEY TO CAREX OF NEBRASKA

Sedges are notoriously difficult to key, possibly because of the reliance in many keys on characters found only in mature, complete specimens. Whenever possible, underground parts should be collected, because presence of rhizomes is an important character for some groups of species, although reliance on this character is kept to a minimum here. More importantly, specimens should be collected with mature perigynia; overmature specimens in which the perigynia have fallen from the plant should be avoided. Immature

material is often difficult or nearly impossible to identify, although wherever possible vegetative and floral characters are included in the key in case mature material is unavailable. Measurements indicate length unless otherwise stated, and geographic notations are for Nebraska only. Names presented in boldface are of species documented from Nebraska; species occurring along our borders and which may be expected in Nebraska are included in the key in lightface type. Nomenclature follows recent taxonomic treatments unless otherwise stated. Synonyms from *Flora GP* and Kartesz (1994) are included.

CAREX L. (SEDGE)

Cespitose or rhizomatous perennial herbs; culms sharply to obscurely 3-angled; flowers unisexual (the plants monoecious or infrequently dioecious), borne in spikes of pistillate flowers, staminate flowers or both, perianth lacking, pistillate flower surrounded by a sac-like structure called a perigynium, which encloses the achene at maturity.

1. Spreading hairs > 0.25 mm conspicuous on some part of the leaves (leaf blades, sheaths, or both), bracts, or culms (sometimes these confined to the lower leaf-sheaths or summit of the front of the leaf sheath; otherwise glabrous plants with rough-margined leaves or culms should not be considered hairy)
 2. Perigynia hairy
 3. Perigynia 3.5–5 mm, beaks untoothed; cespitose (clumped) plants of woodland; possible in extreme s-e *C. hirtifolia*
 3. Perigynia 7–12 mm, beaks with teeth 1.3–3 mm; rhizomatous plants of wetlands *C. atherodes*
 2. Perigynia glabrous (margin of beak may be serrulate)
 4. Uppermost spike of staminate flowers only
 5. Perigynia 4.5–7 mm, beaks of perigynia untoothed; cespitose (clumped) plants of woodlands *C. hitchcockiana*
 5. Perigynia 7–12 mm, beaks with conspicuous teeth 1.3–3 mm; rhizomatous plants of wetlands *C. atherodes*
 4. Uppermost spike with pistillate flowers above and staminate flowers at the base
 6. Spikes 18–45 mm, 6–8 × longer than broad, and nodding to ascending; perigynia usually > 4 mm *C. davisii*
 6. Spikes (except uppermost) 5–20 mm, 1.5–4 × longer than broad, ascending to erect; perigynia 2–4 mm *C. bushii*
1. Spreading hairs absent from leaves, bracts, and culms, though the leaves or culms may have rough margins
 7. All flowers staminate, no pistillate flowers present (*Note*: If plants appear wholly staminate on first glance check the bases of the spikes carefully for pistillate flowers or perigynia); plants rhizomatous
 8. Culms sharply 3-angled, rough just below the inflorescence; rhizomes stout, 2–3 mm thick, with black scales *C. praegracilis*
 8. Culms bluntly 3-angled to ± round, smooth just below the inflorescence; rhizomes slender, < 2 mm thick, with brownish scales *C. douglasii*
 7. At least some pistillate flowers present; plants cespitose or rhizomatous
 9. Perigynia pubescent (otherwise glabrous perigynia with rough or serrulate edges to the beak should not be considered pubescent) **GROUP I, p. 9**
 9. Perigynia glabrous (edge of beak may be serrulate)
 10. The single pistillate spike apparently arising between 2 leaflike bracts, because the scale of the lowest pistillate flower is prolonged, green, 15–50 mm, and resembles the leaflike bract at the base of the flowering spike; each culm appearing to have only 1 pistillate spike (lateral spikes are borne on basal peduncles) which has 2–4 perigynia; all flowering culms shorter than the clumped leaves; styles 3; body of perigynium ± globose, tapering abruptly to the beak; woodlands

11. Scale of lowest pistillate flower 1.2–2.5 mm wide, spreading and not concealing the perigynia; margins of pistillate scales with a wide hyaline (white or translucent) border at the base; edges of leaves and culms green; staminate spike elongated (with 6–many flowers) and equaling or exceeding the body of the uppermost perigynium (and often exceeding entire perigynium); perigynium body definitely globose, with 2 strong nerves, tapering abruptly to the beak; plants green; rich woodlands from Washington C. s *C. jamesii*
11. Scale of lowest pistillate flower 2.4–4.5 mm wide, erect and essentially concealing the perigynia; margins of pistillate scales green throughout or very narrowly hyaline; edges of leaves and culms usually white; staminate spike short (about 3 flowers) and not exceeding the body of the uppermost perigynium; perigynium body relatively ovate, sometimes with a few faint nerves at the base and on the beak (in addition to the 2 strong main nerves), and tapering less abruptly into the beak than in the preceding; fresh plants often with a bluish tint; pine and oak woodland (and borders) in n and Omaha area *C. saximontana*
10. Each spike clearly subtended by either a single leaflike bract or a narrow bract not resembling a leaf; lowest scale of pistillate spike never leaflike, < 10 mm (if bracts appear numerous, each subtends a spike in a cluster of spikes); other characteristics various
12. Styles 3; achenes 3-sided or 3-angled; perigynia 3-sided or round, although inflated perigynia may appear flattened and 2-sided upon drying **GROUP II, p. 10**
12. Styles 2 (rarely 3); achenes 2-sided or 2-angled; perigynia ± flattened or lens-shaped
13. Spikes dissimilar, some completely pistillate or completely staminate; plants mostly rhizomatous, or if caespitose then growing at least knee-high and forming large clumps usually > 20 cm diameter at base **GROUP III, p. 13**
13. Spikes all alike or nearly so, staminate and pistillate flowers in the same spike (on specimens mature enough for identification, staminate flowers may be represented by empty scales, usually at the top or bottom of the spike)
14. Scales of pistillate flowers blunt or rounded at tip, not tapering or slender-pointed (rarely deciduous and absent at maturity); leaves < 3 mm wide; spikes well-separated on slender culms; perigynia mostly spreading to reflexed so spikes appear starlike
15. Terminal spike with a narrow, tapering, wedge-shaped base formed by staminate flowers; culms usually erect; wet meadows in n-c *C. interior*
15. All spikes with staminate flowers at the tip (often inconspicuous), all spikes rounded at the base; culms often arching; woodlands in e ½
16. Perigynium beaks glabrous; pistillate scales deciduous and absent at maturity *C. texensis*
16. Perigynium beaks serrulate along margins; pistillate scales persistent
17. Stigmas stout, 0.07–0.10 mm thick, mostly strongly recurved or coiled; achene below center of perigynium; broadest leaves > 1.7 mm wide; base of fertile culm > 1.4 mm wide; frequent. *C. rosea*
17. Stigmas narrow, 0.03–0.06 mm thick, often abruptly curved at the base, otherwise straight to slightly curved; achene central in perigynium; broadest leaves usually 0.9–1.7 mm wide; base of fertile culm usually 0.7–1.4 mm wide; apparently rare *C. radiata*
14. Scales of pistillate flowers tapering, short- to long-pointed or awned; spikes and habit various
18. All spikes wholly pistillate; plants < 3 dm tall, rhizomatous. *C. douglasii*
18. All spikes with staminate and pistillate flowers; habit various
19. Staminate flowers at tips of some or all spikes **GROUP IV, p. 14**
19. Staminate flowers at the base of spike
20. Base of uppermost spike with a narrow, tapering wedge-shaped base formed by staminate flowers, contrasting with the lower spikes, which have rounded bases and appear star-like (perigynia spreading to reflexed at maturity); spikes few-flowered

- and usually widely separated; lower part of mature perigynium corky or spongy-thickened, in contrast to the firm upper part (stick a pin into the perigynium to test this); perigynia not winged; leaves ≤ 2.5 mm wide; wet meadows in n-c .. *C. interior*
20. Bases of all spikes similar, rounded or wedge-shaped; disposition of spikes various; lower part of mature perigynium not corky or spongy-thickened; perigynia usually winged; leaves and habitat various GROUP V, p. 16

CAREX, GROUP I (perigynia pubescent)

1. Spikes solitary on culms; culms equaling or exceeding leaves
2. Spike entirely pistillate *C. parryana*
2. Spike staminate above, pistillate at base *C. filifolia*
1. Spikes 2 or more per culm (if appearing solitary, culms very short and hidden among leaf bases)
3. Uppermost spike with pistillate and staminate flowers *C. parryana*
3. Uppermost spike entirely staminate
4. Perigynium beak with conspicuous teeth 0.3–3 mm; rhizomatous plants of wetlands or mesic ground, flowering in May and June, with perigynia maturing in June, July, or early August
5. Teeth of perigynia beaks erect, 0.5–1 mm; perigynia evenly and usually densely pubescent, the nerves faint or not visible through the hairs; front surface of leaf sheaths copiously red-dotted
6. Perigynia densely pubescent, the nerves not visible, 2.5–5 mm; pistillate spikes 3–8 mm thick; common *C. pellita*
6. Perigynia moderately pubescent, the nerves often faint but visible, 5–6 mm; pistillate spikes 8–15 mm thick; possible in extreme s-e (a hybrid of the preceding and *C. hyalinolepis*) *C. xsubimpressa*
5. Teeth of perigynia beaks erect to outcurved, mostly 1–3 mm; perigynia body usually pubescent only on the nerves (rarely evenly pubescent), which are raised and clearly visible; front surface of leaf sheaths not red-dotted (rarely reddish-tinged at summit)
7. Teeth of most perigynia beaks clearly outcurved, 1.2–3 mm (longest usually > 2 mm); leaf sheaths usually with a few conspicuous spreading hairs on the front surface or at apex; leaves papillose below (15 \times magnification); vegetative culms hollow .. *C. atherodes*
7. Teeth of perigynia beaks erect to slightly outcurved, 1–2 (very rarely ~ 3 mm); leaf sheaths scabrous or glabrous on front surface, spreading hairs absent; leaves not papillose; vegetative culms solid
8. Front surface of uppermost leaf sheath scabrous, at least on the nerves; the apex pale brown (reddish-brown); rare to common in low open ground in e $\frac{1}{2}$
9. Perigynia sparsely pubescent on the nerves and ribs; leaf sheaths strongly to sparsely scabrous; common *C. laeviconica*
9. Perigynia moderately and evenly pubescent; leaf sheaths sparsely scabrous on nerves; rare in extreme e *C. laeviconica* \times *C. trichocarpa*
8. Front surface of uppermost leaf sheath glabrous, the apex conspicuously reddish-tinged, thickish and opaque; possible in wet woods in extreme e *C. trichocarpa*
4. Perigynium beak untoothed (sometimes with small toothlike projections < 0.2 mm); cespitose or rhizomatous plants of upland forest and prairie, flowering in April and early May, with perigynia maturing in April, May or early June
10. Pistillate spikes cylindric, $> 3 \times$ longer than wide; perigynia often papillate (sandpaper-like) near tip; plants of mesic meadows *C. parryana*
10. Pistillate spikes ovoid to short-cylindric, $< 3 \times$ longer than wide; perigynia not papillate; plants of upland forest and prairie
11. Plants densely cespitose, at least some of the flowering culms consisting only of single pistillate spikes on peduncles much shorter than the leaves and hidden among the leaf bases
12. Tallest flowering culms (those with both staminate and pistillate spikes) with a long leaflike bract at the base of the inflorescence surpassing the staminate spike; pine forest in the extreme w *C. rossii*

12. Tallest flowering culms with a short, scalelike bract not surpassing the staminate spike; tallgrass prairie in the s-e *C. umbellata*
11. Plants cespitose to rhizomatous, flowering culms usually bearing both staminate and pistillate spikes and nearly all the same height (basal spikes rare); spikes borne above the leaf bases
13. Leaves narrow and threadlike, about 0.25 mm wide; spike 1, though sometimes appearing as 2, with the staminate flowers slightly separated from the few perigynia below *C. filifolia*
13. Leaves ≥ 0.5 mm wide; pistillate and staminate flowers in separate spikes with staminate spike at tip of culm
14. Perigynium body about as long as wide, at maturity globose to elliptic, rarely obscurely 3-angled; long-rhizomatous plants of prairie and open woods
15. Perigynium body 1.1–1.5(–1.7) mm wide, elliptic to obovate, round to obscurely 3-angled in cross section, 1.4–2 mm long; possible in extreme e. *C. pensylvanica*
15. Perigynium body 1.6–2.2 mm wide, globose to broadly elliptic, round in section, 1.8–2.5 mm long; common and widespread *C. heliophila*
14. Perigynium body distinctly longer than wide, at maturity ellipsoid or obovoid and slightly 3-angled in cross section; cespitose to short-rhizomatous plants of woodland
16. Pistillate scales usually brown along the sides, the tips mostly surpassing the bases of the beaks of the perigynia they subtend; achenes ≤ 1.4 mm *C. albicans*
16. Pistillate scales usually pale (mostly green or white) the tips mostly not surpassing the bases of the perigynium beaks; achenes > 1.4 mm *C. peckii*

CAREX, GROUP II (styles 3, achenes 3-sided)

1. Leaves threadlike, to 0.7 mm wide; the 2–4 pistillate spikes held above the sessile staminate spike at the tip of the culm on threadlike peduncles *C. eburnea*
1. Leaves flat or slightly folded to form a narrow channel along the midrib, ≥ 2 mm wide; inflorescence various
2. Uppermost spike pistillate above and staminate below (sometimes entirely pistillate or with intermingled staminate and pistillate flowers in *C. parryana*), and if (very rarely) a few culms have the uppermost spike entirely staminate, others in the same clone have pistillate flowers at the tip. *Note*: if plant appears to have the uppermost spike pistillate and the second entirely staminate, the culm is bent so that the terminal, staminate spike appears misplaced
3. Uppermost spike entirely pistillate or with intermingled staminate and pistillate flowers *C. parryana*
3. Uppermost spike with staminate flowers present only at the base
4. Perigynium beak 2–3.5 mm; mature pistillate spikes 10–22 mm thick, cylindrical or (rarely) globose; very rare and probably extirpated in Nebraska *C. squarrosa*
4. Perigynium beak very short or absent; mature pistillate spikes 2–7 mm thick
5. Spikes relatively long, mostly 5–8 \times or more longer than wide and often nodding to ascending; perigynia 4–6 mm *C. davisii*
5. Spikes relatively short, all except the uppermost 1.5–4 \times longer than wide and usually erect or ascending; perigynia 1.5–4 mm
6. Pistillate spikes ovoid-cylindric, usually $< 2 \times$ longer than wide; perigynia dark green at maturity (brown in overly mature specimens) and not papillate (sandpaper-like); pistillate scales sometimes with minute hairs; plants usually at least sparsely pubescent on leaf sheaths, cespitose; rare in prairies in s-e *C. buskii*
6. Pistillate spikes narrower, $> 2 \times$ longer than wide; perigynia light green to pale brown at maturity, often covered with minute white papillae (visible under 20 \times magnification) at least near the tip; plants glabrous (occasionally a few minute hairs present atop the perigynia of *C. parryana*), rhizomatous; uncommon to rare; common in low ground and marshes in c and w

7. Leaves distributed along the culm; sheaths with purple dots or short vertical lines on the front surface, the lower ones breaking into a pinnate network of fibers at maturity; pistillate scales distinctly awned; perigynia often evenly and densely papillate over the entire surface; rare in wet meadows in n and c ..
..... *C. buxbaumii*
7. Leaves clustered at base of plant, the mouth of the uppermost leaf sheath usually ≤ 5 cm from the base of the culm; sheaths hyaline on the front surface and not breaking into a fibrous network at maturity; pistillate scales without awns; perigynia often papillate only around the tip (most readily visible on younger perigynia); scattered in meadows in c and w..... *C. parryana*
2. Uppermost spike with all flowers staminate or staminate above and pistillate below
8. Beak (or top of perigynium if beak absent) abruptly curved to one side
9. Perigynia with many fine, scarcely discernable impressed nerves and a definite, slightly outcurved beak 1 mm long; often at least a few fine hairs present on leaf sheaths; extreme e ..
..... *C. hitchcockiana*
9. Perigynia with 2 strong marginal nerves or ribs and often many other upraised nerves present on surface (sometimes faint), beak short and obscure if present; sheaths glabrous; widespread
10. Perigynia with 2 strong marginal ribs and several to many faint, scarcely upraised nerves, many not extending the length of the perigynium, glaucous (blue-green), pale green, or yellowish-brown at maturity; pistillate scales usually purplish-brown on each side of the midrib; leaves papillose (15 \times magnification) on lower surface at least near tips; rhizomatous plants growing as single stems (or few together in loose clumps)
11. Lower pistillate spikes densely flowered with about 6 rows of perigynia (fewer in depauperate plants), 4.5–7 mm thick; perigynia \pm spreading at maturity, somewhat inflated and nearly round in cross section, 2–2.5 mm wide; achenes 1.7–2.2 mm wide; leaves glaucous and stiffly ascending, ligules mostly shorter than wide; usually in upland prairie, occasionally in low meadows *C. meadii*
11. Lower pistillate spikes loosely flowered with 3 rows of perigynia, 3–5 mm thick; perigynia appressed or ascending and obtusely 3-angled to round at maturity, 1.5–2.2 mm wide; achenes 1.2–1.6 (–1.8) mm wide; leaves green and not stiff, ligules mostly longer than wide; wet meadows *C. tetanica*
10. Perigynia with many distinctly upraised nerves mostly extending the entire length in addition to the 2 marginal ribs, pale green or olive to light brown at maturity; pistillate scales white, green, or brown; leaves smooth below; plants densely clumped
12. Broadest leaves 20–40 mm wide; culms narrowly winged and appearing distinctly flattened when pressed; pistillate scales broadly ovate and rounded to obtuse at tip; rare in extreme e *C. albursina*
12. Broadest leaves 5–15 mm wide; culms without conspicuous narrow wings; pistillate scales short to long-pointed at tip; occasional to common, widespread
13. Perigynia tapering and conspicuously narrowed at base, 3-sided and closely surrounding the achenes, green to light brown; pistillate scales usually green or white (brown); common in woodland..... *C. blanda*
13. Perigynia rounded at the base (or at least not long-tapering), round in cross section and loosely surrounding the achenes, dark green to olive-brown; occasional in wet meadows, sometimes in low woods *C. granularis*
8. Beak or top of perigynium straight
14. Pistillate spikes at maturity widely spreading or drooping on flexuous peduncles
15. Perigynium beak minute, not toothed at apex; rare in Sandhills fens *C. limosa*
15. Perigynium beak well-developed and 2-toothed at apex; widespread
16. Perigynium body subglobose, abruptly tapering to a narrow tubelike beak \geq the length of the body, teeth of beak short and soft; woodland..... *C. sprengei*
16. Perigynium body ovoid or lanceolate, tapering gradually into the beak, which is shorter than the body, teeth of beak firm; marshes and open wet ground (sometimes wet woodland)

17. Teeth of perigynium beak 0.3–1 mm, nearly straight; mature perigynia ascending or spreading in the spike, not reflexed; plant red-purple at base
.....*C. hystericina*
17. Teeth of perigynium beak 1.2–2.2 mm, strongly curved outward; most mature perigynia, at least the lower ones, reflexed; plant green at base*C. comosa*
14. Pistillate spikes on erect or ascending peduncles or sessile
18. Perigynium beak prominently 2-toothed, the teeth ≥ 0.4 mm
19. Pistillate spikes 15–30 mm thick; perigynia 10–20 mm*C. lupulina*
19. Pistillate spikes 8–12 mm thick; perigynia 3.5–8 mm
20. Perigynium body broadest in upper half, abruptly narrowing to the beak; scales of pistillate flowers with a long awn much surpassing the perigynium body*C. frankii*
20. Perigynium body broadest in the lower half or near the center, usually tapering gradually to the beak; scales of pistillate flowers mostly not surpassing the perigynium body (sometimes slightly surpassing it)
21. Staminate spike only 1 at tip of each flowering culm; pistillate scales with a rough awn \geq the body of the scale; perigynia strongly 12–17 nerved, green at maturity; plants cespitosego back to couplet 17
21. Staminate spikes 2–6 at the tip of each flowering culm (frequently only 1 is evident in the rare *C. melanostachya*, which has dark reddish-brown perigynia); pistillate scales and perigynia various; plants rhizomatous
22. Perigynia strongly 7–9 nerved, inflated; style strongly S-curved toward the base; culms spongy-thickened at base; rare in Sandhills wetlands*C. utriculata*
22. Perigynia with 10 or more nerves (these sometimes impressed and difficult to discern), slightly to strongly inflated; style straight or slightly bent at the base; culms not spongy-thickened at base; widespread
23. Teeth of perigynium beak 1–3 mm, straight or recurved
24. Teeth of perigynium beak mostly outcurved, 1.3–3 mm (longest usually > 2 mm); summit of leaf sheath usually sparsely pubescent with conspicuous hairs > 0.25 mm; leaves densely papillose below (15 \times magnification); vegetative culms hollow; occasional in wetland, in c, scattered e ...
.....*C. atherodes*
24. Teeth of perigynium beak straight, 1–2 mm; summit of front surface of leaf sheath often strongly scabrous with tiny protrusions < 0.25 mm; leaves smooth below; vegetative culms solid; frequent in low areas in the e $\frac{1}{4}$
.....*C. laeviconica*
23. Teeth of perigynium beak < 1 mm, erect or slightly curved
25. Leaves narrow, mostly 2–4 mm wide; culms with 1 conspicuous staminate spike above and 1 or 2 reduced spikes below (these sometimes absent); pistillate scales dark brown on the sides; rare in disturbed ground.....
.....*C. melanostachya*
25. Leaves wider, mostly 8–15 mm wide; culms with 2–4 conspicuous staminate spikes; pistillate scales whitish or pale brown on the sides; occasional in wet ground
26. Mature perigynia with conspicuous raised nerves; ligules 12–60 mm, the longest $\geq 2 \times$ longer than wide; fertile culms with reddish bladeless sheaths at the base; leaves green.*C. lacustris*
26. Mature perigynia with fine, impressed to barely elevated nerves; ligules 1–10 mm, the longest $< 2 \times$ longer than wide; fertile culms with disintegrating

- remains of leaves at the base, whitish, brownish or barely reddish; leaves glaucous or pale bluish green....
.....*C. hyalinolepis*
18. Perigynium beak either without teeth or with a slight notch with inconspicuous projections < 0.2 mm
27. Uppermost spike clearly longer than lateral spikes, often clearly pistillate in the lower portion; pistillate scales broadly acute at the tip, occasionally minutely mucronate*C. parryana*
27. Uppermost spike shorter than lateral spikes, always staminate throughout; pistillate scales narrowed to a point, often with a conspicuous awn
28. Perigynia glaucous, pale green or yellowish-brown at maturity; pistillate scales usually purplish-brown on either side of the midrib; plants rhizomatous
29. Perigynia with 2 conspicuous marginal ribs, otherwise nerveless or with faint, scarcely upraised nerves, widest in the upper half and tapering to the base; pistillate spikes 1 or 2, usually borne on the upper half of the culmgo back to couplet 11
29. Perigynia with 2 conspicuous marginal ribs in addition to 10 or more conspicuous raised nerves on the surface, broadest at or below the middle and rounded at the base; pistillate spikes 3 or 4, scattered along the length of the culm*C. crawei*
28. Perigynia green to dark green or brown at maturity; pistillate scales whitish or greenish to brown; plants caespitose or rhizomatous
30. Perigynia with conspicuous raised nerves, rounded at the base
31. Staminate spike on a short peduncle or sessile, not conspicuously raised above the pistillate spikes, which are often clustered around the staminate spike at the tip of the culm; plants caespitose
.....*C. granularis*
31. Staminate spike on a long peduncle conspicuously raised above the pistillate spikes, which are scattered along the culm; plants rhizomatous*C. crawei*
30. Perigynia with many fine, impressed nerves scarcely discernible, tapering to somewhat rounded at base
32. Perigynia widest well above the middle; usually some hairs present on the leaf sheaths*C. hitchcockiana*
32. Perigynia widest near the middle or slightly above; leaf sheaths glabrous
33. Perigynia spirally arranged in spikes, gradually tapering or rounded at the tip, often nearly circular in cross section, (1.8-) 2-2.6 mm wide; achenes shorter than and not filling the perigynium, 1.7-2.1(-2.2) mm wide, on a short, stout stalk (stipe) 0.2-0.5 mm; base of plant greenish-white or brown (reddish); very common in woodlands and moist open areas in e ¼
.....*C. grisea*
33. Perigynia arranged in vertical rows (distichous) in spikes, abruptly constricted to a short beak to 0.7 mm, definitely 3-angled in cross section, 1.6-1.9(-2.0) mm wide; achenes nearly completely filling the perigynium, 1.3-1.7 mm wide, on a narrow stipe 0.5-1 mm; base of plant dark purplish-red; frequent in rich woods in extreme e*C. oligocarpa*

CAREX, GROUP III (styles 2, achenes 2-sided, spikes not all alike)

1. Inflorescence of distinctly separated spikes, the spikes longer (3-20 x) than broad
2. Perigynia whitish-powdery to golden-orange at maturity (drying dark brown); achenes dark brown to blackish at maturity; bract of the lowermost pistillate spike usually sheathing the culm; culms usually < 4 dm tall*C. aurea*

2. Perigynia green to brown at maturity; achenes tan to brown at maturity; bract of the lowermost pistillate spike usually sheathless or barely sheathing; culms usually > 4 dm tall
3. Perigynium beak short but definitely discernable, with 2 small teeth at the tip; perigynium strongly nerved at least on the dorsal side; pistillate spikes ≥ 6 mm thick *C. nebrascensis*
3. Perigynium beak small or absent, untoothed when present; perigynium nerveless or faintly nerved; pistillate spikes usually < 5 mm thick
 4. Bract of lowest pistillate spike much surpassing entire mature inflorescence; leaf sheaths glabrous and usually dorsally suffused with a distinctive reddish-tan tinge, front surface not breaking into a fibrous pinnate network at maturity; Sandhills fens *C. aquatilis*
 4. Bract of lowest pistillate spike not surpassing (sometimes equaling or barely exceeding) entire inflorescence. (Note: since the bract seems to reach full size before the rest of the inflorescence, immature plants may be misidentified); sheaths various; widespread
 5. Front surface of lower leaf sheaths filamentous, splitting to form a pinnate network of fibers; intact sheath deeply asymmetrically concave at summit, back surface of leaf sheath scabrous; possible in n and n-e *C. stricta*
 5. Front surface of lower leaf sheaths not filamentous, intact sheath convex at summit, though often irregular in outline, bulging upward on one side or in the center, dorsal surface of leaf sheath glabrous; common and widespread *C. emoryi*
1. Inflorescence a \pm continuous 15–60 mm cluster of short, usually crowded spikes, each spike only slightly longer than broad and only 4–12 mm, spikes often difficult to distinguish from one another
 6. Uppermost spike pistillate above, staminate below, strongly tapering or wedge-shaped at base; perigynia of lower spikes spreading, exceeding pistillate scales and clearly visible; plants cespitose *C. interior*
 6. Uppermost spike staminate above or throughout, or wholly pistillate, rounded to slightly tapered at base; perigynia ascending and \pm completely covered by the pistillate scales; plants rhizomatous
 7. Culm obtusely 3-angled to nearly round and smooth just below inflorescence, < 3 dm tall
 8. Perigynium beak nearly as long as the body, which is nerved on the front surface; inflorescence often > 15 mm wide *C. douglasii*
 8. Perigynium beak half as long as the body, which is nerveless on the front surface; inflorescence usually < 12 mm wide *C. eleocharis*
 7. Culms sharply 3-angled and sometimes rough just below the inflorescence, (1–)3–8 dm tall
 8. Leaf sheath prolonged at the summit to form a collar around the culm, front surface green or greenish striped (except for a V-shaped hyaline area near the mouth); perigynium finely nerved ventrally, beak $\frac{1}{4}$ – $\frac{1}{2}$ as long as body *C. sartwellii*
 8. Leaf sheath not prolonged at the summit to form a collar around the culm, fronts of leaf sheaths hyaline (clear and membranous); perigynia nerveless ventrally, beak $\frac{1}{2}$ or more as long as body *C. praegracilis*

CAREX, GROUP IV (styles 2, achenes 2-sided, spikes all staminate above, pistillate below)

1. Perigynium beaks entire or obliquely cut at the tip, without distinct teeth; mature perigynia brown; plants mostly of peaty soils in and around the Sandhills
 2. Front surface of leaf sheath white-hyaline and only slightly copper-tinged at the mouth (though strongly red-dotted on rest of sheath front); spikes closely crowded; perigynia shiny at maturity; culms erect *C. diandra*
 2. Front surface of leaf sheath strongly copper-tinged at mouth and often on whole surface; lower spikes often somewhat separate; perigynia dull at maturity; culms often arching *C. prairiea*
1. Perigynium beak with 2 distinct teeth at tip (sometimes inconspicuous); mature perigynia green to yellowish-brown or brown
 3. Base of mature perigynium strongly corky or soft-thickened (stick a pin in the perigynium to test this); culms frequently winged
 4. Perigynium beak with smooth margins; spikes well separated and non-overlapping; mature perigynia 2.6–3.4 mm; culms unwinged *C. texensis*
 4. Perigynium beak serrulate; spikes crowded and overlapping at least in upper part of inflorescence; mature perigynia (3.5–)4–8 mm; culms usually winged

5. Perigynium 6–8 mm long, the base dilated into a ring-shaped structure wider than rest of body, beak 2–3 × as long as body; front surface of leaf sheath flat; very rare (possibly extirpated) in s-e.....*C. crus-corvi*
5. Perigynium 3.5–6 mm long, base of perigynium confluent with and not much broader than rest of body, beak 0.5–2 × as long as body; front surface of leaf sheath cross-rugulose (with a series of parallel furrows at a right angle to the axis of the culm); uncommon to common and widespread
 6. Perigynium beak about half as long as body, rounded at the base, ventrally nerveless (or with 1–3 short nerves at base); uncommon in floodplain woods in s-e.....*C. conjuncta*
 6. Perigynium beak 1–2 × as long as body, truncate at base; strongly several-nerved ventrally (rarely nerveless); common and widespread*C. stipata*
3. Base of mature perigynium not corky or soft-thickened (slightly so at most), relatively firm and about the same texture as the rest of the perigynium; culms unwinged
 7. Inflorescence with obvious branches or at least 2 or more spikes at the lower nodes, which are usually distinctly separated from the upper spikes; perigynia brown to yellow-brown or golden at maturity
 8. Larger perigynia (3.3–)3.5–5.5 mm; leaf sheaths loose and baggy and septate-nodulose (with occasional dark diagonal ridges uniting the vertical veins) on dorsal side; usually in upland prairie (occasionally in woodland)
 9. Pistillate scales mostly not surpassing base of beaks of the perigynia they subtend; anthers 0.7–1.3 mm; rich woods in extreme e.....*C. sparganioides*
 9. Pistillate scales surpassing the beaks of the perigynia they subtend; anthers 1.3–3 mm; usually in the open*C. gravida*
 8. Larger perigynia 2–3 mm; leaf sheaths tight, not septate-nodulose; low prairie and wet places
 10. Mature perigynia brown, beaks about equaling bodies, and so comprising about half the length of most mature perigynia; leaves mostly surpassing the flowering culms; common in wet places from marshes to seasonally damp roadside ditches*C. vulpinoidea*
 10. Mature perigynia yellow-brown to golden; beaks shorter than the bodies, comprising $\leq \frac{1}{2}$ of total perigynium length; leaves mostly shorter than the culms; uncommon plants of mesic prairie in s-e.....*C. brachyglossa*
 7. Inflorescence unbranched, only 1 spike per node (if appearing as 2 or more at the lower nodes, the inflorescence a dense uninterrupted ovoid to capitate cluster); perigynia green, brown, or yellow-brown (pale yellow) at maturity
 11. Leaf sheaths loose and baggy and easily breaking or tearing, dorsal surface white with green veins or mottled green-and-white and septate-nodulose (with occasional dark diagonal ridges uniting the vertical veins)
 12. Pistillate scales ovate with acute or short-cuspidate tips almost or not at all reaching the bases of the beaks of the perigynia they subtend; anthers 0.7–1.1(–1.3) mm; stigmas short and stout, protruding only slightly from the perigynium beak; lower spikes well-separated*C. sparganioides*
 12. Pistillate scales with narrowly acuminate or awned tips reaching or exceeding the bases of the beaks of the perigynia they subtend; anthers 1.5–3 mm; stigmas elongate and slender, when intact protruding 1.5 mm or more from the perigynium beak; lower spikes slightly separated to overlapping
 13. Front surface of leaf sheath thin, hyaline, and easily breaking at the straight to slightly concave summit (sometimes slightly thickened and scarcely yellow-tinged); perigynia brown or pale yellow-brown at maturity (sometimes remaining green when growing in shade); spikes usually arranged in a dense head, the lowermost overlapping; edges of culms minutely roughened (run your fingers along the culm below the inflorescence); common, usually in open uplands*C. gravida*
 13. Front surface of leaf sheath thickened and yellow to brown and firm at the concave summit; perigynia green (at least along the edges) at maturity; lowermost spikes often slightly separated; edges of culms smooth to slightly roughened; less common and more shade-tolerant than the preceding*C. aggregata*

11. Leaf sheaths tight, closely enveloping the culms and usually remaining intact at maturity, variously green, white, or mottled on dorsal surface, usually not septate-nodulose
14. Pistillate scales mostly surpassing the perigynia they subtend and largely hiding them from view; plants rhizomatous, with stems occurring singly or few together in loose clumps (rarely cespitose)
15. Plants rhizomatous, larger perigynia ≤ 1.5 mm wide go to couplet 6 in GROUP III
15. Plants cespitose, larger perigynia 2.2–3 mm wide; possible in extreme s and s-e *C. austrina*
14. Pistillate scales mostly not surpassing the perigynia, which are readily visible; plants cespitose
16. Larger perigynia (3.5–)3.9–4.7 mm long
17. Front surface of leaf sheath thin or slightly thickened at the summit *C. gravida*
17. Front surface of leaf sheath thickened and yellow-brown at the summit
18. Back surfaces of most leaf sheaths green; perigynia usually brown at maturity; tips of some pistillate scales equaling the perigynia they subtend *C. austrina*
18. Back surfaces of leaf sheaths white or pale green and septate-nodulose, or green mottled with white; perigynia remaining green at maturity; tips of pistillate scales shorter than perigynia *C. aggregata*
16. Larger perigynia 2–3.5 mm long
19. Inflorescence a crowded to interrupted elongate-oblong spike 15–40 mm, usually with spaces between the clearly distinguishable lower spikes, and with conspicuously protruding bracts; possible in extreme s-e *C. muehlenbergii*
19. Inflorescence a dense, crowded capitate to ovoid cluster, usually 4–25 mm, nearly always uninterrupted, the individual spikes sometimes indistinguishable except for the narrow bracts protruding only slightly from the inflorescence; occasional to common in e
20. Perigynium gently rounded to a very short beak ($<$ half as long as body) which is sometimes smooth or sparsely serrulate near the base where it joins the body, bodies of most mature perigynia widest at or near the rounded to truncate bases; moist meadows, woodlands, and lawns in e half *C. leavenworthii*
20. Perigynium tapering to a longer beak ($>$ half as long as body) which is always strongly serrulate, bodies of most mature perigynia widest at or below the middle
21. Mature culms much exceeding leaves; upper leaf surfaces densely covered with papillate projections visible at $30\times$ magnification; open areas in s-e *C. mesochorea*
21. Mature culms about equaling to slightly exceeding leaves; upper leaf surfaces lacking papillae; woods in extreme e *C. cephalophora*

CAREX, GROUP V (styles 2, achenes 2-sided, spikes all pistillate above, staminate below [sect. *Ouales*])

1. Pistillate scales as long and nearly as wide as the perigynia and usually concealing them at maturity; uncommon in pine woodlands in n-w *C. xerantica*
1. Pistillate scales shorter and narrower than the perigynia and largely exposing the upper margins and beaks at maturity
2. Larger perigynia ≥ 2 mm wide
3. Perigynia lanceolate, $\geq 2.5\times$ as long as wide; achenes 0.7–0.8 mm wide; spikes mostly tapering to a pointed tip *C. scoparia*
3. Perigynia lanceolate to suborbicular, $\leq 2.5\times$ as long as wide; achenes ≥ 1 mm wide; spikes mostly rounded at tip
4. Perigynia very thin, membranous, and nearly translucent, nearly flat, except where distended over the achene; the larger (4.5–)5–7 mm \times 2.7–4.3(–4.8) mm *C. bicknellii*

- 9. Perigynia 4–5.5 mm × 1–2 mm, 2.5–4 × long as wide
 - 11 Broadest leaves 1–3 mm wide; perigynium wing-margined for entire length; wet, sandy soil in the open *C. scoparia*
 - 11 Broadest leaves 3–7 mm wide; perigynium wing strongly narrowed to obsolete below middle of body; wet, silty soil usually in floodplain woods *C. tribuloidea*

Carex aggregata Mack.: Occasional to frequent in woodlands and other shady areas, e ½, scattered w. Evidently weedy in some areas, and probably more widespread than our records indicate. Though often treated as a variety of *C. sparganioides*, *C. aggregata* is rarely confused with that species in our area. *C. aggregata* is sometimes confused with *C. gravida* (particularly shade forms of the latter). *C. aggregata* can usually be distinguished by the leaf sheaths, which are concave, thickened, often yellow to brown at the summit of the front side, and frequently green-and-white-mottled on the dorsal surface of at least some sheaths.

Carex albicans Willd. ex Spreng. var. *albicans* [*C. artitecta* Mack.]: Occasional to common in upland oak bluff forest along the Missouri, Platte, and Big Nemaha rivers. Recent workers have merged *C. artitecta* and the eastern *C. emmonsii* into a single species; nomenclature is outlined by Rettig (1989, 1990). *C. albicans* is one of the first herbaceous plants to flower in the Spring in e Nebraska, with staminate spikes maturing as early as late March.

Carex albursina Sheld.: Rare in rich oak woodlands. Known from a single population discovered in 1994 n of Omaha. Its distinctive, broad leaves resemble lily or orchid leaves.

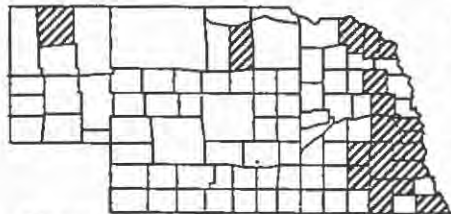
Carex aquatilis Wahl. var. *substricta* Kükenth. [*C. aquatilis* var. *altior* (Rydb.) Fern., misapplied]: Locally common in Sandhills fens. The type of *C. aquatilis* var. *altior* is an

immature specimen of *C. emoryi*. Most reports of this species in the *Atlas GP* were based on *C. emoryi*.

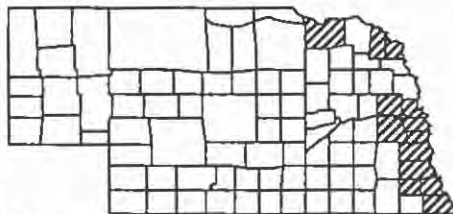
Carex atherodes Spreng.: Occasional to locally common in marshes, wet meadows, and along pond margins in the Sandhills, and scattered locations to the w, e, and s. Many Nebraska specimens of this sedge have scattered hairs on the perigynia, a feature which has gone unreported in most manuals. Although *C. atherodes* is frequently distinguished by its pubescent sheaths, these are occasionally ± glabrous, particularly on plants growing in areas of high water fluctuation (e.g. irrigation ditches). Nonetheless, a few hairs are often still visible near the summit or on the front surface of the leaf sheaths.

Carex aurea Nutt.: Occasional to locally common in wet meadows, streambanks, moist canyon bottoms in the Sandhills, along the Platte and Loup rivers, and in the Panhandle. The distinctive golden-orange perigynia of mature plants fall readily from the spikes and are infrequently represented in herbarium material.

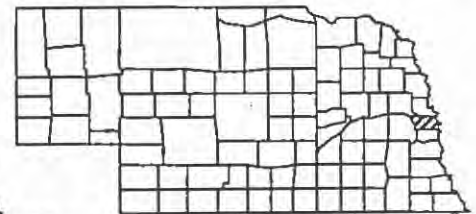
Carex austrina Mack. [*C. muhlenbergii* Schkuhr ex Willd. var. *australis* Olney]: Uncommon in prairie. Collected once from a prairie near Verdon in Richardson C. but likely elsewhere along our s border in s-e Nebraska. Nebraska records dotted in the *Atlas GP* represent *C. gravida* specimens with tight sheaths, which strongly resemble *C. austrina* but lack the thickened concave



Carex aggregata



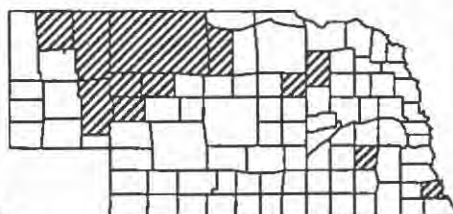
Carex albicans albicans



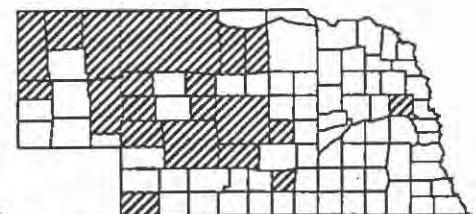
Carex albursina



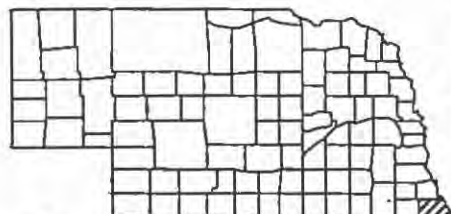
Carex aquatilis substricta



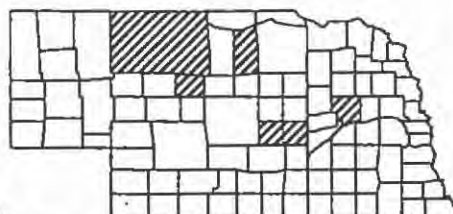
Carex atherodes



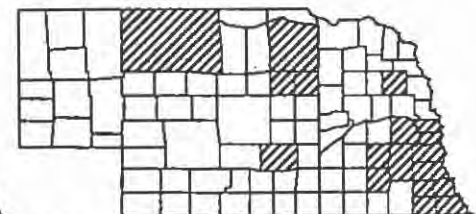
Carex aurea



Carex austrina



Carex bebbii



Carex bicknellii bicknellii

sheath summits typical of that species (cf. Jones, 1994).

Carex bebbii Olney ex Fern.: Uncommon in marshy areas and shores in the Sandhills and Loup River system.

Carex bicknellii Britt. var. *bicknellii*: Occasional in upland prairie in s-e, scattered in mesic meadows in e Sandhills. All our plants appear to be the typical variety, which has minutely papillate leaf sheaths. The mature spikes of some plants are a distinctive orange-brown or copper color.

Carex blanda Dew.: Common in woodlands, moist ravine bottoms, stream margins, shaded lawns, in e ½ and n, evidently absent from the Sandhills, s-w and Panhandle (except Pine Ridge).

Carex brachyglossa Mack. [*C. annectens* Bickn. var. *xanthocarpa* (Bickn.) Wieg.]: Uncommon in low prairie in extreme s-e. The type of *C. annectens* is actually a specimen of *C. vulpinoidea*. *C. brachyglossa* resembles the much more common *C. vulpinoidea* but can be distinguished by its golden-colored perigynia and "tidier" appearance of the inflorescence due to the shorter perigynia beaks. Specimens keyed here should be compared with specimens of *C. vulpinoidea* if possible.

Carex brevior (Dew.) Mack. ex Lunell: Common in upland and lowland prairie, meadows, roadside ditches, lawns, and open woodland throughout, somewhat less common w. Depauperate specimens sometimes key to *C. festucacea*, but can be distinguished by their shorter achenes (1.3–1.7 mm vs. 1.7–2 mm in *C. brevior*).

Carex bushii Mack.: Uncommon in tall-grass prairie along our s border in Gage, Jefferson, and Pawnee counties; first collected in 1974.

Carex buxbaumii Wahl.: Evidently rare in wet meadows in e Sandhills and along Loup River. A 1996 collection from

Howard C. is the first made in Nebraska since 1939.

Carex cephalophora Muhl. ex Willd.: Occasional in oak bluff forest along Missouri and Big Nemaha rivers. Most Nebraska specimens referred here in the past are the similar and more widespread *C. leavenworthii*, or *C. mesochorea*.

Carex comosa F. Boott: Occasional in marshes, wet meadows and drainage ditches mostly in Sandhills and vicinity, scattered e along the Elkhorn, Loup, and Platte rivers.

Carex conjuncta F. Boott: Uncommon in wet riparian woods in s-e; collected only a few times and probably overlooked. Plants in the Seward C. population have arching, nearly reclining culms and resemble an overgrown *C. gravida*.

Carex crawei Dew.: Occasional to common in wet meadows, mostly in the Sandhills, Loup River system, and along the Platte River. Frequently growing with and often confused for *C. granularis* and *C. tetanica*.

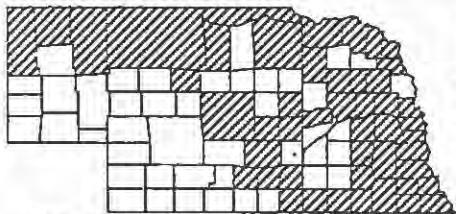
Carex cristatella Britt.: Occasional in low moist ground, marshes, along shores, and in wet woods in e ½.

Carex crus-corvi Shuttlew. ex Kunze: Very rare in marshes and around pond margins in s-e, last collected in 1910.

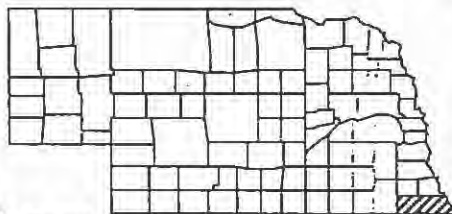
Carex davisii Schwein. & Torr.: Locally common in moist, wooded areas, rarely along roadsides in the e ½, extending slightly westward in the Big and Little Blue river valleys.

Carex diandra Schrank: Uncommon in marshes, seeps, fens, and rarely sandbars in Sandhills and the Loup River system.

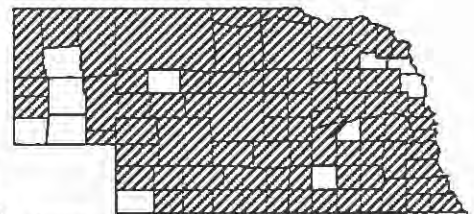
Carex douglasii F. Boott: Occasional in low ground, shores, sometimes upland prairie, often where slightly alkaline in w and w-c.



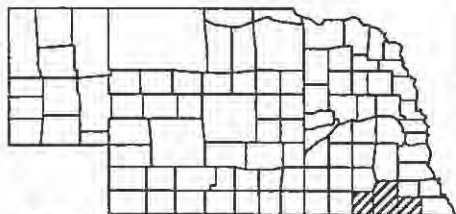
Carex blanda



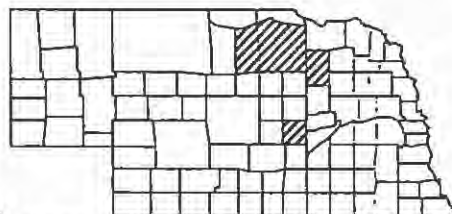
Carex brachyglossa



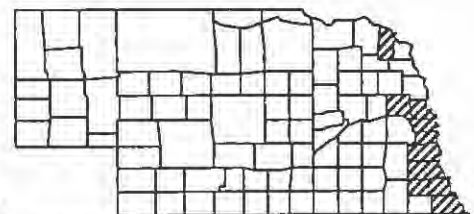
Carex brevior



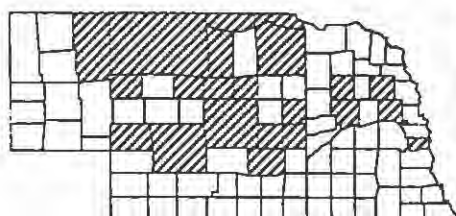
Carex bushii



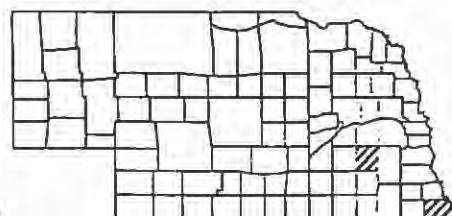
Carex buxbaumii



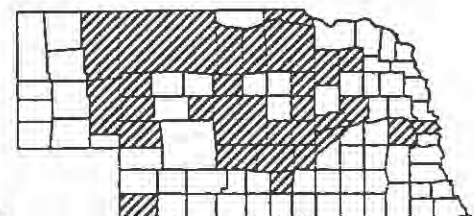
Carex cephalophora



Carex comosa



Carex conjuncta



Carex crawei

Carex eburnea F. Boott: Locally common in upland woods and margins, mostly along the Missouri and Niobrara River and tributaries in n and n-e, scattered s.

Carex eleocharis Bailey [*C. duriuscula* C. A. Mey.]: Frequent in upland prairie, along roadsides and in waste ground throughout, although rare to absent in much of e ½. Very similar and sometimes merged with Eurasian *C. duriuscula* or *C. stenophylla*. In e Nebraska, this species is most likely to occur along roadsides and margins of parking lots. It is tolerant of disturbance and evidently increases in overgrazed rangeland.

Carex emoryi Dew.: Streambanks, wet ditches, marshes and fens; nearly throughout, though possibly absent from s-w. Frequently confused with *C. aquatilis* and *C. stricta* but far more common and widespread than either. In many keys, the three are separated on the basis of the shape of the mature perigynia, but specimens with mature perigynia are seldom collected, since these seem to fall from the plant soon after they are mature or are infected with galls. Standley (1989) indicates they can be reliably separated by vegetative characters alone.

Carex filifolia Nutt.: Common in upland, often rocky mixed- and short-grass prairie in Panhandle and adjacent s-w, and scattered e to Custer C. and along Niobrara R. This species has a short, strap-shaped structure alongside the achene, which is interpreted as a vestigial rachilla, a feature considered primitive in the genus. *C. filifolia* is one of our most economically important sedges, being one of the dominant species in most upland rangeland in the Sandhills, and it decreases with grazing. Local ranchers often call the plant "black-root".

Carex frankii Kunth: Uncommon in low wet ground in extreme s-e. First collected in the State in 1974 and only

a few times since.

Carex granularis Muhl. ex Willd. var. *haleana* (Olney) Porter: Occasional to locally common in wet meadows and low woodland in c, scattered e along Platte River. Variety *granularis* is possible in the extreme s-e, and may be distinguished by the following:

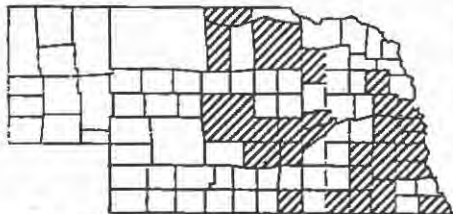
1. Larger perigynia 2–2.8 mm × 1–1.5 mm, ascending at maturity var. *haleana*

1. Larger perigynia 2.5–4 mm × 1.5–2.5 mm, spreading at maturity var. *granularis*

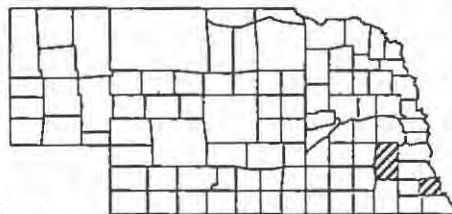
Carex grvida Bailey: Frequent to common in upland and lowland prairie, moist meadows, streambanks, open woods and lawns through much of State, apparently absent from the Sandhills and Panhandle (except Pine Ridge). In extreme s-c and s-w, robust plants with branched inflorescences are found which frequently have ventrally nerved perigynia. These are traditionally treated as var. *lunelliana* (Mack.) Herm., but according to Reznicek (pers. comm.) the type of that variety may not be separable from typical *C. grvida*. Very variable in Nebraska, and frequently mistaken for *C. aggregata*, *C. muehlenbergii*, or even *C. stipata*.

Carex grisea Wahl. [*C. amphibola* Steud. var. *turgida* Fern.]: Common in woodland and low open areas in e ½. The name *C. grisea* has priority over *C. amphibola*.

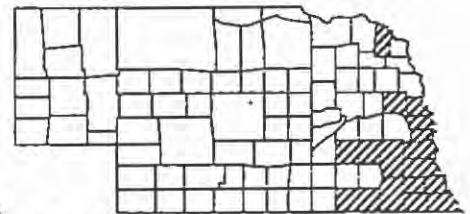
Carex heliophila Mack. [*C. inops* Bailey subsp. *heliophila* (Mack.) Crins]: Common in upland prairie and open woods nearly throughout, though evidently absent from most of Panhandle. Crins and Ball (1983) have submerged *C. heliophila* into western *C. inops* based on numerical analyses. Although the two overlap in most measurements, they are wholly allopatric and differ in overall appearance. *C. heliophila* is far more likely to be



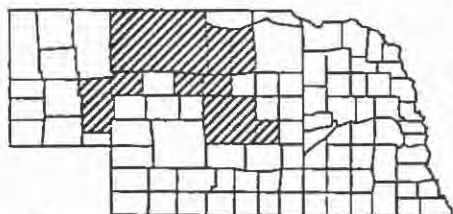
Carex cristatella



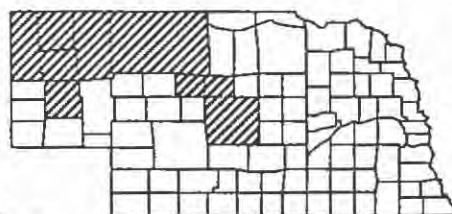
Carex crus-corvi



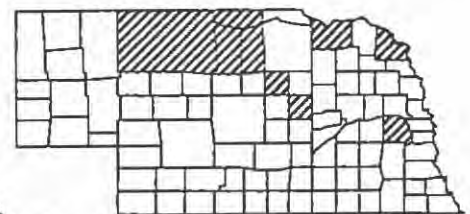
Carex davisii



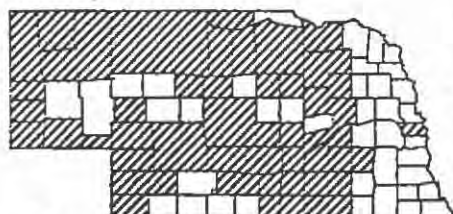
Carex diandra



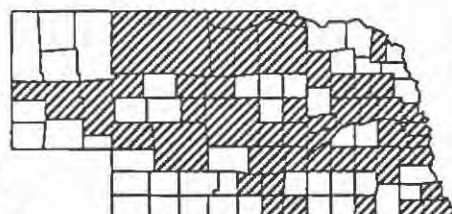
Carex douglasii



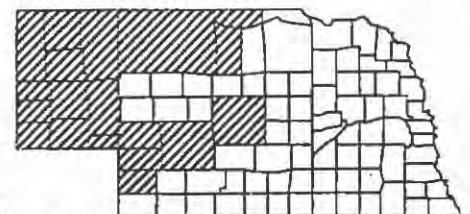
Carex eburnea



Carex eleocharis



Carex emoryi



Carex filifolia

confused with eastern *C. pennsylvanica* in the field and in herbaria. We choose to maintain the 3 as separate species. This sedge is often a dominant constituent of upland Sandhills prairie.

Carex hitchcockiana Dew.: Occasional in rich oak bluff forest along the Missouri River.

Carex hyalinolepis Steud.: Uncommon in low wet ground and borders of oxbow ponds in e ½ and Buffalo C. Most reports of *C. lacustris* from s-e in the Atlas GP are referable here.

Carex hystericina Muhl. ex Willd. Frequent in marshes, shores and wet woods throughout, but rare or absent in some areas.

Carex interior Bailey: Occasional to locally common in wet meadows, seeps, and fens in Sandhills and Loup River system.

Carex jamesii Schwein.: Occasional to locally common in rich oak bluff forest along the Missouri and Big Nemaha Rivers, from Washington C. s. Though very similar to *C. saximontana* in most respects, the two are fairly distinct in the field, where *C. jamesii* is readily distinguished by its upright culms, light green color, and preference for low, moist sites, whereas *C. saximontana* has culms that are often arching and have a bluish-green tint, and is usually found on upper slopes. *C. jamesii* may, in fact, be confused with *C. oligocarpa*, with which it often grows, in the field. The ranges of *C. jamesii* and *C. saximontana* overlap only in the Omaha area.

Carex lacustris Willd.: Occasional to locally abundant in marshes, seeps and fens in the Sandhills and scattered places in n-e and in the vicinity of Omaha.

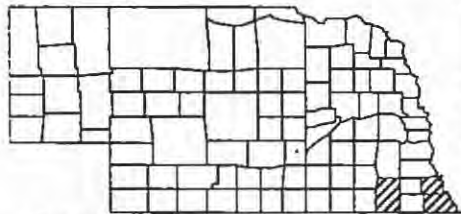
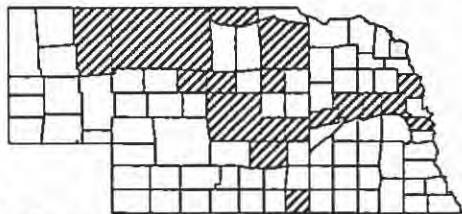
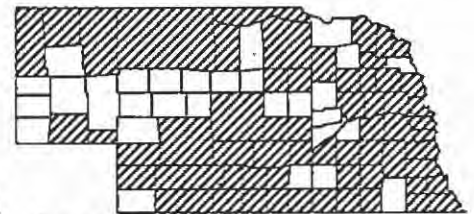
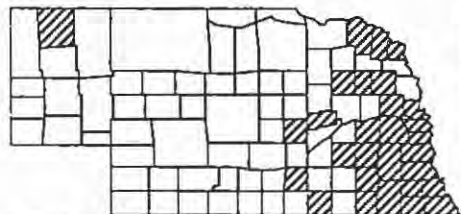
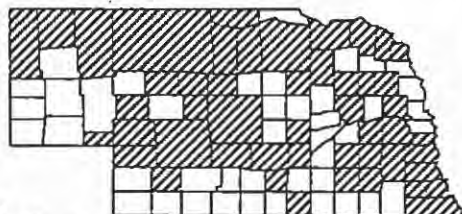
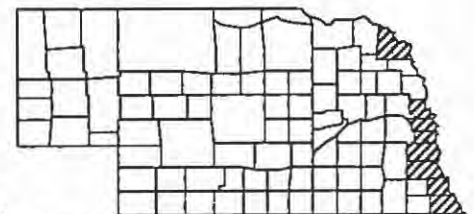
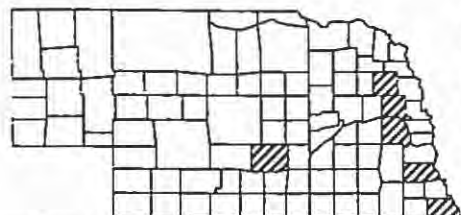
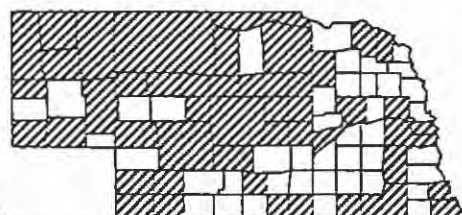
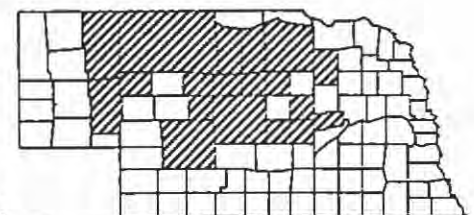
Carex laeviconica Dew.: Frequent in marshes, wet prairie, roadside ditches, and low woodlands in e ½. Like *C.*

atherodes, this species may sometimes have scattered hairs on the perigynia. The two species are sometimes difficult to distinguish. *C. laeviconica* is far more common in the e, appears to prefer fine, silty soils, and is frequently found away from permanently wet sites. *C. atherodes* is mostly restricted to the Sandhills wetlands and is rarely scattered e.

Carex laeviconica × *C. trichocarpa*: Rare in disturbed ground. A sterile hybrid collected once along a roadside in Burt C., where it is at the western limit of its known range. Our specimen mostly resembles *C. laeviconica* but has perigynia that are distinctly and evenly pubescent.

Carex leavenworthii Dew.: Occasional to locally common in low woodlands, along roadsides, prairie swales, lawns, and sometimes upland prairie and woods; most common in s-e though scattered to c. The distribution of this often-overlooked sedge has been underestimated, since most Nebraska specimens have been confused with *C. cephalophora* in herbaria. The inflorescence of *C. leavenworthii* tends to have a "tidier" appearance than that of *C. cephalophora* due to the shorter perigynium beaks. The latter is usually taller and mostly restricted to upland oak woods, whereas *C. leavenworthii* may occur in a variety of habitats. In recent years, many collections of *C. leavenworthii* have been made in lawns, which are similar in some respects to its preferred native habitat (low, mesic, often shaded ground). Collections have been made from lawns in Beatrice, Crete, Humboldt, Kearney, Lincoln and Seward so far.

Carex limosa L.: Rare in Sandhills fens. Known from a few old (ca 1890) collections from Cherry County until rediscovered there in 1992.

*Carex frankii**Carex granularis haleana**Carex gravida**Carex grisea**Carex heliophila**Carex hitchcockiana**Carex hyalinolepis**Carex hystericina**Carex interior*

***Carex lupulina* Muhl ex Willd.:** Rare in low, wet ground, often in floodplain woods. Known from a few sites along the Platte River from Fremont to s of Valley. The Custer C. report in the *Atlas GP* is from a fragmentary collection from 1901, fallen from a load of hay cut near Callaway.

***Carex meadii* Dew.:** Occasional to frequent in upland prairie and in low meadows; most common in e ¼, scattered to c. Although frequently found in upland prairie in the e, *C. meadii* is never common where it occurs. Small or depauperate plants may be confused with the related *C. tetanica*, which is normally restricted to wetter sites (such as subirrigated meadows) and is most common in c.

***Carex melanostachya* M. Bieb. ex Willd.:** Rare in disturbed ground along roadsides. Collected once from a roadside in Cedar C. in 1989. Our specimens appeared quite glaucous in the field, were strongly rhizomatous, and superficially resembled depauperate *C. nebrascensis*. The 3-branched styles and 3-sided achenes of *C. melanostachya* readily separate the two.

***Carex mesochorea* Mack. [*C. cephalophora* Muhl. ex Willd. var. *mesochorea* (Mack.) Gl.]:** Occasional to locally common in upland or lowland tall-grass prairie, rarely in lawns; s-e. Although common around Lincoln, the presence of this species in Nebraska had gone undetected until Stanley Jones annotated specimens in 1992. Most of our material had been identified as *C. cephalophora*, within which this species has traditionally been submerged, though the two are amply distinct in our area. *C. mesochorea* is immediately distinguishable in the field by its habitat (prairie versus woodland), coarser habit, and culms which clearly exceed the leaves. This species usually bears a stronger superficial resemblance to *C. grvida* than to *C. cephalophora*. Although usually found

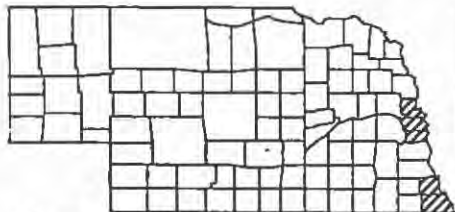
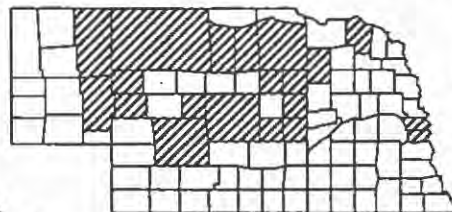
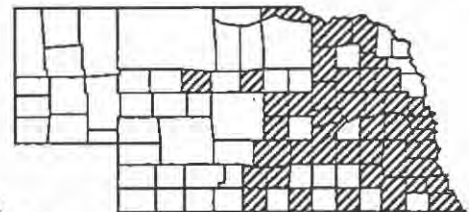
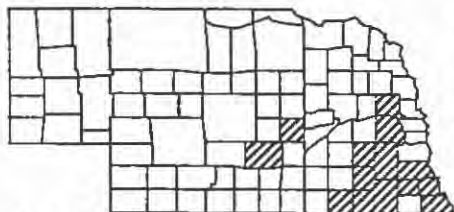
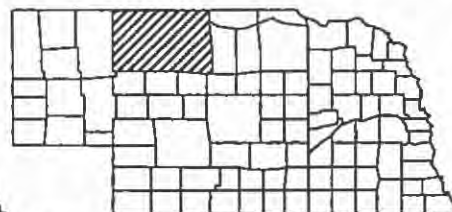
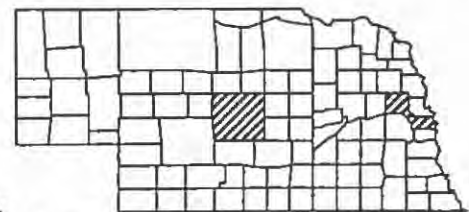
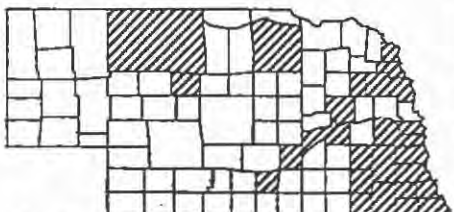
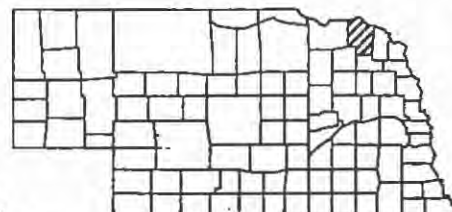
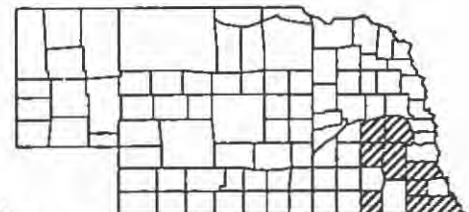
in native habitats, *C. mesochorea* was not collected in Nebraska until 1947 and may have invaded the State from the e.

***Carex molesta* Mack. ex Bright:** Frequent to common in moist meadows, low prairie, roadside ditches and woodlands in e ¼, scattered to c. This sedge is extremely variable and sometimes morphologically overlaps *C. brevior*. When growing in its typical habitat of low, moist ground in the open, *C. molesta* is often readily distinguishable by its densely crowded inflorescences of rounded spikes with spreading perigynia that remain green at maturity. In drier, upland sites, the two may be difficult to distinguish. Specimens of *C. molesta* growing in upland oak woods have a very different, more delicate appearance than well-grown plants in the open, and many of these were reported as *C. normalis* in the *Atlas GP*. The differences among these three species are covered in detail by Zager (1991).

***Carex nebrascensis* Dew.:** Common in marshes, wet meadows, pond margins and fens in w and c. The very blue-green glaucous leaves are distinctive.

***Carex oligocarpa* Schkuhr ex Willd.:** Occasional in rich oak bluff forest along the Missouri and Big Nemaha rivers in extreme e.

***Carex parryana* Dew. subsp. *hallii* (Olney) D. Murr. [*C. hallii* Olney]:** Moist meadows and seeps, often where slightly alkaline; c and w. According to Murray (1969) there is a continuum of variation between *C. parryana* and *C. hallii*. The two may be found together in the Rocky Mountains. This distinctive sedge is rarely confused with other species but is often difficult to identify because of variation in placement of the staminate flowers. It may have a single, pistillate spike, or when 2 or

*Carex jamesii**Carex lacustris**Carex laeviconica**Carex leavenworthii**Carex limosa**Carex lupulina**Carex meadii**Carex melanostachya**Carex mesochorea*

more spikes are present, the terminal one may be wholly staminate, pistillate at the tip and staminate below, or have intermingled staminate and pistillate flowers.

Carex peckii Howe: Occasional in upland oak woods in the Niobrara River drainage in n-c. This sedge superficially resembles *C. albicans* and may be present but overlooked in n-e.

Carex pellita Muhl. ex Willd. [*C. lanuginosa* Michx., misapplied]: Common in marshes, wet meadows, low prairies, road ditches statewide, our commonest species. The type of *C. lanuginosa* is a specimen of *C. lasiocarpa*. Distinguishable in the vegetative stage from our other wetland sedges by the filamentous, often red-spotted and minutely scabrous front leaf sheath surfaces and leaves that are scabrous to minutely pubescent on the upper surface just above the summit of the sheath.

Carex praegracilis W. Boott: Frequent to common in mesic meadows, low prairie, roadsides, and occasionally uplands, often in alkaline soil; throughout, though rare to uncommon in e ½.

Carex prairea Dew. ex Wood: Occasional to locally common in wet meadows, fens and seeps in the Sandhills. Commonly forming large tussocks with arching culms in fens.

Carex radiata (Wahl.) Small [*C. rosea* Schkuhr, misapplied]: Evidently rare in wet floodplain woods; collected once near Fremont in 1979 (Rothenberger 1996) and relocated there in 1995. The type of *C. rosea*, a name long applied to this species, is actually a specimen of *C. convoluta*. Nomenclatural changes are outlined by Webber and Ball (1984). This species is very similar to the next and should be sought elsewhere in e Nebraska.

Carex rosea Schkuhr ex Willd. [*C. convoluta* Mack.]: Occasional to common in upland oak woods in e ½. All reports

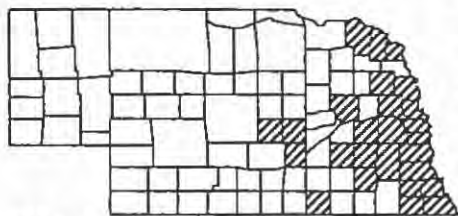
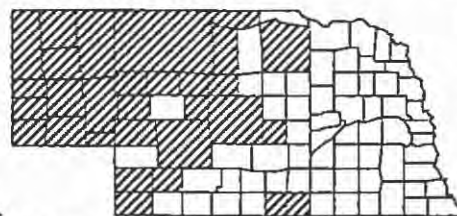
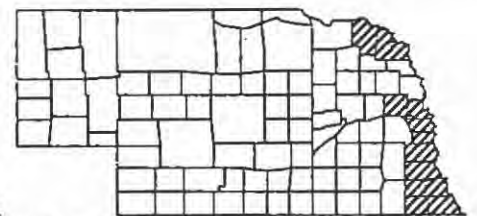
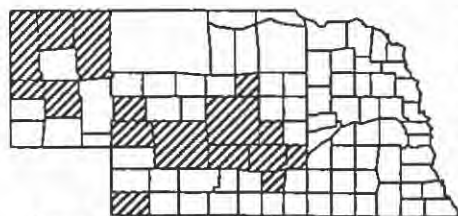
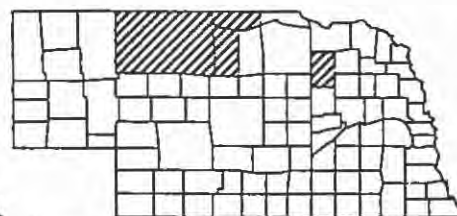
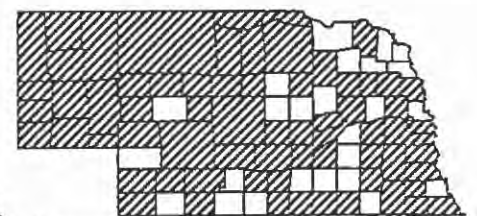
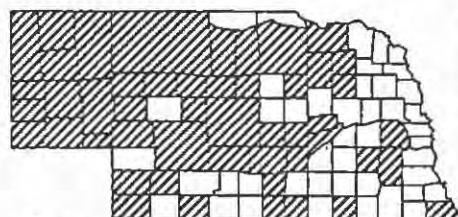
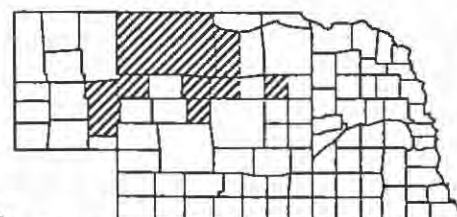
of *C. convoluta* and *C. rosea* in the *Atlas GP* represent this species.

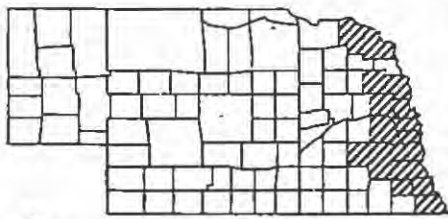
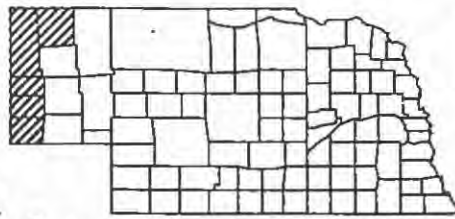
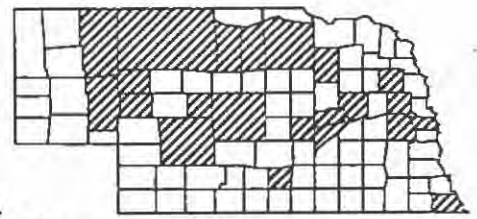
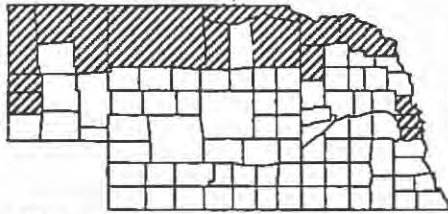
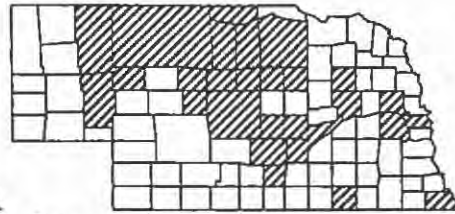
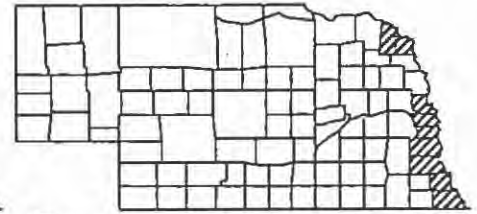
Carex rossii F. Boott: Occasional to frequent in upland pine woods in the Panhandle. Prior to 1991, this species was known from two collections made in the Pine Ridge in 1940. Recent field work has proven it to be relatively common there and in pine stands from the Wildcat Hills southward. *C. rossii* is extremely easy to overlook, since it commonly produces only basal culms which are barely visible among the leaves.

Carex sartwellii Dew.: Occasional in wet meadows in the Sandhills and along the Platte River. This sedge resembles *C. praegracilis* but can be distinguished by the green sheath fronts. It is far less commonly collected than *C. praegracilis*.

Carex saximontana Mack.: Common in pine woods in Niobrara River drainage and Panhandle, also in oak woods along the Missouri River in n-e and in the Omaha area. This species is far more common than indicated by the *Atlas GP*, but it is easily overlooked since the perigynia are often hidden from view by the lowermost pistillate scale.

Carex scoparia Schkuhr ex Willd. Frequent to common in marshes, wet meadows and shores, usually in sandy soil; mostly in the Sandhills and along the Loup and Platte rivers, scattered and uncommon in s-e. This species is often mistakenly identified as *C. tribuloides*, probably because some treatments use the green sheath fronts as a means of separating the two. Many of our specimens of *C. scoparia* have sheath fronts that are mostly green with at most a slender hyaline stripe down the middle. The two are more consistently separated by leaf width and the shape of the spikes. *C. scoparia* usually occurs in

*Carex molesta**Carex nebrascensis**Carex oligocarpa**Carex parryana hallii**Carex peckii**Carex pellita**Carex praegracilis**Carex prairea**Carex radiata*

*Carex rosea**Carex rossii**Carex sartwellii**Carex saximontana**Carex scoparia**Carex sparganioides*

sandy soils and is almost always found in the open, whereas the far less common *C. tribuloides* prefers finer soils and is usually found in shade.

***Carex sparganioides* Willd.:** Occasional in moist, rich oak bluff forest along the Missouri R. in extreme e.

***Carex spengelii* Dew. ex Spreng.:** Occasional to locally abundant in upland and lowland woods in n ½, uncommon in s-e. This sedge is frequent in upland pine and oak woods in the n, and in n-e Nebraska it is often a dominant ground cover in the oak bluff forest along the Missouri River; s of Omaha it becomes uncommon to rare and is unknown from some sites such as Indian Cave State Park. It is locally common in the Salt Creek drainage and along the Big Nemaha River.

***Carex squarrosa* L.:** Rare and evidently introduced in wet ground along railroad tracks w of Lincoln. Collected once, in 1887, and almost certainly now extirpated.

***Carex stipata* Muhl. ex Willd.:** Common in marshes and along streams and wet ditches, sometimes in wet woods; nearly throughout, evidently absent from most of the Panhandle. The beaks of the spreading perigynia give the inflorescence a "prickly" appearance.

***Carex tenera* Dew. var. *echinodes* (Fern.) Wieg.:** Uncommon to locally common in wet woodlands, occasionally in upland woods, in e ½. This infrequently collected sedge is locally common in floodplain forest along the Platte River e of Columbus. In some woods it is among the most conspicuous sedges with tall, slender arching culms with lax, nodding inflorescences and well-separated spikes. It also occurs in upland woods in the e, where it is generally smaller, with flexuous (but not nodding) inflorescences that are slightly more crowded. Most collections of these have been mistakenly identified as *C. normalis*.

***Carex tetanica* Schkuhr:** Occasional in wet meadows in the Sandhills, the Loup River system, and along the Platte River, evidently scattered w. Frequently mistaken for *C.*

crawei and *C. granularis* in herbaria, and often found growing with both in the field. Robust specimens may be confused with *C. meadii*, but they are not usually found growing with that species.

***Carex texensis* (Torr.) Bailey:** Rare in oak woods and lawns. Collected twice in woods in extreme s-e and once in a lawn in Kearney (Buffalo C.). This species (like *C. leavenworthii*) may be introduced in lawns and could appear elsewhere in the State.

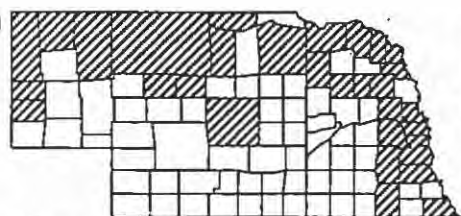
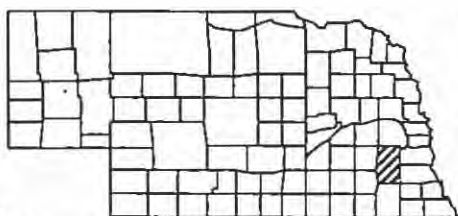
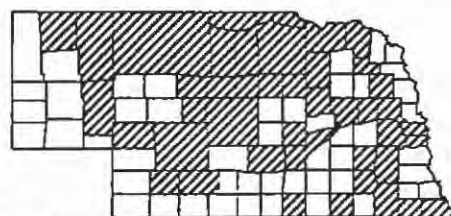
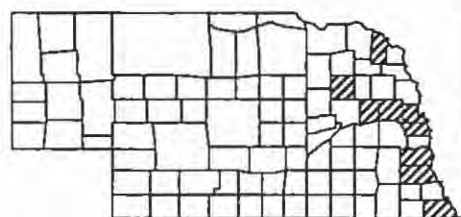
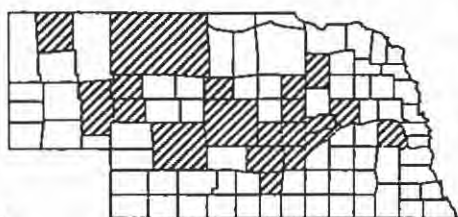
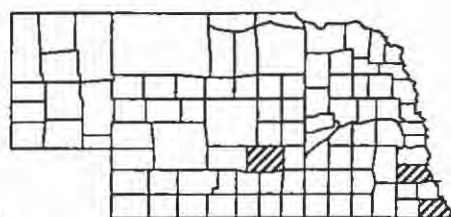
***Carex tribuloides* Wahl.:** Uncommon to locally common in low moist ground, usually in floodplain woods but sometimes in the open; mostly s-e Nebraska, though scattered to the c, evidently uncommon throughout, except in the Big Blue River drainage where locally common. Frequently confused with *C. scoparia*; see comments under that species.

***Carex umbellata* Schkuhr ex Willd. [including *C. microhyncha* Mack.]:** Apparently rare in upland prairie in extreme s-e, but exceedingly inconspicuous and likely more widespread. First collected near Rulo by Ronald McGregor in 1992.

***Carex utriculata* F. Boott [*C. rostrata* Stokes ex Willd, misapplied]:** Rare in marshes in the n Sandhills. Collections housed at the University of Nebraska at Kearney and made in Brown and Cherry C. in 1971 were evidently overlooked during preparation of the *Atlas GP* and the *Flora GP*.

***Carex vulpinoidea* Michx.:** Common in marshes, wet meadows, streambanks, and shores nearly throughout, though evidently uncommon or absent in much of the Panhandle.

***Carex xerantica* Bailey:** Occasional on upper slopes of pine woodlands in n-w. The large pistillate scales give the spikes a pale whitish-brown cast more typical of immature specimens of *C. praegracilis* than our other members of section *Ouales*.

*Carex sprengei**Carex squarrosa**Carex stipata**Carex tenera echinodes**Carex tetanica**Carex texensis*

SCLERIA BERG. (NUT-RUSH)

(Ours) perennial herbs; culms 3-angled; flowers unisexual (monoecious), the 1-flowered pistillate spikelet usually mixed with clusters of staminate spikelets, perianth lacking, achene spherical, whitish, bony, subtended by a disk (hypogium) covered with a white crust.

Scleria triglomerata Michx.: Rare in sandy, lowland tall-grass prairie. First collected in 1997 near the Platte River close to Yutan in Saunders County.

EXCLUDED SPECIES

Carex crinita Lam. was reported from Cass C. in the *Atlas GP*, based on a specimen which is part of a collection likely made in Illinois and mistakenly attributed to Nebraska.

Carex festucacea Muhl. ex Willd. was reported from Richardson C. by both the *Atlas GP* and Rothrock (1991), based on an unusually small specimen of *C. brevior*. It could appear there.

Carex gracilescens Steud. was reported for Pawnee C. by Bryson (1980) based on an atypical specimen of *C. blanda*. *C. gracilescens* can be distinguished from that species by its conspicuous dark reddish coloration at the base of the plant.

C. haydenii Dew. was reported from Lincoln C. in the *Atlas GP* based on an immature specimen of *C. nebrascensis*.

C. muehlenbergii Schkuhr ex Willd. var. *enervis* F. Boott was reported from e Nebraska and Dawes C., based mostly on specimens of *C. aggregata* and *C. grvida* with tight sheaths. A specimen annotated as this species by S. Jones appears to be an overly mature *C. cephalophora*. *C. muehlenbergii* var. *enervis* is possible in the extreme s-e. Plants keying here should be checked against Jones (1994) and herbarium material if possible.

Carex normalis Mack. was reported from e Nebraska in the *Atlas GP* based on specimens of *C. molesta* and *C. tenera* from upland woods. *C. normalis* can usually be separated from the former by its narrower perigynia and from the latter by its wider leaves, but is quite variable. Specimens keying here should be checked against specimens

in a reliable herbarium.

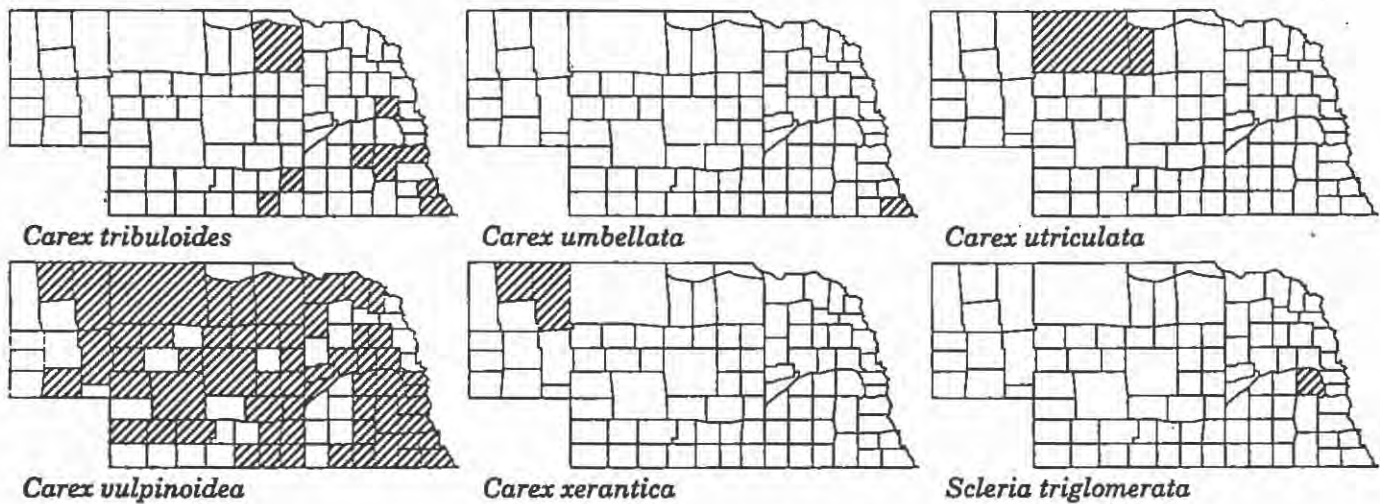
Carex siccata Dew. [*C. foenea* Willd., misapplied] was reported in the *Atlas GP* from Loup C. based on a specimen of *C. prae-gracilis*.

Carex stricta Lam. was reported from much of the State, based on specimens of *C. emoryi*. *C. stricta* could be present in fens in the n-e. Standley (1989) reported it from n Nebraska, but did not cite a specimen. It was not found in Sandhills fens during an intensive survey in 1996 and is excluded pending confirmation of the Nebraska report.

Carex trichocarpa Muhl. ex Willd. was reported for the State in the *Flora GP*, based on a hybrid of this species with *C. laeviconica*. *C. trichocarpa* could be present in extreme e Nebraska.

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