

NYFA Newsletter

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Co-Editors:

Richard S. Mitchell

Robert E. Zaremba

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New York State Museum The Nature Conservancy

ADDRESS ALL CORRESPONDENCE TO NYFA, 3140 CEC, ALBANY, NY 12230 - DUES \$10 PER YEAR

Special Edition

Attached, you will find: A Key to *Carex* Species of New York State by Gordon C. Tucker, which he hopes will prove useful to all. *Carex* is a very difficult genus for us all, and I'm sure we join as a group to thank Gordon for his efforts (The Editors).

Upcoming NYFA Field Trips:

Saturday, June 3: Great Lakes Dunes and Shoreline Fens.

Join us for a visit to New York's interesting non-maritime dunes with the botanist who knows them best, Sandy Bonanno. Sandy studied the vegetation of New York Great Lakes Dunes as a part of her Masters work with Don Leopold at SUNY ESF. We will be visiting a TNC preserve, El Dorado Beach Preserve in Ellisburg, NY, south of Watertown. The site also has an extensive alkaline cobble shore community and successional northern white cedar and juniper woodlands. Later in the day, we will visit nearby Rainbow Shores Fen which supports the bog buckmoth, which should be evident in larval clusters. The fen also boasts the orchid, *Arethusa bulbosa*, and several rare sedges, which may be visible. Bring hiking boots and footwear for a very wet walk in a fen. For complete information about meeting places and times, contact Sandy Bonanno at (716)-546-8030 or Bob Zaremba at (518)-463-6133, ext. 226.

Back by Popular Demand: Visit the Alvar!

Sunday, June 4: Chaumont Barrens and Other Alvarian Wonders. For those who will be attending the Great Lakes trip (June 3), and anyone else who wants to join us, we will stay overnight in the Watertown area and meet Sunday morning to visit Chaumont Barrens. We should be able to see a wide variety of New York rarities, including: *Castilleja coccinea*, *Geum triflorum*, *Senecio pauperculus*, and *Phlox divaricarpa* in bloom. We may also look for *Carex juniperorum*, which is a newly described member of the section Phyllostachys, known from alvar sites in

nearby Ontario. If there is interest, we will also try to get permission to visit another alvar site that was not included in our 1991 visit. For information on hotels, meeting places and times, contact Bob Zaremba at (518)-463-6133 ext. 226.

Saturday, August 19: Anthony's Nose and Iona Island. A joint field trip with the Long Island Botanical Society. We will hike from the Appalachian Trail at the east end of the Bear Mountain Bridge to the top of Anthony's Nose (along a steep, woodland road). We will see a rocky grassland summit and dry oak woods. At low tide, we will visit Iona Island, with a guarantee of seeing rare plant populations, and a brackish tidal marsh with mudflats. Bring both hiking boots and marsh slogging footwear. For information, contact Bob Zaremba at (518)-463-6133 ext. 226.

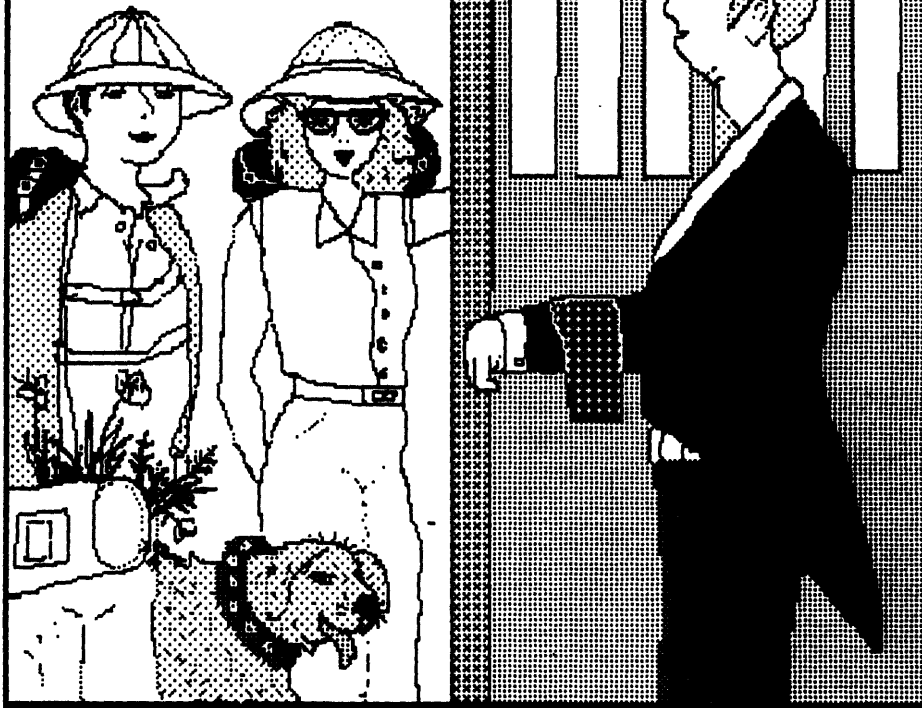
Saturday, September 16: The Albany Pine Bush. We will hike through the central section of the Pine Bush seeing a range of dry pine barrens. Parts of this area have been managed with fire over the past three years. We will also visit several Karner blue butterfly sites (It's too late to see butterflies.) and a pine barrens wetland. The field trip will begin at 10:00am at the Pine Bush sign on Rt. 155 just north of the Thruway underpass. For information contact Bob Zaremba at (518)-463-6133.

1995 NYFA Annual Meeting:

The annual meeting will be held in association with the Fall Field trip to the Albany Pine Bush. If you want to attend, let Skip Blanchard know if you would prefer to meet in the Albany area Friday evening before the field trip or on Saturday afternoon after the field trip. At this meeting we will elect new officers and council members and discuss the grants programs and the possibilities for developing new NYFA programs.

THE INTREPIDS

We come to you
from haunt of coot
and heron..



With profound apologies to James Thurber...RSM

Preliminary Keys to *Carex* (Cyperaceae) in New York State

Gordon C. Tucker
New York State Museum

Carex is the largest genus in New York's flora, with 220 species, nearly all of which are native. They are nearly ubiquitous in habitat, and a large number of them occur in wetlands. Nearly 70 species of *Carex* are listed as threatened or endangered in New York State (Young, 1992). It is hoped that this key will help with their identification. The keys to sections and species generally follow Gleason (1952), unless I preferred those in Fernald (1950). Whenever available, more recent revisions of sections or species groups have been followed and these are noted. The arrangement of species into sections follows that anticipated for the upcoming *Flora of North America* (FNA) treatment (David Murray, family editor; personal communication). Sectional names follow FNA, and are largely the same as those of Tucker (1987), but often different from Gleason & Cronquist (1991).

Before attempting to key an unknown, it is helpful to do the following:

Note disposition of staminate flowers and pistillate ones (i.e. perigynia), whether in different spikes, or in upper and lower parts of the same spike. A few species of *Carex* are dioecious (or polygamodioecious); a separate key for staminate plants is provided. Separate out a typical perigynium from the middle of a spike (for those species with 3 stigmas; for those with 2 stigmas take a perigynium from near the base of one of the lower, but not the lowest, spikes). Measure the length and width and set it aside for further observations when needed. Compare the adaxial and abaxial faces and note the shape of the beak, if present. If possible, dissect out an achene that is mature or nearly mature. While so doing note if the achene completely fills the perigynium or if there is space at the top or bottom. Measure length and width of achene. Measure the width of typical leaves from near base of flowering stem.

There are seven numbered keys, leading to sections or in some cases, species. Start with Key 1. Each section has a key to species. Be sure to read both leads in a couplet before making a choice.

Acknowledgments. Sincere thanks to A.A. Reznicek (University of Michigan) for many useful comments on a draft of this key, and for sharing information from manuscript treatments of certain groups under study for FNA. Thanks also to W.J. Crins, C.T. Bryson, and L.A. Standley for information and reprints; and to Bob Ingalls for trying out the key and helping to improve it.

Key 1

1. Plants with staminate spikes only. **Key 2**
- Plants with pistillate, or bisexual spikes, or both pistillate and staminate spikes. 2
 2. Spikes two or more on each culm (depauperate plants may bear only a single spike; check several in population if possible). **Key 3**
 2. Spike one on each culm. 3
3. Achenes lenticular or plano-convex; stigmas 2. 4
3. Achenes triangular to round in cross-section; stigmas 3. 5
 4. Plants 10-30 cm tall; perigynia ovate. (*C. dioica*) 7. § *Physoglochin*
 4. Plants 20-70 cm tall; perigynia oblong-ovate. (*C. exilis*) 14. § *Stellulatae*.
5. Spikes unisexual. 6
5. Spike bisexual. 8
 6. Perigynia plano-convex, with lacerate-winged margins. 11. § *Macrocephalae*.
 6. Perigynia not wing-margined. 7
7. Spikes 4-12 mm long. 39. § *Acrocystis*.
7. Spikes 20-40 mm long. (*C. scirpoidea*) 40. § *Scirpinae*.
 8. Spike staminate at base, **pistillate** at the summit. 37. § *Squarrosae*.
 8. Spike pistillate at base, **staminate** at the summit. 9
9. Perigynia linear or subulate, spreading or reflexed. (*C. pauciflora*) 34. § *Orthocerates*.
9. Perigynia elliptic or oblong to globose, ascending. 10
 10. Lowest pistillate scale foliaceous, much exceeding the strongly beaked perigynium (beak at least 1/2 as long as perigynium). 44. § *Phyllostachys*.
 10. Lowest pistillate scale not foliaceous, shorter than the perigynium (perigynium beakless). (*C. leptalea*) 45. § *Polytrichoideae*.

Key 2

1. Spikes 1 per culm. 2
1. Spikes several per culm, sometimes closely spaced, overlapping. 4
 - . Anthers about 5 mm long. (*C. scirpoidea*) 40. § *Scirpinae*.
 2. Anthers 1.5-4 mm long. 3

3. Spike 5-10 mm long; leaves 0.5 mm wide. (*C. dioica*) 7. *Physoglochin*.
 3. Spike 10-22 mm long; leaves 1-1.5 mm wide. (*C. exilis*) 14. *Stellulatae*.
 4. Spikes about 15 mm long; anthers 5-6 mm long; plants generally < 30 cm tall; coastal dunes.
 (*C. kobomugi*) 11. § *Macrocephalae*.
 4. Spikes 5-11 mm long; anthers 2-3 mm long; plants generally > 30 cm tall; inland habitats. 5
 5. Plants with rhizomes; culms scabridulous below spike; salted highway verges. (*C. praegracilis*) 9. § *Divisae*.
 5. Plants tufted; culms smooth; fens and other open wetlands. (*C. sterilis*) 14. *Stellulatae*.

Key 3

1. Achenes lenticular to plano-convex; stigmas 2. 2
 1. Achenes trigonous or nearly round; stigmas 3. Key 4
 2. Spikes all alike or essentially so, the lower ones sessile. 3
 2. Spikes differentiated, the lowest and the uppermost distinctly unlike; lateral spikes sessile or peduncled; if sessile, then more or less elongate. 17
 3. Flowering culms solitary or few together, arising from rhizomes, stolons, or decumbent culms. 4
 3. Flowering culms cespitose, the rhizomes either none or very short. 7
 4. Perigynia thin-winged above the middle, with deeply bidentate beak. (*C. siccata*) 10. § *Ammoglochin*.
 4. Perigynia sharply margined to rounded on the sides, not winged. 5
 5. Plants of salted highway roadsides. (*C. praegracilis*) 9. § *Divisae*.
 5. Plants of open natural wetlands. 6
 6. Culms becoming decumbent and sending up new culms from the axils of the old leaves.
 (*C. chordorrhiza*) 6. § *Chordorrhizae*.
 6. Culms from long, black or brown rhizomes. (*C. sartwellii*) 8. § *Intermediae*.
 7. Staminate flowers produced at the summit of some or all spikes. 8
 7. Staminate flowers produced at the base of some or all spikes. 15
 8. Inflorescence simple, the spikes single at each node of the rachis, usually 10 or fewer. 9
 8. Inflorescence compound, at least the lowest node bearing a branch with 2 or more spikes. 12
 9. Achene filling the body of the perigynium. 10
 9. Achene occupying only the upper part of the perigynium, the lower portion occupied by spongy layer. 11
 10. Perigynia plano-convex. 4. § *Phaestoglochin*.
 10. Perigynia nearly terete (circular) in cross-section. 5. § *Dispermae*.
 11. Lateral spikes with a few staminate flowers at the summit; perigynia usually green or greenish, even at maturity. 4. § *Phaestoglochin*.
 11. Lateral spikes wholly staminate or pistillate; perigynia usually brown at maturity. 14. § *Stellulatae*.
 12. Perigynia lanceolate, broadest near the truncate or retuse base, thickly plano-convex, the beak equaling or longer than the body. 1. § *Vulpinae*.
 12. Perigynia ovate to round-ovate or obovate, rounded at base. 13
 13. Perigynia biconvex, brown to black at maturity. 2. § *Heleoglochin*.
 13. Perigynia plano-convex, straw-color to brown at maturity. 14
 14. Pistillate scales acuminate to mucronate. 1. § *Vulpinae*.
 14. Pistillate scales awned. 3. § *Multiflorae*.
 15. Perigynia with thin-winged margins, at least along the upper part of the body and the lower part of the beak, and often extending to the base and apex. 15. § *Ovales*.
 15. Perigynia plump, at most only sharp-edged, never thin-winged, distended by the achene to the margins. 16
 16. Perigynium-body not spongy at base, nearly or quite filled by the achene. 10. § *Glareosae*.
 16. Perigynium-body spongy at base, the achene occupying only the upper 1/2 or 2/3. 17
 17. Perigynia 2-4.5 mm long; when 4 mm long or more always spreading and more than 1/3 as long as wide. 14. § *Stellulatae*.
 17. Perigynia 4-5.5 mm long, 1/5 to 1/3 as wide, appressed-ascending. 13. § *Deweyanae*.
 18. Lower pistillate spikes spreading or drooping on slender peduncles. 17. § *Phacocystis*.
 18. Lower pistillate spikes erect or strongly ascending, sessile or short-peduncled. 19
 19. Perigynia turgid, obovoid, elliptic in cross-section. 20. § *Bicolores*.
 19. Perigynia flat, planoconvex, or biconvex. 17. § *Phacocystis*.

Key 4

1. Perigynium beaked, its teeth at the orifice well developed, slender or stout, stiff, sharp (for convenience some species with conspicuous teeth, although scarcely stiff or sharp, are included here.) 2
1. Perigynium beaked or beakless, its orifice entire, or minutely toothed, or with soft and blunt teeth (for convenience some species with stiff and sharp, but inconspicuous teeth are included here.) go to Key 5
 2. Body of the perigynium, excluding the beak, obovoid, broadest above the middle, usually rounded above and abruptly contracted into the beak. 3
 2. Body of the perigynium ovoid to lanceolate in general outline, gradually tapering into the beak. 6
3. Terminal spike pistillate above, staminate below. 37. § *Squarrosae*.
3. Terminal spike staminate throughout. 4
 4. Perigynium pubescent, 3-4.5 mm long. (*C. lasiocarpa*) 30. § *Paludosae*.
 4. Perigynium glabrous, 4.5-7.5 mm long. 26. § *Hymenochlaenae*
5. Perigynia subulate to narrowly lanceolate. 6
5. Perigynia ovoid-lanceolate to broadly ovoid or ellipsoid. 7
 6. Perigynium teeth reflexed. 36. § *Collinsiae*.
 6. Perigynium teeth erect or spreading. 35. § *Folliculatae*.
7. Perigynia pubescent. 8
7. Perigynia glabrous. 10
 8. Pistillate spikes globose or subglobose. 33. § *Lupulinae*.
 8. Pistillate spikes elongate. 9
9. Pistillate spikes slender, 2-5 mm thick, spreading or drooping. 26. § *Hymenochlaenae*.
9. Pistillate spikes stout, erect, 6-15 mm thick. 31. § *Carex*.
 10. Perigynia conspicuously 7-9 nerved, inflated, nearly circular in cross-section, in dense cylindric spikes. 32. § *Vesicariae*.
 10. Perigynia 12-25 nerved, the nerves often inconspicuous. 11
11. Perigynia plano-convex, with lacerate-winged margins. 11. § *Macrocephalae*.
11. Perigynia not wing-margined. 12
 12. Pistillate spikes 5-10 mm thick; perigynium-teeth not conspicuously sharp or stiff. 13
 12. Pistillate spikes 10-35 mm thick perigynium-teeth stiff and sharp. 14
13. Pistillate spikes either loosely flowered, or slender and elongate, or spreading and drooping. 26. § *Hymenochlaenae*.
13. Pistillate spikes densely flowered, short-cylindric, erect, sessile or short-peduncled. (*C. striata*) 30. § *Paludosae*.
 14. Pistillate spikes 15-35 mm thick, less than 3 times as long; perigynia 9-18 mm long, much inflated, 3.5-7 mm thick. 33. § *Lupulinae*.
 14. Pistillate spikes 10-15 mm thick, cylindric; perigynia not more than 11 mm long, the body little inflated, 3 mm thick or less. 15
15. Staminate spikes 2-6; body of the pistillate scales conspicuous among the short-beaked perigynia. 30. § *Paludosae*.
15. Staminate spike solitary; body of the pistillate scales very small, concealed by the densely crowded, long-beaked perigynia. 32. § *Vesicariae*.

Key 5

1. Bracts of the pistillate spikes (*excluding* any spikes arising from the basal leaf sheaths) bladeless, consisting of sheath only, or with small scale-like blades. 2
1. Bracts of the pistillate spikes bearing well developed blades. 5
 2. Staminate spike long-peduncled. 3
 2. Staminate spike sessile or nearly so. 4
3. Leaf-blades 10-25 mm wide. (*C. plantaginea*) 24. § *Careyanae*.
3. Leaf-blades 2-4 mm wide. 41. § *Clandestinae*.
 4. Perigynia 1.5-2 mm long, beakless. (*C. eburnea*) 43. § *Albae*.
 4. Perigynia 2.5-4.4 mm long, prominently beaked. (*C. rugosperma*) 39. § *Acrocystis*.
5. Terminal spike bearing some perigynia. 6
5. Terminal spike entirely staminate. 14
 6. Perigynia of the terminal spike at its base, subtended by leaf-like scales. 44. § *Phyllostachys*.
 6. Perigynia of the terminal spike at its summit or middle. 7
7. Perigynia beakless, or with a short, obscure, or poorly differentiated beak. 8
7. Perigynia distinctly beaked. 12

- 8. Pistillate spikes slender, spreading or drooping, 2-6 cm. long, loosely flowered with perigynia in few rows and often exposing the axis; perigynia often more than 4 mm long. 26. § *Hymenochlaenae*.
- 8. Pistillate spikes short-cylindric, usually 1-2 cm. but sometimes to 4 cm. long; perigynia densely and compactly arranged, 1.8-4 mm long. 9
- 9. Sheaths or lower leaf-surfaces or both pubescent. 27. § *Porocystis*.
- 9. Sheaths and leaves glabrous. 10
 - 10. Scales conspicuously exceeding the perigynia and spikes spreading or drooping on slender peduncles. (*C. magellanica*) 19. § *Limosae*.
 - 10. Scales shorter than the perigynia or spikes sessile. 11
- 11. Terminal spike about half pistillate. 18. § *Atratae*.
- 11. Terminal spike with 1 or very few perigynia. (*C. livida*) 21. § *Paniceae*.
- 12. Lateral spikes elongate-cylindric, 3-8 mm thick, spreading or drooping on slender peduncles. 26. § *Hymenochlaenae*.
- 12. Lateral spikes short-cylindric to globose. 13
- 13. Pistillate spikes 5-10 mm thick, erect, sessile or nearly so. 38. § *Ceratocystis*.
- 13. Pistillate spikes 10-20 mm thick, erect or spreading on short peduncles. 37. § *Squarrosae*.
- 14. Perigynia glabrous. go to Key 6
- 14. Perigynia pubescent, at least around the base of the beak. 15
- 15. Perigynia beakless or minutely apiculate. (*C. flacca*) 16. § *Glaucæ*.
- 15. Perigynia beaked, the body obovoid in general outline. 16
 - 16. Perigynia 2-ribbed only, the intermediate nerves none, or very obscure, or developed only at the base. 17
 - 16. Perigynia 2-ribbed and conspicuously several-nerved. 18
- 17. Culms and leaves glabrous. 19
- 17. Culms and leaves pubescent. (*C. hirtifolia*) 29. § *Halleranae*.
- 18. Beak of perigynium 0.5 mm long or more; style-base not expanded. 39. § *Acrocystis*.
- 18. Beak of perigynium shorter, conic; style-base expanded into a ring about 0.5 mm in diameter. 42. § *Mitratae*.
- 19. Perigynium with beak about 1/2 as long as body; longest bract about 2 times as long as inflorescence; culms scabrous on angles. (*C. scabrata*) § 28. *Anomala*.
- 19. Perigynium with beak about 1/4 as long as body; longest bract about 1/2 as long as inflorescence; culms not scabrous on angles. (*C. vestita*) § 30. *Paludosae*.

Key 6

- 1. Bract of the lowest pistillate spike with a well developed sheath. 2
- 1. Bract of the lowest pistillate spike sheathless or very nearly so. Key 7
 - 2. Perigynia 2-ribbed, otherwise either nerveless or with fewer than 10 faint or obscure nerves, or not extending to the summit of the perigynium or scarcely visible with hand lens. 3
 - 2. Perigynia 2-ribbed and also conspicuously nerved; nerves numerous, normally more than 10, extending the length of the perigynium. 8
- 3. Perigynium beakless, the orifice entire. 21. § *Paniceae*.
- 3. Perigynium beaked. 4
 - 4. Pistillate spikes spreading or drooping, mostly on slender peduncles; perigynia either smaller, or tapering into the beak, or bidentate at the orifice. 6
 - 4. Pistillate spikes erect or nearly so. 26. § *Hymenochlaenae*.
- 5. Perigynia 4.3-6.7 mm long, abruptly prolonged into a slender beak. 21. § *Paniceae*.
- 5. Perigynia 2.4-4.1 mm long, abruptly narrowed to a very short beak. 6
 - 6. Perigynia sharply trigonous, plane or with slightly convex faces, abruptly or shortly tapering at base; lowest pistillate spike borne in axil of basal leaf. 24. § *Careyanae*.
 - 6. Perigynia obtusely trigonous, with faces convex especially below; lowest pistillate spike borne from axil of cauline bract. 22. § *Laxiflorae*.
- 7. Pistillate spikes sessile or nearly so, short-sylindric to subglobose, very densely flowered; perigynia spreading or squarrose, conspicuously beaked; bracts of the pistillate spikes with short sheaths. 38. § *Spirostachyae*.
- 7. Pistillate spikes short-cylindric to elongate, at least the lower peduncled, densely or loosely flowered, the perigynia mostly ascending, never squarrose or reflexed; bracts of the pistillate spikes with well developed sheaths. 8
 - 8. Perigynia obovoid, fusiform or lanceolate in form, distinctly narrowed to the base.
 - 8. Perigynia ovoid, ellipsoid, or rarely obovoid in form, rounded at base. 11

- 9. Pistillate spikes short-cylindric, usually erect, in a few species drooping and then with sharply triangular perigynia. 10
- 9. Pistillate spikes elongate, at least the lower widely spreading or drooping. 26. § *Hymenochlaenae*.
 - 10. Perigynia with fine elevated nerves; awns of the pistillate scales either none or smooth. Return to 6
 - 10. Perigynia with very numerous impressed nerves, with the appearance of a longitudinally wrinkled surface; awns of the pistillate scales rough. 25. § *Griseae*.
- 11. Perigynia beakless. 12
- 11. Perigynia with a short but distinct beak. 13
 - 12. Pistillate spikes short-cylindric, 1-2 cm long, or elongate to 4 cm, erect or nearly so on short peduncles. 25. § *Griseae*.
 - 12. Pistillate spikes very slender, 3-6 cm. long, widely spreading or drooping on slender peduncles. (*C. gracillima*) 26. § *Hymenochlaenae*.
- 13. Leaf-blades flat; plants of non-saline habitats. 23. § *Granulares*.
- 13. Leaf-blades involute; rare plant of saline or brackish habitats. (*C. extensa*) 38. § *Spirostachyae*.

Key 7

- 1. Perigynia beakless or minutely apiculate. 2
- 1. Perigynia with short or long but distinct beak. 6
 - 2. Pistillate spikes short-cylindric to ovate or cylindric, at least the lower spreading or drooping on slender peduncles. 3
 - 2. Pistillate spikes short-sylindric, erect or nearly so, sessile or short-peduncled. 5
- 3. Pistillate spikes short-cylindric or ovate, rarely as much as twice as long as thick; perigynia flattened. 19. § *Limosae*.
- 3. Pistillate spikes cylindric, 3 times as long as thick or longer; perigynia from nearly circular to obscurely tirgonous in cross-section. 4
 - 4. Pistillate scales white or pale green with green center (*C. prasina*) 26. § *Hymenochlaenae*.
 - 4. Pistillate scales with brown or purple sides and paler center. 16. § *Glaucuae*.
- 5. Foliage very glaucous; perigynia fusiform 3-5 mm long (*C. livida*) 21. § *Panicuae*.
- 5. Foliage green; perigynia ellipsoid, 2.1-2.8 mm long (*C. pallescens*) 27. § *Porocystis*.
 - 6. Perigynia obovoid or stoutly rhomboid-fusiform in outline, broadest at or above the middle, abruptly narrowed to the beak. 7
 - 6. Perigynia ovoid or ovoid-lanceolate in outline, broadest below the middle and tapering gradually into the beak. 8
- 7. Pistillate spikes cylindric, 2-5 cm. long; pistillate scales rough-awned. 16. § *Glaucuae*.
- 7. Pistillate spikes short-cylindric to subglobose, 2 cm. long or less; pistillate scales obtuse to acuminate, but not awned. 38. § *Spirostachyae*.
 - 8. Pistillate spikes spreading or drooping on slender peduncles. 26. § *Hymenochlaenae*.
 - 8. Pistillate spikes erect or strongly ascending, sessile or short-peduncled. 9
- 9. Larger leaf-blades 5-9 mm wide; pistillate spikes 3-8 cm long; rare introduction. (*C. acutiformis*) 30. § *Paludosae*.
- 9. Larger leaf-blades 1-3 (rarely 4) mm wide; pistillate spikes 1-3 cm long. 10
 - 10. Staminate spike long-peduncled. 32. § *Vesicariae*.
 - 10. Staminate spike sessile. (*C. extensa*) 38. § *Spirostachyae*.

Subg. *Vignea* (Lestib.) Kükenthal

1. § *Vulpinae*.

- 1. Perigynia lanceolate, broadest near the truncate or retuse base, thickly plano-convex, the beak equaling or longer than the body. 2
- 1. Perigynia distinctly ovate, about half as long as wide, rounded at base, plano-convex, comparatively thin, the beak not longer than the body. 3
 - 2. Sheaths not transversely wrinkled, the apex thick-margined, concave, usually remaining intact when pressed. *C. laevivaginata*.
 - 2. Sheaths transversely wrinkled, the apex thin-margined, convex, usually tearing when pressed. *C. stipata*.
- 3. Sheaths not transversely wrinkled; perigynia becoming wholly or largely golden brown at maturity, inconspicuously few-nerved on the lower face, the beak 3/4 as long as the body. *C. alopecoidea*.
- 3. Sheaths transversely wrinkled on the ventral band; perigynia green or somewhat straw-color at maturity, stongly few-nerved on the lower face, the beak about 1/2 as long as the body (rare). *C. conjuncta*.

2. *Heleoglochin* (*Paniculatae*)

1. Leaves 2.5-8 mm wide; inflorescence lax, 7-18 cm long; perigynia abruptly contracted to beak; rare, western and central NY only. *C. decomposita*.
1. Leaves 1-3 mm wide; inflorescence 1-10 cm long; perigynia gradually tapered to beak; widespread in upstate. 2
 2. Perigynia olivaceous to blackish, spreading, nearly as wide as long. *C. diandra*.
 2. Perigynia yellowish to brown, appressed, about 1/2 as wide as long. *C. prairea*.

3. § *Multiflorae*.

1. Perigynium beak 0.5-1 times as long as body; larger perigynia 1.1-1.9 mm wide; culms often shorter than to equalling the leaves, even at maturity. *C. vulpinoidea*.
1. Perigynium beak 0.25-0.55 as long as the body; larger perigynia 1.5-2.3 mm wide; culms well exceeding the leaves at maturity. 2
 2. Perigynia at maturity dull yellowish green to brown, often with several conspicuous nerves on the ventral face; inflorescences dense or loose, the axis often visible between the spikes; bracts and pistillate scale awns \pm conspicuous. *C. annectens* var. *annectens*.
 2. Perigynia at maturity deep yellow to orange brown, mostly nerveless on adaxial face; inflorescences \pm dense, the axis not visible; bracts and pistillate scale awns inconspicuous. *C. annectens* var. *xanthocarpa*.

4. § *Phaestoglochin* (*Bracteosae*).

1. Sheaths loose, septate-nodulose and usually mottled green and white on the dorsal surface. 2
1. Sheaths tight, not septate-nodulose on the dorsal surface. 5
 2. Scales long-acuminate to awn-tipped. *C. grvida*.
 2. Scales obtuse to acute. 3
3. Perigynia 2-3.2 mm wide; leaves 3-6 mm wide. *C. aggregata*.
3. Perigynia 1.5-2.5 mm wide; leaves 5-10 mm wide. 4
 4. Spikes crowded into a head 1.5-4 cm long. *C. cephaloidea*.
 4. Spikes (except the uppermost) widely spaced, inflorescence 3-15 cm long. *C. sparganoides*.
5. Inflorescence capitate, ovoid, the spikes densely aggregated and indistinguishable, except by projecting setaceous bracts. 6
5. Inflorescence spicate, the spikes plainly distinguishable and often separated by an exposed internode of the axis. 7
 6. Perigynia 2-3 mm long, about 1.5 mm wide. *C. cephalophora*.
 6. Perigynia 3-3.5 mm long, 2-2.5 mm wide. *C. mesochorea*.
7. Pistillate scales strongly tinged brownish or reddish purple. 8
7. Pistillate scales greenish or greenish-hyaline, or becoming straw-color or pale brown when dried; native species of dry or moist woods and open places. 9
 8. Principal leaf-blades 3-6 mm wide; perigynia 3.2-3.8 mm long becoming wholly or partly golden-brown at maturity, the beak 2/3 to fully as long as the body. **Go back to 1. § *Vulpinae***
 8. Principal leaf-blades 2-3 mm wide; perigynia 4-5.5 mm long, green, the beak about 1/2 as long as the body (rare introduction). *C. spicata*.
9. Perigynia not spongy-thickened at base, prominently nerved on the lower convex face. *C. muhlenbergii*.
9. Perigynia conspicuously thickened and spongy at base, nerveless, or finely striate or nerved on the spongy base only. 10
 10. Beak of the perigynium smooth-margined; scales early deciduous, acuminate, acute, or cuspidate. *C. retroflexa*.
 10. Beak of the perigynium rough-margined; scales obtuse, persistent. *C. rosea* Group¹, 11
11. Broadest leaves 0.9-1.7 mm wide; base of fertile culm 0.7-1.4 mm wide. 12
11. Broadest leaves > 1.7 mm wide; base of fertile culm > 1.4 mm wide. 13
 12. Distance from base of perigynium to base of achene 0.1-0.5 mm; base of perigynium cuneate. *C. appalachica* (*C. radiata*, misapplied).
 12. Distance from base of perigynium to base of achene 0.5-0.9 mm; base of perigynium truncate. *C. radiata* (*C. rosea*, misapplied).
13. Stigmas 0.03-0.06 mm thick, straight to slightly twisted. *C. radiata*.
13. Stigmas 0.07-0.10 mm thick, mostly coiled. *C. rosea* (*C. convoluta*).

¹Key follows treatment follows J.M. Webber & P.W. Ball. 1984. The taxonomy of the *Carex rosea* group (section *Phaestoglochin*) in Canada. *Canad. Jour. Bot.* 62: 2058-2073.

5. Dispermae

One species in NY. *C. disperma.*

6. § Chordorrhizae.

One species in NY. *C. chordorrhiza.*

7. Physoglochin (Dioicae)

One species in NY. *C. dioica* ssp. *gynocrates.*

8. § Intermediae.

One species in NY. *C. sartwellii.*

9. § Divisae.²

One species in NY, recently naturalized from western U.S. *C. praegracilis.*

10. § Ammoglochin (Arenariae).

1. Terminal spike staminate; scales equaling or longer than the perigynia; beak much shorter than the body of the perigynium; plants of the sea-coast. *C. arenaria.*

1. Terminal spike pistillate at the summit; scales shorter than the perigynia; beak 1/2 to fully as long as the body of the perigynium; plants of inland situations. *C. siccata.*

11. § Macrocephalae.

One species, native to eastern Asia, naturalized in the coastal Northeast (Massachusetts, New Jersey, and Rhode Island) but not yet known from NY *C. kobomugi.*

10. § Glareosae (Heleonastes).

1. Spikes closely aggregated and overlapping in a short ovoid or oblong head. 2

1. Spikes, at least the lower ones, separate and not overlapping. 3

2. Perigynia broadest just above the base (rare). *C. arcta.*

2. Perigynia broadest near or above the middle (rare). *C. tenuiflora.*

3. Perigynia, spikes, and foliage gray-green and glaucous; perigynia 10-30 in each ovoid or oblong spike, the beak very short. *C. canescens.*

3. Perigynia, spikes, and foliage green; scales and perigynia becoming brown in age; perigynia in each spike 1-10. 4

4. Spikes 3-several; perigynia 5-10 in each spike, 2-2.5 mm long, the distinctly rough-margined beak 1/3 to 1/2 as long as the body. *C. brunnescens.*

4. Spikes 1-3, usually 2; perigynia 1-5 in each spikes, 2.6-4 mm long, the beak smooth, a fifth as long as the body. *C. trisperma.*

13. § Deweyanae.

1. Perigynia sharply nerved on the upper face; wetland plants. *C. bromoides.*

1. Perigynia nerveless on the upper face; forest plants. *C. deweyana.*

14. § Stellulatae³

1. Spikes usually solitary; leaves involute; anthers 2.0-3.6 mm long. *C. exilis.*

1. Spikes 2-8; leaves flat or plicate; anthers 0.6-2.2 (-2.35) mm long. 2

2. Perigynium beak smooth-margined; plants of wet woods and forest edges. *C. seorsa.*

2. Perigynium beak at least sparsely serrulate on margins; plants of open wetlands. 3

3. Widest leaves 2.8-5.0 mm wide. 4

3. Widest leaves 0.8-2.7 mm wide. 5

²Included in sect. Ammoglochin by Tucker (1987).

³Key derived from A.A. Reznicek and P.W. Ball. 1980. The taxonomy of Carex section Stellulatae in North America north of Mexico. Contr. Univ. Mich. Herb. 14: 153-203.

- 4. Lower perigynia of spikes mostly 1.1-1.6 times as long as wide, mostly 2.1-3.0 wide. *C. atlantica* ssp. *atlantica*.
- 4. Lower perigynia of spikes (1.5) 1.7-3.0 times as long as wide, mostly 1.2-2.0 mm wide. *C. wiegandii*.
- 5. Terminal spikes entirely staminate; anthers (1.0-) 1.2-2.2 (-2.35) mm long. *C. sterilis*.
- 5. Terminal spikes partly or wholly pistillate; anthers 0.6-2.2 (-2.35) mm long. 6
- 6. Terminal spikes without distinct clavate base of staminate scales, staminate portion less than 1 mm in length; anthers (1.0-) 1.2-2.2 (-2.35) mm long. *C. sterilis*.
- 6. Terminal spikes with distinct clavate base 1.0-16.5 mm long of staminate scales; anthers 0.6-1.6 (-2.0) mm long. 7
- 7. Lower perigynia 2.0-3.0 wide. *C. atlantica* ssp. *atlantica*.
- 7. Lower perigynia 0.9-1.95 mm wide. 8
- 8. Lower perigynia mostly 2.85-4.75 mm long, (1.7-) 1.8-3.6 times as long as wide; beaks mostly 0.95-2.0 mm long, mostly 0.45-0.85 times as long as body. *C. echinata*.
- 8. Lower perigynia mostly 1.9-3.0 mm long, 1.0-2.0 (-2.2) times as long as wide; beaks mostly 0.2-0.95 mm long, mostly 0.2-0.5 times as long as body. 9
- 9. Perigynia mostly nerveless over achene on adaxial surface; beak of perigynium conspicuously setulose-serrulate; perigynia often more or less convexly tapered from widest point to beak, forming a "shoulder." *C. interior*.
- 9. Perigynia 1-10-nerved over achene on adaxial surface; beak of perigynium more sparsely serrulate with definite spaces between the often single teeth; perigynia mostly more or less cuneate or even concavely tapered from widest point to beak. 10
- 10. Widest leaves 1.6-2.7 mm wide, inflorescence mostly 18-45 mm long. *C. atlantica* ssp. *atlantica*.
- 10. Widest leaves (0.65-) 0.8-1.6 mm wide, inflorescence mostly 8-20 mm long. *C. atlantica* ssp. *capillacea*.

15. § Ouales.⁴

- 1. Inflorescence bracts leaf-like, 5-12 times longer than inflorescence. *C. sychnocephala*.
- 1. Inflorescence bracts setaceous, at most 2 times as long as inflorescence. 2
- 2. Pistillate scales about as long as the perigynia, largely or completely covering their distal portions. 3
- 2. Pistillate scales shorter and narrower than the perigynia, largely exposing the distal margins and beaks of the perigynia. 6
- 3. Perigynia slender beaked, the apical portion sub-terete. *C. ovalis* (*C. leporina* of American authors)
- 3. Perigynia with poorly defined beak, serrulate margined. *C. foenea* group, 3
- 4. Inflorescence stiff, spikes aggregated or approximate. *C. adusta*.
- 4. Inflorescence arching, lower spikes well separated. 5
- 5. Adaxial face of perigynium strongly 5-8 nerved. *C. argyrantha*.
- 5. Adaxial face of perigynium nerveless or nearly so. *C. foenea*.
- 6. Achenes narrow, mostly 0.5-0.8 mm wide; perigynia often but not always more than 2.5 times longer than wide; body of perigynium never obovate. 7
- 6. Achenes broader, 0.9-1.5 mm wide (if slightly narrower, then the perigynium body obovate); perigynia at most 2.5 times longer than wide. 15
- 7. Perigynium 2.4-3.9 mm long, 1.1-1.5 mm wide, up to 3 times as long as wide. 8
- 7. Perigynium either at least 4 mm long, or more than 3 times longer than wide, or both. 9
- 8. Perigynium with a stiffly spreading to recurved beak, the body often not winged to the base. *C. cristatella*.
- 8. Perigynium with a stiffly ascending beak, the body winged to the base. *C. bebbii*.
- 9. Principal leaves 3-7 mm wide. 10
- 9. Principal leaves 1-3 mm wide. 11
- 10. Spikes 5-8 mm long, at least the lower ones separate in an elongate inflorescence; spikes of 15-30 perigynia. *C. projecta*.
- 10. Spikes 8-12 mm long, overlapping and crowded; spikes with more than 30 perigynia. *C. tribuloides*.
- 11. Perigynium 1.5-2.5 times as long as wide; sheaths ventrally green-veined almost to the summit, with only a very short hyaline area. 12
- 11. Perigynia 2.5-5 times as long as wide; sheaths ventrally hyaline. *C. scoparia* group, 13

⁴Basic key follows that of Cronquist (in Gleason & Cronquist 1991), although several of his varieties are treated as species, following Fernald and others; many valuable comments incorporated from A.A. Reznicek. See also Rothrock, P.E. 1991. The identity of *Carex albolutescens*, *C. festucacea*, and *C. longii* (Cyperaceae). *Rhodora* 93: 51-66.

12. Spikes rhomboid-ellipsoid, gradually tapered to base and apex; body of perigynium widest at 2/5-1/2 its length, orbiculate to obovate, 4.2-5.5 mm long; brackish coastal habitats. *C. hormathodes*.
12. Spikes rounded, the terminal one broadly rounded to staminate base; body of perigynium widest at 1/3-2/5 its length, ovate to orbiculate, 4-5.2 mm long; damp meadows, non-saline. *C. straminea*.
13. Perigynium 3.3-5 mm long, 0.8-1.1 mm wide, 3.5-5 times as long as wide, planoconvex and not much wider than the achene. *C. crawfordii*.
13. Perigynium 4-5.5 mm long, 1.5-2 mm wide, 2.5-3 times longer than wide, strongly flattened and much wider than the achene. 14
14. Scales stramineous to pale brown, much the same color as perigynia; perigynia lanceolate to lance-ovate. *C. scoparia* var. *scoparia*.
14. Scales castaneous to blackish, strongly contrasting with the perigynia; perigynia elliptic-ovate. *C. scoparia* var. *tessellata*.
15. Perigynia less than 4 mm long and also less than 2 mm wide. 16
15. Perigynia more than 4 mm long or more than 2 mm wide (or both). 23
16. Perigynium body obovate; achenes mostly less than 1 mm wide. 17
16. Perigynium body ovate, oblong, elliptic, or orbiculate; achenes often more than 1 mm wide. 18
17. Perigynium beak slender, its winged margins not reaching the tip; pistillate scales distally flat and acute, the midvein reaching the tip. *C. albolutescens*.
17. Perigynium beak broad, its winged margins extending to the tip; pistillate scales distally naviculate (boat-shaped) and mostly obtuse, the midvein not reaching the tip. *C. longii*.
18. Perigynium body orbicular to broadly elliptic, abruptly rounded to a slender beak. *C. festucacea*.
18. Perigynium body ovate to elliptic or oblong, more gradually tapering into the often broader beak. 19
19. Scales as long as but distinctly narrower than the perigynia. 20
19. Scales distinctly shorter than (as well as narrower than) the perigynia. 21
20. Adaxial face of perigynium strongly 5-8 nerved. *C. argyrantha*.
20. Adaxial face of perigynium nerveless or nearly so. *C. foenea*.
21. Inflorescence mostly lax and elongate, the lower spikes well separated; main leaves mostly 1.5-2.5 mm wide. *C. tenera*.
21. Inflorescence contracted, the lower spikes overlapping; main leaves mostly 2.5-6 mm wide. 22
22. Pistillate scales pale brown; perigynia 3-4 mm long, with spreading or slightly recurved beaks; leaf blades 3.5-6.5 mm wide. *C. normalis*.
22. Pistillate scales dark brown; perigynia 3.5-5 mm long, loosely ascending; leaf blades 2-4 mm wide. *C. tincta*.
23. Sheaths with an elongate hyaline ventral area; perigynia ovate or broadly ovate, widest at a point 1/4-2/5 the way from base to beak. 24
23. Sheaths ventrally green veined almost to the summit, with only a short hyaline are; perigynia orbicular to obovate, widest at a point 2/5-1/2 the way from base to beak. 29
24. Perigynia planoconvex, at most 4.4 mm long. 25
24. Perigynia flat, 3.2-7 mm long. 26
25. Perigynia 1.3-2 times as long as wide. *C. festucacea*.
25. Perigynia 2-2.5 times as long as wide. **return to 21**
26. Perigynia very thin, almost translucent, evidently nerved on both sides, 4.2-7 mm long. *C. bicknellii*.
26. Perigynia thicker and firmer, opaque, often nerveless on adaxial face, 3.2-4.8 mm long. *C. brevior* group, 27
27. Spikes conical to slightly rounded at summit, narrowed below, often with clavate or turbinate base; spikes 3-8 in an open to slightly moniliform inflorescence 2-4.5 cm long; pistillate scales acuminate, nearly equalling the beak of the perigynium; body of firm pale perigynium broadly ovate to suborbiculate, its wing rarely nerved. *C. brevior*.
27. Spikes broadly rounded at summit and base, the lateral ones without prolonged bases; scales blunter, reaching only to the base of the beak of the perigynium. 28
28. Inflorescence compact, 1-3 cm long; perigynia ovate, 2-3 mm broad, pale green, becoming drab, the translucent wings nerveless or rarely nerved; leaf blades generally 2-3.5 mm wide; leaf sheaths not papillose. *C. molesta*.
28. Inflorescence usually open and submoniliform, (2-) 3-7.5 cm long; perigynia broadly ovate to sub-orbiculate, 2.5-3.5 mm wide, the translucent wings often 1-2 nerved; leaf blades 3-4.5 mm wide; leaf sheaths papillose. *C. merritt-fernaldii*.
29. Pistillate scales acuminate into a subulate or awn-like tip. 30
29. Pistillate scales inconspicuous, obtuse or merely acute. 31

- 30. Spikes separated in an elongate inflorescence, the sub-terminal ones conspicuously tapering to the base. **return to 12**
- 30. Spikes crowded and overlapping, the sub-terminal ones obtuse to short-clavate at base. *C. alata*.
- 31. Subterminal spikes clavate at base; perigynia 4.0-5.2 mm long, widest at a point over the middle of the achene. *C. silicea*.
- 31. Sub-terminal spikes obtuse or rounded at base; perigynia 3-4.5 mm long, widest at a point at or distal to the apex of the achene. 32
- 32. Perigynia evidently nerved on both faces; sheath apex, not prolonged, concave. **return to 17**
- 32. Perigynia nerveless on adaxial face; sheath apex 0-3 mm long, truncate. *C. cumulata*.

Subg. *Carex*

16. § *Glaucæ* (*Scitæ*).

- 1. Perigynia glabrous; pistillate scales brown throughout, with very narrow brown midvein; rare native. . . *C. barrattii*.
- 1. Perigynia minutely hispidulous distally; pistillate scales with brown sides and broad, much paler than midvein; rare introduction. *C. flacca*.⁵

17. § *Phacocystis* (*Acutæ*, *Cryptocarpæ*).⁶

- 1. Spikes all erect. 2
- 1. Spikes, or at least the lower ones, drooping. 8
 - 2. Lowest bract much exceeding the inflorescence. 3
 - 2. Lowest bract = or shorter than inflorescence. 4
- 3. Perigynia not nerved or torulose, often brown spotted on the lower 1/2; leaves up to 10 mm wide, sheaths red on the dorsal surface. *C. aquatilis*.
- 3. Perigynia nerved, basally torulose, white on the lower one 1/2, not spotted; leaves up to 3 mm wide, sheaths green on dorsal surface. *C. lenticularis*.
 - 4. Lower sheaths scabrous, red brown, splitting to form a pinnate network; perigynia flattened, 1-3 nerved, generally ovate, tapering to an indistinct beak. *C. stricta*.
 - 4. Lower sheaths smooth, not filamentose; perigynia not as above. 5
- 5. Scales black; perigynia distally purple-brown. 6
- 5. Scales brown or red; perigynia not distally purple-brown. 7
 - 6. Perigynia nerveless, not basally torulose when dried, membranaceous; pistillate spikes 2-3 mm wide; alpine. *C. bigelowii*.
 - 6. Perigynia 5-9 nerved, basally torulose when dried, somewhat coriaceous; pistillate spikes 4-5 mm wide; not alpine. *C. nigra*.
- 7. Perigynia inflated, olive green with red dots, not nerved; scales acute, generally longer than the perigynia; mouth of sheath concave, the ligule longer than width of leaf, sheaths green on dorsal surface. *C. haydenii*.
- 7. Perigynia not inflated, green to stramineous, without spots, 5-9 nerved on each face; scales acute or obtuse, generally shorter than the perigynia; mouth of sheath convex, the ligule shorter than the width of the leaf, sheaths red on the dorsal surface. *C. emoryi*.
 - 8. Scales not awned; black; perigynia thin walled, tightly enclosing the achene; achenes without notch. . . *C. torta*.
 - 8. Scales awned, brown; perigynium not tightly enclosing achene; achene with (or without) notch. 9
- 9. Perigynium inflated, apically truncate; lower sheaths glabrous. *C. crinita*.
- 9. Perigynium not inflated, apically acute; lower sheaths scabrous. 10
 - 10. Perigynia not distinctly papillose; achenes generally with invagination; distribution general. . . . *C. gynandra*.
 - 10. Perigynia distinctly papillose; achenes generally without invagination; coastal SE NY. *C. mitchelliana*.

18. § *Atratae*.

- 1. Pistillate spikes on slender peduncles 1-4 cm long; very rare, High Peaks only. *C. atratiformis*.
- 1. Pistillate spikes sessile or nearly so; widespread. *C. buxbaumii*.

⁵Not in Mitchell (1986); recent specimens from Dutchess Co. and Lewis Co.

⁶Based on key to eastern North American species presented by Standley (1989), *Canad. Jour. Bot.* 67: 6.

19. § Limosae.

- 1. Pistillate scales ovate or elliptic, about as wide and long as the perigynia and largely concealing them. . . . *C. limosa.*
- 1. Pistillate scales lanceolate, long-acuminate, narrower and longer than the perigynia. *C. magellanica.*

20. § Bicolores.

- 1. Mature perigynia fleshy, orange colored. *C. aurea.*
- 2. Mature perigynia membranous, granular-whitish. *C. garberi.*

21. § Paniceae.⁷

- 1. Perigynia with a distinct beak 0.7-2.2 mm long. 2
- 1. Perigynia beakless, or with a minute beak less than 0.5 mm long. 3
 - 2. Basal leaves with developed blades; perigynia all or mostly in 2 rows. *C. polymorpha.*
 - 2. Basal leaves reduced to bladeless sheaths; perigynia in 3 rows or more. *C. vaginata.*
- 3. Leaves glaucous, 0.3-0.5 mm wide, becoming plicate or involute. *C. livida.*
- 3. Leaves green or slightly glaucous, 1.5-7 mm wide, flat, becoming revolute with age. 4
 - 4. Culms smooth throughout. *C. panicea.⁸*
 - 4. Culms scabrous at summit. 5
- 5. Lower sheaths bladeless; perigynia loosely arranged in alternate fashion, about 1.5 mm wide, not turgid, tapering to short outwardly curved beak. *C. woodii.*
- 5. Lower sheaths mostly blade bearing; perigynia densely arranged, especially distally, 1.5-2.5 mm wide. 6
 - 6. Leaves gray, stiff, 2.5-7 mm wide; lower pistillate spikes 5-10 mm thick; perigynia abruptly contracted apically, becoming turgid. *C. meadii.*
 - 6. Leaves green, submembranous, 1.5-4.5 mm wide; pistillate spikes 3-5 mm thick; perigynia tapering to tip, not turgid. *C. tetanica.*

22. § Laxiflorae.⁹

- 1. Perigynia with only 2 distinct nerves, and sometimes with several additional faint ones on each face as well. *C. leptoneria.*
- 1. Perigynia with numerous equally distinct nerves. 2
 - 2. Base of plant purple or wine-red. 3
 - 2. Base of plants green or greenish white (not purple or wine-red). 5
- 3. Perigynia tapering into a straight or slightly curved beak. *C. ormostachya.*
- 3. Perigynia with short, abruptly bent beak. 4
 - 4. Leaves of sterile culms 10-52 mm wide; staminate spike not purple or brownish purple, hidden by large pistillate bracts. *C. albursina.*
 - 4. Leaves of sterile culms 1-5 mm wide; staminate spike purple or brownish-purple, not hidden by large pistillate bracts. *C. gracilescens.*
- 5. Perigynia obovoid. 6
- 5. Perigynia fusiform. 8
 - 6. Perigynia tapering into straight or slightly curved beak. *C. laxiflora.*
 - 6. Perigynia with short, abruptly bent beak. 7
- 7. Sterile shoots with leaves 15-52 mm wide; pistillate scales truncate or obtuse, not awned. *C. albursina.*
- 7. Sterile shoots with leaves 1-10 (-15) mm wide; pistillate scales acute or aristate, awned. *C. blanda.*
 - 8. Perigynia loosely overlapping or scattered, long beak straight, lowest spike with erect or ascending peduncle. *C. striatula.*
 - 8. Perigynia closely overlapping, ascending slightly outward, long beak recurved; lowest spike with long drooping slender peduncle. *C. styloflexa.*

⁷Key to species follows Fernald (1950).

⁸Report only -- no voucher for NYS.

⁹Laxiflorae key and Careyanae key (next page) from C.T. Bryson (unpublished dissertation, 1985).

23. § **Granulares.**

- 1. Peduncle of the staminate spike elongate, overtopping the uppermost pistillate spike. *C. crawei*.
- 1. Peduncle of staminate spike none or shorter than the uppermost pistillate spike. *C. granularis*.

24. § **Careyanae**

- 1. Base of plant purple. 2
- 1. Base of plant greenish or greenish white. 3
 - 2. Perigynia 5-7 mm long; bract blades developed, bract sheaths green, purple-tinged, or purple; central and western NY. *C. careyana*.
 - 2. Perigynia 4-5 mm long; bract blades reduced or obsolete, bract sheaths usually dark purple; upstate, widespread. *C. plantaginea*.
- 3. Leaves of sterile culms 7-28 mm wide, smooth; foliage reduced. *C. platyphylla*.
- 3. Leaves of sterile culms 2-12 mm wide, serrulate on veins; foliage only slightly reduced. 4
 - 4. Basal scale of pistillate spike sterile. *C. laxiculmis*.
 - 4. Basal scale of pistillate spike fertile (i.e., bearing perigynium). 5
- 5. Staminate spike sessile, inconspicuous or nearly so, hidden by the 1 or 2 uppermost pistillate bracts; uppermost 2 pistillate spikes approximate; SE NY. *C. abscondita*.
- 5. Staminate spike pedunculate, conspicuous, not hidden by pistillate bracts, distant from uppermost pistillate spike; statewide. *C. digitalis*.

25. § **Griseae** (incl. *Oligocarpae*)

- 1. Perigynia tightly covering achene, definitely angled, 1-9 per spike, loosely arranged on axis. 2
- 1. Perigynia loosely to closely covering achene, obscurely angled, much longer than achene. 3
 - 2. Perigynia 4.3-5.9 mm long, broadest well above the middle; sheaths of the bracts hispidulous; achenes with strongly bent beak. *C. hitchcockiana*.
 - 2. Perigynia 3.5-4.3 mm long, broadest at about the middle; sheaths of the bracts normally glabrous; achenes with minute straight beak. *C. oligocarpa*.
- 3. Pistillate peduncles, margins of the bract-sheaths, and usually the midvein of the pistillate scales rough; perigynia 3.5-3.8 mm long. *C. conoidea*.
- 3. Pistillate peduncles, margins of the bract-sheaths, and usually the midvein of the pistillate scales smooth; perigynia 3-5.4 mm long. 4
 - 4. Lowest pistillate scales with awns about as long as or longer than the body, the whole scale distinctly longer than the perigynium. 5
 - 4. Lowest pistillate scales awnless or with an inconspicuous awn to 1 mm long, the whole scale much shorter than the perigynium. *C. flaccosperma* var. *glaucoidea*.
- 5. Basal sheaths conspicuously tinged with purple; perigynia 1/3-2/5 as thick as long; principal blades 2-4 mm wide. *C. amphibola* var. *amphibola*.
- 5. Basal sheaths green or tinged with brown; perigynia 2/5 to 1/2 as thick as long; principal blades 4-8 mm wide. *C. amphibola* var. *turgida* (*C. grisea*).

26. § **Hymenochlaenae** (Incl. *Capillares*, *Gracillimae*, *Longirostres*, *Sylvaticae*).

- 1. Sheaths and or blades ± pilose. 2
- 1. Sheaths and blades glabrous or essentially so. 5
 - 2. Perigynium with a beak about 2/3 as long as body, the beak bidentate. *C. castanea*.¹⁰
 - 2. Perigynium beak less than 1/3 as long as perigynium, ± entire or slightly bidentate. 3
- 3. Leaves 1.5-3 mm wide; spikes 2-3 mm thick; perigynia beakless. *C. aestivalis*.
- 3. Leaves 3-10 mm wide; spikes 3-6 mm thick; perigynia short-beaked. 4
 - 4. Pistillate scales long-attenuate to long-awned; lateral spikes pistillate throughout. *C. davisii*.
 - 4. Pistillate scales acute to obtuse; lateral spikes with few staminate scales at base *C. formosa*.
- 5. Perigynium abruptly contracted into beak. 6
- 5. Perigynium gradually tapering into beak, or beakless. 7
 - 6. Perigynia lance-ovoid; spikes 2-4 mm thick. *C. capillaris*.
 - 6. Perigynia subglobose-ovoid; spikes 8-10 mm thick. *C. sprengelii*.

¹⁰Hybrid with *C. arctata* is *C. X knieskernii*.

- 7. Perigynia beakless. *C. gracillima.* 8
- 7. Perigynia gradually tapering to a beak. 8
 - 8. Perigynia about twice as long as wide, 2-nerved. *C. prasina.* 9
 - 8. Perigynia 3-5 times longer than wide, several-nerved. 9
- 9. Achene sessile in the base of the perigynium. 10
- 9. Achene elevated above the perigynium-base on a slender stipe 0.5-1.5 mm long. 11
 - 10. Perigynium sessile, strongly 2-ribbed, otherwise nerveless, its slender beak about as long as the body; rare introduction; SE NY. *C. sylvatica.*
 - 10. Perigynium stiptate, strongly 2-ribbed and finely several-nerved, its beak much shorter than body; upstate, widespread. *C. arcata.*
- 11. Perigynium 2-ribbed and conspicuously several-nerved, the nerves about as strong as the ribs; spikes more compact, the perigynia separated by internodes 1-1.5 mm long. *C. venusta.*
- 11. Perigynium 2-ribbed and obscurely several-nerved; spikes loosely flowered, the perigynia separated by internodes 2-4 (-6) mm long. 12
 - 12. Perigynia 6.8-9.3 mm long (mean 7.6); SE NY, rare. *C. debilis* var. *debilis.*
 - 12. Perigynia 4.7-6.8 mm long (mean 5.8); widespread, common. *C. debilis* var. *rudgei.*

27. § Porocystis (Virescentes)

- 1. Terminal spike entirely staminate. *C. pallescens.*
- 1. Terminal spike pistillate at the summit, staminate below. 2
 - 2. Perigynia densely pubescent. 3
 - 2. Perigynia glabrous. 4
- 3. Pistillate spikes 1-2 cm long, perigynia closely spaced basally. *C. swanii.*
- 3. Pistillate spikes 2-4 cm long (some spikes on a plant may be only 1-2 cm long), perigynia loosely spaced basally. *C. virescens.*
 - 4. Perigynia appressed-ascending, much wider than thick, blunt, obscurely few-nerved. *C. complanata.*
 - 4. Perigynia spreading, nearly or quite as thick as wide, short-pointed, conspicuously nerved. 5
- 5. Sheaths glabrous or nearly so on the ventral strip; blades glabrous except at base; pistillate scales obtuse to short-cuspidate. *C. caroliniana.*
- 5. Sheaths pubescent on the ventral strip; blades usually pubescent; pistillate scales long-acuminate. 6
 - 6. Perigynia beakless; scales shorter than perigynia *C. hirsutella.*
 - 6. Perigynia with short, bent beak; pistillate scales as long as or longer than perigynia *C. bushii.*

28. § Anomalae

- One species in NY *C. scabrata.*

29. Halleranae (Triquetrae)

- One species in NY *C. hirtifolia.*

30. § Paludosae

- 1. Perigynia pilose or strongly hirtellous. 2
- 1. Perigynia glabrous or scabridulous but not pubescent. 5
 - 2. Perigynia 4.5-8.1 mm long, the nerves plainly visible among the hairs. *C. houghtonii.*
 - 2. Perigynia 2.8-4.5 mm long, the nerves obscured by dense pubescence. 3
- 3. Beak of the perigynium soft and hyaline, marked with purple on the back; SE NY and Albany area. *C. vestita.*
- 3. Beak of the perigynium distinctly stiff and bidentate; statewide. 4
 - 4. Leaves filiform-convolute except at base; culms obtusely angled and smooth; achenes ellipsoid. *C. lasiocarpa.*
 - 4. Leaves flat with revolute margins; culms triquetrous, scabrous; achenes broadly obovoid to obovoid-ellipsoid. *C. pellita* (*C. lanuginosa*).
- 5. Perigynia 2.5-4 mm long; naturalized. *C. acutiformis.*
- 5. Perigynia 4.7-8 mm long; native. 6
 - 6. Perigynia ovoid; pistillate scales 1/2 to equalling perigynia in length. *C. striata* (*C. walteriana*).
 - 6. Perigynia narrowly ovoid to ellipsoid; pistillate scales at most 1/2 as long as perigynia. 7
- 7. Ligules about as long as wide; lower leaves with blades. *C. hyalinolepis*
- 7. Ligules much longer than wide; lower leaves bladeless. *C. lacustris*

31. § Carex (Hirtae)

- 1. Perigynia glabrous, with teeth 1.6-3 mm long. *C. atherodes*
- 1. Perigynia short hairy, with teeth 0.7-2.0 mm long.

- 2. Leaf sheaths densely hirsute, especially apically; staminate scales \pm hirsute. *C. hirta*.
- 2. Leaf sheaths glabrous; staminate scales glabrous. *C. trichocarpa*.

32. § *Vesicariae* (incl. *Pseudocypereae*)¹¹

- 1. Pistillate scales smooth margined, obtuse to acuminate, awnless. 2
- 1. Pistillate scales with a prominent scabrous awn; often the body also ciliate. 7
 - 2. Leaves filiform-involute, 1-3(-32.) mm wide; stems terete. *C. oligosperma*.
 - 2. Leaves flat, U-, V-, or M-shaped in cross-section, stems triangular to obtusely triangular. 3
- 3. Achenes asymmetrical, deeply indented or notched. *C. tuckermanii*.
- 3. Achenes symmetrical, not indented or notched. 4
 - 4. Perigynium beaks 2.4-4.2 mm long, usually finely scabrous at least near the tip and on the teeth; widest leaves 1.8-4.3 mm wide. *C. bullata*.
 - 4. Perigynium beaks 1-2.2 (-2.7) mm long, smooth; widest leaves 1.5-15 mm wide. 5
- 5. Bract of lowest pistillate spike (ignore spikes from long sheaths near base of plant) (2.5-) 3-9 times longer than inflorescence; staminate spike 1, slightly if at all elevated above summit of crowded pistillate spikes; lower perigynia reflexed. *C. retrorsa*.
- 5. Bract of lowest pistillate spike shorter than to no more than 2.5 times longer than the inflorescence; staminate spikes 2-4, well elevated above the summit of the separate pistillate spikes. 6
 - 6. Extensively colonial from long-creeping rhizomes; leaves (4.5-) 5-12 (-15) mm wide; ligules about as long as wide; basal sheaths usually spongy-thickened and little or not red tinged. *C. utriculata* (*C. rostrata*, of authors).
 - 6. Cespitose; leaves 3-6 mm wide; ligules longer than wide; basal sheaths not spongy thickened, and often tinged with reddish-purple. *C. vesicaria*.
- 7. Extensively colonial from elongate creeping rhizomes; staminate scales acute to acuminate, essentially smooth margined except at the very tip; perigynia 7-11 nerved. *C. schweinitzii*.
- 7. densely to loosely cespitose, rhizomes connecting individual culms in a clump no more than about 10 cm long; at least some staminate scales with a distinct scabrous awn and sometimes also ciliate margined; perigynia 7-25 nerved
 - 8. Perigynia 6-12 nerved, the nerves separate nearly to the beak apex, bodies broadly ellipsoid to \pm globose, (1.8-) 2-4.2 mm wide; achenes rough-papillate. 9
 - 8. Perigynia 13-25 nerved, the nerves (except for the 2 prominent lateral ones) confluent at or below middle of beak, bodies ellipsoid to lance-ovoid, 1.1-2.2 mm wide; achenes smooth. 10
- 9. Spikes (12-) 15-22 mm thick; widest leaves (4-) 4.5-13 mm wide; if spikes less than 15 mm thick, then usually less than 2.5 times as long as wide; perigynia (6-) 6.5-10.8 mm long, with beaks 0.7-0.9 times as long as body. *C. lurida*.
- 9. Spikes 9-14 (-15) mm thick; widest leaves 2.4-4 (-5) mm wide; spikes usually 2.5-3.5 times as long as wide; perigynia 4.8-6.6 (-7.6) mm long, the beaks 0.7-1.3 times as long as the body. *C. baileyi*.
- 10. Perigynia spreading to ascending, herbaceous, \pm inflated, terete, many nerves separated by more than 3 times their width; longest beak teeth 0.3-0.9 mm long. *C. hystericina*.
- 10. perigynia \pm reflexed when mature, leathery, uninflated, \pm compressed triangular, strongly and closely nerved with most nerves separated by less than 3 times their width; longest beak teeth 0.7-2.1 (-2.8) mm long. 11
- 11. Spikes 12-18 mm thick; beak teeth strongly outcurved, the longest 1.3-2.1 (-2.8) mm long. *C. comosa*.
- 11. Spikes 9-12 mm thick; beak teeth \pm straight or slightly outcurved, the longest 0.7-1.2 (1.4) mm long. *C. pseudocyperus*.

33. § *Lupulinae*.¹²

- 1. Style straight or loosely contorted above the middle; pistillate spike globose to short-ovoid. 2
- 1. Style contorted just above the base; pistillate spikes short-cylindric. 3
 - 2. Perigynia dull and usually pubescent below the middle, obconic from the base to the widest portion. *C. grayi*.
 - 2. Perigynia shining and smooth, rounded at base. *C. intumescens*.
- 3. Achene about 2/3 as wide as long, ovoid, each face flat or very slightly concave. *C. lupulina*.
- 3. Achene as wide as long or wider, diamond-shaped, each face distinctly concave. *C. lupuliformis*.

34. § *Orthocerates*.

- One species in NY. *C. pauciflora*.

¹¹Key follows draft by A.A. Reznicek for FNA.

¹²References: S.D. Jones & S.L. Hatch. 1990. Synopsis of *Carex* section *Lupulinae* (Cyperaceae) in Texas. *Sida* 14: 87-99; and A.A. Reznicek & P.W. Ball. 1974. The taxonomy of *Carex* series *Lupulinae* in Canada. *Canad. Jour. Bot.* 52: 2387-2399.

35. § **Folliculatae.**

- 1. Larger leaves 4-16 mm wide; bract-sheaths distinctly convex at mouth; statewide. *C. folliculata*.
- 1. Larger leaves 2-4 mm wide; bract-sheaths concave at the mouth; northern and western NY. *C. michauxiana*.

36. § **Collinsiae.**

- One species in NY. *C. collinsii*.

37. § **Squarrosae.**

- 1. Terminal spike staminate; pistillate scales with awns conspicuously protruding between perigynia; rare. . *C. frankii*.
- 1. Terminal spike chiefly pistillate; pistillate scales rarely protruding. 2
 - 2. Achene narrowly oblong-ellipsoid, 1/3 to 2/5 as wide as long; style much curved near its base. . . *C. squarrosa*.
 - 2. Achene broadly ellipsoid, 1/2 to 3/5 as wide as long; style straight or nearly so; rare. *C. typhina*.

38. § **Spirostachyae (Extensae)**¹³

- 1. Leaves involute; sheaths red-dotted on the ventral strip; rare introduction. *C. extensa*.
- 1. Leaves flat; sheaths white on the ventral strip. 2
 - 2. Perigynia 2-3.6 mm long, not curved, spreading or ascending; achene nearly filling the perigynium body. *C. viridula*.
 - 2. Perigynia 3.4-6 mm long, some or all of them curved or deflexed; achene in lower 1/2 of perigynium body. . . 3
- 3. Pistillate scales inconspicuous, of the same color as the perigynia or nearly so; perigynium-beak smooth. *C. cryptolepis*.
- 3. Pistillate scales conspicuous, copper-color or brown; perigynium-beak rough-margined. *C. flava*.

39. § **Acrocystis (Montanae)**¹⁴

- 1. Each culm producing a single peduncle, usually elongate, bearing 2-4 spikes at or near the summit. 2
- 1. Each culm producing apparently 2-4 peduncles, the longest of these bearing a staminate spike, often with an adjacent pistillate spike, the shorter ones each bearing 1 pistillate spike; or plants bearing culms of several lengths.10
 - 2. Perigynium-body (beak and contracted base excluded) ellipsoid to obovoid, distinctly longer than wide, usually wider than thick at maturity distinctly but obtusely 3-angled. 3
 - 2. Perigynium-body subglobose, about as long and as thick as wide, at maturity not 3-angled or very obscurely so. 8
- 3. Perigynia much longer than their subtending scales. 4
- 3. Perigynia about as long as the subtending scales. 5
 - 4. Culms ascending, much longer than leaf blades; pistillate scales with broad white margins; perigynia slenderly ellipsoid to fusiform, 3-4 mm long, gradually narrowed to thick spongy base, copiously hirsute. *C. peckii*.
 - 4. Longer culms arching or recurving, others erect, mostly shorter than leaf blades; scales with purple margins; perigynia 2.5-3 mm long, the ellipsoid-obovoid body abruptly narrowed to a stipe, minutely puberulent. *C. deflexa*.
- 5. Principal leaves 3-7 mm wide; ligules longer than width of leaf blade; inflorescence 1-8 cm long; perigynia 2.5-4 mm long, about 1.5 mm wide. *C. communis*.
- 5. Principal leaves 0.5-2.5 mm wide; ligules shorter than the width of the leaf blade; perigynia 2-3.5 mm long, 1-1.5 mm wide. 6
 - 6. Plants loosely cespitose; staminate and lowest pistillate spike short-peduncled; perigynia pale, thin, 2-2.5 mm long, 1-1.25 mm wide. *C. novae-angliae*.
 - 6. Plants densely cespitose; staminate (usually) and pistillate spikes sessile; perigynia 2.5-3.5 mm long, 1-1.5 mm wide. 7
- 7. Culms arching or recurving; all but the lowermost spikes closely aggregated into glomerule 1-2 cm long. *C. albicans* var. *albicans* (*C. emmonsii*).
- 7. Culms erect or nearly so; spikes distinctly separated from each other, the inflorescence 1-4.5 (-8) cm long. *C. albicans* var. *artitecta* (*C. artitecta*).
- 8. Plants not stoloniferous. *C. communis*.
- 8. Plants producing long horizontal stolons. 9

¹³See Crins, W.J. 1988. Sectional limits and phylogenetic considerations in *Carex* section *Ceratocystis* (Cyperaceae). *Brittonia* 40: 38-47.

¹⁴References: W.J. Crins & P.W. Ball. 1983. The taxonomy of the *Carex pensylvanica* complex (Cyperaceae) in North America. *Canad. Jour. Bot.* 61: 1692-1717; *C. heliophila* has been reported from NY, but the specimen was re-identified by Crins.

- 9. Beak of perigynium 0.9-2.0 mm long (1/2- = to perigynium body);
culm usually strongly scabrous below inflorescence. *C. lucorum*.
- 9. Beak of perigynium 0.2-0.8 (-0.9) mm long (1/8-1/2 the length of the perigynium body);
culm usually smooth below inflorescence. *C. pennsylvanica*.
- 10. Staminate spike closely associated with a pistillate spike, the bract of the latter foliaceous, exceeding the
staminate spike. *C. deflexa*.
- 10. Staminate spike either alone or associated with a pistillate spike; in the latter base, the subtending bract
scale-like, not surpassing the staminate spike. 11
- 11. Body of perigynium oblong-ellipsoid, 1/2-2/3 as wide as long. *C. nigromarginata*.
- 11. Body of perigynium broadly ellipsoid, ellipsoid-obovoid or sub-globose, 4/5 or more as wide as long. 12
- 12. Leaves 2.5-5 mm wide; perigynia usually glabrous. *C. tonsa*.
- 12. Leaves 1.5-2.5 (-3) mm wide; perigynia pubescent. 13
- 13. Pistillate scales lance-ovate; perigynia 3.2-4.7 mm long, with ellipsoid or ellipsoid-obovoid bodies,
the beaks 0.9-1.7 mm long. *C. rugosperma*
- 13. Pistillate scales broadly ovate or ovate-oblong; perigynia 2.2-3.3 mm long, with globose-ovoid bodies,
the beaks 0.5-1.0 mm long. *C. umbellata*.

40. § Scirpinae.

One species in NY. *C. scirpoidea*.

40. § Clandestinae (*Digitatae*).

- 1. Pistillate scales conspicuously and abruptly cuspidate; widespread in upstate. *C. pedunculata*.
- 1. Pistillate scales rounded, obtuse, or acute; rare, western NY only. *C. richardsonii*.

42. § Mitratae (*Praecoces*).

One species in NY. *C. caryophyllea*¹⁵

42. § Albae

One species in NY. *C. eburnea*.

44. § Phyllostachys¹⁶

- 1. Pistillate scales wholly green. *C. backii*.
- 1. Pistillate scales with hyaline margins. 2
- 2. Body of the perigynium obovoid-oblong, tapering into a stoutly pyramidal beak. *C. willdenovii*.
- 2. Body of the perigynium subglobose above the stipe-like base, abruptly prolonged into a slender beak.
. *C. jamesii*.

45. § Polytrichoideae

One species in NY. *C. leptalea*.

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¹⁵Rare introduction: one collection from Bronx Co. in 1890s.

¹⁶The recently described *C. juniperorum* is possibly present in NY on limestone woodlands.