



DR. ROBERT
MOHLENBROCK

ADVANCED PLANT IDENTIFICATION

CAREX, XYRIS, RHYNCHOSPORA, AND JUNCUS | April 11 & 12, 2011



Advanced Plant Identification:

CAREX, XYRIS, RHYNCHOSPORA, AND JUNCUS

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Advanced Plant Identification:

CAREX, XYRIS, RHYNCHOSPORA, AND JUNCUS

WORKSHOP AGENDA

April 11, 2011 (Day 1)

- 8:30 - 9:00 a.m. Registration
- 9:00 - 9:30 a.m. Welcome / Introductions
- 9:30 - 11:00 a.m. Botanical Lecture (Juncus/Carex)
- 11:00 - 12:00 p.m. Field Visit (NERR, Bayou Heron)
- 12:00 - 1:00 p.m. ~Lunch~
- 1:00 - 4:00 p.m. Field Visit (Ward Bayou)

April 12, 2011 (Day 2)

- 8:30 - 9:00 a.m. Registration
- 9:00 - 9:30 a.m. Review
- 9:30 - 11:00 a.m. Botanical Lecture (Rhynchospora/Xyris)
- 11:00 - 12:00 p.m. Field Visit (NERR, Savanna)
- 12:00 - 1:00 p.m. ~Lunch~
- 1:00 - 3:00 p.m. Field Visit (Dantzler Preserve/MGCCC)
- 3:00 - 3:45 p.m. Review
- 3:45 - 4:00 p.m. Evaluations/Adjourn!

INSTRUCTOR BIO

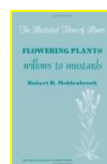
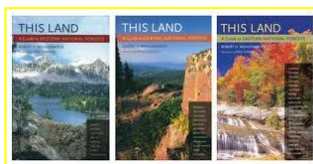
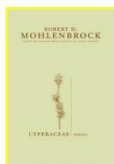
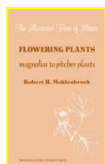


Photo By: Avia Husman

Dr. Robert Mohlenbrock's passion for plants has been inspiring students and workshop participants to learn for more than sixty years. His role as a workshop instructor is actually a second career. Dr. Mohlenbrock started in academia, working as a Professor of Botany at Southern Illinois University (1957-1990) and as Chair of the department for 16 years. His time there was well spent, he mentored 90 graduate students and authored numerous publications.

In 1990 he was tempted away from university life by two former students who founded a consulting firm and wanted him to be their lead plant identification instructor. After teaching professional workshops for just one summer, Dr. Mohlenbrock knew he had found his new career. To-date he had taught over 300 week-long plant identification courses to various groups and government agencies in 30 states.

Dr. Mohlenbrock is the author of more than 60 books and over 550 publications, and has been a monthly columnist for the journal, *Natural History*, since November of 1984.



CAREX

LIST OF CAREX SPECIES KNOWN IN MISSISSIPPI COASTAL COUNTIES

<i>Carex albolutescens</i>	<i>Carex flaccosperma</i>	<i>Carex lupulina</i>
<i>Carex amphibola</i>	<i>Carex frankii</i>	<i>Carex lurida</i>
<i>Carex atlantica</i>	<i>Carex gigantea</i>	<i>Carex molesta</i>
<i>Carex aureolensis</i>	<i>Carex granularis</i>	<i>Carex muhlenbergii</i>
<i>Carex blanda</i>	<i>Carex glaucescens</i>	<i>Carex oxylepis</i>
<i>Carex bromoides</i>	<i>Carex glaucoidea</i>	<i>Carex radiata</i>
<i>Carex caroliniana</i>	<i>Carex grisea</i>	<i>Carex seorsa</i>
<i>Carex cephalophora</i>	<i>Carex grayii</i>	<i>Carex straminea</i>
<i>Carex cherokeensis</i>	<i>Carex howei</i>	<i>Carex striata</i>
<i>Carex comosa</i>	<i>Carex hyalinolepis</i>	<i>Carex texensis</i>
<i>Carex complanata</i>	<i>Carex intumescens</i>	<i>Carex triangularis</i>
<i>Carex debilis</i>	<i>Carex joori</i>	<i>Carex tribuloides</i>
<i>Carex decomposita</i>	<i>Carex laxiculmis</i>	<i>Carex turgescens</i>
<i>Carex digitalis</i>	<i>Carex leavenworthii</i>	<i>Carex venusta</i>
<i>Carex elliottii</i>	<i>Carex leptalea</i>	<i>Carex verrucosa</i>
<i>Carex exilis</i>	<i>Carex lonchocarpa</i>	<i>Carex vulpinoidea</i>
<i>Carex festucacea</i>	<i>Carex longii</i>	
<i>Carex fissa</i>	<i>Carex louisianica</i>	



KEY TO CAREX SPECIES KNOWN IN MISSISSIPPI COASTAL COUNTIES

1. Hairs present on stems, sheaths, and/or culms.
 2. Perigynia pubescent.
 3. Lowest spikes on pendulous peduncles.....*C. oxylepis*
 3. Lowest spikes ascending.....*C. complanata*
 2. Perigynia glabrous.
 4. Terminal spike staminate.....*C. venusta*
 4. Terminal spike gynecandrous.
 5. Lowest spikes on pendulous peduncles.....*C. oxylepis*
 5. Lowest spikes ascending.....*C. caroliniana*
1. Leaves, sheaths, and culms all glabrous.
 6. Perigynia pubescent.
 7. Terminal spike gynecandrous.....*C. caroliniana*
 7. Terminal spike entirely staminate.
 8. Staminate spikes 2 or more per culm.....*C. striata*
 8. Staminate spike one per culm.....*C. grayii*
 6. Perigynia glabrous.
 9. Spike one.
 10. Spike androgynous; leaves flat.....*C. leptalea*
 10. Spike gynecandrous; leaves involute.....*C. exilis*
 9. Spikes more than one.
 11. Stigmas 3; achenes trigonous.
 12. Terminal spike entirely staminate.
 13. Perigynia 10 mm long or longer.
 14. Perigynia not inflated, lanceoloid, up to 2.5 mm wide.....*C. lonchocarpa*
 14. Perigynia strongly inflated, ovoid, over 2.5 mm wide.
 15. Pistillate spikes globose or subglobose.

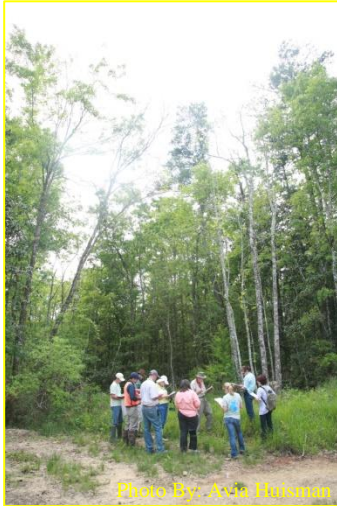
16. Perigynia radiating in all directions, tapering to base.....*C. grayii*
16. Perigynia never reflexed, rounded at base.....*C. intumescens*
15. Pistillate spikes thick-cylindric, longer than broad.
17. All perigynia horizontally spreading; beak of perigynium 2-3 times longer than the body.....*C. gigantea*
17. Perigynia ascending; beak of perigynium slightly shorter than or slightly longer than the body.
18. Perigynia crowded, 13-20 mm long; pistillate scales often awned.....
.....*C. lupulina*
18. Perigynia loosely arranged, 10-14 mm long; pistillate scales never awned.....*C. louisianica*
13. Perigynia up to 10 mm long, often much shorter than 10 mm.
19. Staminate spikes more than 1 per culm.
20. Leaves blue-green; perigynia 6-8 mm long; plants rhizomatous.....
.....*C. hyalinolepis*
20. Leaves green; perigynia 5-6 mm long; plants with a taproot.....
.....*C. cherokeensis*
19. Staminate spike 1 per culm.
21. Perigynia conspicuously 2-toothed at the apex or prolonged into a conspicuous beak.
22. Pistillate spikes 2-5 mm thick.
23. Pistillate spikes 2-3 mm thick; perigynia not strongly overlapping; pistillate scales whitish.....*C. debilis*
23. Pistillate spikes 4-5 mm thick; perigynia strongly overlapping; pistillate scales chestnut-brown.....*C. venutsa*
22. Pistillate spikes usually at least 1 cm thick.
24. Some of the perigynia reflexed.



Photo By: Avia Huisman

- 25. Perigynia ovoid, the beak 1.5-3.0 mm long.
 - 26. Perigynia inflated, with 22 or more veins.....*C. turgescens*
 - 26. Perigynia not inflated, with 5-11 veins.....*C. elliotii*
 - 25. Perigynia lanceoloid, the beak 1-2 mm long.....*C. comosa*
- 24. None of the perigynia reflexed.
 - 27. Culms red-purple at base.
 - 28. Pistillate scales much longer than the perigynia; perigynia broadest above the middle.....*C. aureolensis*
 - 28. Pistillate scales not longer than the perigynia; perigynia broadest near the base.....*C. lurida*
 - 27. Culms brown at base.....*C. frankii*
- 21. Perigynia ending abruptly at the apex or minutely bidentate or with a beak less than 0.5 mm long.
 - 29. All or the lowest pistillate spikes on pendulous peduncles; plants glaucous.
 - 30. Leaves harshly scabrous on the margins; perigynia obscurely nerved.....*C. glaucescens*
 - 30. Leaves smooth or sparsely scabrous on the margins; perigynia strongly nerved.
 - 31. Pistillate scales acute; perigynia not glaucous.....*C. joori*
 - 31. Pistillate scales; perigynia glaucous.....*C. verrucosa*
 - 29. All pistillate spikes, except sometimes the very lowest, ascending; plants not glaucous (except *C. glaucodea*, *C. flaccosperma*, *C. granularis*).
 - 32. Beak of perigynium bent or curved to one side.
 - 33. Perigynia loosely arranged, not overlapping.....*C. laxiculmis*
 - 33. Perigynia crowded, always overlapping.

34. Perigynia rounded at base; leaves more or less glaucous.....
*C. granularis*
34. Perigynia tapering to base; leaves not glaucous.....*C. blanda*
32. Beak of perigynium straight.
35. Staminate spike elevated above the pistillate spikes.
36. Pistillate spikes loosely and remotely flowered.
37. Leaves 6-20 mm wide; pistillate scales cuspidate to awned.....
*C. laxiculmis*
37. Leaves up to 5 mm wide; pistillate scales acute.....*C. digitalis*
36. Pistillate spikes with crowded perigya.....*C. amphibola*
35. Staminate spike not elevated above the pistillate spikes.
38. Perigynia up to 10 per spike.
39. Leaves glaucous.
40. Perigynia 2.0-2.3 mm wide; pistillate scales up to ½ as long
 as the perigynia.....*C. flaccosperma*
40. Perigynia 1.5-1.8 mm wide; pistillate scales nearly as long as
 the perigynia.....*C. glaucodea*
39. Leaves green.
41. Perigynia 3.5-4.7 mm long; one or more pistillate spikes
 usually near base of plant.....*C. amphibola*
41. Perigynia 4.5-5.5 mm long; no pistillate spikes near base of
 plant.....*C. grisea*
38. Perigynia 10-16 per spike.
42. Pistillate scales up to ½ as long as perigynia; leaves green.....
*C. grisea*
42. Pistillate scales more than ½ as long as perigynia; leaves
*C. glaucodea*



- 43. Perigynia 2.3-4.0 mm long, strongly nerved; pistillate spikes 3-6 mm thick.....*C. granularis*
- 43. Perigynia 3.5-4.0 mm long, finely nerved; pistillate spikes 5-8 mm thick.
- 44. Perigynia 2.0-2.3 mm wide; pistillate scales up to ½ as long as the perigynia.....*C. flaccosperma*
- 44. Perigynia 1.5-1.8 mm wide; pistillate scales about ¾ as long as the perigynia.....*C. glaucoidea*

12. Terminal spike gynecandrous.

- 45. Perigynia narrowly lanceoid; pistillate scales not setaceous.....*C. debilis*
- 45. Perigynia obconic; pistillate scales setaceous.
- 46. Culms brown at base.....*C. frankii*
- 46. Culms red-purple at base.....*C. aureolensis*

11. Stigmas 2; achenes lenticular.

47. Spikes androgynous.

48. Inflorescence consisting of 10 or more spikelets.

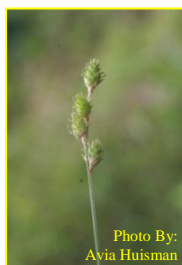
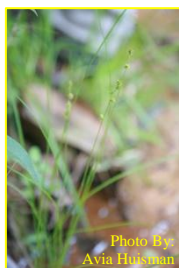
- 49. Perigynia convex on both surfaces, black.....*C. decomposita*
- 49. Perigynia convex on one face, flat on the other face.
- 50. Perigynia with red dots.....*C. triangularis*
- 50. Perigynia without red dots.
- 51. Leaves longer than the flowering culms.....*C. vulpinoidea*
- 51. Leaves shorter than the flowering culms.....*C. fissa*

48. Inflorescence consisting of up to 10 spikelets.

52. All the spikelets crowded into a head.

- 53. Leaves 5-10 per culm; perigynia 2-3 mm wide.....*C. muhlenbergii*
- 53. Leaves 3-5 per culm; perigynia 1.2-2.0 mm wide.
- 54. Leaves 2-5 mm wide; perigynia widest above the base.....*C. cephalophora*

54. Leaves up to 3 mm wide; perigynia widest at the base.....*C. leavenworthii*
52. Spikelets in an elongated, often interrupted, inflorescence.
55. Perigynia 2-3 mm wide.....*C. muhlenbergii*
55. Perigynia 0.7-2.0 mm wide.
56. Beak of perigynium smooth.....*C. texensis*
56. Beak of perigynium serrulate.....*C. radiata*
47. Spikes gynecandrous.
57. Perigynia convex on one surface, flat on the other surface.
58. Perigynia with rounded margins, ascending, 3.5-4.5 mm long.....*C. bromoides*
58. Perigynia with a narrow rim, spreading or reflexed, up to 3.5 mm long.
59. Beak of perigynium smooth.....*C. seorsa*
59. Beak of perigynium serrulate.
60. Leaves more than 1.6 mm wide; inflorescence more than 2 cm long.....
.....*C. atlantica*
60. Leaves less than 1.6 mm wide; inflorescence less than 2 cm long.....*C. howei*
57. Perigynia flat on both surfaces.
61. Spikelets rounded at apex.
62. Spikelets well separated; pistillate scales awned.....*C. straminea*
62. Spikelets crowded or sometimes slightly separated; pistillate scales not awned.
63. Perigynia 2.5-3.5 mm long, spreading.....*C. festucacea*
63. Perigynia 4.0-5.5 mm long, ascending.....*C. molesta*
61. Spikelets pointed at apex.
64. Perigynia lanceolate, broadest at base, 1.2-1.5 mm long.....*C. tribuloides*
64. Perigynia obovate, broadest near middle, 1.5-2.7 mm wide.
65. Perigynia ascending, the wing reaching the top of the perigynia.....*C. longii*
65. Perigynia spreading, the wing not reaching the top of the perigynia.....
.....*C. alboluteus*



XYRIS

LIST OF XYRIS SPECIES KNOWN IN MISSISSIPPI COASTAL COUNTIES

Xyris ambigua

Xyris baldwiniana

Xyris brevifolia

Xyris caroliniana

Xyris curtissii

Xyris difformis

Xyris drummondii

Xyris elliottii

Xyris fimbriata

Xyris flabelliformis

Xyris floridana

Xyris jupicai

Xyris laxiflora

Xyris platylepis

Xyris serotina

Xyris smalliana

Xyris stricta

Xyris torta



NOTES ON XYRIS IN MISSISSIPPI COASTAL COUNTIES

PLANTS SOLITARY OR IN SMALL TUFTS

ambigua
flabelliformis
caroliniana
platylepis
torta
fimbriata
smalliana
laxiflora
difformis
floridana
jupicai

PLANTS IN LARGE TUFTS

drummondii
brevifolia
elliottii
baldwiniana
curtissii
stricta
serotina

SCAPES SCABROUS

stricta
serotina
fimbriata
difformis
curtissii
floridana

SCAPES DISTINCTLY TWISTED

brevifolia
flabelliformis
elliottii
ambigua
caroliniana
platylepis
torta
fimbriata



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NOTES ON XYRIS IN MISSISSIPPI COASTAL COUNTIES

LEAVES LESS THAN 2 MM

WIDE

drummondii
brevifolia
flabelliformis
elliottii
baldwiniana

LEAVES 2-5 MM WIDE

drummondii
flabelliformis
ambigua
stricta
serotina
caroliniana
torta

LEAVES 5-30 MM WIDE

ambigua
serotina
platylepis
fimbriata
smalliana
laxiflora
jupicai
difformis
curtissii
floridana

BRACTS 5 MM LONG OR LONGER

elliottii
ambigua
stricta
serotina
caroliniana
platylepis
torta
fimbriata
smalliana
laxiflora
jupicai
difformis
floridana

BRACTS UP TO 5 MM LONG

drummondii
brevifolia
flabelliformis
baldwiniana
curtissii
floridana



NOTES ON XYRIS IN MISSISSIPPI COASTAL COUNTIES

SPIKES TO 10 MM LONG

drummondii
brevifolia
flabelliformis
elliottii
baldwiniana
torta
jupicai
curtissii

SPIKES 10-20 MM LONG

elliottii
ambigua
stricta
serotina
caroliniana
platylepis
torta
fimbriata
smalliana
jupicai
diformis
floridana

SPIKES 20-40 MM LONG

ambigua
stricta
caroliniana
platylepis
torta
fimbriata
laxiflora
diformis

SCAPE DISTINCTLY FLATTENED NEAR SPIKE

drummondii
ambigua
stricta
serotina
torta
fimbriata
laxiflora
jupicai

SCAPES LESS THAN 1 MM WIDE

drummondii
flabelliformis
brevifolia



NOTES ON XYRIS IN MISSISSIPPI COASTAL COUNTIES

PLANTS TO 20 CM TALL

- drummondii*
- brevifolia*
- flabelliformis*
- difformis*
- curtissii*

PLANTS 20-60 CM TALL

- elliottii*
- baldwiniana*
- stricta*
- serotina*
- caroliniana*
- platylepis*
- torta*
- smalliana*
- jupicai*
- difformis*
- floridana*

PLANTS OVER 60 CM TALL

- ambigua*
- stricta*
- caroliniana*
- platylepis*
- torta*
- fimbriata*
- smalliana*
- laxiflora*
- jupicai*
- difformis*

SPIKES OVOID OR OBOVOID, BROADEST BELOW THE MIDDLE OR ABOVE THE MIDDLE

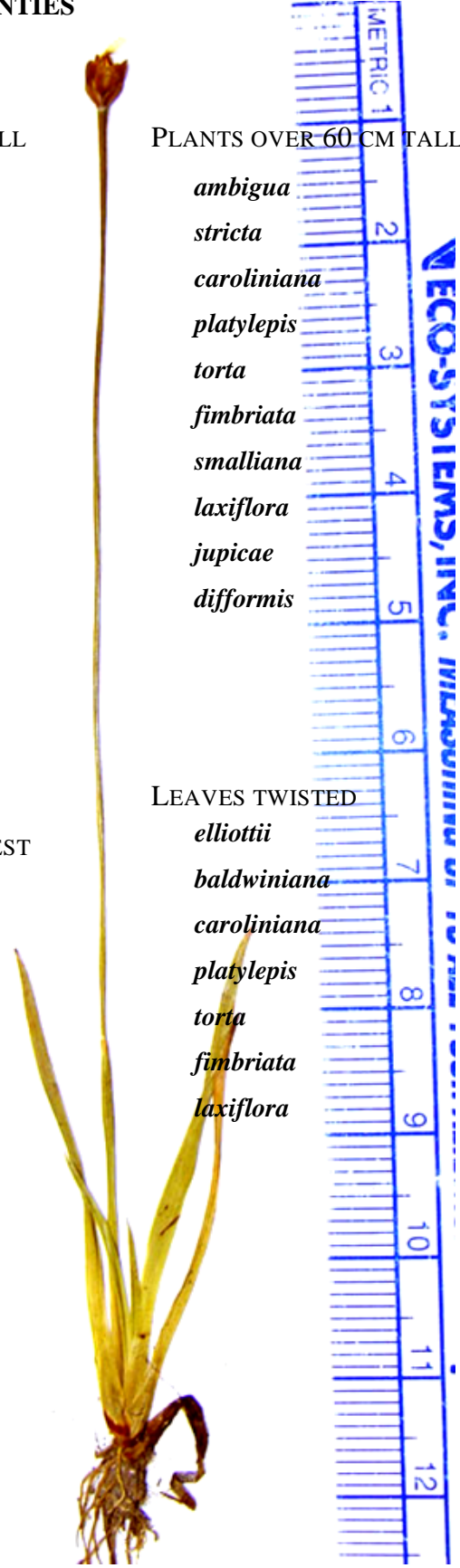
- drummondii*
- brevifolia*
- flabelliformis*
- elliottii*
- baldwiniana*
- ambigua*
- serotina*
- platylepis*
- torta*
- difformis*
- curtissii*

SPIKES ELLIPSOID OR OBLONGOID, BROADEST NEAR THE MIDDLE

- stricta*
- caroliniana*
- platylepis*
- torta*
- fimbriata*
- smalliana*
- laxiflora*
- jupicai*
- curtissii*

LEAVES TWISTED

- elliottii*
- baldwiniana*
- caroliniana*
- platylepis*
- torta*
- fimbriata*
- laxiflora*



KEY TO XYRIS SPECIES IN MISSISSIPPI COASTAL COUNTIES

1. Scapes up to 20 cm tall.
 2. Scapes less than 1 mm wide, smooth.
 3. Plants usually solitary.....*X. flabelliformis*
 3. Plants in small tufts.
 4. Scapes terete, strongly twisted; bracts not keeled.....*X. brevifolia*
 4. Scapes flattened near spike, curvy but not twisted; bracts keeled.....*X. drummondii*
 2. Scapes 1 mm wide or wider, scabrous.
 5. Spikes about 1 cm long; bracts 5-7 mm long; plants usually pinkish or purplish at base.....
.....*X. difformis*
 5. Spikes up to 5 mm long; bracts 3-4 mm long; plants usually red-brown at base.....
.....*X. curtissii*
1. Scapes more than 20 cm tall.
 6. Scapes 20-60 mm tall (8" – 2').
 7. Scapes scabrous.
 8. Plants in large tufts; scapes flattened near spike.
 9. Spikes ovoid, broadest below the middle.....*X. serotina*
 9. Spikes ellipsoid, broadest near the middle.....*X. stricta*
 8. Plants usually solitary, not in large tufts.
 10. Spikes about 10 mm long.....*X. difformis*
 10. Spikes 10-15 mm long.....*X. floridana*
 7. Scapes glabrous or nearly so.
 11. Scapes distinctly twisted.
 12. Scapes distinctly flattened above.....*X. torta*
 12. Scapes not distinctly flattened above.

- 13.Spikes ovoid, broadest near the base.....*X. platylepis*
- 13.Spikes ellipsoid, broadest near the middle.....*X. caoliniana*
- 11.Scapes not distinctly twisted.
- 14.Leaves 1-5 mm wide.
- 15.Spikes 6-15 mm long; bracts 5-6 mm long, very loosely arranged.....*X. elliottii*
- 15.Spikes 4-7 mm long; bracts 4-5 mm long, tightly appressed.....*X. baldwiniana*
- 14.Leaves 5 mm wide or wider.
- 16.Scapes more or less flattened above, usually pale yellow-green at base.....
.....*X. jupicai*
- 16.Scapes terete, usually pink at base.....*X. smalliana*
6. Scapes more than 60 mm tall (2' or more).
- 17.Scapes scabrous.
- 18.Plants in large tufts.....*X. stricta*
- 18.Plants solitary or in small tufts.
- 19.Spikes ovoid, about 10 mm long.....*X. difformis*
- 19.Spikes ellipsoid, 12-25 mm long.....*X. fimbriata*
- 17 Scapes smooth or nearly so.
- 20.Scapes distinctly twisted.
- 21.Leaves 5-10 mm wide; scapes usually pink or purplish at base.....*X. platylepis*
- 21.Leaves up to 5 mm wide; scapes usually brown or chestnut-brown at base.
- 22.Apex of spikes sharply pointed.....*X. caroliniana*
- 22.Apex of spikes rounded or with a short point.....*X. torta*
- 20.Scapes more or less straight
- 23.Spikes ellipsoid, 10-20 mm long.....*X. smalliana*
- 23.Spikes ovoid, 20-40 mm long.....*X. laxiflora*

RHYNCHOSPORA

LIST OF RHYNCHOSPORA SPECIES KNOWN IN MISSISSIPPI COASTAL COUNTIES

R. baldwinii

R. brachychaeta

R. breviseta

R. caduca

R. capillacea

R. capitellata

R. careyana

R. cephalantha

R. chalarocephala

R. chapmanii

R. ciliaris

R. compressa

R. corniculata

R. crinipes

R. curtissii

R. debilis

R. decurrens

R. divergens

R. elliotii

R. fascicularis

R. fernaldii

R. filiformis

R. globularis

R. glomerata

R. gracilentia

R. grayi

R. harperi

R. harveyi

R. inexpansa

R. inundata

R. macra

R. macrostachya

R. megalocarpa

R. microcarpa

R. microcephala

R. miliacea

R. mixta

R. oligantha

R. perplexa

R. pleiantha

R. plumosa

R. pusilla

R. rariflora

R. recognita

R. stenophylla

R. tracyi

R. wrightiana



NOTES ON RHYNCHOSPORA SPECIES IN MISSISSIPPI COASTAL COUNTIES

STEMS FILIFORM	HEIGHT IN CM
<i>capillacea</i>	20-40
<i>oligantha</i>	20-40
<i>breviseta</i>	20-40
<i>plumosa</i>	20-80
<i>pusilla</i>	15-30
<i>divergens</i>	10-30
<i>stenophylla</i>	30-60
<i>rariflora</i>	15-60
<i>pleiantha</i>	10-40
<i>curtissii</i>	10-30
<i>filifolia</i>	30-100
<i>chapmanii</i>	30-50
<i>brachychaeta</i>	20-50
<i>gracilentia</i>	10-100
<i>wrightiana</i>	10-50
<i>debilis</i>	20-45

SPIKELETS IN ROUND CLUSTERS

microcephala

cephalantha

tracyi

BRISTLES OF FRUIT 1-3

chapmanii

brachychaeta

perplexa

pusilla

divergens

BRISTLES OF FRUIT 12-20

macra

baldwinii

****All other species have 6 bristles per fruit****



NOTES ON RHYNCHOSPORA SPECIES IN MISSISSIPPI COASTAL COUNTIES

LEAVES UP TO 1 MM WIDE

pleiantha
harperi
curtissii
filifolia
chapmanii
brachychaeta
fernaldii
gracilentia
capillacea
oligantha
breviseta
plumosa
pusilla
divergens
stenophylla
rariflora
wrightiana
debilis

LEAVES 1-3 MM WIDE

tracyi
capitellata
chalarocephala
cephalantha
perplexa
crinipes
microcephala
macra
inexpansa
recognita
decurrens
microcarpa
fascicularis
grayi
harveyi

LEAVES OVER 3 MM WIDE

inundata 3-10
careyana 3-12
macrostachya 3-15
corniculata 3-20
glomerata 3-5
crinipes 3-4
caduca 4-7
mixta 3-5
compressa 3-5
recognita 3-5
miliacea 4-7
decurrens 3-4
elliottii 3-5
baldwinii 3-5
ciliaris 4-6
fascicularis 3-4
megalocarpa 3-7
grayi 3-4

LEAVES CILIATE

ciliaris

SPIKELETS DROOPING

inexpansa

BRISTLES OF FRUIT PLUMOSE

plumosa
breviseta
oligantha

NOTES ON RHYNCHOSPORA SPECIES IN MISSISSIPPI COASTAL COUNTIES

FRUIT BODY SMOOTH	FRUIT BODY RUGOSE	FRUIT BODY STRIATE	FRUIT BODY HONEYCOMBED
<i>macra</i>	<i>capillacea</i>	<i>capillacea</i>	<i>mixta</i>
<i>filifolia</i>	<i>oligantha</i>	<i>divergens</i>	
<i>chapmanii</i>	<i>breviseta</i>	<i>pleiantha</i>	
<i>brachychaeta</i>	<i>plumosa</i>	<i>harveyi</i>	
<i>fernaldii</i>	<i>pusilla</i>	<i>inundata</i>	
<i>gracilentata</i>	<i>stenophylla</i>	<i>careyana</i>	
<i>tracyi</i>	<i>rariflora</i>		
<i>macrostachya</i>	<i>inexpansa</i>		
<i>corniculata</i>	<i>caduca</i>		
<i>capitellata</i>	<i>compressa</i>		
<i>glomerata</i>	<i>recognita</i>		
<i>chalarocephala</i>	<i>miliacea</i>		
<i>cephalantha</i>	<i>decurrrens</i>		
<i>microcephala</i>	<i>globularis</i>		
<i>wrightiana</i>	<i>microcarpa</i>		
<i>debilis</i>	<i>elliottii</i>		
<i>baldwinii</i>	<i>perplexa</i>		
<i>ciliaris</i>	<i>crinipes</i>		
<i>fascicularis</i>	<i>curtissii</i>		
<i>megalocarpa</i>	<i>grayi</i>		
	<i>harveyi</i>		



KEY TO RHYNCHOSPORA SPECIES IN MISSISSIPPI COASTAL COUNTIES

1. Tubercle much longer than the body of the fruit, usually conspicuously exerted; plants over 1m tall, often in standing water; styles not deeply 2-cleft.
 2. Spikelets 5-6 mm long, in round heads.....*R. tracyi*
 2. Spikelets 10 mm long or longer, not in round heads.
 3. Plants with rhizomes, forming colonies.
 4. Bracts longer than the inflorescence; spikelets red-brown.....*R. inundata*
 4. Bracts shorter than the inflorescence; spikelets orange.....*R. careyana*
 3. Plants without rhizomes, forming tufts.
 5. Clusters of spikelets crowded; bristles longer than the fruit.....*R. macrostachya*
 5. Clusters of spikelets open; bristles shorter than the fruit.....*R. corniculata*
1. Tubercle shorter than the body of the fruit, at least not conspicuously exerted; plants of various heights, rarely in standing water; styles deeply 2-cleft.
 6. Culms filiform, less than 1 mm wide.
 7. All culms less than 40 cm long.
 8. Lowest bract of inflorescence at right angles to main culm.
 9. Spikelets 6-8 mm long; fruit with neck at top.....*R. oligantha*
 9. Spikelets 5-6 mm long; fruit without neck at top.....*R. breviseta*
 8. Lowest bract of inflorescence ascending.
 10. Spikelets ovoid; body of fruit smooth.....*R. debilis*
 10. Spikelets ellipsoid to lanceoloid or fusiform, rugose, wavy, or striate.
 - 10a. Spikelets 2-4 mm long.
 - 10b. Spikelets 2-3 mm long.....*R. pusilla*
 - 10b. Spikelets 3-4 mm long.....*R. divergens*
 - 10a. Spikelets 4-7 mm long.

- 11.Spikelets ellipsoid or fusiform, fruit rugose or wavy.
- 12.Spikelets ellipsoid, 4.5-5.0 mm long.....*R. curtissii*
- 12.Spikelets fusiform, 6-7 mm long.....*R. capillacea*
- 11.Spikelets lanceoloid, fruit striate.....*R. pleiantha*
- 7.Most or all the culms at least 40 cm long.
- 13.Most or all the culms 40-60 cm long.
- 14.Spikelets dark light brown; bristles of fruit absent or reduced to 1.....*R. chapmanii*
- 14.Spikelets red-brown; bristles of fruit 6 or more (1-2 in *R. brachychaeta*).
- 17.Spikelets 2.8-3.0 mm long, usually falcate; tubercle 1.0-1.5 mm long.....*R. stenophylla*
- 17.Spikelets 1.5-2.5 mm long, not falcate; tubercle 0.3-0.8 mm long.
- 18.Spikelets 1.5-2.0 mm long; body of fruit obovoid to orbicular; tubercle 0.3-0.5 mm long.
- 19.Spikelets 1.5-1.6 mm long; body of fruit orbicular, smooth.....*R. brachychaeta*
- 19.Spikelets 1.8-2.0 mm long; body of fruit obovoid, rugose.....*R. rariflora*
- 18.Spikelets 2.0-2.5 mm long; body of fruit ellipsoid; tubercle 0.5-0.8 mm long.....
.....*R. wrightiana*
- 13.Most or all the culms over 60 cm long.
- 20.Spikelets dark brown, 3-4 mm long; bristles of fruit plumose.....*R. plumosa*
- 21.Spikelets red-brown, either 2.5-3.0 mm long, or 4-5 mm long; bristles not plumose.
- 22.Spikelets 2.5-3.0 mm long.....*R. filifolia*
- 22.Spikelets 4-5 mm long.....*R. gracilentia*
- 6.Culms not filiform, 1 mm wide or usually wider.
- 23.Leaves ciliate.....*R. ciliaris*
- 23.Leaves not ciliate.
- 24.Inflorescence drooping.....*R. inexpansa*
- 24.Inflorescence ascending to erect.

- 25.Plants in dry white sands or sandhills.
- 26.Some or all of the leaves 5 mm wide or wider; spikelets 4-8 mm long...*R. megalocarpa*
- 26.Leaves 1-4 mm wide; spikelets 2.5-5.5 mm long.
- 27.Spikelets 4.0-5.5 mm long.....*R. grayi*
- 27.Spikelets 2.5-4.0 mm long.....*R. harveyi*
- 25.Plants in wet savannas, flatwoods, or swamps.
- 28.At least some of the culms more than 1 m tall.
- 29.Spikelets in round heads.....*R. cephalantha*
- 29.Spikelets not in round heads, either hemispheric or turbinate.
- 30.Culms triangular.
- 31.Spikelets rich brown.....*R. caduca*
- 31.Spikelets red-brown.
- 32.Spikelets 2-3 mm long.....*R. elliottii*
- 32.Spikelets 3.0-6.5 mm long.
- 33.Inflorescence usually with 7 or more clusters of spikelets; spikelets ellipsoid; fruit not flat; tubercle 1.3-1.8 mm long.....*R. glomerata*
- 33.Inflorescence with 3-6 clusters of spikelets; spikelets ovoid; fruit very flat; tubercle 0.5-0.8 mm long.....*R. compressa*
- 30.Culms terete.
- 34.Leaves 4-7 mm wide; inflorescence with 4-6 clusters of spikelets; spikelets red-brown; fruits 1.3-1.5 mm long, rugose.....*R. miliacea*
- 34.Leaves 1-4 mm wide; inflorescence with 1-3 clusters of spikelets; spikelets dark brown; fruits 2.0-2.5 mm long, smooth.....*R. fascicularis*
- 28.None of the culms more than 1 m tall.
- 35.Spikelets whitish.....*R. macra*

35. Spikelets brown or red-brown.
36. Spikelets in round heads.....*R. microcephala*
36. Spikelets not in round heads.
37. Culms scabrous.....*R. baldwinii*
37. Culms smooth.
38. Culms triangular.
39. Spikelets crowded, appearing bristly because of elongated bracts; some of the leaves up to 5 mm wide.....*R. recognita*
39. Spikelets more or less open, not appearing bristly; all leaves up to 3 mm wide.
40. Plants usually with more than 4 clusters of spikelets; tubercle of fruit 1.0-1.5 mm long.....*R. capitellata*
40. Plants with 1-4 clusters of spikelets; tubercle of fruit 0.2-0.5 mm long.
41. Branches of the inflorescence capillary.....*R. perplexa*
41. Branches of the inflorescence not capillary.
42. Plants with 4-6 clusters of spikelets; spikelets ovoid, 2-3 mm long; fruits 2-3 per spikelet.....*R. microcarpa*
42. Plants with 1-4 clusters of spikelets; spikelets ellipsoid to lanceoloid, 3-4 mm long; fruit 1 per spikelet.....*R. harveyi*
38. Culms terete.
43. Leaves filiform, involute, to 1 mm wide (to 1.5 mm wide in *R. plumosa*).
44. Inflorescence often with more than 3 clusters of spikelets; spikelets 3-4 mm long; fruits rugulose, flared at base; bristles of fruit plumose.....*R. plumosa*
44. Inflorescence with 1-3 clusters of spikelets; spikelets 2-3 mm long; fruits smooth or striate, not flared at base; bristles of fruit not plumose.
45. Spikelets ovoid; body of fruit 1.0-1.4 mm long, smooth, dull.....*R. fernaldii*

45. Spikelets lanceoloid; body of fruit 2.0-2.5 mm long, striate, shiny.....*R. harperi*
43. Leaves linear, flat, 1.5-5.0 mm wide.
46. Branches of inflorescence capillary.....*R. perplexa*
46. Branches of inflorescence not capillary.
47. Leaves usually twisted; inflorescence with 1-4 clusters of spikelets; culms 40-70 cm tall.....*R. globularis*
47. Leaves not twisted; inflorescence with 3-7 clusters of spikelets; culms often more than 70 cm tall.
48. Leaves 1.5-2.0 mm wide; fruit 1 per spikelet, 3-5 mm long, the body smooth; tubercle of fruit 1.5-2.0 mm long.....*R. chalarocephala*
48. Leaves 2-5 mm wide; fruits 2-4 per spikelet, 1.5-2.5 mm long, the body rugulose or honeycombed.
49. Spikelets about 5 mm long, red-brown; fruits 2.1-2.5 mm long; bristles shorter than the fruit; tubercle of fruit 0.7-1.1 mm long.....*R. crinipes*
49. Spikelets 2.5-4.0 mm long, brown or pale brown; fruits 1.5-2.0 mm long; bristles equaling or longer than the fruit; tubercle of fruit 0.3-0.6 mm long.
50. Spikelets pale brown; bristles longer than the fruit; fruit honeycombed, stipitate; tubercle of fruit 0.5-0.6 mm long.....*R. mixta*
50. Spikelets brown; bristles equaling the fruit; fruit rugulose, not stipitate; tubercle of fruit 0.3-0.4 mm long.....*R. divergens*



JUNCUS

LIST OF JUNCUS SPECIES KNOWN IN THE COASTAL COUNTIES OF MISSISSIPPI

Juncus acuminatus

Juncus anhelatus

Juncus brachycarpus

Juncus bufonius

Juncus canadensis

Juncus coriaceus

Juncus debilis

Juncus dichotomus

Juncus diffusissimus

Juncus effusus

Juncus elliotii

Juncus gymnocarpus

Juncus marginatus

Juncus megacephalus

Juncus nodatus

Juncus polycarpus

Juncus repens

Juncus scirpoides

Juncus secundus

Juncus tenuis

Juncus torreyi

Juncus trigonocarpus

Juncus validus



NOTES ON JUNCUS KNOWN IN MISSISSIPPI COASTAL COUNTIES

FLOWERS LATERAL

J. roemerianus

J. effusus

J. gymnocarpus

J. coriaceus

All other *Juncus* species
have terminal flowers.



LEAVES FLAT, NOT SEPTATE

J. bufonius

J. repens

J. tenuis

J. anthelatus

J. dichotomus

J. secundus

J. marginatus

LEAVES FLAT, SEPTATE

J. polycephalus

J. validus

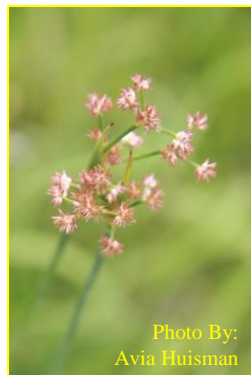
All other *Juncus* species
have terete, septate
leaves



FLOWERS IN HALF-ROUND HEADS

J. acuminatus

J. canadensis



FLOWERS IN ROUND HEADS

J. megacephalus

J. polycephalus

J. validus

J. brachycarpus

J. torreyi

J. scirpoides



PLANTS RED-PURPLE AT BASE

J. polycephalus

J. megacephalus

J. trigonocarpus (sometimes)

KEY TO JUNCUS IN MISSISSIPPI COASTAL COUNTIES

1.Flowers lateral.

2.Stems ending in a needle-like point; plants of brackish or salt water.....*J. roemerianus*

2.Stems ending in a soft point; plants of fresh water.

3.Leaves 1-3 on each stem.....*J. coriaceus*

3.Leaves absent.

4.Stems hollow, more than 2 mm in diameter.....*J. effusus*

4.Stems not hollow, 1-2 mm in diameter.....*J. gymnocarpus*

1.Flowers terminal.

5.Plants less than 10 cm tall.

6.Annuals; plants in tufts.....*J. bufonius*

6.Perennials; plants creeping, sometimes in standing water.....*J. repens*

5.Plants more than 10 cm tall.

7.Leaves flat, not septate.

8.Leaves 2-4 mm wide.....*J. marginatus*

8.Leaves about 1 mm wide.

9.Flowers borne on only one side of branchlets.....*J. secundus*

9.Flowers borne all around the branchlets.

10.Auricle of leaf sheath absent or nearly so.....*J. dichotomus*

10.Auricle of leaf sheath 2-6 mm long.

11.Plants up to 30 cm tall.....*J. tenuis*

11.Plants more than 30 cm tall.....*J. anhelatus*

7.Leaves terete, septate or, if flattened, then septate.

12.Leaves flattened but septate.

13.Base of plant red-purple.....*J. polycephalus*

- 13. Base of plant green.....*J. validus*
- 12. Leaves terete and septate.
- 14. Flowers in half-round or round heads.
- 15. Heads half-round.
 - 16. Capsules dark brown, 3.5-4.5 mm long; seeds 1-2 mm long, caudate; cataphylls stramineous, rounded at the tip.....*J. canadensis*
 - 16. Capsules tan, 2.5-3.5 mm long; seeds 0.3-0.4 mm long, not caudate; cataphylls gray, pointed at the tip.....*J. acuminatus*
- 15. Heads round.
 - 17. Base of plant red-purple or maroon.....*J. megacephalus*
 - 17. Base of plant green.
 - 18. Stems 3-4 mm in diameter; heads 10-15 mm in diameter..... *J. torreyi*
 - 18. Stems 1-3 mm in diameter; heads up to 10 mm in diameter.
 - 19. Heads up to 10; capsules longer than petals, 3-4 mm long....*J. scirpoides*
 - 19. Heads 10-30; capsules shorter than petals, 1.8-2.7 long.*J. brachycarpus*
- 14. Flowers neither in half-round or round heads.
 - 20. Capsules at least twice as long as the petals.....*J. diffusissimus*
 - 20. Capsules barely longer than the petals.
 - 21. Stems 3-6 mm in diameter, stout.
 - 22. Individual heads 4-8 mm across; capsules 4.5-5.3 mm long; seeds 1.6-2.8 mm long.....*J. trigonocarpus*
 - 22. Individual heads 0.3-0.5 mm across; capsules 2.0-2.5 mm long; seeds 0.5-0.6 mm long.....*J. nodatus*
 - 21. Stems 1-3 mm in diameter, slender.
 - 23. Heads up to 40 (-50) per panicle, each head 2-5 mm across; capsules

- stramineous, lanceoloid, 2.8-4.0 mm long.....*J. debilis*
23. Heads 50 or more per panicle, each head 0.3-0.5 mm across; capsules
chestnut-brown, ovoid, 2.5-3.0 mm long.....*J. elliotii*



GLOSSARY

androgynous: male and female flower on same spikelet, the male is on top

ascending: pointing upward

bidentate: two teeth

ellipsoid: oval shaped

filiform: threadlike

finely nerved: small/tiny veins

glabrous: hairless/smooth

glaucous: blue/green in color

globose: round

glume: scale with no flower

gyneandrous: female and male flower on same spikelet, the female is on top

honeycombed: surface dotted or dented

involute: leaf, or other flat surface rolled into a tube-like structure

lanceoloid: elongated teardrop shaped: wide base and has depth

lemma: fertile scale

obconic: shaped like an upside-down cone/teardrop

oblongoid: elliptical and two to four times as long as broad

ovoid: teardrop shape

pendulous: drooping

perigynium: sac like structure, made up of “scales,” that surrounds the male or female flower

pubescent: has hair

reflexed: mirrored arrangement, e.g. petals around entire flower vs. petals on half of flower

rugose: wrinkled

serrulate: serrated edge

setaceous: drawn out to a long point

scabrous: rough to the touch

staminate: male flowers only

stipitate: small stock at base of fruit

striate: lined

strongly nerved: large obvious veins

tubercle: circular, triangular, or spear shaped formation on top of seed



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