

GRASS IDENTIFICATION

Elizabeth Gandy and Chris Matson



Grasses-General

- Flowering plants in the Poaceae family
- The most widespread plant family in the world, fourth largest, ~11,000 species.
- Around 400 species (+ subspecies and varieties=~460) in Florida, about 40% non-native.
- Grasses are monocots.
 - Floral parts in threes
 - Lateral veins
 - Single cotyledon
- Wind pollinated.
- Can be annual or perennial.
- Important component of healthy natural communities.



<https://talltimbers.org/wiregrass-growth-on-closer-examination/>



Axonopus furcatus
Photo by Keith Bradley

<https://florida.plantatlas.usf.edu/photo.aspx?ID=12181>

Get started studying grasses:

- Arm yourself with the correct tools.
 - Dichotomous keys.
 - Identification guides that have species descriptions.
 - Plant reference and identification websites and apps.
- Magnification, measurement.
 - Hand lens!!
 - Dissecting scope

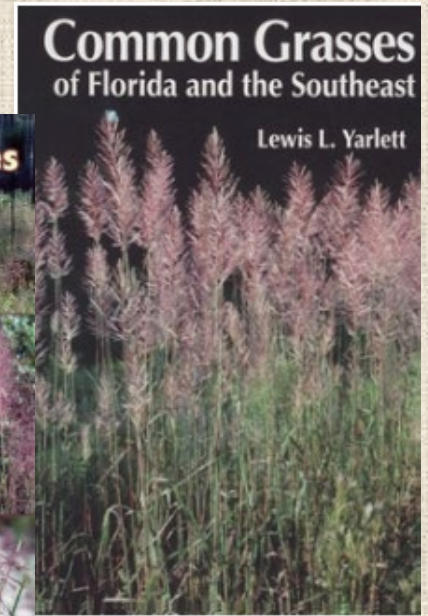
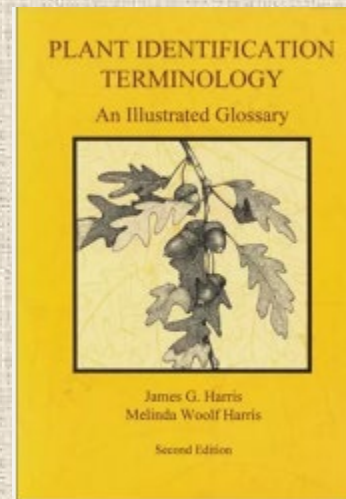
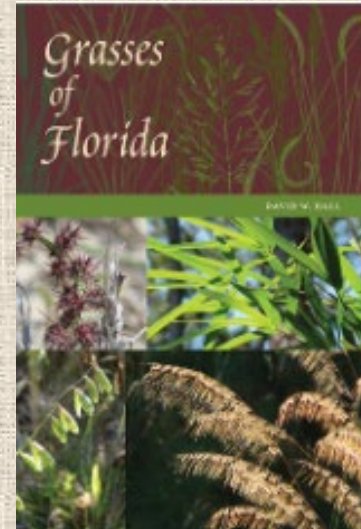


Photo by Jeff Weber

How do we ID grasses?

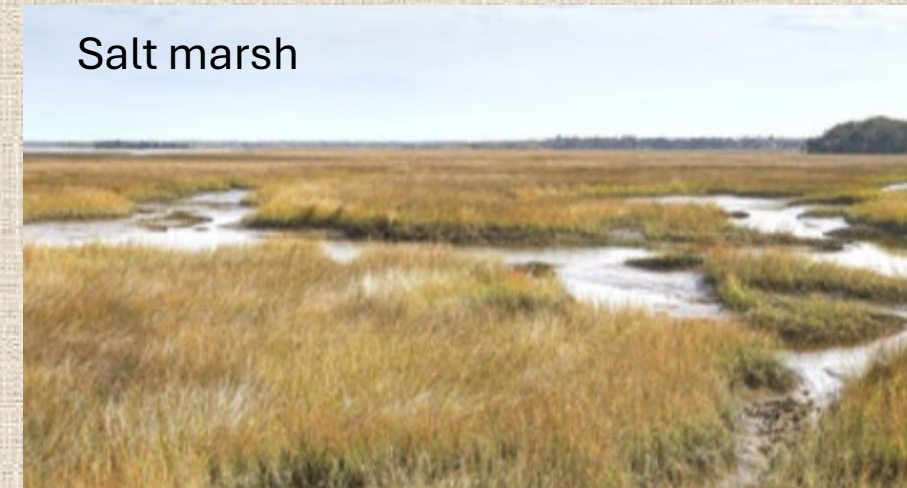
- Habitat-where is the plant growing?
 - Geography
 - Wet, dry, salty, fresh
 - Natural vs. disturbed
- Seasonality-when is it growing?
 - Most of our grasses are summer/fall
 - Recent burn
- Habit-how is it growing?
 - Bunch vs. sod/matt
 - Few vs. monoculture
- Morphology-what does it physically look like?
 - Magnifier anyone?



Photo by Sean Patton
<https://www.inaturalist.org/observations/185473099>

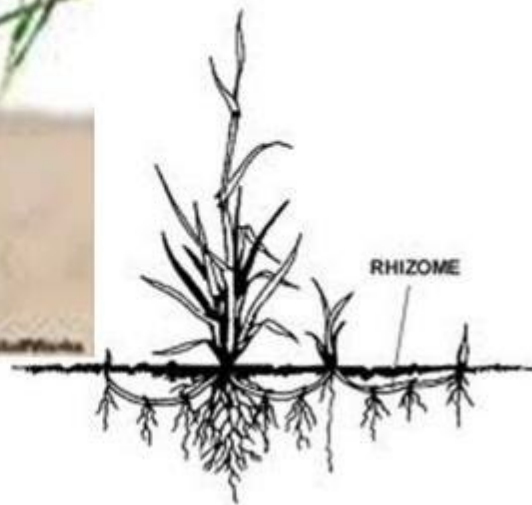
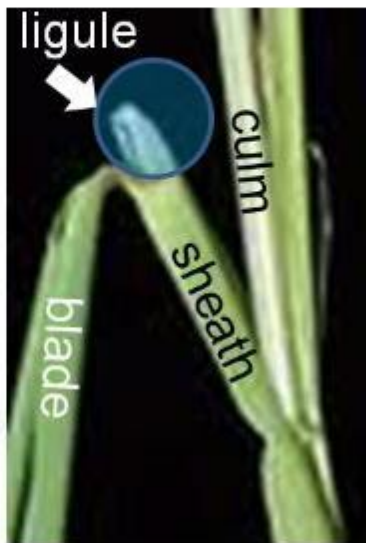
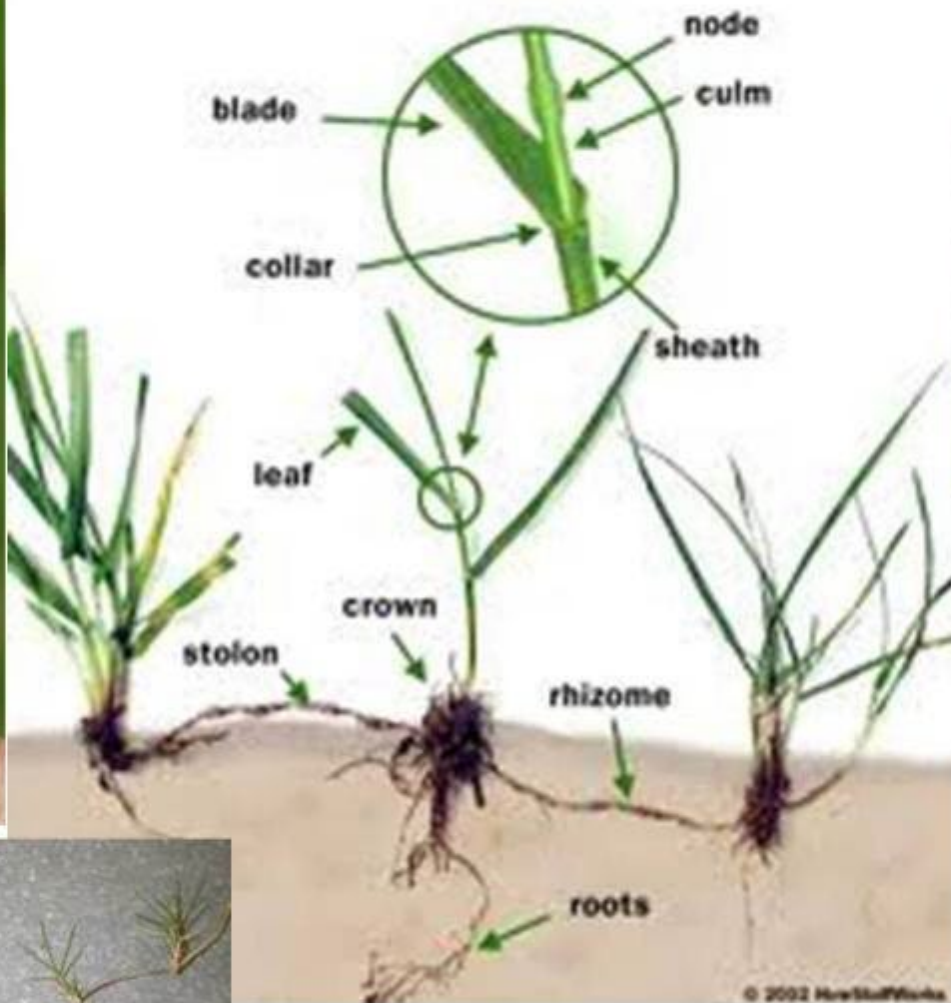
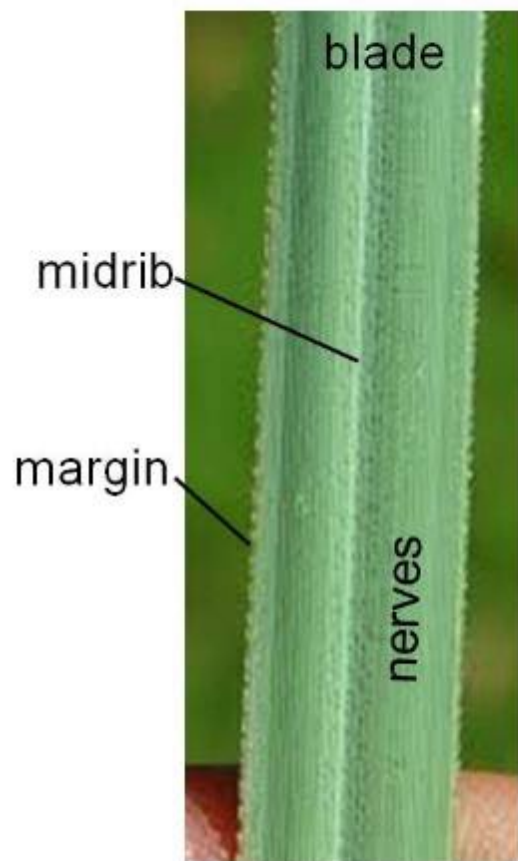


Photo by Chris Meyer



<https://www.publicnewsservice.org/2021-05-06/environment/million-acre-southeast-salt-marsh-conservation-plan-gets-green-light/a74207-1>

Non-floral parts of a grass



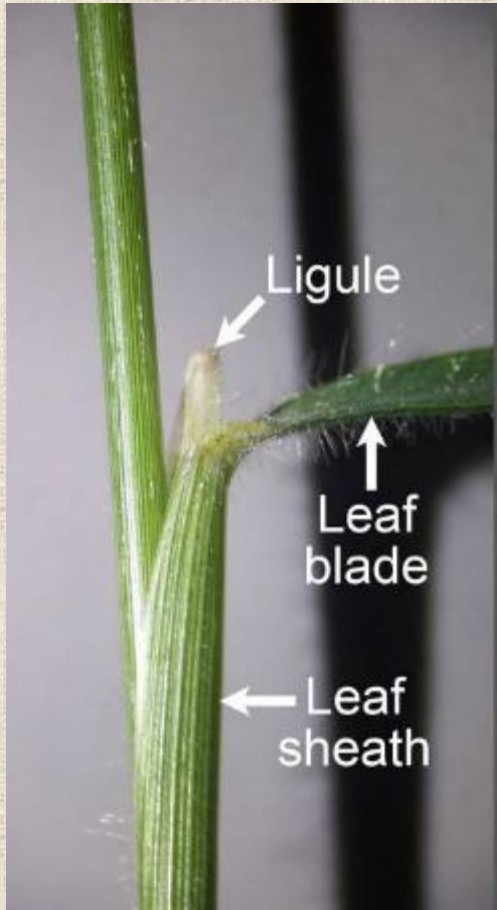
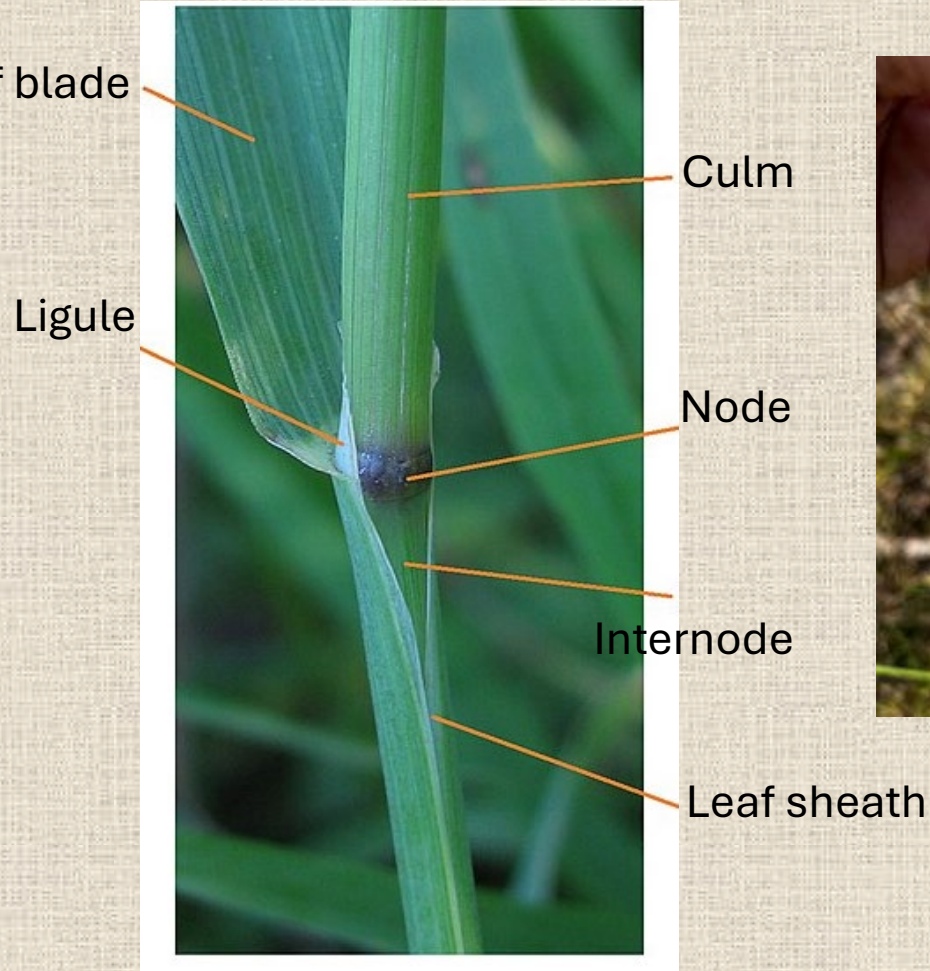
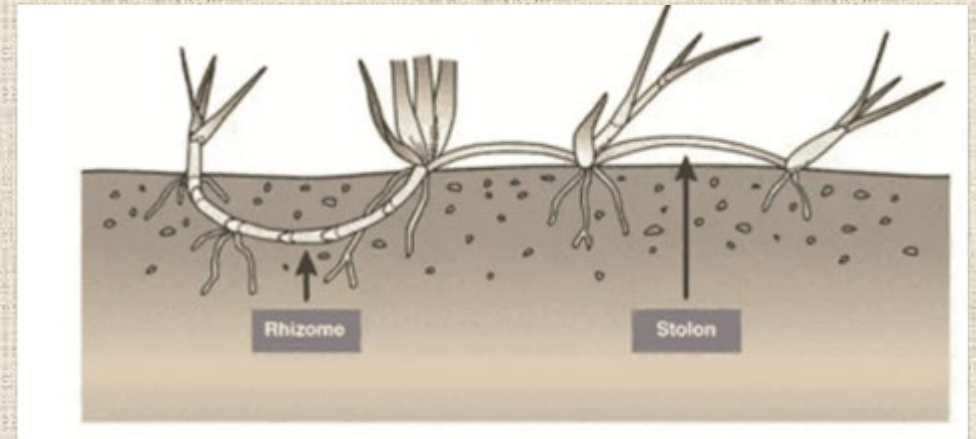


Photo by Stefan.Iefnaer (Wikimedia Commons, Creative Commons Attribution-ShareAlike 4.0 International license)



https://commons.wikimedia.org/wiki/File:Phleum_pratense_culm.jpg



<https://ngturf.com/the-ultimate-guide-to-zoysia-grass/>

Ligules



hairy ligule



membranaceous
ligule



hairy and membranaceous
ligule

Images by Debi Tharp

Leaf taper

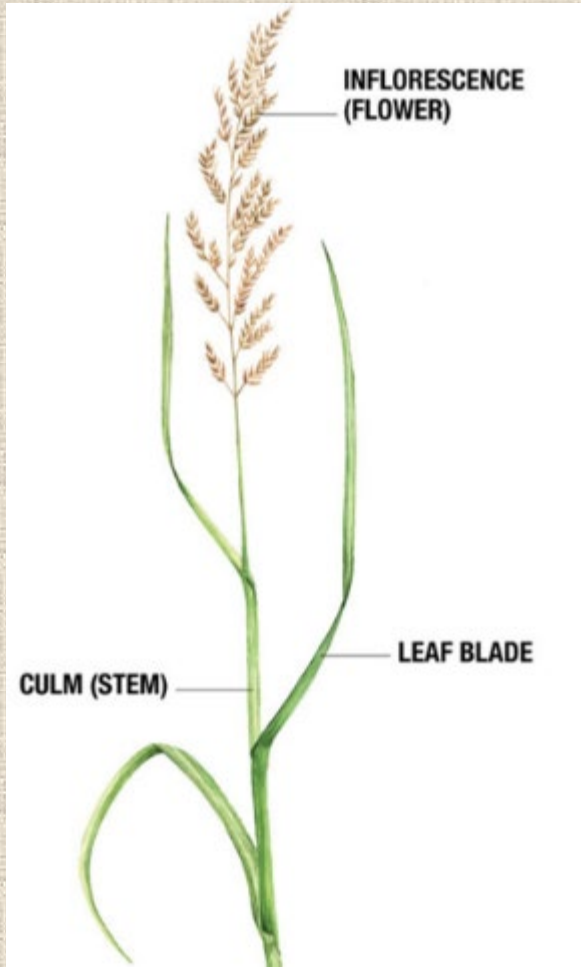


Acuminate tip

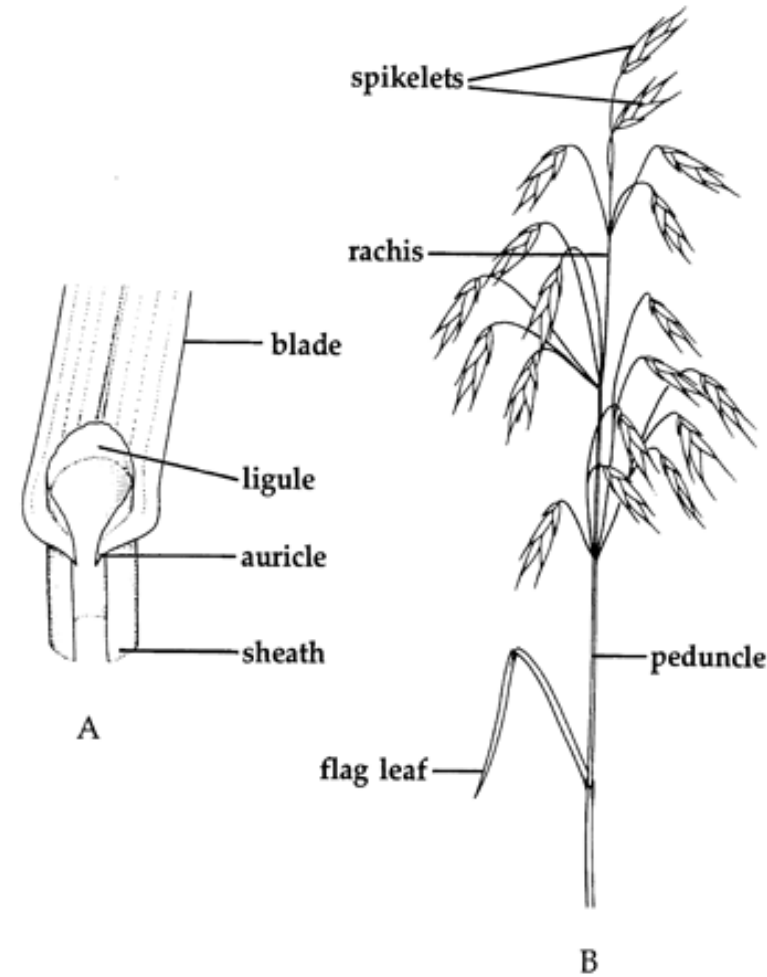


Attenuate tip

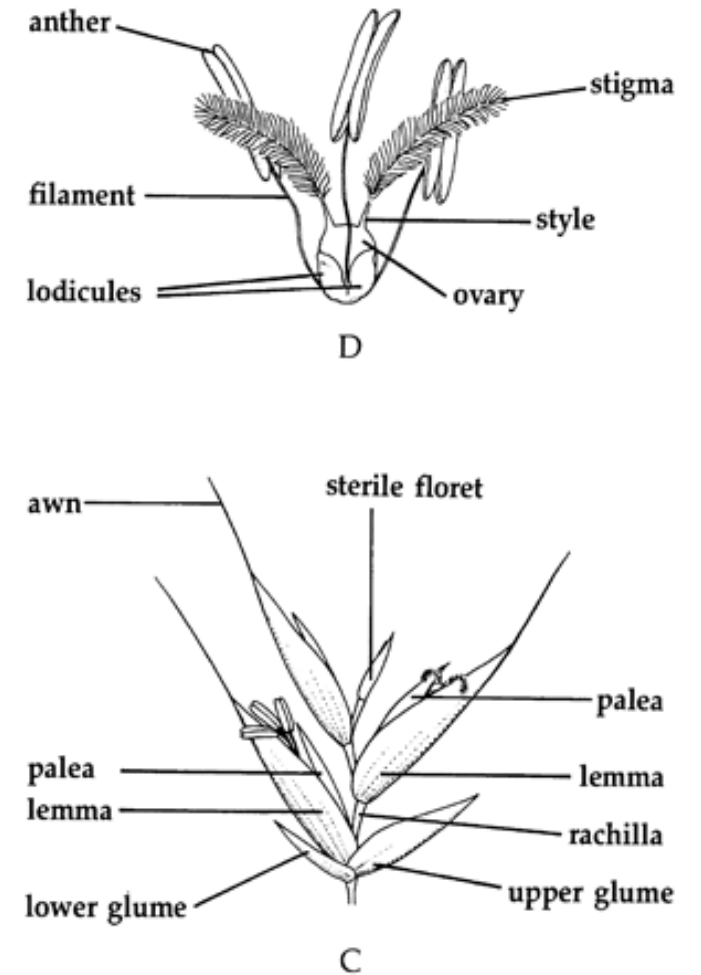
Flower morphology



<https://www.finegardening.com/article/a-guide-to-growing-reed-grasses-best-performing-varieties-and-care>



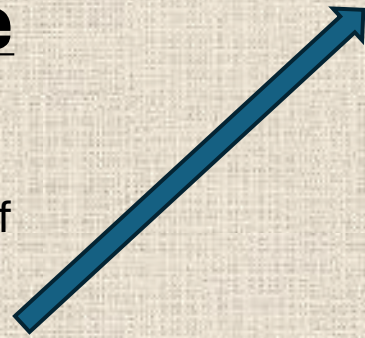
Leaf and floral structures in Poaceae. A, leaf; B, inflorescence, (a compound panicle described as 'paniculate'); C, bisexual spikelet; D, bisexual flower.



<https://plantnet.rbgsyd.nsw.gov.au/cgi-bin/NSWfl.pl?page=nswfl&lvl=fm&name=Poaceae>

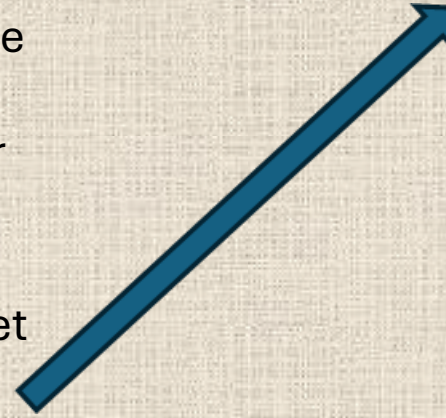
Inflorescence

- Flowering head
- Terminal or axillary
- Peduncle-main stalk of inflorescence
- Rachis-axis
- Made up of spikelets



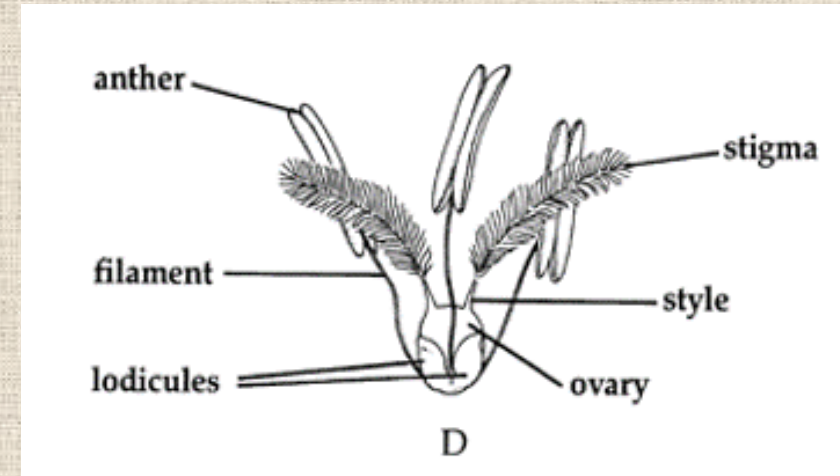
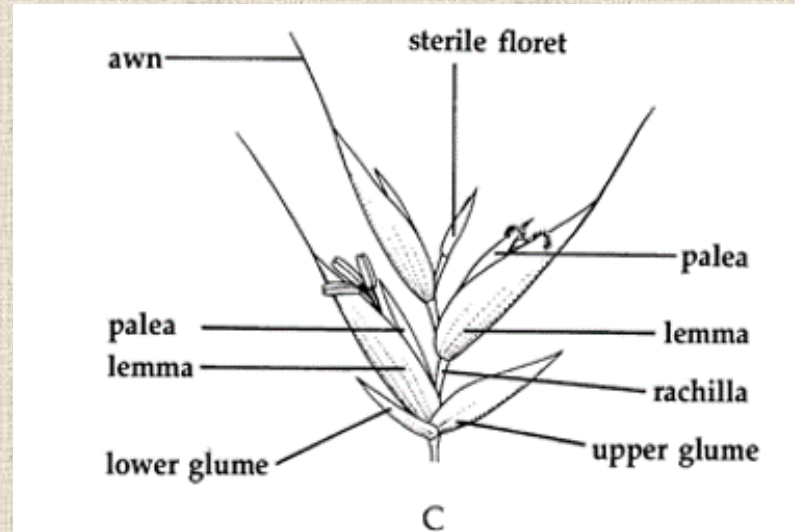
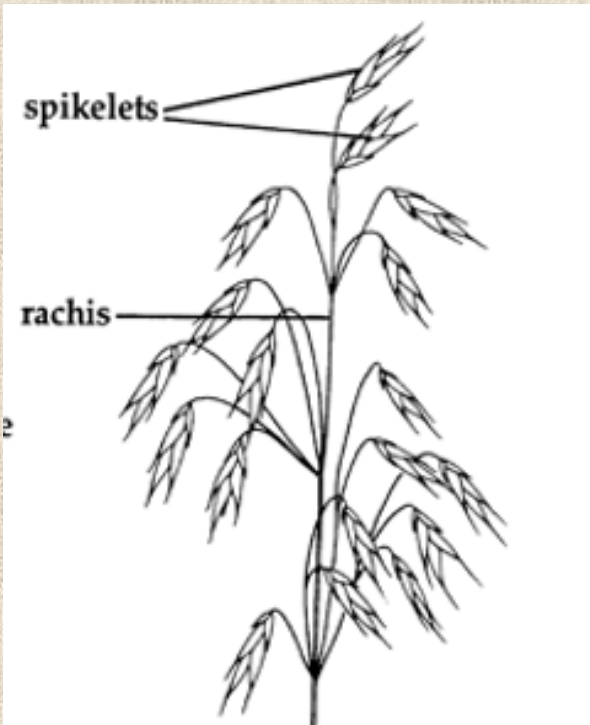
Spikelet

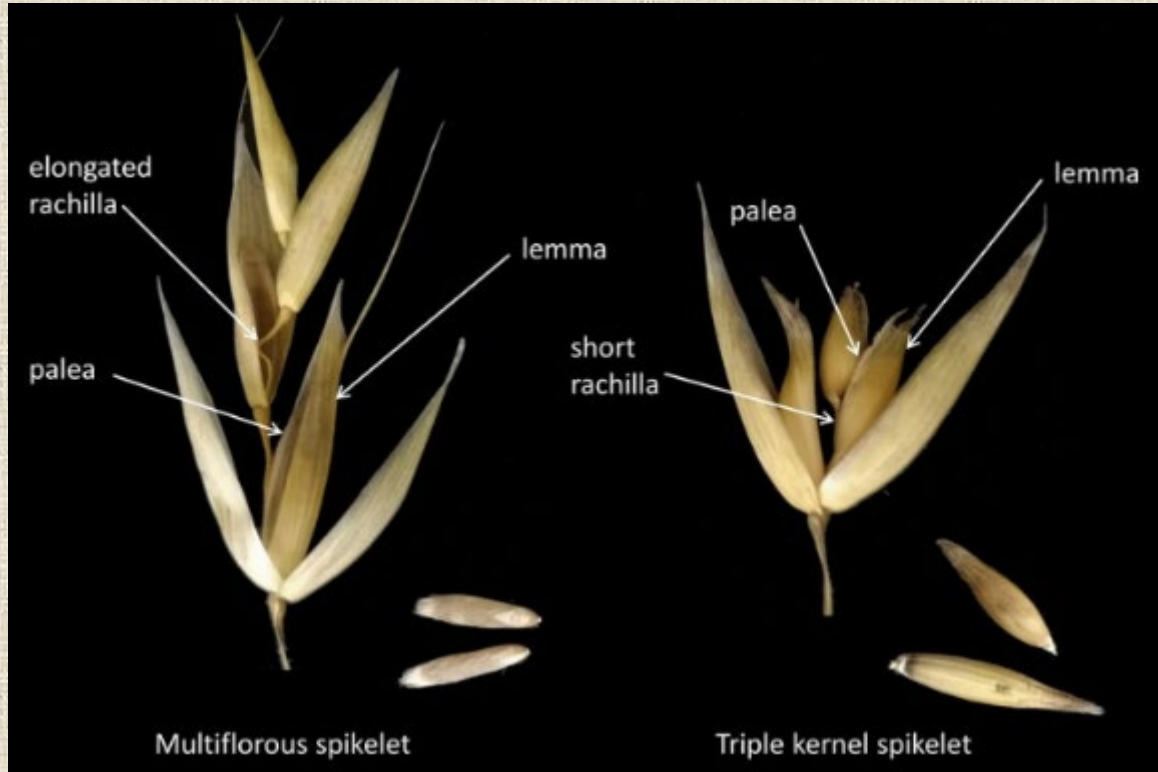
- Set of bracts that protect the flowers
- Glumes-upper and lower
- Pedicel-main stalk of spikelet
- Made up of floret(s)



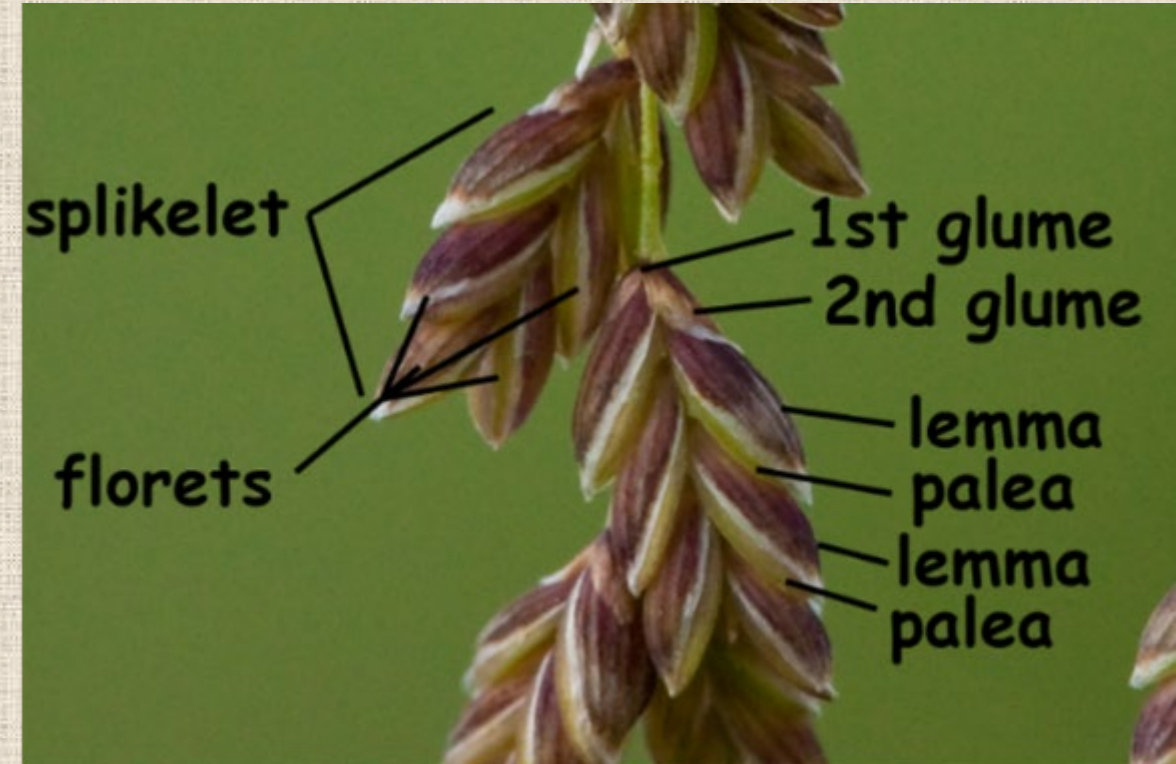
Floret

- Reproductive organ
- Rachilla-stem of floret
- Lemma
- Palea
- Pistil
- Stamen
- Ovary
- Lodicules





https://www.researchgate.net/figure/Spikelet-and-grain-of-typical-hulless-and-hulled-oat-Multiflorous-spikelets-left-are_fig1_344139687



<https://ohioplants.org/families-poaceae/>

A Floret of *Megathyrsus*

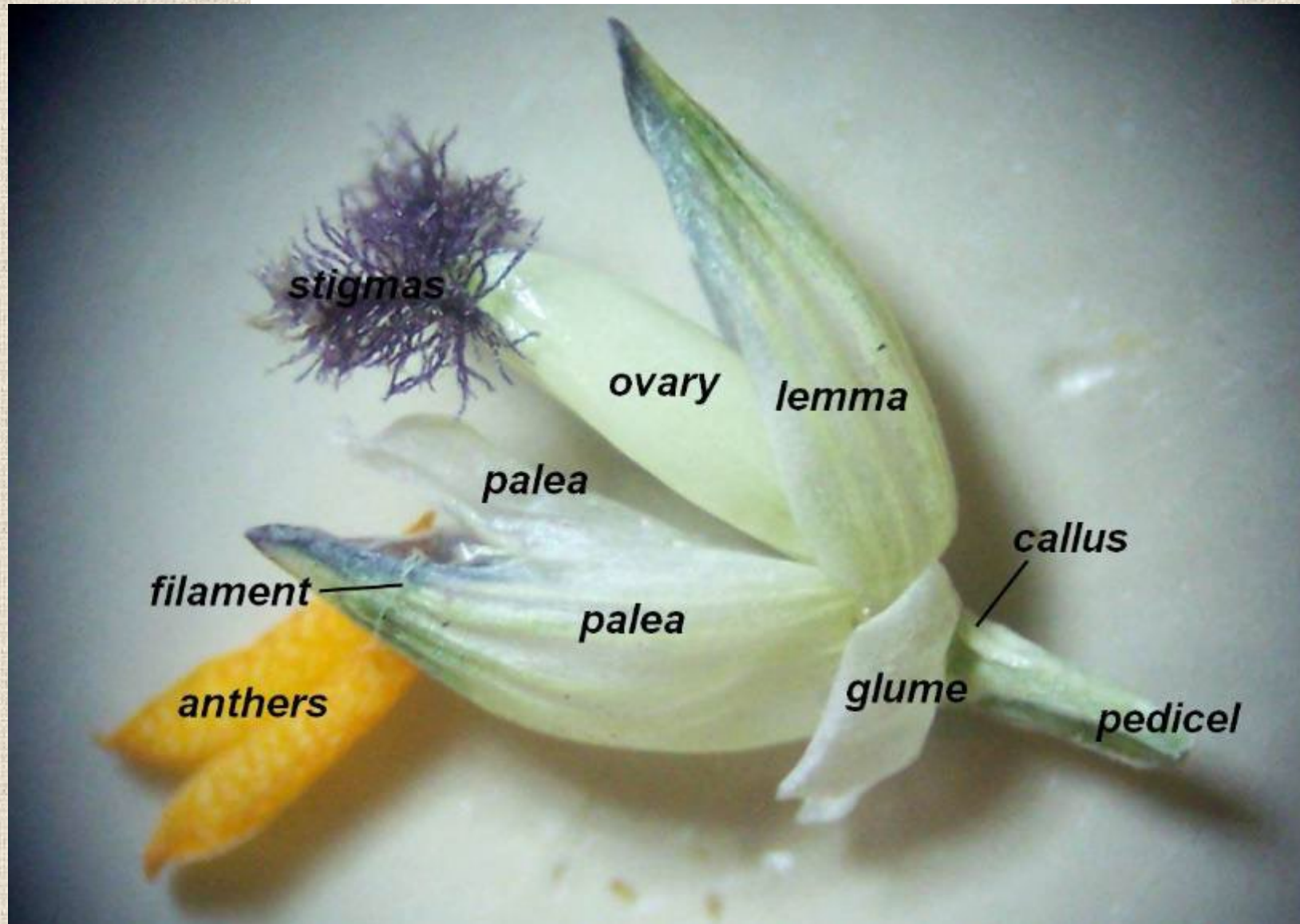


Image By Debi Tharp

Looking under a hand lens

Spikelets laterally compressed (think bluegill fish)



Eragrostis spikelet
before dissection

Spikelets dorsally compressed (think stingray body or heads of shark or catfish)

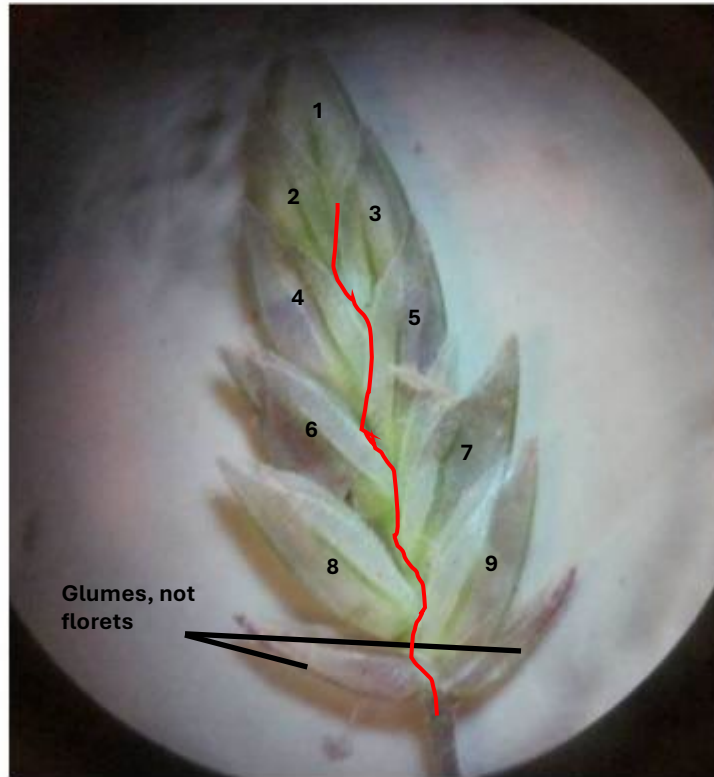


Paspalum spike segment
before dissection

Images by Debi Tharp

Dissected views

Rachilla—the axis tissue that connects the multiple florets of a spikelet to their peduncle



Eragrostis spikelet
(9 florets)

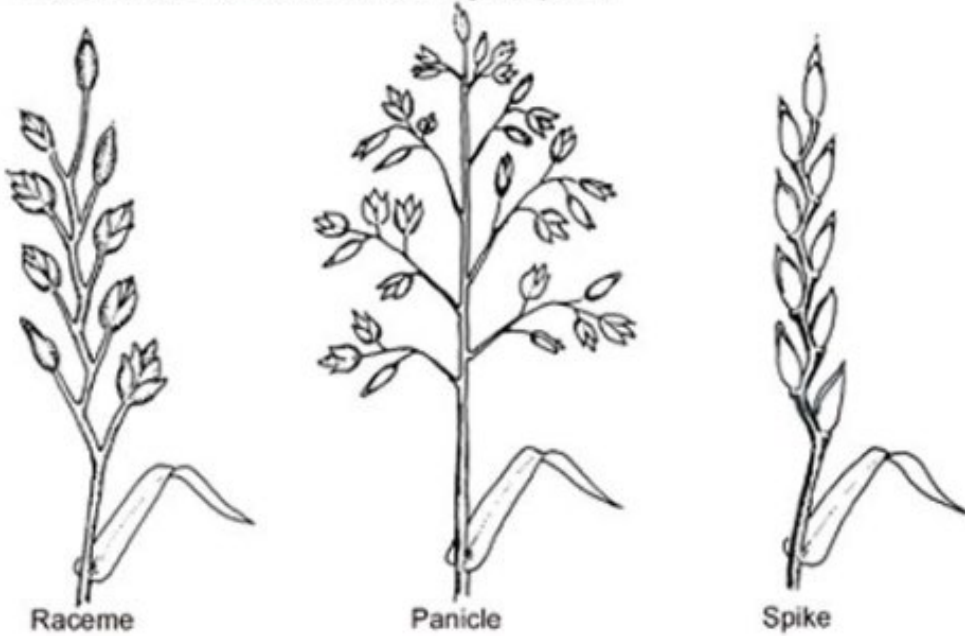


Paspalum spikelet
(single floret)

Images by Debi Tharp

Morphology: Inflorescence types

Inflorescence: Flower structure of a grass plant.



<https://www.pinterest.com/pin/707276316457497961/>



<https://florida.plantatlas.usf.edu/photo.aspx?ID=14076>

- Stalked spikelets arranged on an axis
- Can have multiple racemes
- Careful-stalks can be short



<https://florida.plantatlas.usf.edu/photo.aspx?ID=1463>

- Branched inflorescence
- Spikelets stalked
- Most common type for Florida grasses



<https://florida.plantatlas.usf.edu/photo.aspx?ID=9768>

- Spikelets sessile or subsessile
- Unbranched

Grass growth forms



bunch grasses, caespitose



sod-grasses, colonial



Other characteristics

- Habit
- Overall size
- Leaves-shape, length/width
- Hair
 - Presence/absence
 - Type
- Awns
- Bristles
- Modified spikelets
- Venation
- Pith
- Margins



<https://florida.plantatlas.usf.edu/photo.aspx?ID=1934>



Photo by Mary Keim
<https://plants.ces.ncsu.edu/plants/aristida-stricta/>



<https://florida.plantatlas.usf.edu/photo.aspx?ID=9864>



<https://florida.plantatlas.usf.edu/photo.aspx?ID=3742>

Random useful traits of some FL grasses



Ascending culm



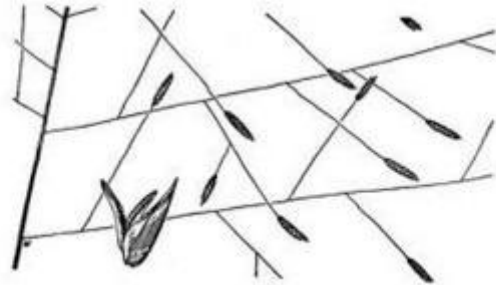
Descending spike



Bearded florets



Dangling spikelets



Free spikelets



Awned florets



Drooping inflorescences



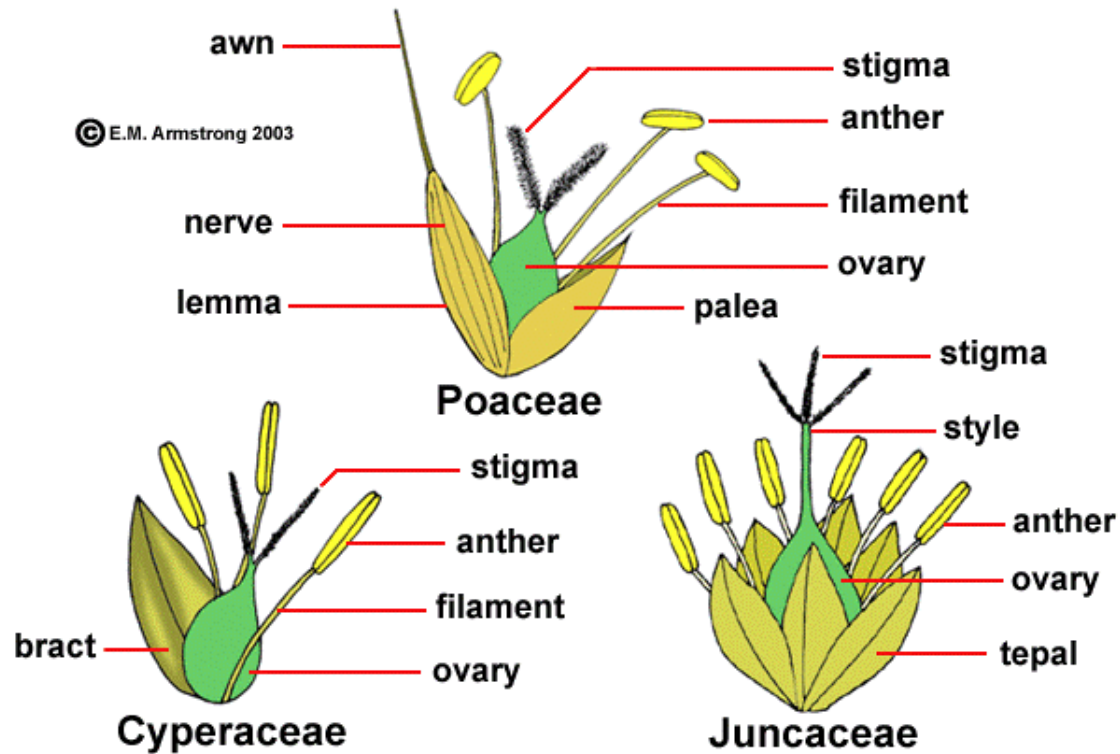
Appressed spikelets



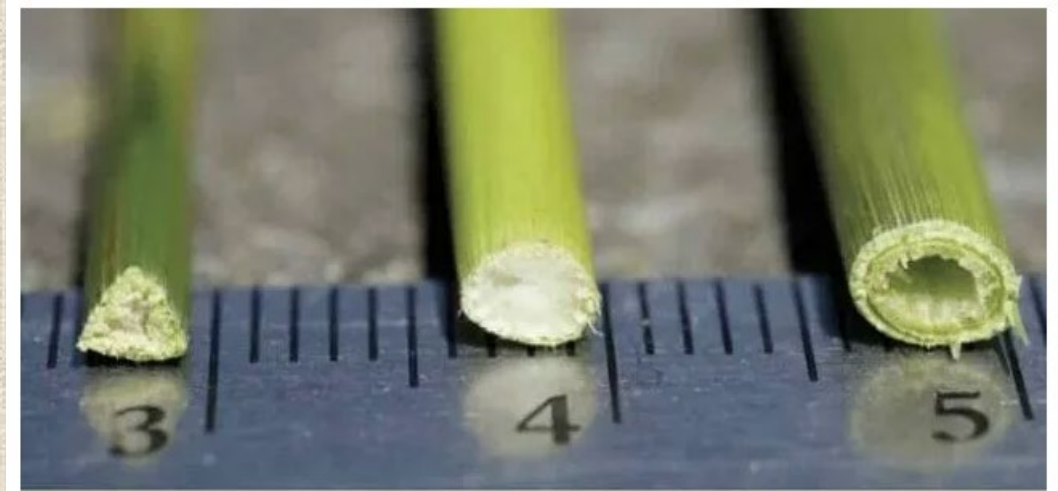
Hairy node

The lookalikes!

Grass vs. sedge vs. rush



<https://www.waynesword.net/termfl3.htm>



SEDGES

Sedges have Edges

(Cyperaceae)

Sedge stems are triangular, with three edges, and are solid when cross-sectioned.

RUSHES

Rushes are Round

(Juncaceae)

Rushes, or *Juncus*, have round stems that are solid and filled with a spongy pith.

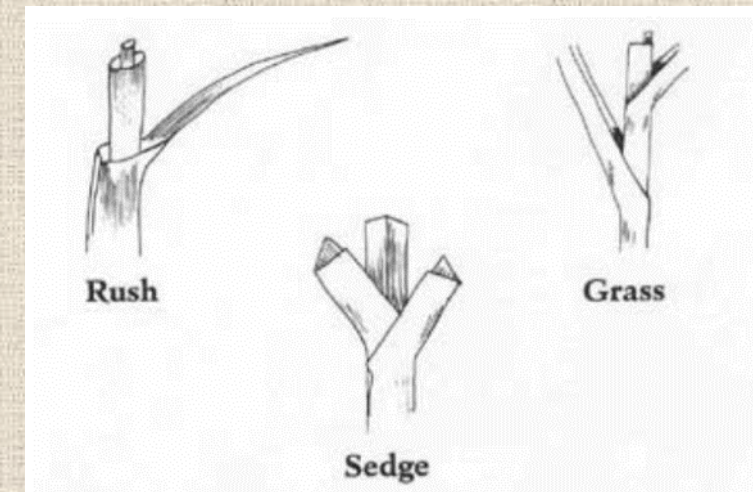
GRASSES

Grasses are Hollow

(Poaceae)

Grass stems are hollow, in contrast to the solid stems of sedges and rushes.

<https://awaytogarden.com/the-best-of-the-sedges-and-how-to-use-them-even-mown-with-sam-hoadley/>

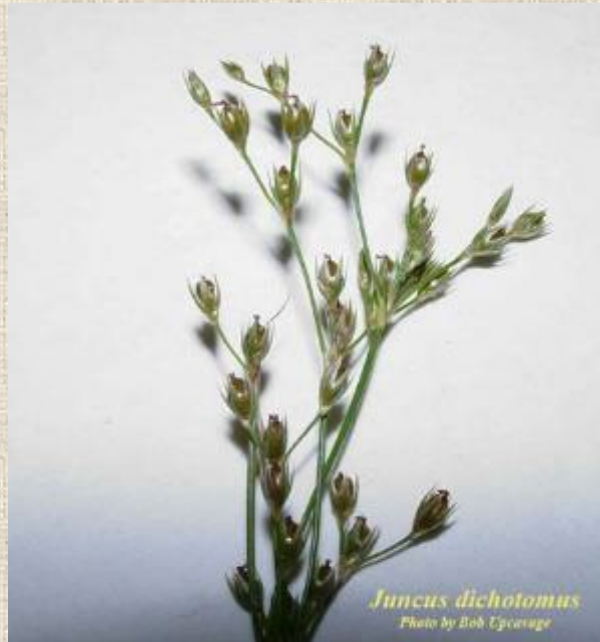


<https://cales.arizona.edu/yavapai/anr/hort/byg/archive/sedges2016.html>

Juncaceae



https://commons.wikimedia.org/wiki/File:Juncus_ensifolius_IP0807005.jpg



<https://florida.plantatlas.usf.edu/photo.aspx?ID=13559>

Cyperaceae



<https://florida.plantatlas.usf.edu/photo.aspx?ID=18987>

Patrick Alexa

<https://plants.ces.ncsu.edu/plants/panicum-virgatum/>



Poaceae



Photo by Wade Collier

Caryopsis



<https://myfavouritepastime.com/2018/12/09/hard-wheat-kernel/>



<https://florida.plantatlas.usf.edu/photo.aspx?ID=1117>



<https://florida.plantatlas.usf.edu/photo.aspx?ID=668>



<https://florida.plantatlas.usf.edu/photo.aspx?ID=6151>

Also not grasses:

Seagrass
Thalassia,
Syringodium,
Halodule,
Ruppia,
Halophila



<https://commons.wikimedia.org/wiki/Category:Seagrasses>

Sawgrass
Cladium jamaicense



Photo by Sean Patton
<https://www.inaturalist.org/observations/116858684>

Hurricane grass
Fimbristylis cymosa



Arrowgrass
Triglochin striata



Photo by Jay Horn
<https://www.inaturalist.org/observations/142634348>

Silkgrass
Pityopsis ssp.



Photo by Jeff Weber

Blue-eyed grass
Sisyrinchium ssp.



Photo by Jeff Weber

Longleaf pine grass stage
Pinus palustris



Photo by Chris Meyer

Grasses love fire-best time to survey!



Photos by Jeff Weber

123 Grass Genera in FL

Agrostis	Bothriochloa	Desmazeria	Festuca	Lithachne	Phragmites	Sporobolus
Aira	Bouteloua	Dichanthelium	Glyceria	Lolium	Phyllostachys	Steinchisma
Alloteropsis	Brachyelytrum	Dichanthium	Gymnopogon	Luziola	Piptochaetium	Stenotaphrum
Alopecurus	Briza	Digitaria	Hackelochloa	Megathyrsus	Poa	Themeda
Amphicarpum	Bromus	Dinebra	Hemarthria	Melica	Polypogon	Trichachne
Anatherum	Cenchrus	Diplachne	Heteropogon	Melinis	Pseudosassa	Tridens
Andropogon	Chasmanthium	Disakisperma	Holcus	Microstegium	Reimarochloa	Tripidium
Anthaenania	Chloris	Distichlis	Hordeum	Miscanthus	Rostraria	Triplasiella
Antheophora	Chrysopogon	Echinochloa	Hymenachne	Mnesithia	Rottboellia	Triplasis
Anthoxanthum	Coleataenia	Eleusine	Hypparhenia	Muhlenbergia	Saccharum	Tripsacum
Aristida	Cortaderia	Elionurus	Ichnanthus	Neyraudia	Sacciolepis	Triticum
Arthraxon	Ctenium	Elymus	Imperata	Oplismenus	Schizachyrium	Uniola
Arundinaria	Cymbopogon	Eragrostis	Kellochloa	Panicum	Secale	Urochloa
Arundo	Cynodon	Eremochloa	Lagurus	Paspalum	Setaria	Vulpia
Avena	Dactylis	Erianthus	Laciasis	Phalaris	Sorghastrum	Zea
Axonopus	Dactyloctenium	Eriochloa	Leersia	Phanopyrum	Sorghum	Zizania
Bambusa	Danthonia	Eustachys	Leptochloa	Pharus	Spartina	Zizaniopsis
			Limnodea	Phleum	Sphenopholis	Zoysia

Restricted to Northern Counties

Rare, Historic, Unlikely on a Normal Outing

Localized Disturbance Areas Including Agriculture, Landscaping, Ports of Entry

Existence of Some Taxa Within Genus Requires Fire or Surrogate in FL

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Bambusa	Danthonia	Eustachys	Leptochloa	Pharus	Spartina	Zizaniopsis
			Limnodea	Phleum	Sphenopholis	Zoysia

Green = all natives within genus in FL
Red = within genus all species are non-natives within FL
Gray = within genus some species native and some non-native in FL

73 Genera in FL contain non-native species, most nonnative grasses are invasive at some level

Agrostis	Briza	Dichanthium	Hackelochloa	Laciasis	Paspalum	Sorghum
Aira	Bromus	Digitaria	Hemarthria	Lolium	Phalaris	Sporobolus
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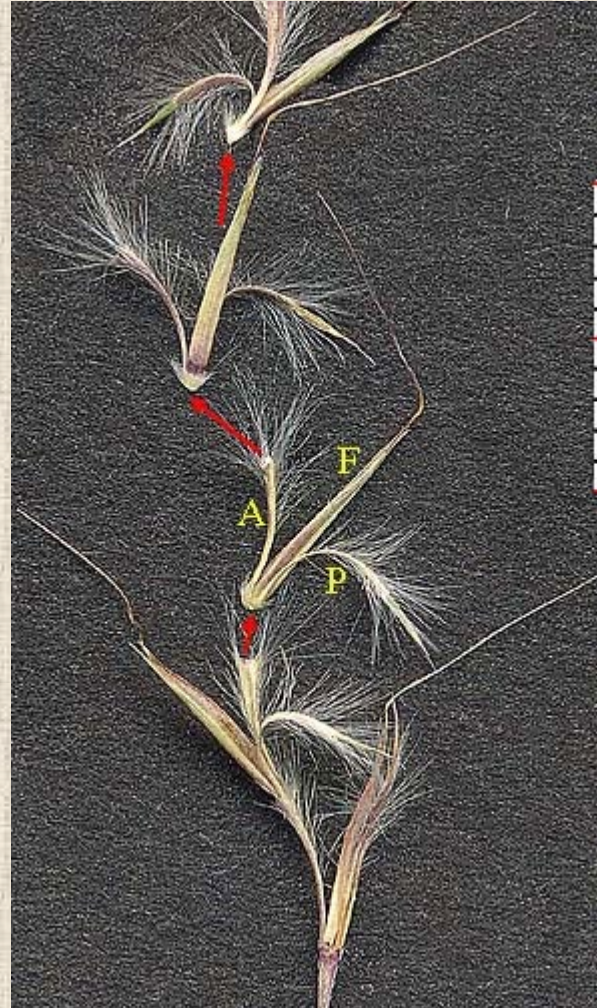
Amphicarpum muhlenbergianum

- Blue maidencane
- Panicles with spikelets tightly compressed to rachis
- Leaves erect, blueish-green, margins white



Andropogon (Anatherum)/ Schizachyrium

- Broomsedges
- Racemes (rames) two or more per inflorescence branch vs. solitary
- Spikelets paired-sessile fertile, pedicellate sterile



<https://w3.biosci.utexas.edu/prc/DigFlora/KR/SCSC.html>



Photos by Chris Meyer



<https://treasurecoastnatives.wordpress.com/2012/10/29/bluestem-grasses-andropogons/>



Aristida

- Three-awn grasses-glumes have three awns-useful for ID
- Panicles, variable in structure



Aristida spiciformis
Photo by Keith Bradley



Aristida spiciformis
Photo by Betty Wargo



Photo by Chris Meyer

Coelorachis

- Jointtail grasses
- Inflorescence spike-like
- Paired spikelets, one sessile and fertile, the other pedicellate and sterile



Photo by Jay Horn <https://www.inaturalist.org/photos/215890017>



Photo by Sean Patton
<https://www.inaturalist.org/observations/311323041>

Dichanthelium

- Witchgrasses
- Branched panicles
- Spikelets often rounded
- Plants often tufted



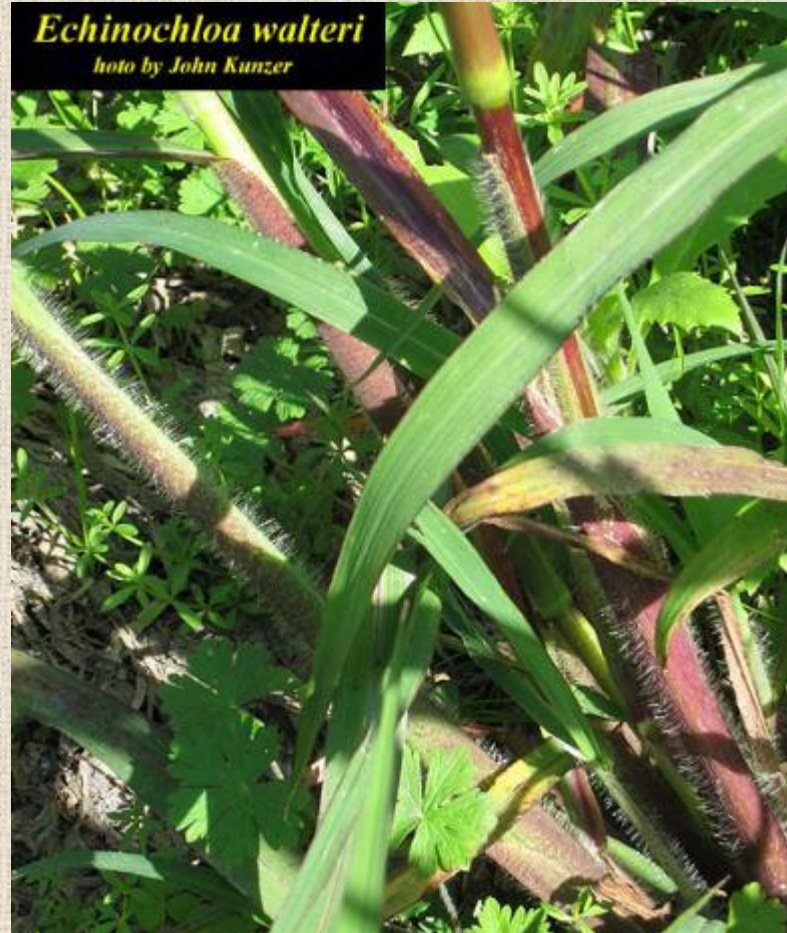
Digitaria

- Crabgrasses
- Panicles with spikelike branches
- Spikelike branches; may be spreading finger or digit-like
- Spikelets paired, sometimes pubescent



Echinochloa

- Barnyard grasses
- Panicles-spreading or compressed
- Mostly awned
- Lack ligules



Eragrostis

- Lovegrasses
- Characteristic spikelets
 - Multi-flowered
 - Folded lemma (dorsally compressed)
 - Panicles open or dense with lateral branches compressed



<https://florida.plantatlas.usf.edu/photo.aspx?ID=776>



<https://florida.plantatlas.usf.edu/photo.aspx?ID=10696>



Eustachys

- Fingergrasses
- Digitate (finger-like) spikes
- Leaves and culm bases dorsally folded, distinctive flattened- appearance



Eustachys glauca
Photo by Mary Keim

<https://florida.plantatlas.usf.edu/photo.aspx?ID=14244>

Hymenachne

- Maidencane
- Formerly Panicum
- Branched panicle with branches erect
- West Indian marshgrass (invasive)



<https://edis.ifas.ufl.edu/publication/IN491>

<https://florida.plantatlas.usf.edu/photo.aspx?ID=12176>

<https://florida.plantatlas.usf.edu/photo.aspx?ID=12630>

Panicum/ Coleataenia/ Steinchisma/ Kellochloa

- Branched panicles-open or compressed
- Split based on length of pedicel, spikelet arrangement



<https://florida.plantatlas.usf.edu/photo.aspx?ID=18307>



<https://florida.plantatlas.usf.edu/photo.aspx?ID=18318>



<https://florida.plantatlas.usf.edu/photo.aspx?ID=2794>

Paspalum

- Crowngrasses
- Inflorescence of one to several racemes
- Spikelets may be paired or solitary



<https://florida.plantatlas.usf.edu/photo.aspx?ID=13621>



<https://florida.plantatlas.usf.edu/photo.aspx?ID=10485>

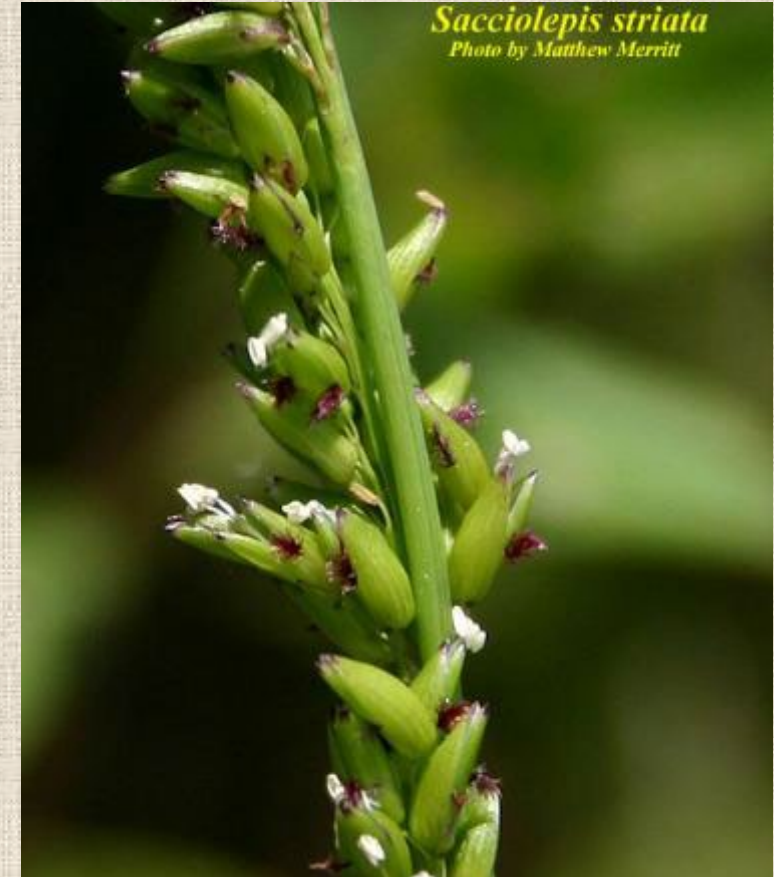
Saccharum

- Sugarcane plumegrass
- Plume like panicles
- Seen “sticking up” above other vegetation
- Large clumping grass



Sacciolepis

- Cupscapes
- Branched panicle with branches tightly appressed to rachis.
- Spikelets with distinctive sac-like bulge on one side



Sorghastrum

- Indiangrasses
- Our most common, *Sorghastrum secundum*-panicle with spikelets on one side (secund)
- Large, clumping grass
- Large, membranous ligule



Photo by Chris Meyer

Sporobolus (formerly *Spartina*)

- Inflorescence of multiple comb-like spikes
- May be open or compact



<https://florida.plantatlas.usf.edu/photo.aspx?ID=1998>



<https://florida.plantatlas.usf.edu/photo.aspx?ID=5443>



<https://florida.plantatlas.usf.edu/photo.aspx?ID=9474>

Sporobolus

- Dropseeds
- Panicles-may be spreading or tightly compressed
- Spikelets numerous



<https://florida.plantatlas.usf.edu/photo.aspx?ID=13309>



<https://florida.plantatlas.usf.edu/photo.aspx?ID=8881>



<https://florida.plantatlas.usf.edu/photo.aspx?ID=3103>

Urochloa

- Signalgrasses
- Panicles with branches spreading or appressed
- Spikelets usually appressed to the branches, may be single or paired
- Lower glume turned toward the rachis



Photos by Sandra Robinson
<https://www.inaturalist.org/observations/98881492>

Aquatic plant with staminate and pistillate flowers growing separately

Luziola

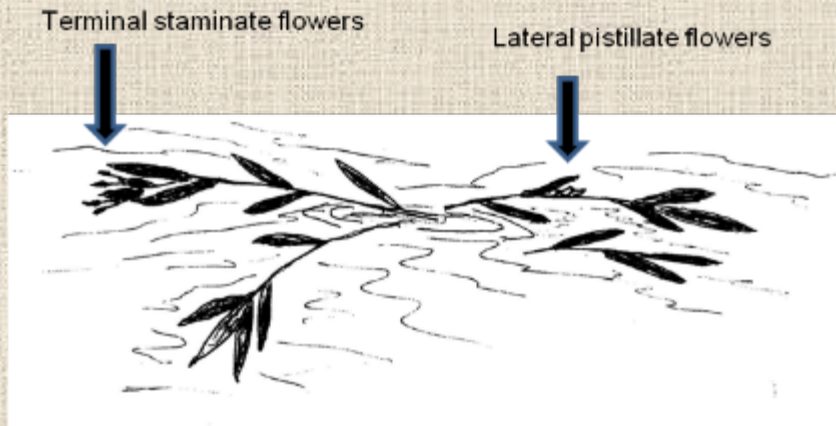
—watergrass

Forms mats on water, mud or sand surface

L. fluitans—small leaves, usually about 1-2 inches long

Very narrow stems, like wire

L. subintegra—larger leaves several inches long
swollen sheaths allow plants to float in open water
similar to *Paspalum repens* in general habit; locally
invasive in south FL but could move north



Small Spikes

Terminal pistillate flowers

Lateral staminate flowers

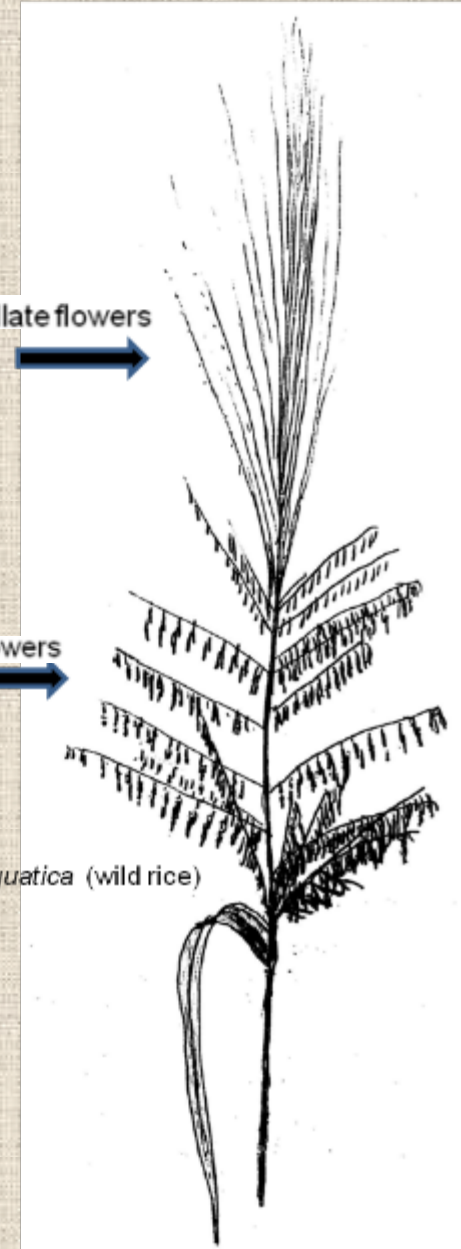
Zizania aquatica (wild rice)

Zizania aquatica

Aquatic

Tall, chest to
over head high

Large Panicles



Native vs. Invasive

- Florida has almost 200 non-native grasses.
- Only some are invasive.
- Many are hard to eradicate.
 - Well adapted to disturbance.
 - Morphological traits like rhizomes or stolons.
 - Prolific viable seed production.
 - Deliberate introduction.
- Some easily confused with native species.



<https://florida.plantatlas.usf.edu/photo.aspx?ID=2109>

VS.



<https://florida.plantatlas.usf.edu/photo.aspx?ID=1063>

<https://florida.plantatlas.usf.edu/photo.aspx?ID=1463>



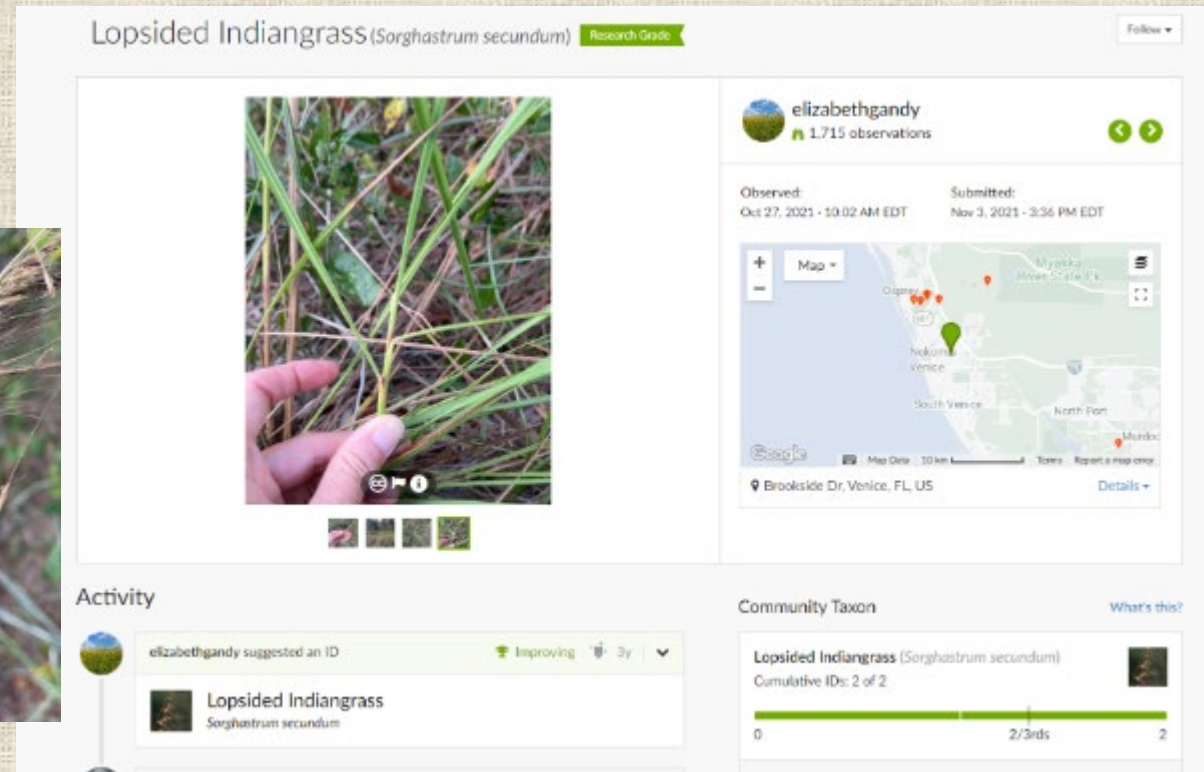
VS.



Photo by Sean Patton
<https://www.inaturalist.org/observations/185473099>

Still need help?

- The plant community to the rescue!
- iNaturalist!
 - Mobile app or desktop.
 - Easily post plants to get ID's.
 - Make sure you post relevant photos!!!! Or no ID!
 - If you have less than four photos of a grass, you don't have enough!



Thank you!!

Questions??

