Wetland Plant Identification Course

June 27, 2018
Montrose, CO



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Colorado Natural Heritage Program
Warner College of Natural Resources
Colorado State University
www.cnhp.colostate.edu

Schedule and Logistics

Wednesday June 27

8 am-12 pm—Classroom

Wednesday Field Trip

1—4 Cerise Park

Thursday June 28; 9—3 pm

-Meet at Escalante Creek road/CR650 at Hwy 50, north of Delta

-Bring lunch, water, field guides, hand lens, insect repellent and pocket guides

Denise and Pam

Denise R. Culver

- Grew up in Rock Springs, WY!
- Park Service flunky for 10 yrs
- BS from U of WY, MS from MSU
- Worked in Wyoming, Montana, and Colorado
- Started at CNHP in 1995
- Bicycled the Baja Peninsula

Pam Smith

- BS Botany, Ohio, MS Botany Michigan, 10 years in Colorado
- Park Ranger 11 years
- Private Consulting 13 years CSU 2008
- Volunteer: Forensic Botany, CSU Extension, City of FC Natural Areas

Colorado Natural Heritage Program

- **Non-profit organization based at Colorado State University**
- **Research unit of the Warner College of Natural Resources, Department of Fish Wildlife and Conservation Biology**
- **Member of NatureServe, an international network of Heritage programs**
- **Provide scientific information and tools needed to help guide effective conservation action in Colorado**

WARNER COLLEGE OF Natural Resources
Colorado State University

NATURAL HERITAGE PROGRAM COLORADO

NatureServe

Objectives

- Know the diagnostic characters of major wetland plant families
  - Find your "wetland family" at breaks and in field!
  - Write down 5-6 characters
- Focus on difficult genera e.g., grasses, sedges, rushes, willows
- Test your skills in the field
- Have fun!

Identification is the First Step

Cattails, woody wetland plants, duckweeds indicate permanent saturation. Purple loosestrife indicates disturbance (unnatural water level fluctuations or nutrient flows).

- The condition of the vegetation reflects the condition of the wetland as a whole
- Vegetation structure and composition respond to factors that can indicate subsurface hydrological features, not obvious from the surface features.

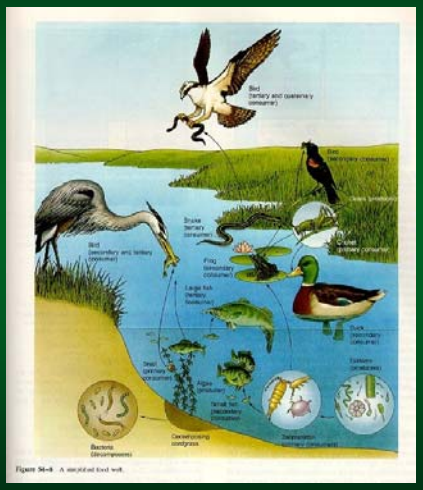
Wetland Plants

- Plants that grow in wetlands are called hydrophytes.
- Hydrophytes are used along with soil and hydrological features to delineate wetlands.
- Hydrophytes grow in water or a substrate that is periodically deficient in oxygen as a result of excessive water content.

Colorado Wetlands

- Playas
- Riparian areas and associated floodplains
- Wet meadows
- Fens
- Emergent marshes
- Forested wetlands
- Shrub dominated wetlands
- ~ 2% of the land area in CO

Wetland Plant Food Web



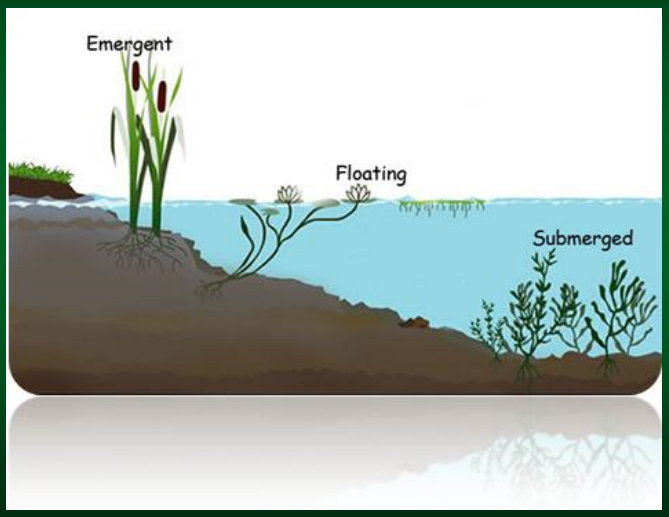
- Hydrophytes basis for food web.
- Waterfowl consume tubers, seeds.
- Detritus from decaying plants for invertebrates, algae.
- Wetland plants reduce peak flood events, clean water.

Urban Wetlands

Functions:

- Flood control
- Pollution abatement

Wetland Plant Growth Forms



Emergent

Roots in water; aerial reproductive and photosynthetic parts

Arrowhead (*Sagittaria latifolia*)

Cattail (*Typha domingensis*)

Submergent Aquatic Vegetation (SAVs!)

Leaves at or below the water surface; photosynthetic parts underwater.

Floating

Floating – no connection to bottom

Floating-leaved – roots anchored

Woody Wetland Plants

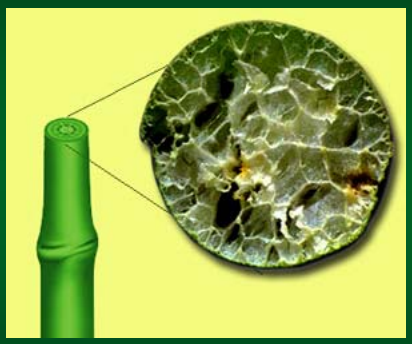
Forested Wetlands

Shrub Dominated Wetlands

Unique Wetland Plant Adaptations

- Changing water levels
- Low oxygen levels
- Erratic flow rates i.e. flashy on the plains, snowmelt in the mountains
- Intermittent dry periods

Aerenchyma tissue



- Unusually large cells in plant roots are arranged so that air spaces are present in the root.
- During anoxic conditions, oxygen can be transported to the air spaces in the roots from plant parts above the water surface.

Inflated Stems

Water hyacinth (*Eichhornia crassipes*)

- Allows plants to float
- Oxygen can be stored in enlarged passageways

Shallow Roots

- Allows growth when deeper soils are saturated.
- Wind-thrown trees are often indicative of shallow root systems.

Water Roots (Adventitious Roots)

Water cress *(Nasturtium officinale*)

Water awlwort (*Subularia aquatic* var. *Americana*)

- Adventitious roots occur where roots are normally not found.
- Small roots protrude from trees or herbaceous plants just above the soil surface in response to soil saturation.

Polymorphic Leaves

Hemlock waterparsnip
(*Siam suave)*

- Some herbaceous plants produce different types of leaves, depending on the water level at the time of leaf formation. (Upland plants also produce polymorphic leaves.)

Waterthread pondweed
(*Potomogeton diversifolius*)

Hypertrophied Lenticels

- Enlarged lenticels thought to increase oxygen uptake when soils are saturated.

Major Wetland Plant Families

- Salicaceae – Willows and Cottonwoods
- Juncaceae – Rushes
- Cyperaceae – Sedges, Bulrushes, Cottongrasses
- Brassicaceae – Mustards
- Asteraceae - Sunflowers
- Poaceae – Grasses (we will focus on wetland species)

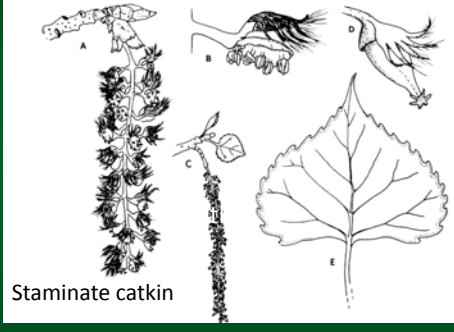
Salicaceae – The Willow Family

- Trees and shrubs
- Simple leaves, alternate
- Flowers in catkins
- Dioecious
- Fruit is a capsule
- Two genera:

1) *Salix* (willows)
2) *Populus* (cottonwoods)

Populus morphology

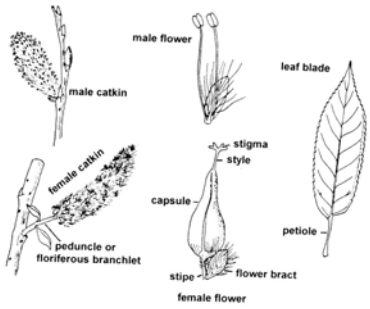
Staminate flower



Staminate catkin

Salix morphology

Pistillate flower



Open your hymnals

- Find Woody Plants (brown border)
- Find family: Salicaceae
- Find Genus: *Populus*
- How many species of *Populus* in Colorado?

1) Populus X acuminata

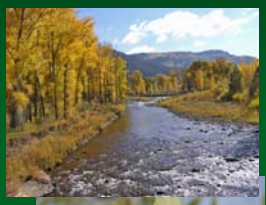
2) Populus angustifolia

3) Populus balsamifera

4) Populus deltoides (ssp. *monilifera*; ssp. *wislizeni*)

Populus-Cottonwoods

Trees, buds with 3+ overlapping scales, resinous, catkins usually pendulous

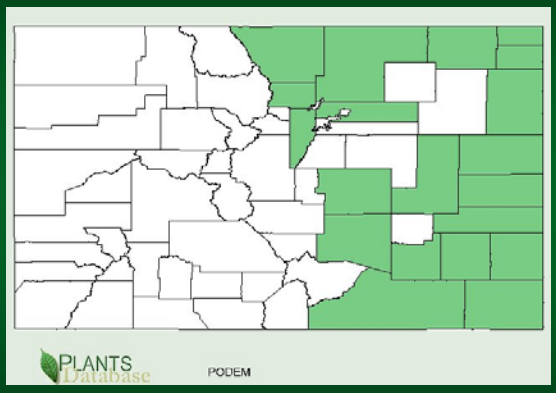


Narrowleaf cottonwood
(*Populus angustifolia*)

Catkin – (ament) unisexual flowers along a central stem; petals none (or inconspicuous)

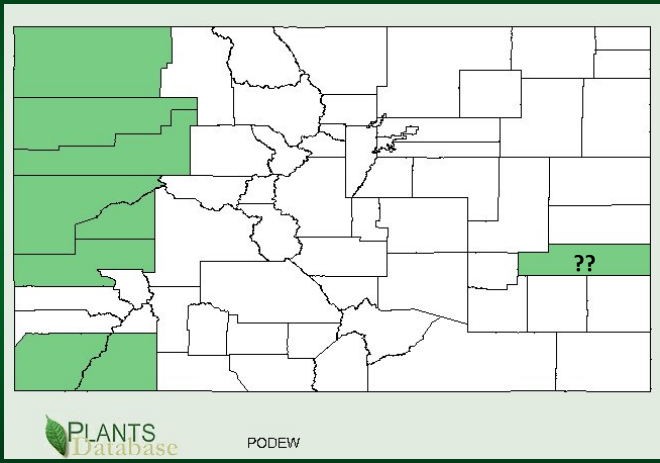
Rio Grande cottonwood
(*Populus deltoides* ssp. *wislizenii*)

Plains Cottonwood
(Populus deltoides ssp. *monilifera)*



Colorado distribution

Rio Grande Cottonwood
(Populus deltoides ssp. *wislizeni)*



Colorado Distribution

West vs. East

Rio Grande Cottonwood
- **Leaf tips short acuminate**
- **Lack glands**
- **Winter buds pubescent**

Plains Cottonwood
- **Leaf tips long acuminate**
- **2 round glands at leaf bases**
- **Winter buds glabrous**

Acuminate – tapering gradually to a sharp point

Salix-Willows

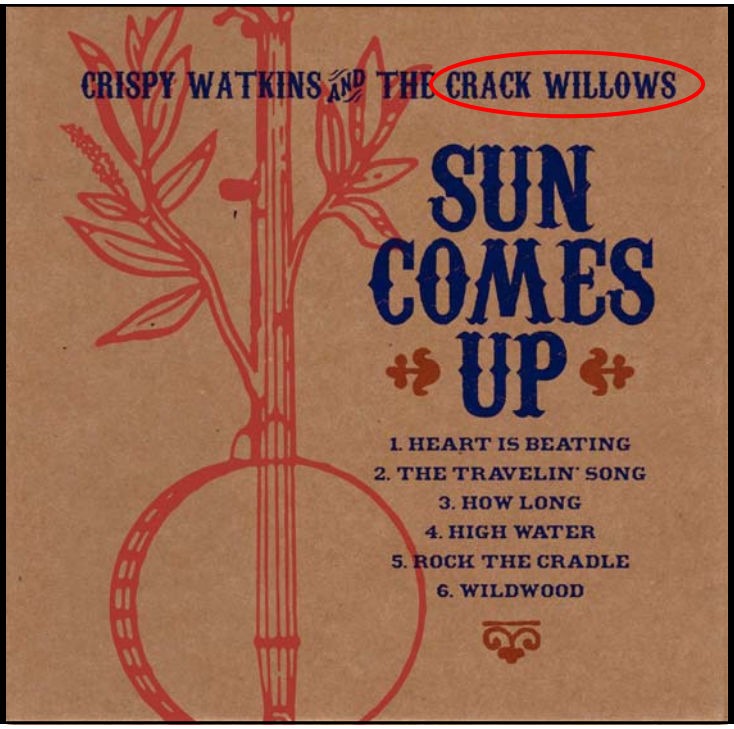
Shrubs or trees, dioecious, leaves narrow, simple, flowers arranged in erect catkins, fruit a capsule hairy seeds, buds 1-scaled

Peachleaf willow
(*Salix amygdaloides*)

Narrowleaf willow
(*Salix exigua*)

Yellow willow
(*Salix lutea*)

Crack willow
(*Salix fragilis*)



Test--which one is the willow?

Multiple scales on buds

One bud scale

Juncaceae-Rush Family

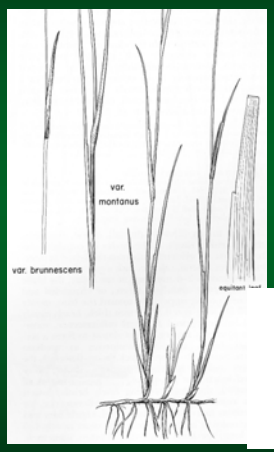
- Grass-like, leaves mostly basal, linear, septate vs flattened
- Complete flowers in head-like clusters or open, subtended by 1 + bracts, usu. leaf-like
- Perianth with 6 tepals, stamens 3 or 6
- Fruit capsule with many seeds

Swordleaf rush
(*Juncus ensifolius*)

Longstyle rush
(*Juncus longistylis*)

Drummond's rush
(*Juncus drummondiana*)

Juncus Leaf Morphology



Septate or divided by one or more partions (septa)

Equitant or overlapping (as in *Iris*)

Ensiform or sword-shaped as in *Iris* leaf

Juncus Diagnostic Characters

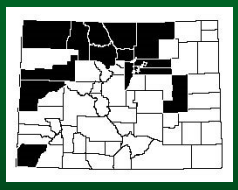
Inflorescence appearing lateral

Baltic rush (*Juncus articus*)

Thread rush (*Juncus filiformis*)

Common rush (*Juncus effusus*)

Non-native Rush



Roundfruit rush (*Juncus compressus*)

Sedge Family—Why Bother?

- Important forage for birds, waterfowl, animals
- Support of food webs-recycling nutrients
- Able to function in aerobic and anaerobic conditions
- Habitat creation for microorganisms, macro-invertebrates, fish, amphibians, mammals, waterfowl
- Removing sediments and toxic compounds
- Stabilizing river and streambanks, as well as prairie soils—erosion control
- Ethnobotanical uses
  —food, baskets, paper, hay, forage

Vulpes velox in a field of *Carex duriuscula*

Cyperaceae-Sedge Family

Carex (sedge)-perigynium closed, stems triangular, ligule present, perianth absent (no bristles)

Kobresia (bog sedge)-perigynium open, wrapped around achene or split on one side to base, densely cespitose, stem triangular

Cyperus (flatsedge)-spikelet flattened, scales of the spikelet distichous (2 ranked), spikelets several, spikes are loosely whorled (unlike Scirpus), no perigynium or scales or bristles

Eleocharis (spikerush)-spikelet solitary and terminal, base of style persistent on the achene as a tubercle (cap), leaves reduced to sheaths at base, ± bristles

Eriophorum (cotton grass)-perianth bristles numerous, long and hair-like

Scirpus or Schoenoplectus (bulrush)-stem round or triangular, solid, inflorescence subtended by 1-several bracts, 3-6 bristles present

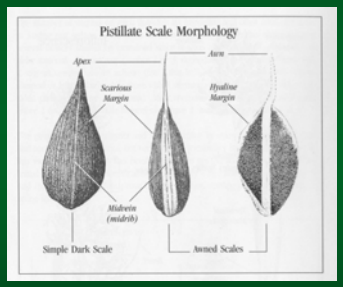
Carex or Sedge Characteristics

- Leaves 3-ranked, closed sheaths
- Leafy bracts
- Absent or indefinite ligules
- Culms (stems) usually triangular in x-section
- Internodes usually solid, not jointed
- Staminate flowers subtended by a single bract
- Pistillate flowers subtended by 2 bracts (scale,perigynia)
- Fruits are achenes

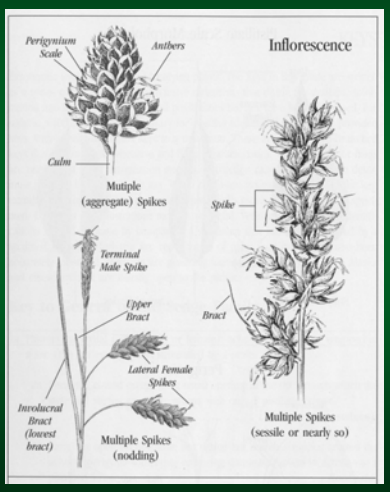
Ochotona princeps with *Carex aquatilis*

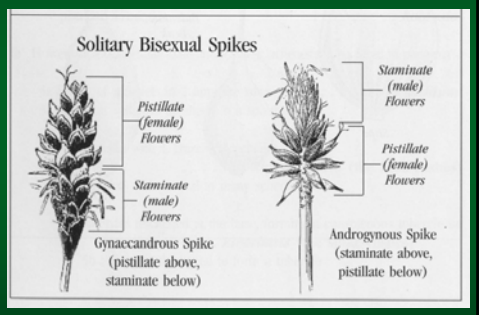
Sedge (*Carex*) morphology
Perigynia

Sedge (*Carex*) Morphology
Pistillate Scales



Sedge (*Carex*) Morphology
Inflorescence





Spikerush (*Eleocharis*)

achenes with a conical or flattened cap at the tip; leaves reduced to sheaths; perianth absent or of up to 7 bristles

Needle spikerush
(*E. acicularis* = *E. pauciflora*)

Common spikerush
(*E. palustris* =*E. macrostachya*)

Fewflower spikerush
(*E. quinqueflora*)

Bulrush (*Schoenoplectus*)

round stems, , inflorescence 2-4 times branched, leaves over 2 mm wide subtended by 1 bract, 6 perinath bristles

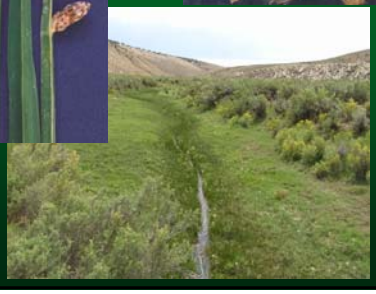
Softstem bulrush
(*S. tabernaemontani*)

Hardstem bulrush
(*S. acutus*)

Cosmopolitan bulrush
(*S. maritimus=Bolboschoenus maritimus*)

Common three-square *Schoenoplectus* (=*Scirpus*) *pungens*

stems sharply triangular



Chairmaker's bulrush
(*Schoenoplectus americanus*)

-Shorter bract up to 6 cm long
-Smaller scales up to 4 mm long
-overall not as robust as *S. pungens*

Bulrush (*Scirpus*)

round stems, subtended by several bracts, spikelets 10-25 mm long, usually few (mostly 3-40), most or all sessile

Panicled bulrush
(*S. microcarpus*)

Rufous bulrush
(*S. pendulus*)

Cloaked bulrush
(*S. pallidus*)

BREAK

Monocot Herb Characteristics

- Embryo with one (mono) seed leaf (cotyledon)
- Leaf veins parallel
- Flower parts in multiples of 3s
- Stem vascular bundles scattered
- No woody or secondary growth

Corn husk lily (*Veratrum tentenuipetalum*)

Stream orchid (*Epipactis gigantea*)

Iridaceae-*Iris* Family

- Rhizomes, corms, or bulbs
- Leaves usually 2-ranked (distichous), equitant (sword-shaped)
- Flowers enclosed in 2 spathes (bracts)
- Tepals 6, in 2 whorls of 3 each

Blue-eyed grass (*Sisyrinchium montanum*)

Rocky Mountain iris (*Iris missouriensis*

Juncaginaceae-Arrowgrass Family

- Found in saline or alkaline marshes, fens
- Monecious flowers are sessile produced on a spike
- Tepals minute, greenish
- Leaves linear and basal
- Contains cyanogenic glycosides that when consumed results in cyanide poisoning

Marsh arrowgrass (*Triglochin palustris*)

Seaside arrowgrass (*Triglochin maritima*)

Liliaceae-Lily Family

- Rhizomes, corms, or bulbs
- Leaves simple
- Flowers with tepals 6, in 2 series

Common goldstar (*Hypoxis hirsuta*)

False hellebore (*Veratrum tenuipetalum*)

Orchidaceae-Orchid Family

- Leaves basal or on stem, simple, entire
- Flowers zygomorphic (bilaterally symmetrical), very showy
- Tepals 6, outer forms lip, sometimes inflated

Stream orchid
(*Epipactis gigantea*)

Bog orchid
(*Platanthera* spp.)

Ute lady's tresses
(*Spiranthes diluvialis*)

Typhaceae-Cattail Family

- Semi-aquatic to emergent
- Thick rhizomes
- Leaves 2-ranked, sheaths open with overlapping margins
- Flowers in terminal cylindric spike,
  - staminate above pistillate

Broadleaf cattail
(*Typha latifolia*)

Non-native Moncot

Narrowleaf cattail (*Typha angustifolia*)

Grasses….Why?!

- One of the most important aspects in all of human civilization!
- Third largest family, on every continent, occupy 1/3 of earth's surface
- FOOD—cereals, rice, corn, sugar
- FEED—cattle, pigs, chickens, sheep, as well as wildlife and birds

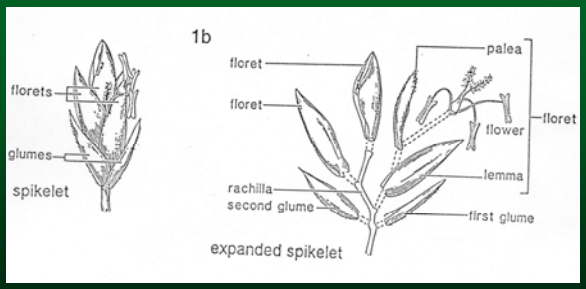
Comparison of Grasses, Sedges, Rushes

	Sedges	Grasses	Rushes
Stems (culm)	Usually solid, 3-angled, not jointed	Hollow, round (terete), nodes jointed	Solid or hollow, round nodes not jointed
Leaves	3-ranked, closed sheath, no ligule	2-ranked, open sheath (most), with ligule	3-ranked, open or closed sheath, no ligule
Florets	Flower enclosed in perigynia, arranged in spikelets	Flower subtended by 2 bracts (lemma, palea)	Usually 6 tepals, usually cymose and often congested
Fruit	Achene -1 seed	Caryopsis - 1 seed	Capsule-many seeds

3-Ranked vs. 2 Ranked Leaves

Grasses Characteristics

- Roots systems are fibrous, often with rhizomes or stolons
- Stems are hollow, rounded with swollen nodes
- Leaves with ligules and sheaths
- Flowers greatly reduced each subtended by palea and lemma
- Seed a caryopsis (grain)



Need to know the # of florets

Arundineae Tribe

- Ligule hairy
- Tall and robust
- Inflorescence a terminal, dense plumose panicle
- Example—common reed (*Phragmites australis*), Giant reed (*Arundo donax*)

Cynodonteae Tribe

- Spikelets with usually more than 1 floret
- Lemmas 3-nerved
- Secund (one-sided) or digitate lateral spike inflorescences
- Ligule partially or entirely fringe of hairs
- Warm-season grass (C_4)
- Examples—muhly (*Muhlenbergia*), stink love grass (*Eragrostis*), buffalo grass (*Buchloe*), salt grass (*Distichilis spicata*), cordgrass (*Spartina*)

Prairie cordgrass (*Spartina gracilis*)

Bromeae

- Closed leaf sheaths
- Membranous ligules
- Inflorescence a panicle
- Persistent glumes, shorter than lowest lemma, awnless
- Several florets per spikelet

Smooth brome (*Bromus inermis*)

Meliceae Tribe

- Lower culm forming corm or bulbous base
- Lemmas with prominent parallel venation
- Glume and lemma appear squared off
- Spikelets with 3-9 florets
- Leaf sheath closed, ligules membranous
- Examples—mannagrass, brookgrass, oniongrass

Closed leaf sheath

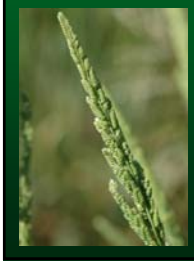
Small mannagrass (*Glyceria borealis*)

American mannagrass (*Glyceria grandis)*

Fowl mannagrass (*Glyceria striata*)

Poaeae (Aveneae) Tribe

- Long awns, if present, from back of lemma
- Sheaths open, ligules membranous, no auricles
- Inflorescence usu. a panicle, spikelets 1 to several florets, glumes shorter than floret, lemmas awnless or awn tipped
- Examples—bluegrass (*Poa*), fescue (*Festuca*), orchardgrass (*Dactylis*), timothy (Phleum), bluejoint (*Calamagrostis*), red top (*Agrostis*), reed canarygrass (*Phalaris*), tufted hairgrass *(Deschampsia*), slough grass (*Beckmania*), foxtail (*Alopecurus*)



Sloughgrass (*Beckmania syzigachne*)

Foxtail (*Alopecurus aequalis*)

Bluejoint (*Calamagrostis canadensis*)

Triticeae Tribe

- 2 ranked, sessile spikelets
- Tendency toward very narrow or awn-like glumes
- Examples-intermediate wheat grass, crested wheat grass, foxtail barley, rye, western wheat grass

Western wheat grass (*Pascopyrum smithii*)

Little barley (*Hordeum pusillum*)

Foxtail barley (*Hordeum jubatum*)

Non-native Grasses

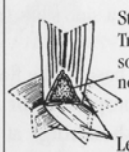
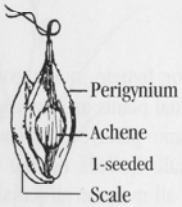
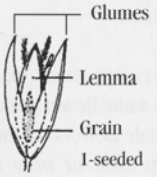
Reed canarygrass ?? (*Phalaris arundinacea*)

Timothy (*Phleum pratense*)

Cheatgrass (*Bromus tectorum*)

Creeping meadow foxtail (*Alopecurus arundinaceus*)

Comparison of Sedges to Other Grasslike Families

	Sedges	*Grasses*	*Rushes, Woodrushes*
Simplified Cross Section of Stem, Leaves	 Stem Triangular solid not jointed; Leaves 3-ranked	 Stem round hollow jointed; Leaves 2-ranked	 Stem round solid not jointed; Leafless or 2-ranked
Flower, Fruit	 Perigynium; Achene 1-seeded; Scale	 Glumes; Lemma; Grain 1-seeded	 Capsule 3 to many seeded; Bract-like segments

(Adapted from Roberts 1983)

Dicot Characteristics

- Leaf veins net-like veination
- Flower parts in multiples of 4s or 5s
- Stem vascular bundles in a ring
- Woody or secondary growth often present
- Embryo with 2 (di) seed leaves (cotyledons)

Marsh felwort (*Lomatogonium rotatum*)

Streamside fleabane (*Erigeron glabellus*)

Apiaceae-Carrot

Leaves usually compound, umbel, aromatic, fruit a schizocarp, some deadly poisonous

Poison hemlock
(*Conium maculatum*)

Water hemlock
(*Circuta maculata* var. *angustifolia*)

Asteraceae-Composite or Daisy

flower heads composed of many small ray and disk flowers, flowers on receptacle, surrounded by phyllaries, radially symmetrical, pappus, achene

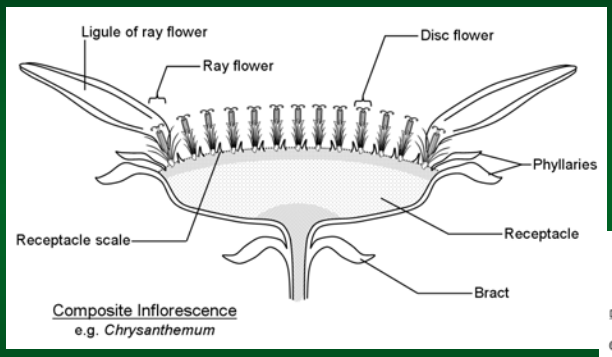
Devil's beggartick
(*Bidens frondosa*)

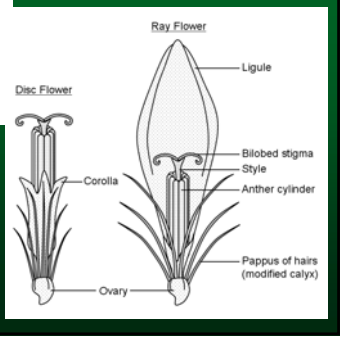
Big devil's beggartick
(*Bidens vulgata*)

White panicle aster
(*Symphyotrichum lanceolatum* ssp. *hesperium*)

Canada thistle
(*Cirsium arvense*)

Asteraceae





Brassicaceae-Mustard

4 petals in a cross, silque or silicle, leaves with simple, forked, or stellate hairs, peppery taste

Heartleaf bittercress
(*Cardamine cordifolia*)

Broadleaved pepperweed
(*Lepidium latifolium*)

American yellowrocket
(*Barbarea orthoceras*)

Spreading yellowcress
(*Rorippa sinuata*)

Chenopodiaceae-Goosefoot

small, green flowers lacking showy petals, with fused sepals, fruits can be showy

Red goosefoot
(*Chenopodium rubrum*)

Pursh seepweed
(*Suaeda calceoliformis*)

Poison suckleya
(*Suckleya suckleyana*)

Lamiaceae-Mint

leaves opposite, stems 4-angled, aromatic , flowers bilabiate (2-lipped), 5 fused petals, fruit 4 nutlets

Wild mint
(*Mentha arvensis*)

Hairy hedgenettle
(*Stachys pilosa*)

Western germander
(*Teucrium canadense* var. *occidentale*)

American water horehound
(*Lycopus americanus*)

Polygonaceae-Buckwheat or Knotweed

small tepals, swollen nodes, sheath around node (ocrea), achenes ± wings

Narrowleaf knotweed
(*Polygonum aviculare*)

Curlytop knotweed
(*Polygonum lapathifolium*)

Curly dock
(*Rumex crispus*)

Ranunculaceae-Buttercup

flowers are actinomorphic or radial, 5 sepals distinct, often showy, 5 petals usu. reduced, numerous stamens and carpels on receptacle

Alkali buttercup
(*Ranunculus cymbalaria*)

Purple meadow-rue
(*Thalictrum dasycarpum*)

Macoun's buttercup
(*Ranunculus macounii*)

Rosaceae-Rose and Cinquefoil

flowers radially symmetrical, 5 petals, many stamens, hypanthium (floral cup or tube), leaves various, stems modified as thorns

Paradox cinquefoil
(*Potentilla paradoxa*)

Silverweed cinquefoil
(*Argentina anserina*)

Brook cinquefoil
(*Potentilla rivalis*)

Phrymaceae-(Scrophulariaceae)

leaves opposite or basal, flowers zygomophic, bilabiate, sepals 5, connate, petals 5, connate, stamens 4, in pairs

Roundleaf monkeyflower
(*Mimulus glabratus*)

Seep moneyflower
(*Mimulus guttatus*)

Tiling's monkeyflower
(*Mimulus tillingii*)

Plantaginaceae-(Scrophulariaceae)

sepals 2-5, distinct, connate, petals absent or 4-5,stamens 2, 4, in pairs or 4 fertile, 1 staminode (Penstemon)

Redwool plantain
(*Plantago eriopoda*)

Hairy purslane speedwell
(*Veronica peregrina* ssp. *xalapensis*)

White River coraldrops
(*Besseya plantaginea*)

Gentianaceae-Gentians

leaves usually opposite, flowers round, sepals and petals + united

Showy prairie gentian
(*Eustoma exaltatum*)

Felwort
(*Swertia perennis*)

Parry's gentian
(*Gentiana parryi*)

Elaeagnaceae-Oleaster

shrubs, trees, silver, peltate hairs, sepals 4, petals absent, ± thorns

Russian olive
(*Elaeagnus angustifolia*)

Silver buffaloberry
(*Sheperdia argentea*)

Tamaricaceae-Tamarisk

shrubs, trees, pink petals, 4 or 5, in panicles

Saltcedar (*Tamarix chinensis*)

Small flower tamarisk (*Tamarix parviflora*)

Noxious Weeds

Whitetop (*Cardaria draba*)

Purple loosetrife (*Lythrum salicaria*)

Leafy spurge
(*Euphorbia esula*)

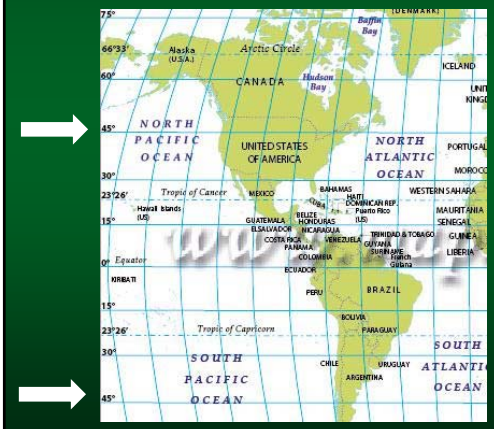
Musk thistle
(*Carduus nutans*)

Aquatic Plants

- ✓Adapted to living in water
  - ✓e.g., leaves finely dissected, lack cuticles, slimy, no lignin, large air spaces, weakly developed vascular tissue, wind and water dispersal or vegetative
- ✓Grow partly or completely submerged in water, either rooted in mud or free-floating
- ✓Examples: duckweed, water milfoil, water starwort

Aquatic Plant Distribution

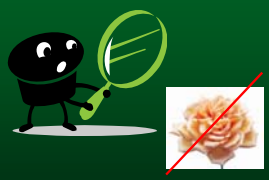
Globally--many are cosmopolitan and cover a wide latitudinal gradient relative to terrestrial plants



- ✓ **More widely distributed than terrestrial plants (60% span more than one continent)**
- ✓ **Water environment is more uniform than land**
- ✓ **Similar genera (usu. monocots) occupying latitudes between 40-50 degrees**

How to Identify Aquatics

- Leaf shapes (round, linear, feathery)
- Leaf arrangement (opposite, alternate, whorled)
- Leaf tips (rounded or pointed)
- Leaf margins (serrate, entire, wavy)
- Venation (mid-veins, lateral veins, number of veins)
- Ligules (at junction of leaf and sheath) present/absent
- Stipules (at petiole base) connate/adnate



No flowers!!

Aquatic Free-Floating Plants

- Float on the water surface or occasionally within the water column
- Roots, if present, hang free in the water and are not anchored
- Move along water surface with winds and currents
- Take nutrients directly from the water via suspended roots or osmotic processes
- Examples: duckweeds *(Lemna* spp.), duckmeat *Spirodela polyrrhiza*

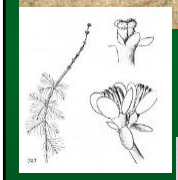
Water fern (*Azolla mexicana*)

Water meal (Wolffia spp.)

Aquatic Submerged Plants

- Live in shallow waters, often rooted at some point to obtain maximum sunlight.
- Conduct entire life beneath water surface, except for flowering
- Photosynthetic tissues (leaves, stems) are underwater
- Stems and leaves are soft, flexible (no lignin) with long, ribbon-like, highly divided
- Examples: water starwort (*Callitriche* spp.), hornwort (*Ceratophyllum demersum*), water milfoil (*Myriophyllum* spp.),

Submerged Plants



Shortspike watermilfoil (*Myriophyllum sibiricum*)
- **Native, common**
- **Leaves whorled, 4-14 leaflet pairs, stiff, pointed tip**
- **Turions present**
- **Terminal spike, floral bracts shorter than flowers**

Eurasian watermilfoil (*Myriophyllum spicatum*)
- **Non-native, noxious weed B List**
- **Stems often reddish**
- **Leaves whorled, 12-20 pairs of leaflets**
- **Turions absent**

Whorl-leaf watermilfoil (*Myriophyllum verticillatum*)
- **Native, not as common**
- **Stems often reddish**
- **Leaves whorled, 7-17 pairs of leaflets**
- **Turions present**

Aquatic Floating-leaved Plants

- Flourish in fluctuating or turbid water because they send up long stalks from often large, buried tubers in mud
- Leaves are circular or oval with entire margins that reduce tearing
- Leathery texture to prevent from herbivory and over saturation
- Stomata are located on the aerial side of leaf
- Can outcompete other aquatic plants by shading the water column
- Inflorescences or flowers float or are close to the water surface
- Examples: Rocky Mountain pond lily (*Nuphar lutea* ssp. *polysepala*), pondweeds (*Potamogeton* spp.)

Emergent Plants

Northern water plantain (*Alisma trivale* = *A. plantago-aquatica*)

- Leaves shorter than inflorescence, petioles sheathing
- Flowers form diffuse panicle, petals white
- Achenes arranged in single ring, beaks erect
- Common

Arumleaf arrowhead (*Sagittaria cuneata*)

- Leaves sagittate, petioles recurved
- Inflorescence as tall as leaves, flowers in whorls of 3s
- Petals white
- Fruiting heads globose

San Luis Valley Rare Duckweed

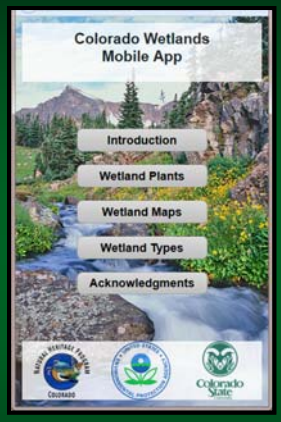
Non-native Aquatic Plants

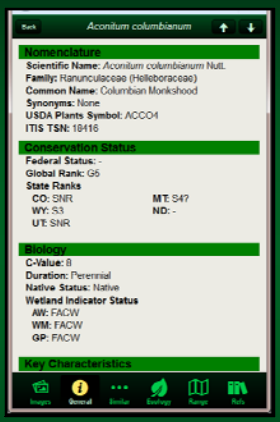
- Watercress (*Nasturtium officinale*)
- Eurasian watermilfoil (*Myriophyllum spicatum*)
- Water hyacinth (*Eichhornia crassipes*)
- Curly pondweed (*Potamogeton crispus*)
- European bur-reed (*Spargainum emersum*)





Wetland Plant Identification: Mobile App





Colorado Wetland Information Center

- www.cnhp.colostate/cwic
- Centralized location on the web for wetland information
- Covers the strategic directions from on plan
- Continually evolving

YEAH! You made it!!


Thank You!
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