Introduction to Wetland Plant Identification Webinar

Association of State Wetland Managers & EPA Region 7

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Tour of Wetlands
Is this Missouri?
Allred Lake Natural Area, SE Missouri
Tupelo-Bald Cypress Swamp
*Nyssa aquatica* and *Taxodium distichum*
Pin Oak Slough Natural Area, Knob Noster State Park, MO
Pin oak - Button Bush *Quercus palustris* - *Cephalanthis occidentalis*
Saline Seep, Blue Lick Conservation Area, MO *Spartina pectinata* prairie cordgrass
Saline Valley Conservation Area, Spring and seep

Big Buffalo Creek Fen, Big Buffalo Creek Conservation Area
Otter Slough Conservation Area, MO

Hymenocallis caroliniana spider lily
Outline

1. Wetland Tour
2. Plant Habit
3. Plant Organs & Characteristics
   1) Roots
   2) Stems
   3) Leaves
4. Reproductive Organs
   1) Cones
   2) Flowers
5. Dichotomous Key
   1) Major Plant Groups
   2) Selected Monocot and Dicot Families
Bryophytes (Mosses, Liverworts & Hornworts)

Pteridophytes – Vascular seedless plants (Ferns, *Equisetum* spp. and *Lycopodium* spp.)

Gymnosperms – Woody cone bearing plants with naked seeds (Pinaceae, Cupressaceae)

Angiosperms – The flowering Plants (Monocots and Dicots)
Tools for the Identification of Wetland Plants

• A plant to identify (preferably fresh-not herbarium specimen)
• 10 x hand lens or Stereoscopic (Dissecting) Microscope
• Single edge razor blade and a pair of dissecting needles
• Dichotomous Key (we will use these later on)
• State or regional Flora (often with Dichotomous Keys)
Vegetative & Reproductive Morphological Characteristics needed to Identify Wetland Plants
Type of Roots

Fibrous

Tap
Phalaris arundinacea
Sagittaria latifolia

Crocus chrysanthus
Terminal Bud
Lateral Bud
Node
Internode
Bud Scales
Leaf Scar
Lenticel
Vascular Bundle Scars
Node
<table>
<thead>
<tr>
<th>Type</th>
<th>Images</th>
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<tbody>
<tr>
<td>Chambered</td>
<td><img src="image1.png" alt="Chambered" /></td>
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<tr>
<td>Solid</td>
<td><img src="image2.png" alt="Solid" /></td>
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<tr>
<td>Diaphragmed</td>
<td><img src="image3.png" alt="Diaphragmed" /></td>
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<tr>
<td>Hollow</td>
<td><img src="image4.png" alt="Hollow" /></td>
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<tr>
<td>Tendrils</td>
<td><img src="image5.png" alt="Tendrils" /></td>
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<td>Spur Shoots</td>
<td><img src="image6.png" alt="Spur Shoots" /></td>
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<td>Thorns</td>
<td><img src="image7.png" alt="Thorns" /></td>
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<tr>
<td>Prickles</td>
<td><img src="image8.png" alt="Prickles" /></td>
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<tr>
<td>Spines</td>
<td><img src="image9.png" alt="Spines" /></td>
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</tbody>
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Examples:
- Chambered: ![Example](image10.png)
- Solid: ![Example](image11.png)
- Diaphragmed: ![Example](image12.png)
- Hollow: ![Example](image13.png)
- Tendrils: ![Example](image14.png)
- Spur Shoots: ![Example](image15.png)
- Thorns: ![Example](image16.png)
- Prickles: ![Example](image17.png)
- Spines: ![Example](image18.png)
Leaf Morphology and Phyllotaxy (leaf arrangement on Stem)

- **Leaf Parts**
  - Lamina (blade)
  - Apex
  - Midvein
  - Primary vein
  - Margin
  - Base
  - Petiole
  - Stipule

- **Leaf Arrangement**
  - Alternate
  - Opposite
  - Whorled

- **Imbricate**
- **Fascicled**
Leaf Shape, Venation, and Margins

- **Arcuate**
- **Palmate**
- **Parallel**
- **Pinnate**
- **Reticulate**

- **Involute**
- **Lacerate**
- **Laciniate**
- **Lobed**
- **Pinnatifid**

- **Revolute**
- **Serrate**
- **Doubly Serrate**
- **Serrulate**
- **Sinuate**
Leaf Shape, and Margins

- Ciliate
- Cleft
- Crenate
- Crenulate
- Dentate
- Denticulate
- Entire
- Incised
Leaf Apices

- BROADLY NARROWLY ABRUPTLY ACUMINATE
- BROADLY NARROWLY ACUTE
- APICULATE
- ARISTATE
- CAUDATE
- CUSPIDATE
- EMARGINATE
- MUCRONATE
- OBTUSE
- RETUSE
Leaf Bases

- Attenuate
- Acute
- Aurinculate
- Cordate
- Cuneate
- Hastate
- Oblique
- Obtuse
- Obtuse-oblique
- Peltate
- Rounded
- Sagittate
- Truncate
Leaf Surfaces

- Antrorse
- Retrorse
- Barbellate
- Canescent
- Comose
- Echinate
- Farinaceous
- Floccose
- Glandular
- Hirsute
- Hirtellous
- Hispid
- Lanate
- Lepidote
- Muricate
- Pannate
- Papillate
Gymnosperm and Angiosperm Reproductive Structures

Gymnosperms – Woody cone bearing plants with naked seeds (Pinaceae, Cupressaceae)

Angiosperms – The flowering Plants (Monocots and Dicots)
Gymnosperm Reproductive Structures

Pinus. (a) Long and dwarf shoots with male and female cones (b) A part of stem showing two types of leaves and branches (c) Cluster of male cones (d) Female cone in different stages
Hypanthium is a tubular outgrowth of the receptacle or corolla tube.
Bryophytes (Mosses, Liverworts & Hornworts)

Pteridophytes – Vascular seedless plants (Ferns, *Equisetum* spp. and *Lycopodium* spp.)

Gymnosperms – Woody cone bearing plants with naked seeds (Pinaceae, Cupressaceae)

Angiosperms – The flowering Plants (Monocots and Dicots)
Major Plant Group Dichotomous Key

1. Plants lacking vascular tissue, roots, stems, leaves, and seeds; mainly reproducing by spores; gametophyte green and photosynthetic and dominant phase of life-cycle, Sporophyte non-photosynthetic and dependent on the Gametophyte – **BRYOPHYTES (Mosses, Liverworts and Hornworts)**.

1. Plants possessing true roots, stems and leaves; vascular tissue present; reproducing by spores or seeds; sporophyte is dominant phase of the life-cycle ------------------------------------------ 2

2. Plants not producing flowers or seeds, mainly reproducing by spores; gametophyte and sporophyte generations independent at maturity (gametophytes sometimes subterranean, very small, or included in the spore wall) ------------------- **PTERIDOPHYTES (Fern and Fern Allies)**

2. Plants reproducing by seeds; gametophytes reduced and enclosed entirely within tissues of the sporophyte at maturity, not independent ------------------------------------------------------- 3

3. Flowers not produced; ovules not enclosed in an ovary, instead borne on the surface of a scale, the scales commonly grouped into a strobilus (cone), this becoming more-or-less woody in texture or berrylike at maturity; plants shrubs or trees with needlelike or scalelike leaves ----------------------------- **GYMNOSPERMS**

3. Flowers are produced; ovules enclosed in an ovary, this becoming a fruit at maturity; plants herbs, shrubs, or trees with variously shaped leaves (if leaves all scale like or needlelike, then the plant is an herb) ----------------------------------------------- 4 **(ANGIOSPERMS)**
4. Flower parts (sepals, petals, stamens and pistils) or the perianth whorls mostly with multiples of 4 or 5 parts (rarely none); leaves often lacking sheaths, mostly with pinnate, palmate, or netted venation, the main veins usually not parallel and not joined only at the base and tip of the leaf blade; cotyledons usually 2 ----------------------------------------------- DICOTS

4. Flower parts (sepals, petals, stamens and pistils) or perianth whorls mostly 3 or multiples of 3 (in flowers with modified perianth structure, such as grasses and sedges, the stamens and/or stigmas often in multiples of 3); the main veins usually parallel, joined at the base and tip of the leaf blade, the smaller veins parallel or forming a network; cotyledon 1 or less commonly absent; stem usually not forming a ring (appearing as 1 or more rings in groups with hollow stems) ----------------------------------------------- MONOCOTS
A Modification of the Key to Groups of Wetland Plants in the Midwest*

1. Plants vascular or non-vascular, reproducing by spores, not seeds ---------------------- 2

1. Plants reproducing by seeds (naked or enclosed in an ovary), herbaceous or woody, reproductive structures either through cones or flowers --------------------------------------- 3

2. Plants lacks vascular tissue; roots, stem and leaves absent ---------------------------Bryophytes
2. Plants with vascular tissue; roots, stem and leaves present --------------------------Pteridophytes

3. Plants woody; naked seeds born on a scale in a woody cone --------------- Gymnosperms
3. Herbaceous or woody plants that maybe aquatic or terrestrial with flowers (either showy or reduced); seeds borne within the ovary; fruits are produced ------------- 4
   (Angiosperms or Flowering Plants)

4. Parallel veins; flower parts usually in 3's or multiples there of --------------- 5 (Monocots)
4. Netted leaf veins; flower parts usually in 4's or 5's or multiples there of --- 7 (Dicots)
Monocot Key

5. Plants without apparent sepals and petals or perianth, each flower associated with (often hidden) by scales or scale like structures with flowers arranged in spikelets ------- 6

6. Leaves 2-ranked, the sheaths usually open; Stems typically hollow, round or flat (not triangular) and jointed; stamens with the anther attached to the middle with the filament ----------------------------------------------- Poaceae (Grasses)

6. Leaves 3-ranked, sheaths closed (maybe ruptured); stems typically triangular or round; stamens attached at the base of the filament ---------------- Cyperaceae (Sedges)

5. Flowers with normal sepals and petals (green or brown in Juncaceae), not arranged in spikes or spikelets --------------------------------- other Monocots
Poaceae habit and Morphology

Note leaves are two-ranked along the stem
Poaceae Inflorescence, Spikelets and Florets
Agrostis stolonifera L.
creeping bentgrass
Arundinaria gigantea (Walter) Muhl. giant cane
Chasmanthium latifolium (Michx.) Yates  river oats
Cinna arundinacea L. sweet woodreed
Dichanthelium clandestinum (L.) Gould  deertongue
Dichanthelium acuminatum (Sw.) Gould & C.A. Clark (tapered rosette grass)
*Panicum rigidulum* Bosc ex Nees  redtop panicgrass
Sphenopholis obtusata (Michx.) Scribn. prairie wedgescale
*Echinochloa muricata* (P. Beauv.) Fernald  rough barnyardgrass
Glyceria striata (Lam.) Hitchc.
fowl mannagrass
Leersia oryzoides (L.) Sw. rice cutgrass

Steve Hurst, hosted by the USDA-NRCS PLANTS Database
Paspalum fluitans (Elliott) Kunth  horsetail paspalum
Phalaris arundinacea L.
reed canarygrass
Phragmites australis (Cav.) Trin. ex Steud. common reed
Poa compressa. L Canada bluegrass
Spartina pectinata Bosc ex Link, prairie cordgrass
leaves are three-ranked along the stem (stem typically triangular)
Carex conjuncta
Carex frankii
Carex granularis
Carex hyalinolepis
Carex lupulina
Carex squarrosoa
Carex tribuloides
Eleocharis obtusa (Willd.) Schult. blunt spikerush

Steve Hurst, hosted by the USDA-NRCS PLANTS Database
Alisma subcordatum Raf.
American water plantain

Juncus effusus L.
common rush
Juncus dudleyi Wiegand
Dudley's rush
Typha angustifolia L. narrowleaf cattail Staminate and pistillate portions separated

Typha latifolia L. broadleaf cattail Staminate and pistillate portions continuous
Dicot Key

7. Plants are woody (Trees, shrubs, vines; stems woody) -------------------------- Woody Dicots (not discussed here)

7. Plants are herbaceous; stems not woody -------------------------------------- 8

8. Leaves compound; divided into distinct leaflets ------- Dicots with Compound Leaves
8. Leaves single and entire and not compound ------------------------------------ 9

9. Most or all the leaves opposite or whorled -- Dicots with Opposite or Whorled Leaves
9. Most or all the leaves alternate --------------------------------------------- Dicots with Alternate Leaves
Geum canadense Jacq. white avens

Rosaceae – Rose Family
Apios americana Medik. groundnut

Amphicarpa bracteata (L.) Fernald
American hogpeanut

Fabaceae – Bean Family
Senna marilandica (L.) Link
Maryland senna

Fabaceae – Bean Family
Bidens frondosa L. devil's beggartick

Asteraceae – Composite or Aster Family

Apiaceae – Carrot Family

*Cicuta maculata* L. spotted water hemlock
Chaerophyllum procumbens
(L.) Crantz  spreading chervil

Apiaceae – Carrot Family
Packera glabella (Poir.) C. Jeffrey  butterweed

Asteraceae – Composite or Aster Family
Dicot Key

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8. Leaves compound; divided into distinct leaflets ------ Dicots with Compound Leaves
8. Leaves single and entire and not compound  ----------------------------------------------- 9

9. Most or all the leaves opposite or whorled - Dicots with Opposite or Whorled Leaves
9. Most or all the leaves alternate  ------------------------ Dicots with Alternate Leaves
Leaves simple and opposite

**Dicots**

- *Gratiola neglecta* Torr.  
  clammy hedgehyssop

- *Agalinis purpurea* (L.) Pennell  
  purple false foxglove

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**Scrophulariaceae – Figwort Family**
Eupatorium perfoliatum L.
common boneset

Asteraceae – Composite or Aster Family

Eutrochium maculatum (L.) E.E. Lamont  spotted joe pye weed
Scrophulariaceae – Figwort Family

*Mimulus alatus* Aiton
sharpwing monkeyflower

*Scutellaria lateriflora* L.
blue skullcap
Rubiaceae – Madder Family

*Galium obtusum* Bigelow
bluntleaf bedstraw

*Galium tinctorium* (L.) Scop
Scop stiff marsh bedstraw
Laportea canadensis (L.) Weddell
Canadian woodnettle

Boehmeria cylindrica (L.) Sw.
smallspike false nettle

Urticaceae – Nettle Family
Ammannia coccinea Rottb. valley redstem

Lythraceae – Toothcup Family
Apocynum cannabinum L. - Indian hemp

Apocynaceae – Dogbane Family

Asclepias incarnata L. - Swamp milkweed

Asclepiadaceae – Milkweed Family
Dicot Key

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9. Most or all the leaves alternate --------------------------------------------- Dicots with Alternate Leaves
Rudbeckia laciniata L. cutleaf coneflower

Solidago gigantea Aiton giant goldenrod

Asteraceae – Composite or Aster Family
Polygonum hydropiper L.
marshpepper knotweed

Polygonum hydropiperoides Michx.
swamp smartweed

Polygonaceae – Smartweed
Family
Thank You for Listening Today

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Schizaea pusilla