Submersed Aquatic Plant ID

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Standards and Assessment Section
FAB Plant Workshop
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Submersed Plants

- Coontail – style (dissected leaves)
- Hydrilla – style (simple small leaves)
- Broad-leaf
- Strap-leaf
- Bladderworts
Submersed Plants

• Whorled dissected leaves
  – Cabomba, Ceratophyllum, Myriophyllum, Limnophila

• Whorled simple leaves
  – Hydrilla, Egeria, Elodea, Mayaca. Chara, Nitella

• Opposite simple leaves
  – Najas

• Alternate simple leaves
  – Potamogeton, Stuckenia
**Cabomba caroliniana**  
**Fanwort**

- Stems purplish, plant soft
- 2 types of leaves:
  - **SUBMERSED**: - very divided and fan-like  
    - opposite or in whorls along stem  
  - **FLOATING**: - small, diamond-shaped
- **Flowers**: - on stalks arising from stem tips  
  - white, pink, purplish, $\frac{1}{2}$” across
Cabomba caroliniana
Fanwort
Ceratophyllum demersum
Coontail

- Green stems, plant holds shape out of water
- Leaves: - dichotomously branched (tuning fork)
  - in whorls on stem
  - several teeth on midribs (rough feeling)
  - bright green to blackish color
- Flowers: - very small, at leaf base
Native *Myriophyllums*

- Reddish stems
- Rough stems
- Leaves in whorls of 3-6
- Includes *M. heterophyllum*, *M. laxum*, and *M. pinnatum*
- Leaves with 12-28, 8-10, and 11-21 divisions (cannot distinguish these 3 without fruiting tips)
- Fruiting tips with bracts of various sizes, stick up above water surface

*Myriophyllum heterophyllum*
Myriophyllum heterophyllum
Variable-leaf water milfoil

- Stem: long, submersed
- Leaves:
  - Deeply divided and feathery, 2” long
  - In whorls of 4 to 6 along stem
- Flower:
  - Very tiny, reddish
  - In whorls of 4-6 at emergent end of stem
  - Subtended by bright green leaf-like bracts
  - Bracts clearly visible in *M. heterophyllum*
Myriophyllum laxum
Loose water milfoil

- Stems: - submersed, reddish, slender
- Leaves: - divided, very finely, feathery
  - in whorls of 4 to 5
- Flowers: - pink to reddish
- Bracts subtending flowers very short
**Myriophyllum pinnatum**
Cutleaf water milfoil

- **Stems:** submersed, reddish, slender
- **Leaves:** divided, very finely, feathery
  - in whorls of 4 to 5
- **Flowers:** pink to reddish
- **Bracts subtending flowers** very short
Native *Myriophyllum*

<table>
<thead>
<tr>
<th></th>
<th><em>heterophyllum</em></th>
<th><em>laxum</em></th>
<th><em>pinnatum</em></th>
</tr>
</thead>
<tbody>
<tr>
<td>leaves/whorl</td>
<td>4-6</td>
<td>4-5</td>
<td>3-4</td>
</tr>
<tr>
<td>leaf segments</td>
<td>12-28</td>
<td>11-21</td>
<td>8-10</td>
</tr>
<tr>
<td>bract shape</td>
<td>serrate, not dissected</td>
<td>dissected to entire moving up stem</td>
<td>dissected</td>
</tr>
<tr>
<td>bract size</td>
<td>visible, longer than internode</td>
<td>barely visible, shorter than internodes</td>
<td>visible, longer than internode</td>
</tr>
</tbody>
</table>

*M. heterophyllum* has more robust stems
Myriophyllum aquaticum
Parrot feather
NON-NATIVE

- Emersed plant
- Stems: - can be 5’ long
  - trail along the ground or water surface
  - become erect and leafy at the ends
- Leaves: - oblong, deeply cut and feathery looking
  - bright blue-green
  - in whorls of 4 to 6
Myriophyllum Spicatum
Eurasian water milfoil
NON-NATIVE

• Submersed
• Stems: - branched, long, 6 to 9 feet long
  - dark green to grayish
• Leaves: - deeply divided, soft, feather-like, 2” long
  - arranged in whorls of 3 to 6 around stem
• Flowers: - very small, reddish, bracts tiny
  - on flower spike above water
**Limnophila sessiliflora**

**Limnophila**

**NON-NATIVE**

- Rooted
- Stems: up to 12 feet long, with a few inches emersed
- 2 types of leaves:
  - **SUBMERSED**: finely divided and feathery, 1” long
    - in whorls along stem
  - **FLOATING**: more or less lance-shaped, in whorls
    - leaf margins appear to be torn irregularly
- Flowers: single flower on emersed part of stem
  - blue, violet, pink or lavender
Limnophila sessiliflora
NON-NATIVE
Coontail-like (dissected lvs)

*Cabomba caroliniana*
- Opposite, palmately branched

*Limnophila sessiflora*
- Whorled, tree branching

*Ceratophyllum demersum*
- Whorled, forked

*Myriophyllum sp.*
- Whorled, pinnately branched

**NOTE:** Some *Utricularia* species have coontail-like appearance in water. However, they will have bladders, are usually slimy and limp out of the water.
Hydrilla verticillata
NON-NATIVE

• Rooted
• Stems: slender, branched and up to 25 feet long. Often grows to water surface and shades out others.
• Leaves: - small, strap-like and pointed
  - in whorls of 4 to 8
  - saw-toothed leaf margins
  - 1 or more sharp teeth along leaf mid-rib
• Flowers: - only female in Florida
  - tiny, white on long stalks
• Turions: - greenish bud-like at leaf axils
• Tubers: - potato-like attached at the roots
Hydrilla verticillata
NON-NATIVE
Hydrilla verticillata

Can be smaller, lack teeth, and have a bright green “aquarium” appearance after herbicide treatment.
Egeria densa
Brazilian waterweed
NON-NATIVE

• Rooted, submersed plants
• Stems: - Slender, usually a foot or two long
  – Does not branch as prolifically as hydrilla
• Leaves: - strap-shaped
  - whorls of 3 to 6
  - toothed leaf margins
  - smooth midrib
• Flowers: - short stalks 1”
  above water
  - 3 white petals
  - ¾” across
Egeria densa
NON-NATIVE
Elodea Canadensis
Canadian waterweed

- Rare in Florida
- Leaves in whorls of 3
- Plant smooth to the touch
- No teeth on midrib, teeth on leaf edges barely visible
Mayaca fluviatilis
Bog moss

- **Stems:** - several feet long
  - whitish-green, flexible
- **Leaves:** - emergent are mossy
  - submersed are thread-like
  - densely arranged in spirals on stem
- **Flowers:** - solitary, on stalks 2” long
  - small, 3 petals
  - whitish to pink
Chara sp.  
Muskgrass

- Ponds, lakes and ditches
- Macro-alga = NO TRUE LEAVES
- Branches and branchlets:
  - Made of single column shaped cells
  - Spiny cells + calcium deposit (rough feeling)
  - In whorls
- Garlic-y odor
Nitella sp.

- Green macro-alga = NO TRUE LEAVES
- Branches and Branchlets:
  - Smooth translucent stems
  - No smell
  - In whorls, at regular intervals along the main branches
  - Sporangia: reproductive part at the end of branches
Najas guadalupensis
Southern naiad

- **Stems:** - submersed, very long
  - slender, very branched
- **Leaves:** - arranged **opposite** or whorls of 3
  - very narrow (~2 mm wide), 1 inch long
  - small teeth on leaf margins
- **Flowers:** - very small on axils
  - inconspicuous
Note reddish color and no teeth on leaves
Najas marina
Spiny naiad

• **Stems:** - brittle up to about 0.5 m long
  - often branched toward the upward portion
  - conspicuous, brownish, prickly teeth at internodes.

• **Leaves:** - opposite or sometimes in whorls of three
  - triangular teeth along the leaf margins
  - prickles along the midrib on the underside

• **Flowers:** - solitary in the leaf axils

• **Plants:** dioecious with the male and female flowers on separate individuals.
**Potamogeton illinoensis**
Illinois Pondweed

- Submersed
- Leaves:
  - **Alternately** arranged
  - Floating and submersed lvs same
    - Elliptic in shape
    - Much longer than wide (8” long)
    - On long petioles
    - Pointed tips and bases
- Flower: - greenish on spike
  - 1 to 3” long
**Potamogeton diversifolius**
*Waterthread pondweed*

- Small plant
- Leaves *alternate*, 2 styles
  - Small elliptic floating
  - Thin threadlike submersed
- Fruits on tight spike
- Grows in shallow calm waters
**Stuckenia pectinata**  
*(Potamogeton pectinatus)*  
Sago pondweed

- Submersed plant with no floating leaves
- Arise from thick matted rhizomes with terminal tuberous bulbs
- Stems: - branched  
  - long and slender
- Leaf blades: - alternate  
  - filiform, margins entire  
  - 8 cm long, 1 mm wide  
  - originated at the apex of the sheath  
  - stipules like sheaths  
  - 2-5 cm long around stem
**Potamogeton pusillus**
Small pondweed

- **Leaves:** - Submersed, alternate
  - linear leaves, 2-7 cm long, 0.5-2 mm wide
  - pointed/rounded tips and 3 veins.
  - stipules free from leaf base, appear to stick out in leaf axils
- **Stem:** - Slender and profusely branched
  - with small paired yellowish glands at leaf base
- **Flower:** - in 1-4 whorls on spikes measuring 3-15 mm long;
  - spikes not always above the water;
  - on stalks to 5 cm long, often curved at the base.
**Utricularia foliosa**  
Flat-stem bladderwort

- Rootless, floating carnivorous plant
- Main stem: - Thick and flat
- Leaves: - 3-dimensional bushy leaves – fern-like  
  - Upper lobes: bright green, few bladders  
  - Lower lobes: pale green, full bladders
- Flowers: - bright yellow  
  - on long emerged stalk  
  - up to 20 flowers/stalk  
  - distinct rounded lips
Utricularia gibba (U. biflora)
Humped bladderwort

• Rootless, free floating
• Forms dense mat of tangled stems and branches
• Leaves: - alternate, usually forked only once if at all
• Flower stems:
  - slender
  - 1-3 yellow flowers
• Rounded spur under flower
**Utricularia inflata**
Big floating bladderwort

- Large (floats to 12 cm diameter), free floating
- Leaves: 2 types
  - Submersed: - alternate leaves
    - forked four to five times
    - contains bladderwort
  - Floats: inflated petioles
- Flowering: in groups of 4-12 on stalks 15 cm long
- *U. radiata* looks essentially the same, but smaller (floats to 5 cm diameter)
Utricularia floridana
Florida bladderwort

- “Rooted” but no true roots: this part tends to be whitish to light yellow
- Branches: 20-50mm across
  - Like foxtails
  - Leafy branches, bladder branches
- Flowering raceme arising from a leafless, flattened stem up to 1m long
- Flowers: Yellow emergent with red streak
Utricularia purpurea
Purple bladderwort

- No roots
- Free floating stems
- Leaves: - in whorls of 4 to 7 throughout entire plant
  - lacy looking, can appear as puffballs
- Bladders: - at tips of the leaves
- Inflorescence: - 1 to 4 purple flowers emergent on stalk
Vallisneria americana
Eelgrass

- Leaves: - Dark green, tape-like
  - 1-2 cm wide, variable
  - Raised spongy midsection
  - Rounded tips
- Flowering: - Floating, pistillated flower on curling stem
  - Submersed staminoid flower at base of plant
  - Flower: 3 sepals + 3 white petals
- Fertilization: stem of pistillated flower coils and submerges fruit
- Fruit: - slender, banana-like capsule with tiny seeds.
Vallisneria americana
Eelgrass
**Sagittaria kurziana**

Strap-leaf Sagittaria

- Leaves: - \( \frac{3}{4} \)” wide
  - Sharp, pointed tips (Vallisneria = rounded)
  - 3 to 5 prominent ridges that run the entire length of the leaf
- Flowers: - Emersed/floating on branched stalks
  - 3 white petals
**Vallisneria vs. Sagittaria kurziana**

<table>
<thead>
<tr>
<th>Leaves:</th>
<th>thick midsection</th>
<th>5 distinct ridges</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leaf tips:</td>
<td>rounded</td>
<td>pointed</td>
</tr>
<tr>
<td></td>
<td>leaf size varies for both!</td>
<td></td>
</tr>
<tr>
<td>Flowers:</td>
<td>spiral peduncle,</td>
<td>several white flowers</td>
</tr>
<tr>
<td></td>
<td>single thick unit</td>
<td>on straight peduncle</td>
</tr>
</tbody>
</table>

*Vallisneria americana*

*Vallisneria kurziana*

*Photo by John Van Dyke*  
*Copyright 1990 Florida Department of Environmental Protection*
Sagittaria sp.

- Several species can have strap-like (phyllloidial) leaves and small floating spatulate leaves
- Flowers on leafless emersed stalks, 3 white petals
  - Need flower stalk to key to species!
- Whitish roots and leaf bases
S. isoetiformis & S. filiformis - Small species that grow in shallow water. Most noticeable when flowering.

S. filiformis = S. stagnorum in G&W
Eleocharis spp.
Spikerushes

- Leafless stems growing from node (ramet)
- When submersed, new ramets sprout from stem tips
- Usually *E. baldwinii* when submersed and flourishing, but not always!
Websteria confervoides
Algal bulrush

• Looks like *Eleocharis*
• Clumps of wispy leafless stems appear like puffballs in water.
Bacopa caroliniana
Lemon bacopa

- Common in fresh and brackish water
- Leaves: - succulent and thick
  - opposite and clasping stems
  - Lemony scent when crushed
  - almost round
- Flowers: - small and blue
  - 4 or 5 petals
Bacopa monnieri
Smooth water hyssop

- Common in fresh and brackish waters
- Leaves: - succulents and thick
  - oblanceolate
  - opposite, not clasping stems
- Flowers: - small and white
  - 4 or 5 petals
Micranthemum umbrosum
Baby tears

- Small, creeping, usually totally emersed
- Stems: - creeping, slender, 6 to 8” long
- Leaves: - small, light-green
  - round, opposite
- Flowers: - very tiny white or purplish
  - hard to find
Micranthemum glomeratum
Baby tears

- Small, creeping, usually totally emersed
- Stems: - creeping, slender, 6 to 8” long
- Leaves: - smaller than *M. umbrosum*
  – light-green
  – more lanceolate, opposite
- Flowers: - very tiny white or purplish
  - hard to find
**Hygrophila polysperma**
East Indian hygrophila

**NON-NATIVE**

- Found in streams and slowly moving waters
- Submersed with few inches sometimes emerged
- Stems: - square
  - up to 6 feet long
- Leaves: - opposite, pointed
  - 1 ½” long, ½” wide
- Flowers: - at leaf axils
  - bluish-white to white
  - 2 lips
Hygrophila polysperma
Photo by Patricia Howell
Proserpinaca palustris
Marsh mermaid-weed

• Found in very calm waters, often shallow wetlands
• Leaves: - 5 to 10 cm long
  - alternate on the stem
• 2 types of leaves:
  – Submersed leaves feather-like, divided
  – Emergent leaves
    - associated with flowering and fruiting
    - blade-shaped and conspicuously serrated
• Flower: - reddish-purple (2 cm wide)
  - In leaf axils of the emergent leaves
  - Fruit is 3-sided nutlet
Proserpinaca palustris
Marsh mermaid-weed
Thank you.

Questions?