

Session 5

Chris Doyle, CLM

The Diverse Pondweeds



Submersed Plants: Pondweeds

Potamogeton spp.

- Very Diverse Genus
- Identification can be difficult
- **“Plasticity”**
 - Available nutrients
 - Sediment type
 - Flow rate
 - Light availability
- **Can hybridize**
- Primary food source for waterfowl
- Only one species is exotic to the USA
- **Distinguishing Characteristics:**
 - All have alternate leaves with a midvein
 - Flowers are small, arranged in a spike
 - Some have both floating and submersed leaves
 - **Stipules:** appendage of tissue at base of leaf stalk
 - Fibrous, fused to leaf, or free

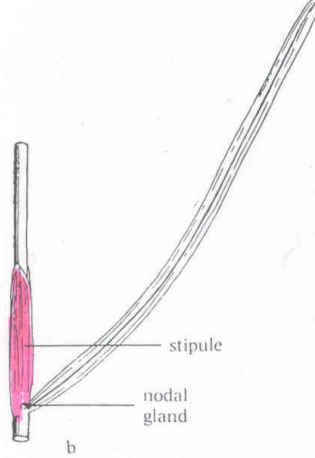


Stipules: Bits of leafy tissue where leaf meets stem

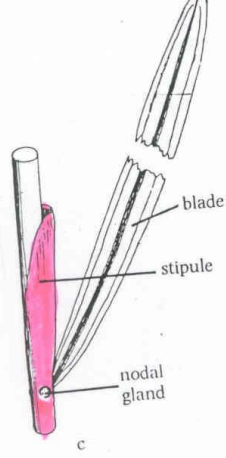
- Free: stipule attached to, and often hugging stem but not attached to leaf
- Adnate: stipule attached to leaf at least part of stipule's length
 - In a few species of *Potamogeton*, stipule is attached to leaf in a short way
 - In *P. pectinatus*, stipule attached to leaf in a long way
- Fibrous: membranous whole year
 - Might break down over course of the growing season
 - Might not be present late



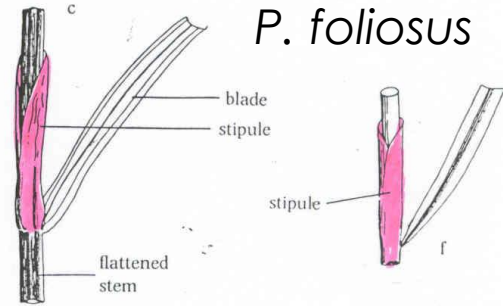
Pondweed Structures



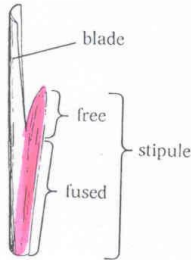
P. pusillus



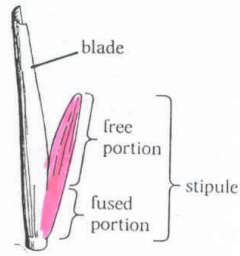
P. obtusifolius



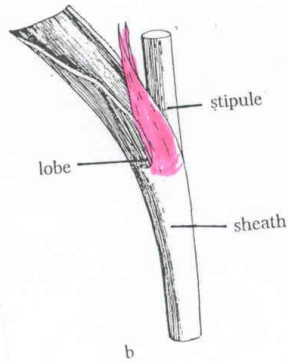
P. zosteriformis



P. spirillus



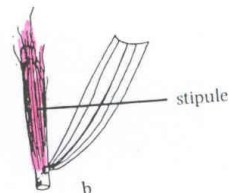
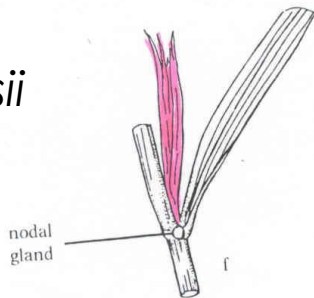
P. diversifolius



P. robbinsii



P. friesii



Free, but hugging

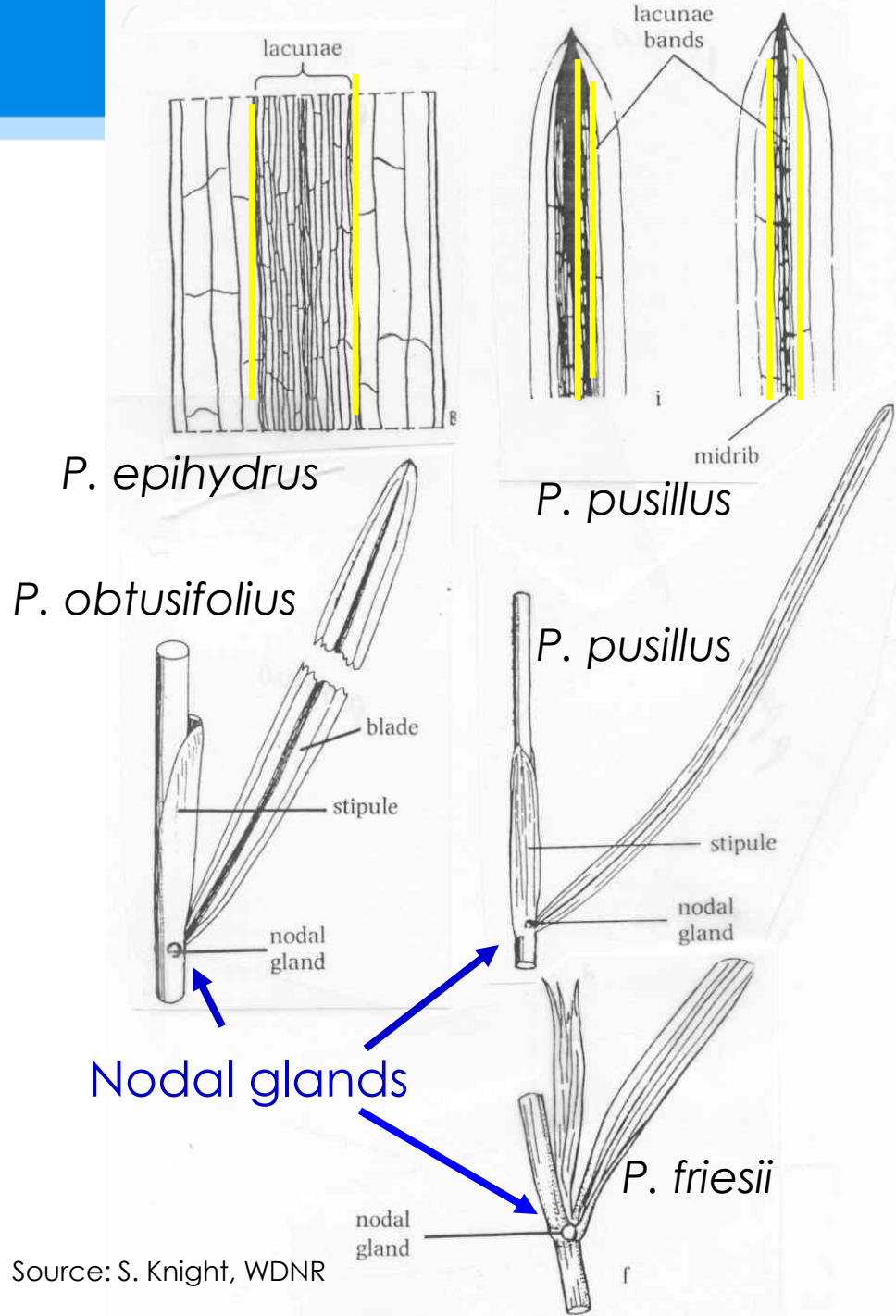
Adnate, short way

Fibrous

Source: S. Knight, WDNR



Pondweed Structures



Lacunae: Hollow cells (usually several bands) that border the midvein of a leaf

- Ex. Ribbon-leaf, leafy and small pondweeds

Nodal Glands: Swollen bumps at the base of the leaf attachment

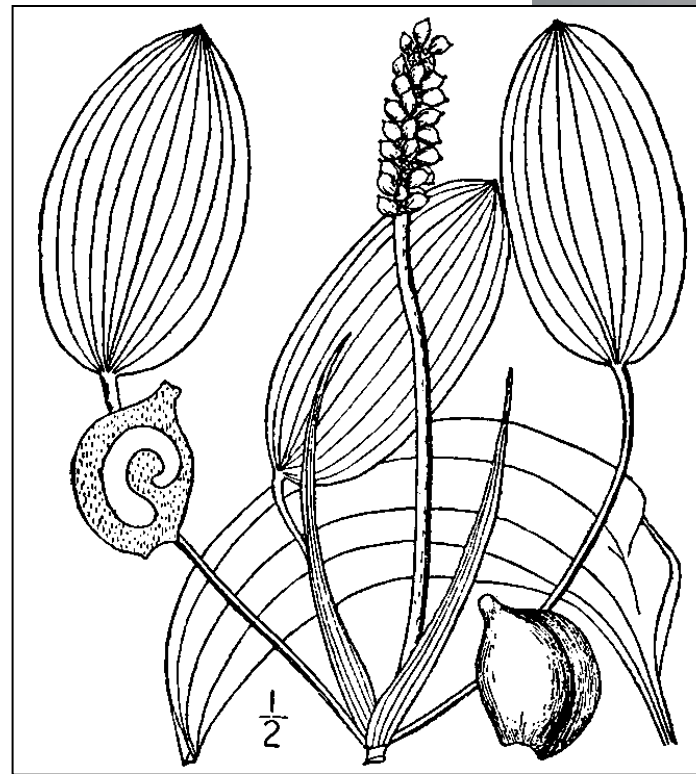
- The “node”
- Ex. Blunt-leaf and small pondweeds

Pondweeds: Bassweed

Bassweed

Potamogeton amplifolius

- Excellent fish habitat
- AKA Large-leaf Pondweed
- **Distinguishing Characteristics:**
- Submersed leaves wavy
- Very Wide (3-7 cm)
 - **25-37 veins**
 - Alternate arrangement
- Floating Leaves
 - Generally opposite
 - Oval, smaller
- Stipules large, free and pointed



Pondweeds: Illinois Pondweed

Illinois Pondweed

Potamogeton illinoensis

- Excellent fish habitat
- **Distinguishing Characteristics:**
- Submersed leaves long and taper
 - Up to 8 inches long
 - **9-19 veins**
 - **Short or no stalk**
- Floating Leaves
 - Generally opposite
 - Elliptical, up to 7 inches
- Stipules membranous
- **Seed stalk swollen**



illustration provided by:
IFAS, Center for Aquatic Plants
University of Florida, Gainesville, 1993



Pondweeds: **Curly-leaf Pondweed**

Curly-leaf Pondweed *Potamogeton crispus*

- Only exotic pondweed in USA
- Spaghetti-like stems
- Early season grower
 - Natural die back in June-July
- **Distinguishing Characteristics:**
- No floating leaves
 - But stems often reach surface
 - Up to 3 m long!
- **Wavy leaves; serrated margins**
 - “**Crispy feel**”
- Produces pine-cone-like **turions**
 - Up to 1,600/m²



Pondweeds: Ribbon-leaf Pondweed

Ribbon-leaf Pondweed

Potamogeton epihydrus

- **Distinguishing Characteristics:**

- Floating leaves
 - Oval to elliptic
 - Opposite Arrangement
 - Short stalk
- Submersed Leaves
 - Long, tape-like; up to 25 cm
 - 1-10 mm wide
 - Alternate Arrangement
 - No stalk
 - Lacunae border mid-vein
- Fruit produced on stalks
 - Same thickness as stem
 - Flatten disk, dorsal ridge
 - 2 lateral ridges



Photo: Donald Cameron



Pondweeds: Robbin's Pondweed

Robbin's Pondweed

Potamogeton robbinsii

- Often low-growing
- Can create dense bottom cover
 - 1,000 stems per m²
- AKA Fern Pondweed
- **Distinguishing Characteristics:**
- No floating leaves
- Submersed Leaves
 - Stiff, fern-like leaves
 - Alternate Arrangement
 - Serrated leaf margin
 - Distinct ear-like lobe at stem
- Fibrous stipule
- Rarely produces flowers/fruit



Pondweeds: White-stem Pondweed

White-stem Pondweed

Potamogeton praelongus

- Prefers soft sediment
- Prefers suitable water clarity
- **Distinguishing Characteristics:**
- **No floating leaves**
- Submersed Leaves:
 - Lance or oval
 - 3-5 strong veins
 - 11-35 weaker veins
 - Leaf clasps around stem
 - **Wraps 1/3 to 1/2 around stem**
- **Stems zig-zag**
- Tips are “boat-shaped”
- Stipules: white and fibrous



Pondweeds: Claspingleaf Pondweed

Claspingleaf Pondweed

Potamogeton richardsonii

- Tolerant of Disturbance
- **Distinguishing Characteristics:**
- No Floating Leaves
- Submersed Leaves
 - Longer, lance-shaped
 - 3-12 cm long
 - 13-21 Veins
 - Some more prominent
 - **Wrap $\frac{1}{2}$ to $\frac{3}{4}$ around stem**
 - Base heart shaped
- Stipules: fibrous
 - Disintegrates into a “white beard”
- Fruit packed on cylindrical spike



Pondweeds: Heart Pondweed

Heart Pondweed

P. perfoliatus

- Very similar to *P. richardsonii*
- No Floating Leaves
- **Distinguishing Characteristics:**
- Submersed Leaves
 - Oval, rounder shape
 - **Smaller; 1-5 cm long**
 - **Completely wrap around stem**
 - 7-15 veins
- Stipules
 - Upper portion of the plant only
 - Disappear later in season



Photo: Donald Cameron



Pondweeds: Grass-leaved Pondweed

Grass-leaved Pondweed *Potamogeton gramineus*

- AKA Variable Pondweed
- Extremely variable appearance (plasticity)
 - Influenced by habitat/water chemistry
- **Distinguishing Characteristics:**
- Submersed leaves
 - Lance shape; 3-8 cm long
 - **taper to stem; no stalk;**
 - **3-7 veins**
- Floating leaves
 - Ellipse, 2-5 cm
 - 11-19 veins
 - **stalk > blade**
- Free stipules
 - blunt, slightly hooded tip



Photo: Susan Knight



Pondweeds: Floating-leaf Pondweed

Floating-leaf Pondweed

Potamogeton natans

- Similar to a water lily
- **Distinguishing Characteristics:**
- Floating Leaves
 - Heart-shaped leaf base
 - Stem base “pinched”
 - Often lighter color
 - Allows leaf to lay flat on water
- Submersed leaves
 - Stalk-like; no blade
 - 10-40 cm long; 1-2 mm wide
- Fibrous, free stipules
- Fruit produced in dense spike
 - Emergent
 - Fruit surface wrinkled
 - Persist late

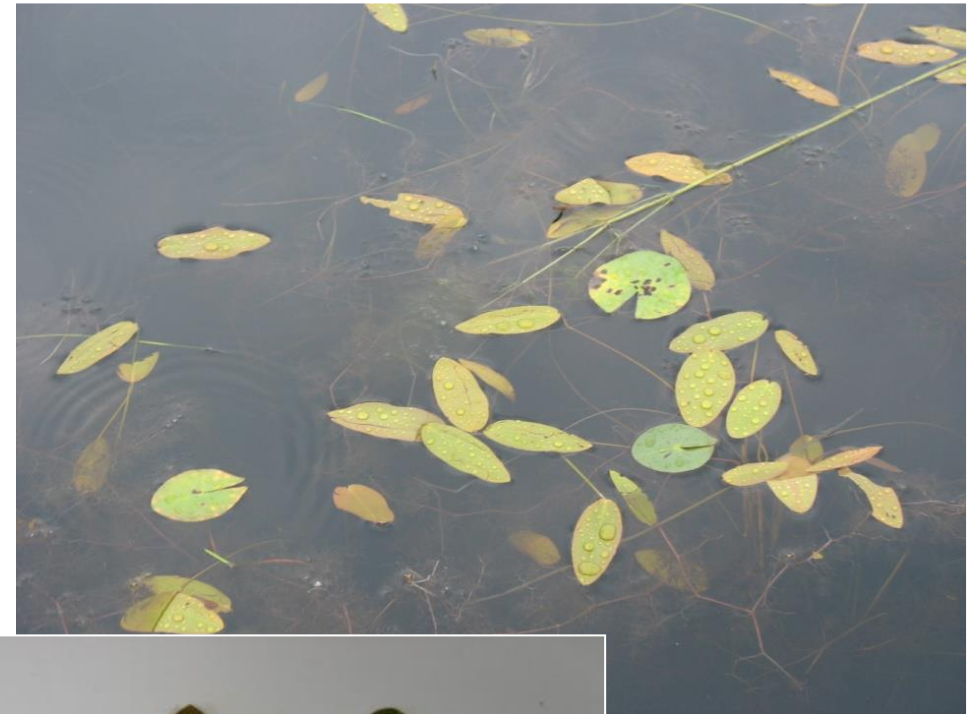
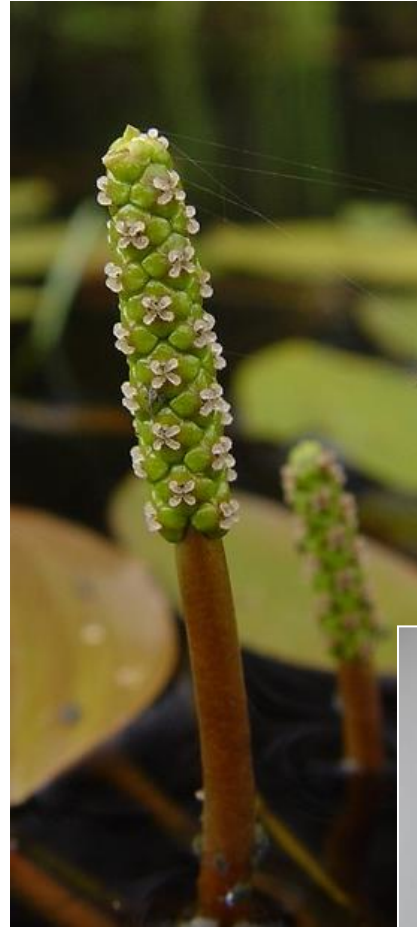


Photo: Donald Cameron

Pondweeds: Long-leaf Pondweed

Long-leaf pondweed

P. nodosus

- **More common in flowing water**
- Tolerates turbidity
- **Distinguishing Characteristics:**
- Floating Leaves
 - 5-13 cm long; 1-4 cm wide
 - **Very long stalk**
- Submersed Leaves
 - Long; up to 30 cm
 - Alternate
 - Narrow, taper to stalks
- Stipules free
 - Break down over season
- Fruit produced on emergent spike
 - Lumpy dorsal ridge; short beak

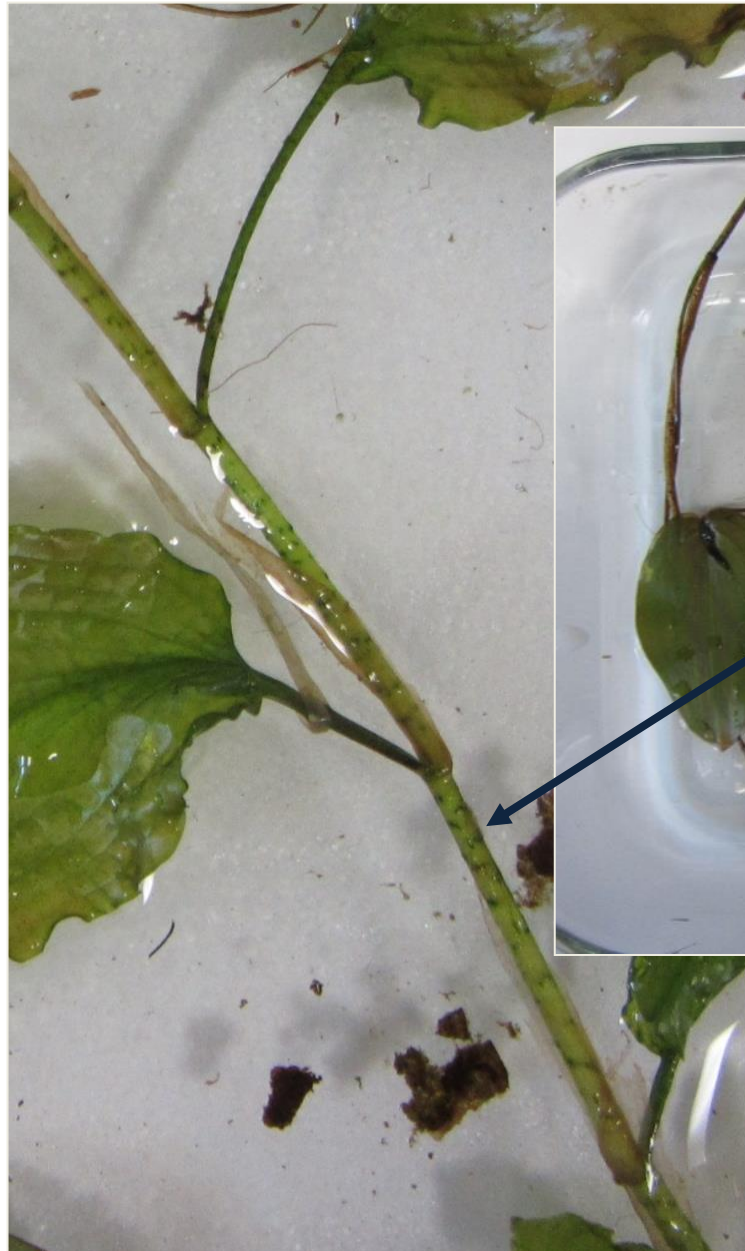


Pondweeds: Spotted Pondweed

Spotted Pondweed

Potamogeton pulcher

- Not Common
- Prefers quiet, acidic waters
- **Distinguishing Characteristics:**
- Wide floating leaves
 - 21-35 veins
 - Long stalks (purple hue)
- Submersed leaves wavy
 - Lance-shaped
 - Up to 3 cm wide
 - Short stalk or none
- **Black spots on stem**
 - Conspicuous



Pondweeds: Oakes' Pondweed

Oakes' Pondweed

Potamogeton oakesianus

- Prefers acidic waters
- **Distinguishing Characteristics:**
- Floating leaves
 - Lanceolate to elliptic or ovate
 - **2 to 6 cm long** by 1 to 2.5 cm wide
 - 7 to 23 veins.
- Submersed leaves wavy
 - Sessile and lax
 - 0.25 to 1 mm wide with 3 veins
- **Fruit are smooth**

Photos: Donald Cameron

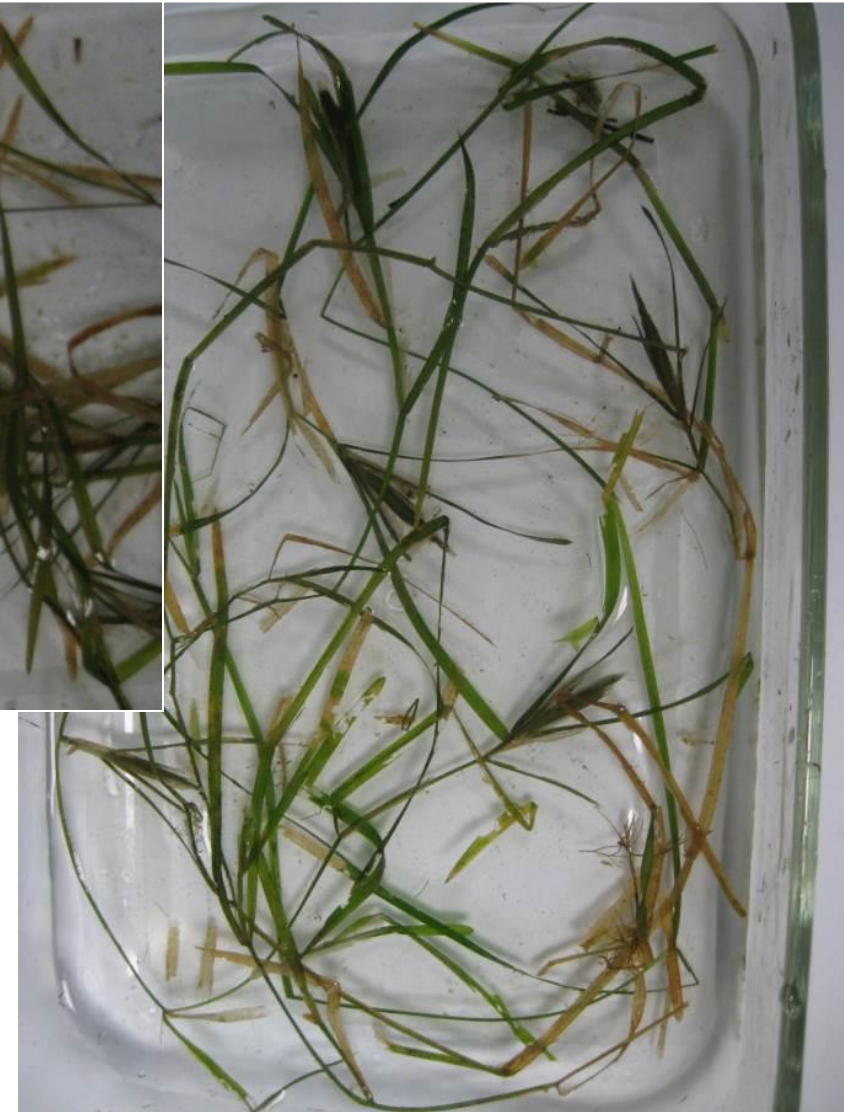


Pondweeds: Flat-stem Pondweed

Flat-stem Pondweed

Potamogeton zosteriformis

- Tolerates variety of habitats
- No floating leaves
- **Distinguishing Characteristics:**
- **Stems are strongly flattened**
 - Angled appearance
- Submersed Leaves
 - Stiff and linear leaves
 - 10-20 cm long; 2-5 mm wide
 - **Prominent midvein**
- Firm, free stipules
- Fruit are nut-like
 - Oval, sharp, narrow dorsal ridge



Note: Easily confused with Water Stargrass

Pondweeds: Alpine Pondweed

Alpine pondweed *Potamogeton alpinus*

- Not common
- Floating leaves
 - Typically green tint
 - Smaller and delicate
- Submersed Leaves
 - Alternate, no stalk
 - **Distinct red tint**
 - **7-9 veins**
 - Alternate between prominent and faint
 - Can be long, narrow pointed tips
 - Or short and blunt
- Fruit
 - Smooth, plump
 - Small stalk, and curved beak



Photos: Donald Cameron

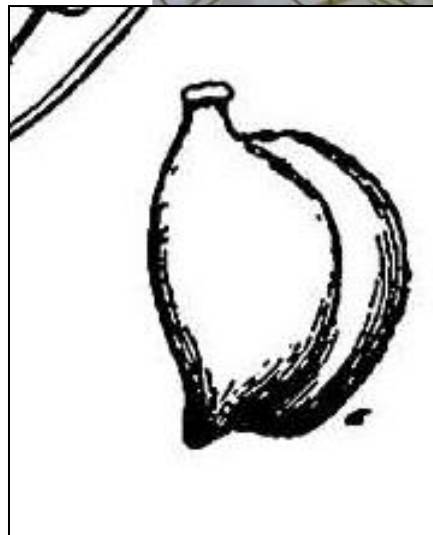


Pondweeds: Small Pondweed

Small Pondweed

Potamogeton pusillus

- Several Sub-species
 - Taxonomic mess!
- **Distinguishing Characteristics:**
- **No** Floating Leaves
- Submersed Leaves
 - 1-7 cm long; 0.2-0.25 mm wide
 - Several bands lacunar cells
 - **Nodal glands at base**
- Fruit are plump
 - Smooth back, short beak
 - 1-4 whorls
 - **Long stalk; up to 6 cm**



Thin-leaf Pondweed: Need the fruit to identify!

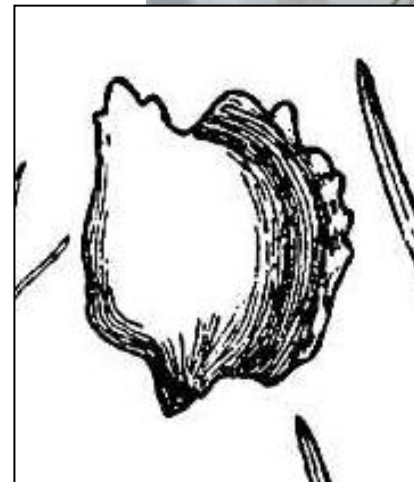
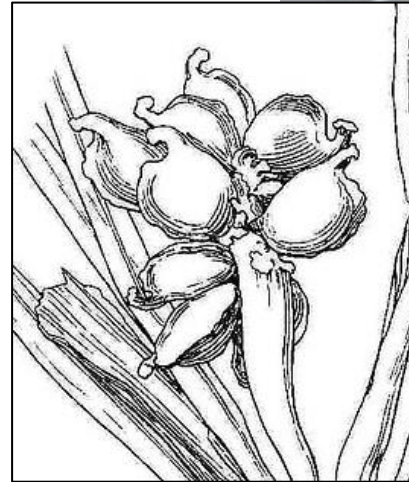


Pondweeds: Leafy Pondweed

Leafy Pondweed

Potamogeton foliosus

- **Distinguishing Characteristics:**
- No Floating Leaves
- Submersed Leaves
 - Narrow, parallel sides
 - 3-5 veins
 - Midvein flanked by lacunar cells
 - **No nodal glands**
- Fruit, flattened
 - Dorsal wavy ridge with short beak
 - **Tight clusters in upper axils**
 - **Short seed stalk**
 - Produced early season
- Stipules
 - Wrap around stem early
 - Membranous late



Thin-leaf Pondweed: Need the fruit to identify!



Pondweeds: Blunt-leaf Pondweed

Blunt-leaf Pondweed

Potamogeton obtusifolius

- **Distinguishing Characteristics:**
- No Floating Leaves
- Submersed Leaves
 - Often red tint
 - 3-10 cm long; 1-3.5 mm wide
 - **Blunt tip leaves**
 - **Nodal glands**
- Fruit
 - Low sharp dorsal keel
 - Short beak
- Membranous stipules
- Often produces winter buds

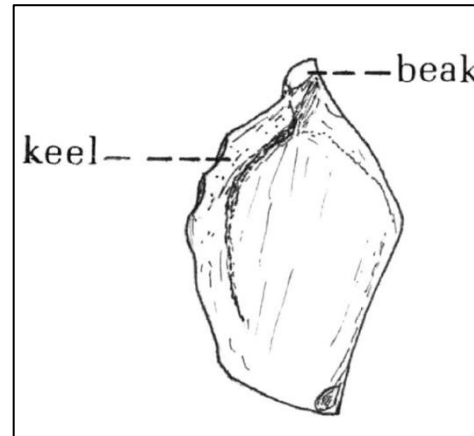


Photo: Hellquist



Thin-leaf Pondweed: Need the fruit to identify!

Photos: Donald Cameron



Pondweeds: Water-thread Pondweed

Water-thread Pondweed

Potamogeton diversifolius

- **Distinguishing Characteristics:**
- **Floating Leaves**
 - Ellipse; 0.5-4 cm long
- Submersed Leaves
 - Narrow, linear
 - 1-10 cm long; 0.1-1,5 mm wide
 - Prominent midvein
 - Lacunar cells
- Two forms fruiting spikes
 - Submersed axils-Globe shape
 - Short stalk; 1-10 mm
 - 1-15 fruits
 - Floating leaf axils: Cylindrical Spike
 - Long stalk; 3-32 mm
 - 5-120 Fruits
- Fruit
 - Coiled snail shell, flattened short beak



Thin-leaf Pondweed: Need the fruit to identify!

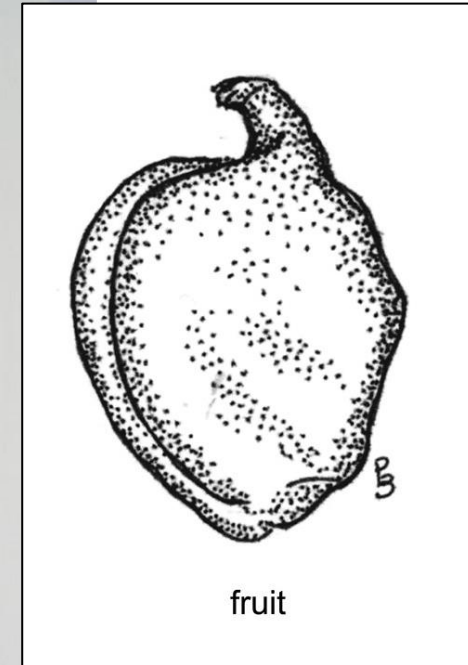
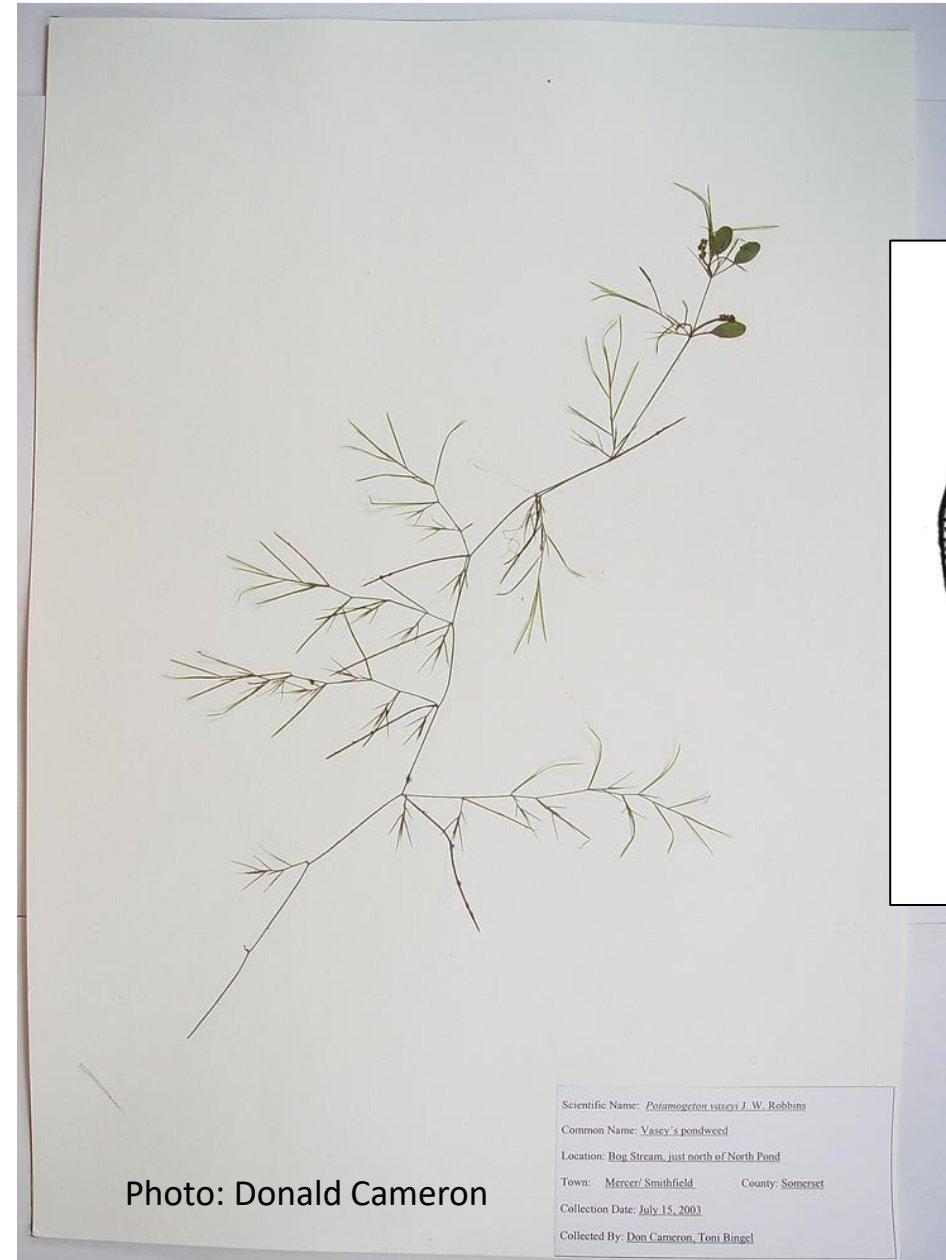


Pondweeds: Vasey's Pondweed

Vasey's Pondweed

Potamogeton vaseyi

- Not Common in NE
- **Distinguishing Characteristics:**
- Floating Leaves
 - Ellipse shape; 8-15 mm long
 - Transparent
 - 5-9 veins
 - Slender lacunar cells between veins
- Submersed Leaves
 - Hair-like; 0.2-1.0 mm wide
 - Sharply pointed
 - 1-3 veins; **no lacunar cells**
 - 2-6 cm long
- Fruit on whorled spike
 - Rounded
 - Hooked beak



Pondweeds: Spiral-fruited Pondweed

Spiral-fruited Pondweed

Potamogeton spirillus

- Stems are compact
 - Numerous branching
- **Distinguishing Characteristics:**
- Floating Leaves
 - **Tiny, ellipse shape**; 7-35 mm long
- Submersed Leaves
 - Linear; 1-8 cm long; 0.5-2.0 mm wide
 - Curled Appearance
- Nut-like Fruit
 - Coiled embryo, smooth sides
 - **Flat disk with sharply toothed margin**
- Stipules fused around stem
 - **>1/2 of length**



Thin-leaf Pondweed: Need the fruit to identify!



Pondweeds: Algal-leaved Pondweed

Algal-leaved Pondweed *Potamogeton confervoides*

- Prefers quiet, shallow waters
- Low pH, soft water
- **Distinguishing Characteristics:**
- No Floating Leaves
- Submersed Leaves, delicate
 - Very fine leaves
 - 2-5 cm long; 0.25 mm wide
 - **One vein only**
 - Fan-like branching
- **Thick, singular fruiting stalk**
 - Originates on main stem
- Fruit has 3 ridges

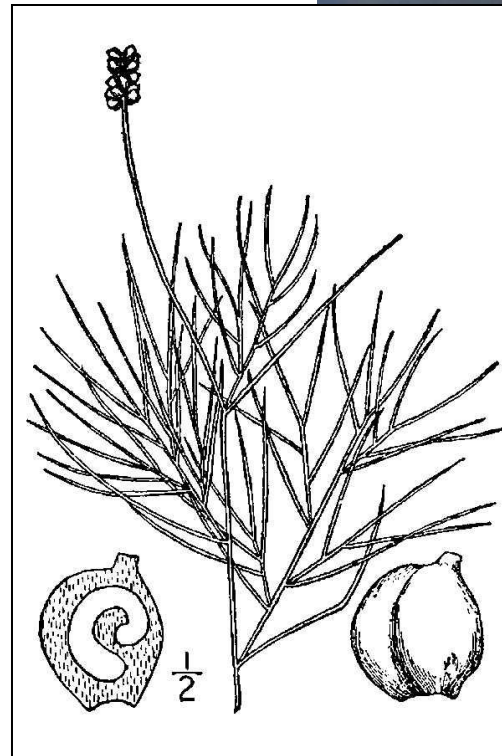


Photo: Donald Cameron

Pondweeds: Sago Pondweed

Sago Pondweed

Potamogeton pectinatus

(=*Stuckenia pectinata*)

- Can thrive in turbid water
- Prolific tuber producer
- **Distinguishing Characteristics:**
- Submersed Leaves Only
 - Pine needle-like leaves
 - Sharp point
 - Each branch forked (fan-like)
- Stipular sheath (fused to stem); 1-3 cm
- Slender seed stalk at surface
 - Seeds in whorl
 - Short beak, dorsal ridge

Similar Species (not pictured):

Sheathed Pondweed (*P. vaginatus*)

Thread-leaf Pondweed (*P. filiformis*)



Photo: Texas A&M



THANK YOU!

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