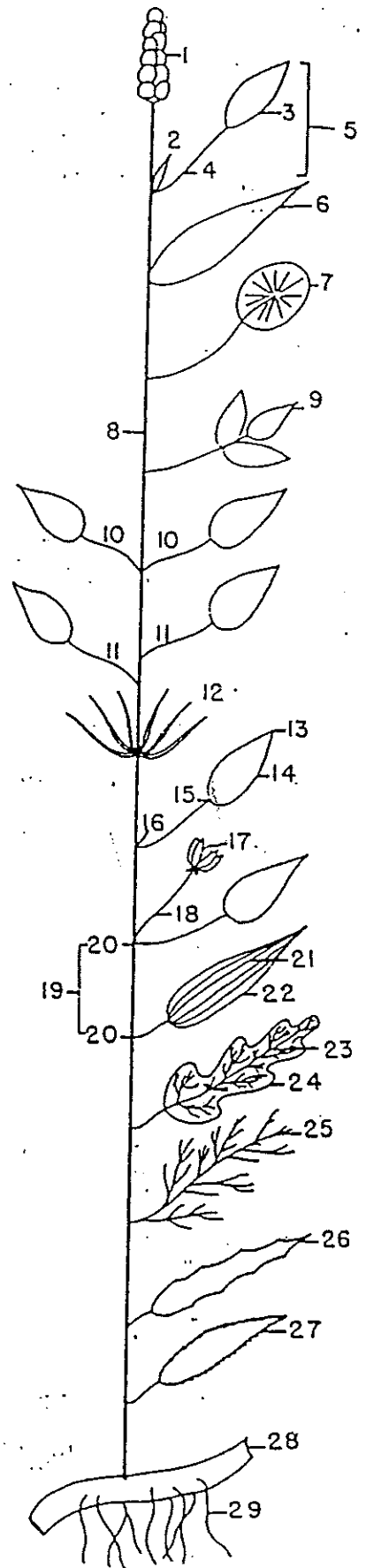
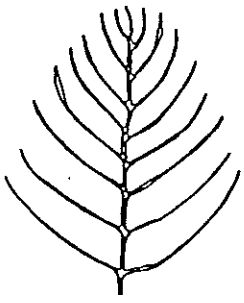


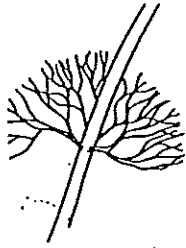
## IDENTIFICATION OF PLANT PARTS

1. Spike
2. Stipule
3. Blade
4. Petiole
5. Simple leaf
6. Sessile leaf (no petiole)
7. Peltate leaf (petiole attached at mid-underside)
8. Stem
9. Compound leaf (with three leaflets)
10. Opposite leaves
11. Alternate leaves
12. Whorled leaves
13. Leaf apex (tip)
14. Leaf margin
15. Leaf base
16. Leaf axil
17. Flower in leaf axil
18. Peduncle
19. Internode (between two nodes or joints)
20. Node (joint)
21. Parallel veins
22. Margin entire
23. Net veins
24. Margin lobed
25. Finely dissected leaf
26. Margin dentate
27. Margin serrate
28. Rhizome (underground stem)
29. Roots

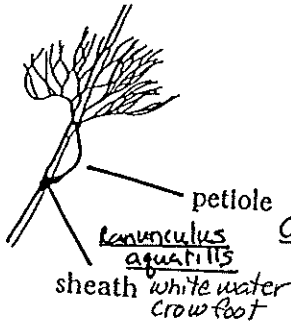




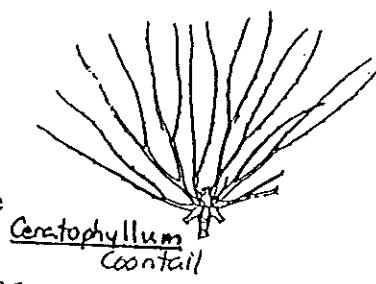
Myriophyllum  
water-milfoil



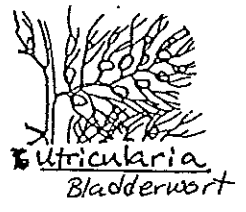
Megalodonta  
water marigold



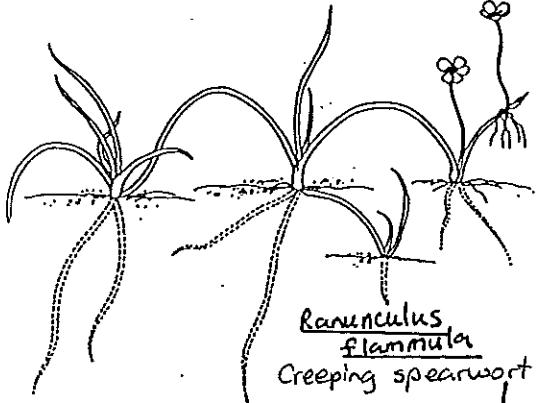
petiole  
Ranunculus aquatilis  
sheath white water  
crowfoot



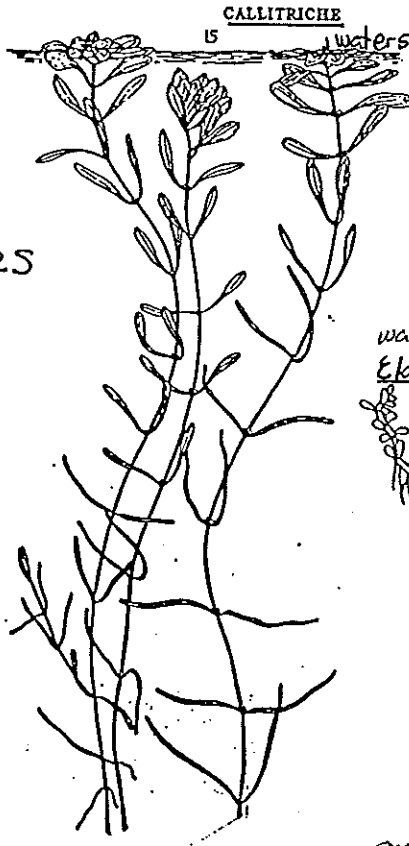
Ceratophyllum  
Coontail



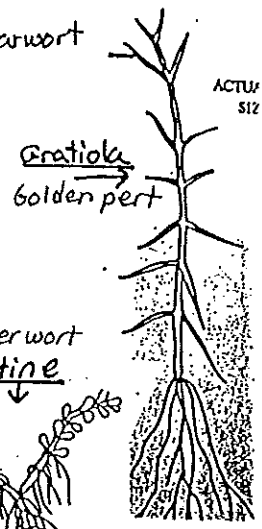
Utricularia  
Bladderwort



Ranunculus flammula  
Creeping spearwort



CALLITRICHE  
Waterstarwort



Gratiola  
golden pert

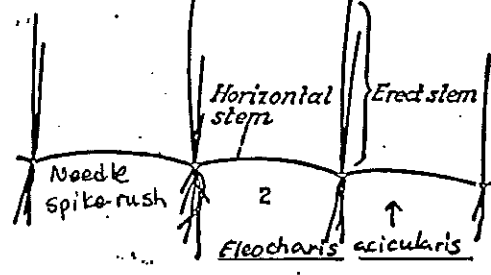
water wort  
Elatine

ACTU  
SIZ

### Look-Alikes

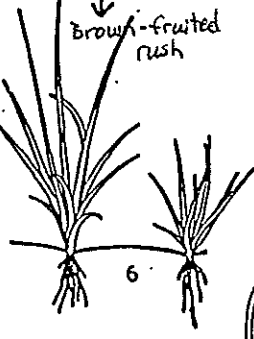


Water  
Lobelia  
Lobelia dortmanna

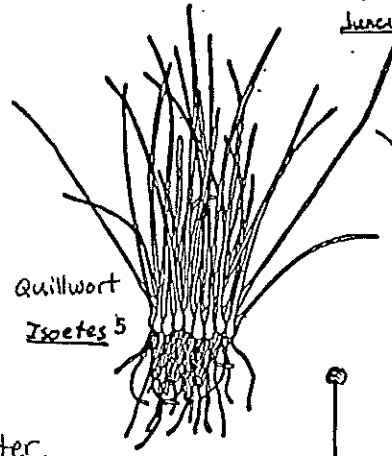


Eleocharis acicularis

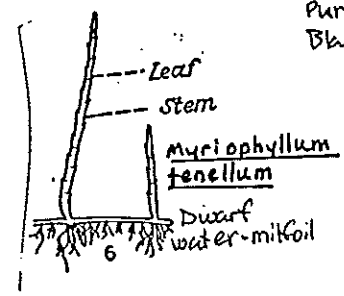
Juncus paleocarpus



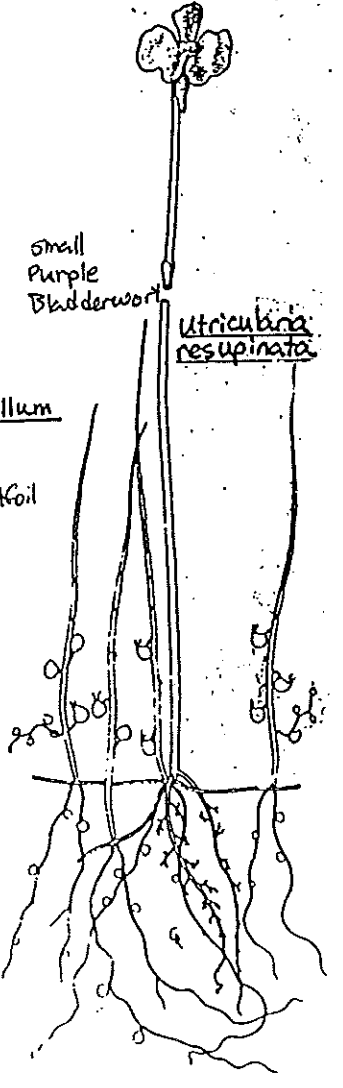
brown-fruited  
rush



Quillwort  
Isoetes 5



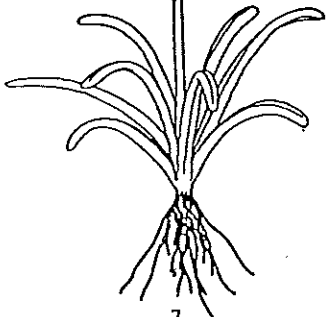
Leaf  
Stem  
Myriophyllum tenellum  
Dwarf  
water-milfoil



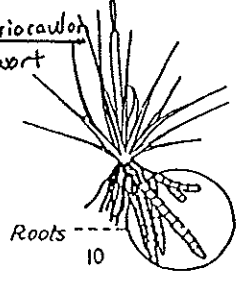
Small  
Purple  
Bladderwort  
Utricularia resupinata



4  
Lobelia dortmanna



Eriocaulon  
Pipewort



Littorella

Roots  
10

Identifying Pondweeds - A Brief Summary			
<i>Potamogeton</i> sp.	Floating Leaves? **	Most Distinguishing Characteristic	Most likely to be confused with
<i>P. alpinus</i>	yes	wide-ish, reddish leaves; 7 veins; wide midvein	<i>P. gramineus</i> , <i>P. illinoensis</i>
<i>P. amplifolius</i>	yes	widest leaves of all pondweeds; arched leaves; lots of veins	<i>P. illinoensis</i> , <i>P. praelongis</i>
<i>P. bicupulatus</i> *	yes	stipule like <i>P. diversifolius</i> ; thread-like submersed leaves; v. pointy floating leaves	<i>P. diversifolius</i> , <i>P. vaseyi</i>
<i>P. confervoides</i> *	no	extremely fine, bright green, thread-like leaves	<i>P. bicupulatus</i>
<i>P. crispus</i>	no	leaves like mini-lasagna noodles; serrate edge	<i>P. richardsonii</i>
<i>P. diversifolius</i> *	yes	subm.lvs. thread-like; stipule attached to leaf for 1/2 stipule length, one vein	<i>P. spirillus</i> , <i>P. bicupulatus</i>
<i>P. epihydrus</i>	yes	long ribbony submersed leaves; silky/slimy feel	<i>P. zosteriformis</i>
<i>P. foliosus</i>	no	narrow leaves; no glands; nutlets (w/knobby keel) in tight cluster on short stalks	<i>P. pusillus</i> , <i>P. strictifolius</i>
<i>P. friesii</i>	no	narrow leaves; 5 veins, glands; turions like fans; stipules white, fibrous,	<i>P. pusillus</i> , <i>P. strictifolius</i>
<i>P. gramineus</i>	yes	leaf width variable but tapered at both ends; leaf tip like thick bristle	<i>P. illinoensis</i>
<i>P. illinoensis</i>	yes	leaves near tip often opposite; stipules big, stiff with two ridges	<i>P. gramineus</i>
<i>P. natans</i>	yes	floating leaves only; base of leaf heart-shaped; petiole pale near leaf	<i>P. oakesianus</i>
<i>P. nodosus</i>	yes	floating and subm. leaves both taper to long leaf stalks	<i>P. illinoensis</i> , <i>P. natans</i>
<i>P. oakesianus</i>	yes	floating leaves only; base of leaf pointed; soft water	<i>P. natans</i>
<i>P. obtusifolius</i>	no	lvs:narrow but wider & rounder at tip than <i>P. pusillus</i> ; glands; nutlets w/ narrow ridge	<i>P. pusillus</i>
<i>P. praelongis</i>	no	leaves with boat-shaped leaf tip that often splits when pressed flat	<i>P. amplifolius</i> , <i>P. illinoensis</i>
<i>P. pulcher</i> *	yes	stems and leaves with black spots; nutlets with 3 sharp ridges	<i>P. natans</i>
<i>P. pusillus</i>	no	leaves narrow; tiny but conspicuous glands; fruits plain	<i>P. foliosus</i> , <i>P. obtusifolius</i>
<i>P. richardsonii</i>	no	leaves: triangular, wavy, often bright green with pale veins, clasp stems	<i>P. crispus</i> , <i>P. praelongis</i>
<i>P. robbinsii</i>	no	leaves: stiff, linear, v. dark green/blackish, strongly 2-ranked; short attached stipule	<i>P. epihydrus</i>
<i>P. spirillus</i>	yes	lvs. narrow & often curled; stipule attached; sharp, toothed ridged nutlets in clusters	<i>P. diversifolius</i>
<i>P. strictifolius</i>	no	lvs:pointy & fairly stiff; glands present(\$); stipules whitish, shreddy, fibrous	<i>P. friesii</i>
<i>P. vaseyi</i> *	yes	submersed leaves narrow & usually 1-veined, tiny floating leaves.	<i>P. foliosus</i> (if no float. lvs. present)
<i>P. zosteriformis</i>	no	very flat stem; leaves same width as flat stem; many veins	<i>P. epihydrus</i>
<i>S. filiformis</i> ***	no	leaves blunt/notched; free part of stipule up to 20mm, less fan-shaped than Sago	other <i>Stuckenia</i>
<i>S. pectinata</i> ***	no	(Sago), most leaves pointy; often bushy but highly variable	<i>Ruppia</i> , other <i>Stuckenia</i>
<i>S. vaginata</i> *** *	no	leaves like <i>S. filiformis</i> , free part of stipule v. short, stipular sheath inflated	other <i>Stuckenia</i>
* Special Concern, Threatened or Endangered      \$ Sources differ on whether <i>P. strictifolius</i> has glands			
**Individuals of plants listed as having floating leaves may or may not have floating leaves			
*** <i>Stuckenia</i> : all have stipules attached to leaf for 2/3 or more length of stipule			by Susan Knight 08/09

Cheat Sheet for Narrow-leaved Potamogeton (not including <i>Stuckenia</i> *)				Consider:
Narrow submersed leaves,	Stipule NOT	Glands**	Stipules: delicate	
No floating leaves,	attached		leaves: rounded, often >2.5mm wide	<i>P. obtusifolius</i>
(except <i>P. vaseyi</i> )			leaves: round w/sm. pointy tip, narrower	<i>P. pusillus</i>
			Stipules: fibrous, white, shreddy	
			leaves: v.pointy, leaf margin vein-like; leaves stiff	<i>P. strictifolius</i>
			leaves: not so pointy; turions: fan-like, 5 viens	<i>P. friesii,</i>
		No glands**	leaves: usually only one (indistinct) vein	<i>P. vaseyi</i>
			& usually has <b>tiny floating leaves, Special Concern</b>	
			veins: few, usually 3, fruit keel bumpy	<i>P. foliosus</i>
			veins: many	<i>P. zosteriformis</i>
			leaves: thread-like, <b>Threatened</b>	<i>P. confervoides</i>
Narrow submersed leaves,	Stipule Attached	Floating leaves	Submersed leaves	
Floating leaves often	half of stipule	tip rounded	0.5-2mm wide, blunt tipped	
present	attached		fruit: can see coiled embryo, bumpy, inclusters in axils	<i>P. spirillus</i>
No glands	half of stipule	more rounded	0.1mm wide, tip pointy, narrow lacunar band	
	attached		<b>Special Concern</b>	<i>P. diversifolius</i>
	less than half of	very pointy	0.1-0.4mm wide, tip tapering, no lacunar band	
	stipule attached		<b>Special Concern, in acidic water</b>	<i>P. bicupulatus</i>
* <i>Stuckenia</i> - stipule attached to leaf more than a few mm.				
**glands-some leaves will not have glands - look at many leaves				by Susan Knight 08/09

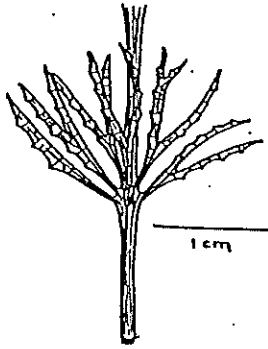
### Notes on Sterile *Myriophyllum* (Water-milfoil)

from Voss, E.G. Michigan Flora. Part II. Cranbrook Institute of Science and University of Michigan Herbarium. Bulletin 59. page 639.

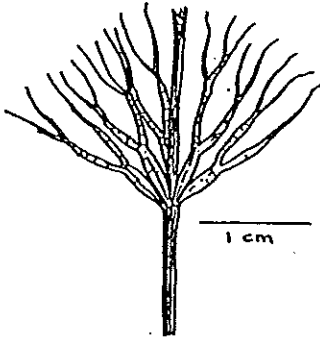
*M. tenellum* poses no problem. The small-leaved *M. alterniflorum* could be confused only with a form of *M. sibiricum* with reduced leaves. *M. farwellii* is extraordinarily limp and grows rarely in northern softwater lakes, nowhere else, and could be confused only with lax sterile *M. heterophyllum*. The following notes may help with the other four widespread species.

1. If there is a definite tendency to alternate leaves somewhere on the stem, the plant is *M. heterophyllum* (if not *M. farwellii*). But if all leaves are whorled it may be any species (except *M. farwellii*).
2. If many internodes exceed 10 mm it is not *M. heterophyllum*.
3. If the foliage is dense (very short internodes, sometimes with 6 leaves) and quite delicate, it is probably *M. heterophyllum*.
4. If the stems are whitish (with scattered yellow-orange dots), it is not *M. verticillatum*.
5. Only *M. spicatum* has as many as 14-17 segments on each side of some or all leaves.
6. *M. sibiricum* and *M. verticillatum* have fewer than 14 segments on each side of the leaf, but differ in stem color (brownish or greenish in the latter), and the former has the leaves all petioled. Plants with fewer than 8 or 9 segments are *M. sibiricum* rather than *M. verticillatum*.
7. If the base of the plant is present, in *M. verticillatum* and *M. sibiricum* roots may arise from a strong U-shaped bend in the stem, representing the axis of a turion, which only these species (and *M. farwellii*) produce.

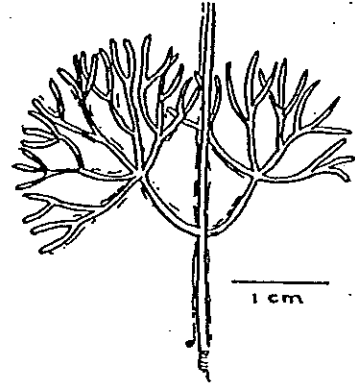
Submersed Plants with Divided Leaves



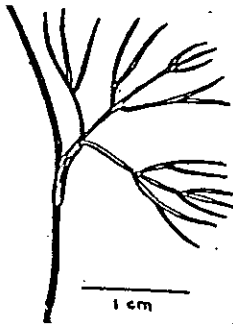
*Ceratophyllum demersum*



*Ceratophyllum echinatum*  
(rare)

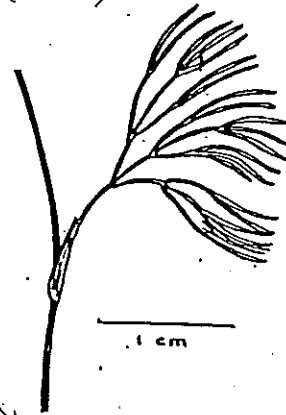


*Cabomba* (invasive, not yet in WI)

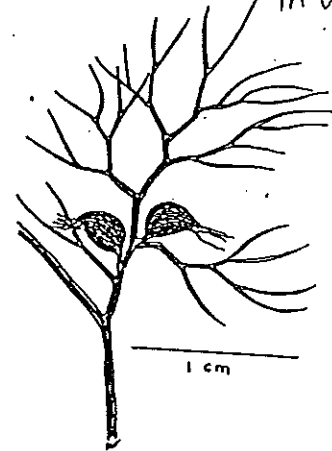


*Ranunculus longirostris*

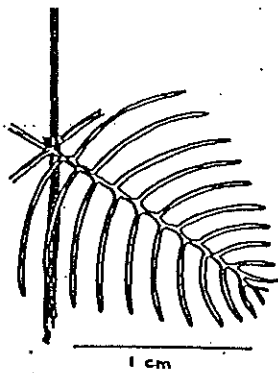
combined as  
*R. aquatilis*



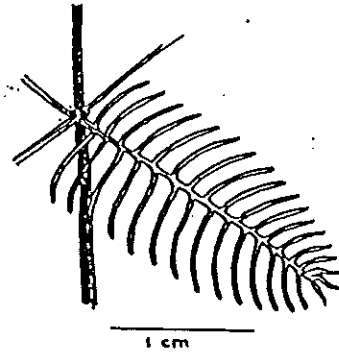
*Ranunculus trichophyllus*



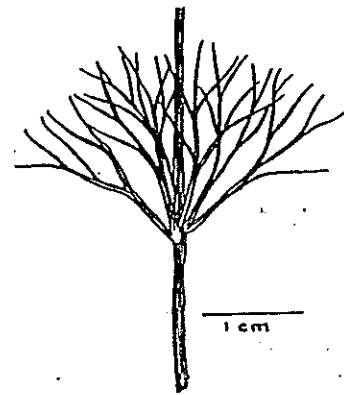
*Utricularia vulgaris*



*Myriophyllum sibiricum*



*Myriophyllum spicatum*



*Bidens beckii*

## Collecting and Pressing Plants

1. Collect as much of the plant as possible, including roots, stems, flowers and fruits. Aquatic plants are often sterile (non-flowering) but flowers and fruits are very helpful for identification. Only collect if you will not harm the population.
2. Keep plant refrigerated until you can identify and press it (up to 3-5 days).
3. Identify plant before pressing.
4. Using a pencil, label mounting sheet with plant name, location, date, and collector's serial number (a running tally of all his/her collections)
5. Rinse plant so it is free of epiphytes, silt, etc. and place on mounting paper. Plant may be bent into a "V" or "W" shape to fit on sheet.
6. If plant is limp or has finely dissected leaves\*,
  - Fill sink or tub with about an inch of water.
  - Slip mounting paper under water and float and arrange plant on sheet.
  - If plant has a complex leaf, such as water-milfoil, cut off one leaf and display it spread out.
  - Slowly, lift paper out of water so that plant remains spread out.
7. Cover plant with a sheet of waxed paper or plastic wrap.
8. Place sheet with specimen and wax paper inside folds of newspaper.
9. Make a sandwich of cardboard, blotting paper, newspaper/specimen, blotting paper, cardboard. Repeat for each specimen.
10. Place sandwiches between top and bottom end boards. Use rope or straps to compress plants to keep specimens flat as they dry.
11. Place press somewhere warm and dry – preferable in a ventilated box with light bulbs for quick drying. Remove plants in 5-6 days or when thoroughly dry.
12. Make label for plant on cotton-bond paper, including
  - County, state
  - Plant scientific name and author
  - Location including lake or place name and township, range and section or lat/long coordinates. (Use topographic map or plat map).
  - Date collected
  - Person who collected plant and person who identified plant if different
  - Collector's specimen
  - Habitat information and associated plants.
13. Glue label on lower right-hand corner of sheet when plant is dry.

\*If plant is not limp, simply place plant on mounting paper and proceed to make "sandwich" with newspaper, blotting paper and cardboard.

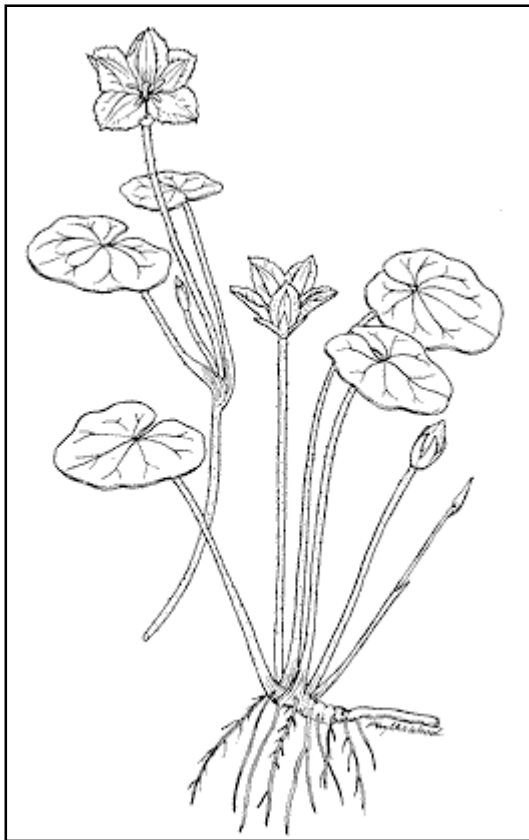
## References for Aquatic Plant Identification

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- Skawinski, P.M. 2018. Aquatic Plants of Upper Midwest: A photographic field guide to our underwater forests. 3<sup>rd</sup> Edition. For copies contact Lakeplants@yahoo.com
- Voss, E.G. and A.A. Reznicek. 2012. Field Manual of Michigan Flora. The University of Michigan Press, Ann Arbor, MI. 990 pp.
- Flora of Wisconsin (Consortium of Wisconsin Herbaria) Web Site:  
<http://wisflora.herbarium.wisc.edu/>
- Center for Aquatic and Invasive Plants - Florida  
<http://plants.ifas.ufl.edu/>
- Flora of North America (FNA) Online Web site: [http://www.efloras.org/flora\\_page.aspx?flora\\_id=1](http://www.efloras.org/flora_page.aspx?flora_id=1)  
\*Note: Not all genera are available on line but Volume 22 has many aquatic plants, including pondweeds (*Potamogeton* and *Stuckenia*). Vol. 23 is sedges.
- Integrated Taxonomic Information System (authoritative taxonomic information for North America)  
<https://www.itis.gov/>

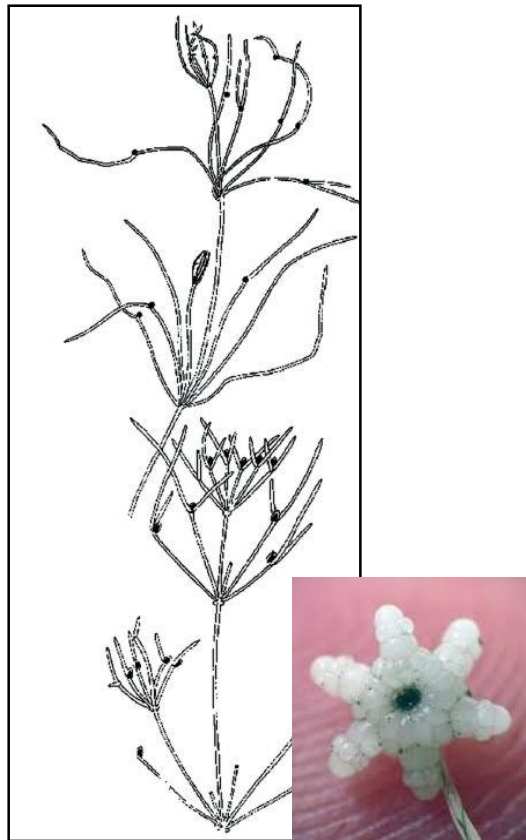


# Aquatic Invasive Plants Threatening WI

***Nymphoides peltata*,**  
Yellow floating heart



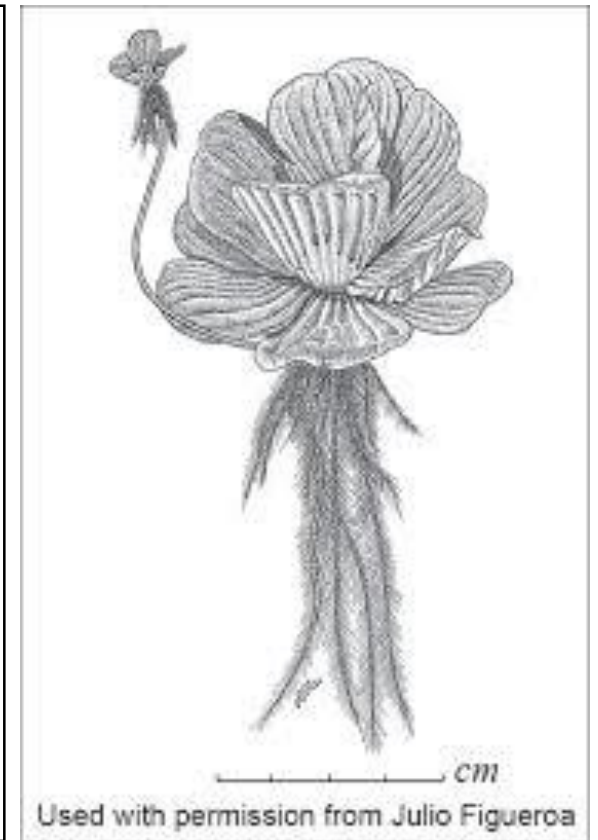
***Nitellopsis obtusa***  
Starry stonewort

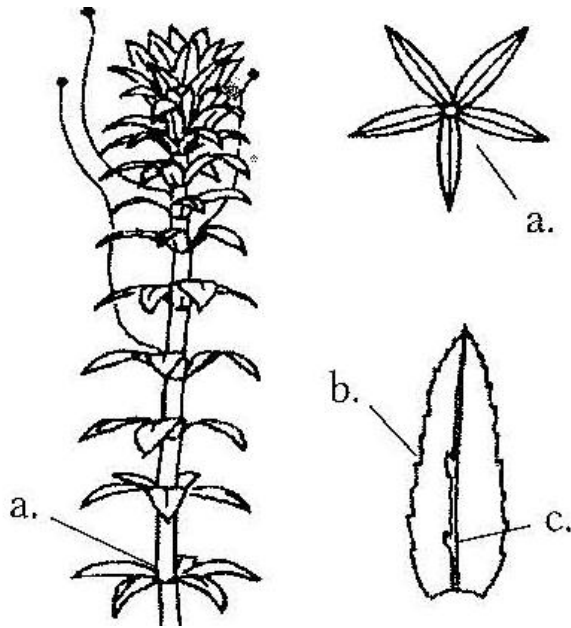


***Eichhornia crassipes***  
Water hyacinth



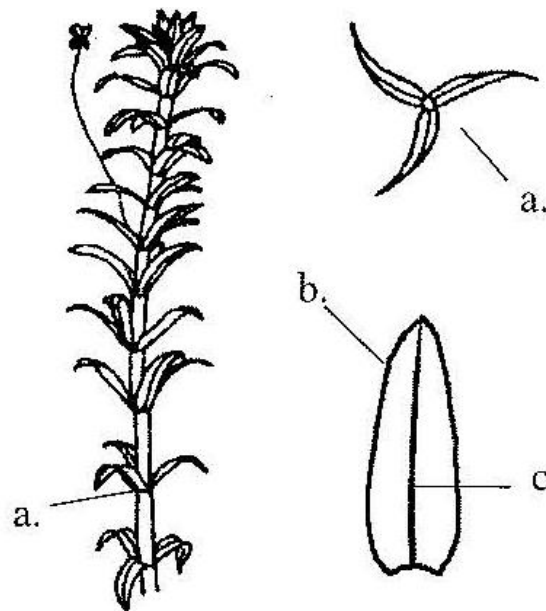
***Pistia stratiotes*,**  
Water lettuce





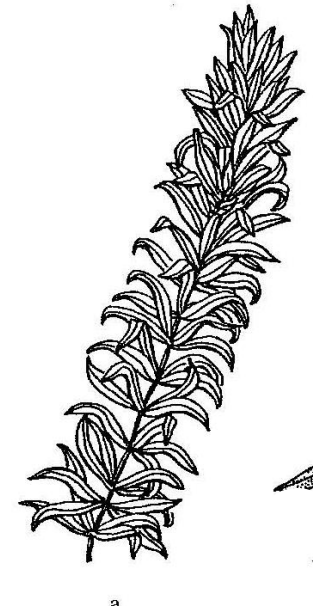
### ***Hydrilla verticillata***

1. Leaves 0.6-1.7 cm
2. Leaves in whorls of 4-6
3. Leaf margins toothed
4. Midvein of lower leaf surface with spine-like teeth



### ***Elodea canadensis***

1. Leaves 0.6-1.7 cm
2. Leaves in whorls of 3
3. Leaf margins smooth



### ***Egeria densa***

1. Leaves 1.2-4 cm
2. Leaves in whorls of 5 or more
3. Leaf margins smooth