

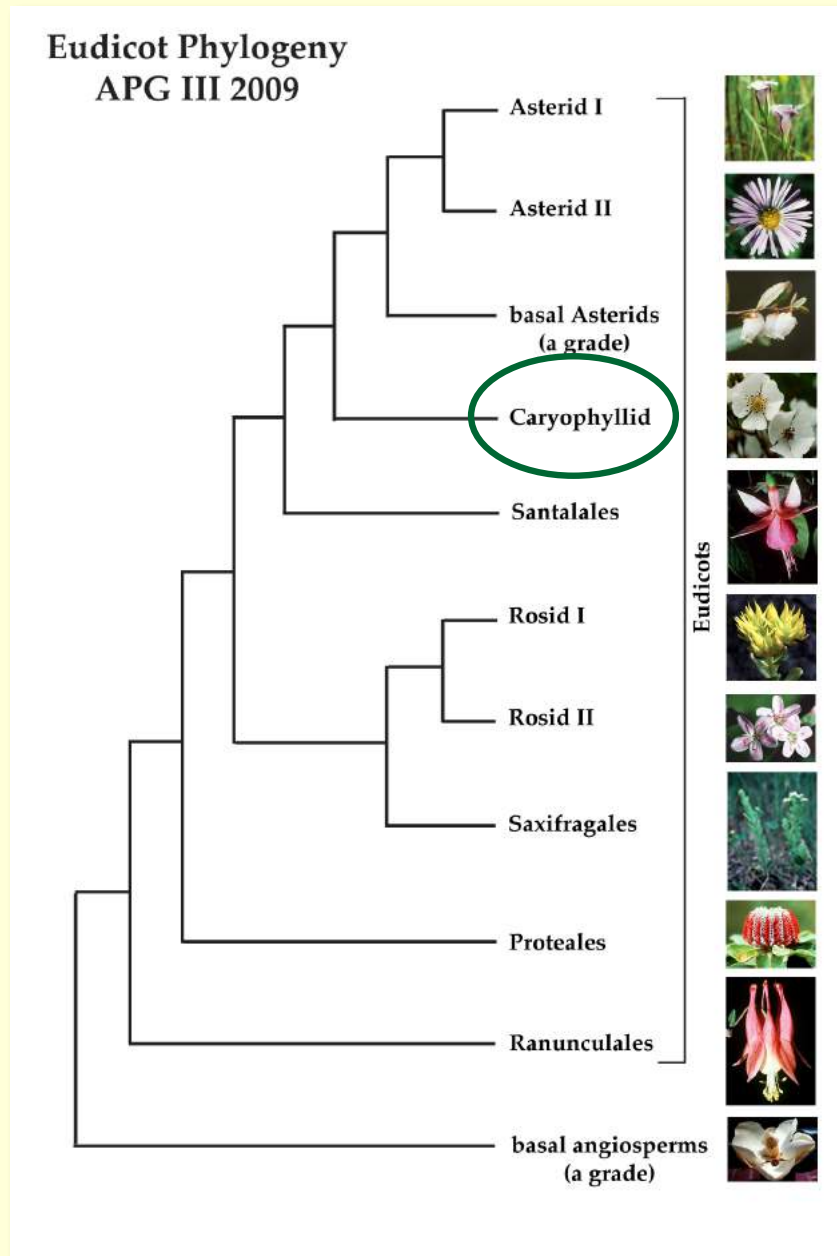


Diversity of Caryophyllids

. . . carnations, cacti, chenopods . . .

[Tues lab –
you will finish mayapples, poppies, lotus lily, sycamores in lab]

Succulents & Carnivores & Weeds



The caryophyllid group is a strange mixture of plants including cacti, carnations, and some carnivorous families.

Specialists of deserts, salt environments, nutrient poor sites, and weedy areas – often with interesting physiological adaptations.



Caryophyllaceae - pink family

Huge family, widespread but characteristic of temperate and warm temperate regions of the Northern Hemisphere.

In Wisconsin we have 18 genera and 63 species

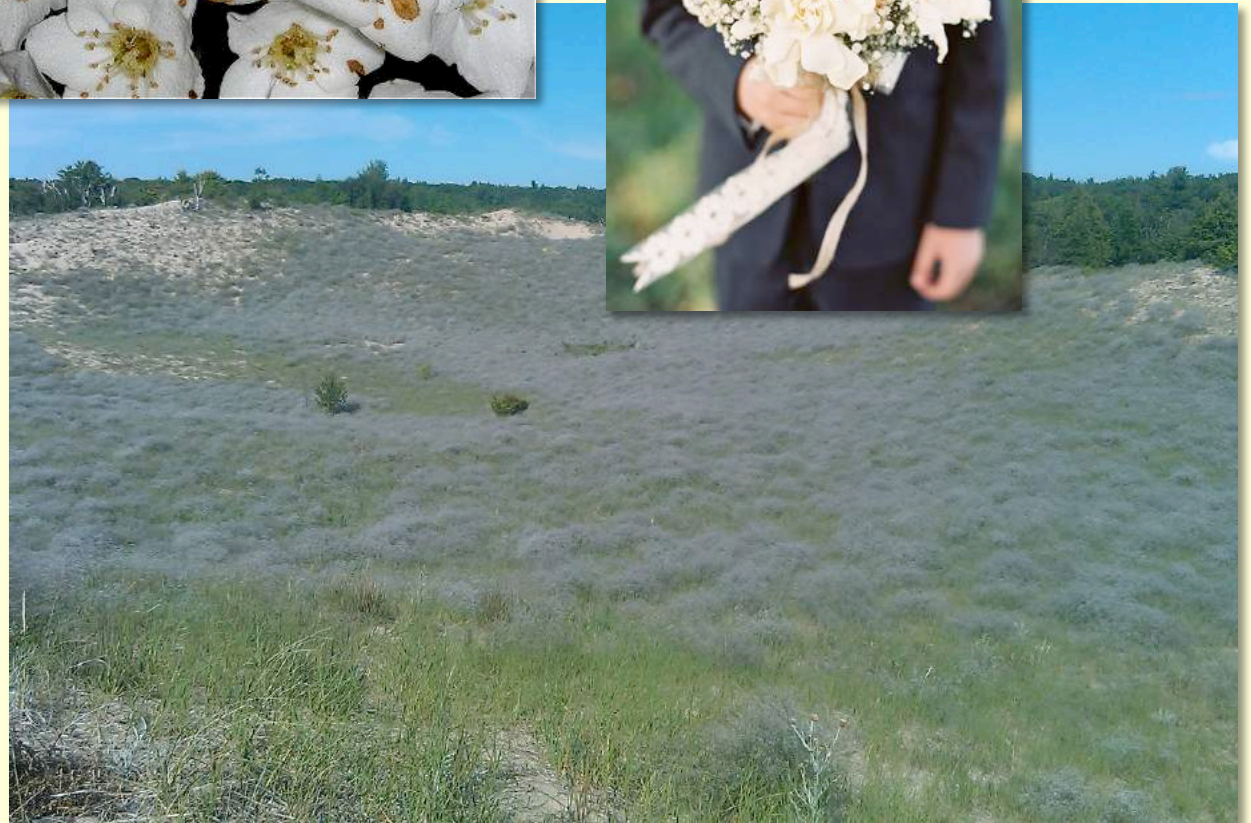
Caryophyllaceae includes the pinks, catchflies, and carnations of garden fame



Caryophyllaceae - pink family

Many of the species are **introduced** (either by Native Americans or Europeans or later)

- either **naturalized** – well-established, often widespread plant that is not originally in our flora
- or **adventive** – only casually established, not persistent.



Gypsophila paniculata
Baby' s-breath invasive on
Lake Michigan dunes

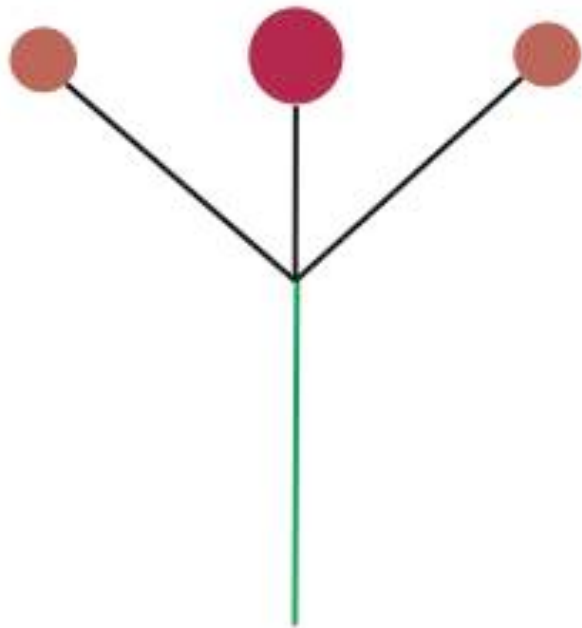
Caryophyllaceae - pink family

- Herbs, simple, opposite, entire leaves; nodes usually swollen
- Inflorescence a **dichasium** - determinate inflorescence - or **cyme** (compound dichasium)



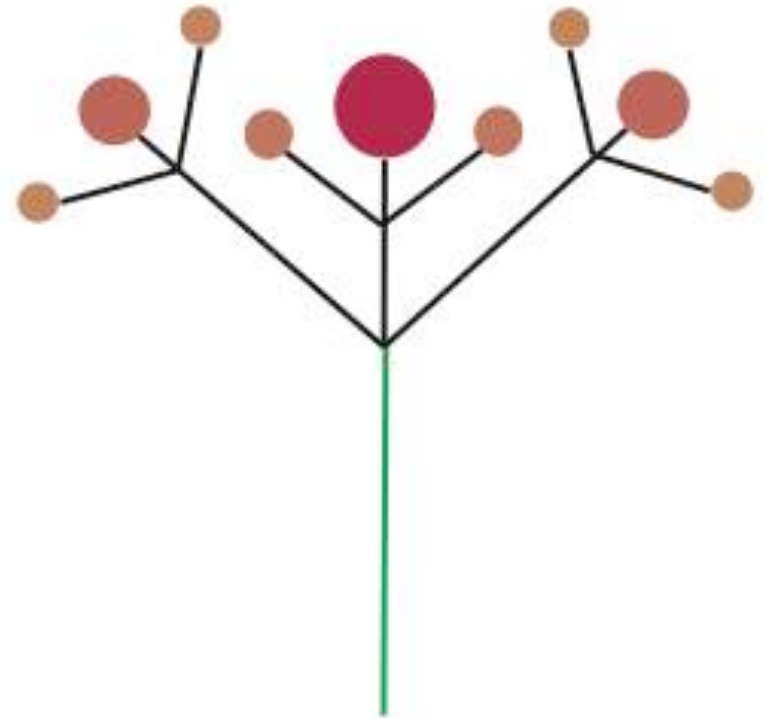
Note 3 way split,
middle branch is
oldest flower

The dichasium inflorescence is terminated (i.e., determinate) by the oldest flower and flanked by two lateral younger flowers.



Dichasium

compound



Cyme

Caryophyllaceae - pink family



CA 5, (5) CO 5 A 5, 10 G (2-5)

- Some fused sepals, others not
- Petals often differentiate into a limb and claw, the apex is often notched

Free central placentation = free standing placental column in single locular pistil on which ovules are attached, or **axile**, or both at same time!

Capsule opens by valves or teeth





Silene vulgaris



Silene gallica



Silene secundiflora



Silene latifolia



Silene colorata



Silene nicaeensis

Caryophyllaceae - pink family



Minuartia michauxii
(= *Arenaria stricta*)
sand rockwort



Caryophyllaceae - pink family



Cerastium
mouse-ear chickweed
5- styles!

Caryophyllaceae - pink family



Stellaria longifolia
long leaved stitchwort



Stellaria media
common stitchwort

3 styles!

Caryophyllaceae - pink family



Silene latifolia - white campion



Silene vulgaris - bladder
campion with vespid wasp
pollinator



Silene – also called “catch-fly”

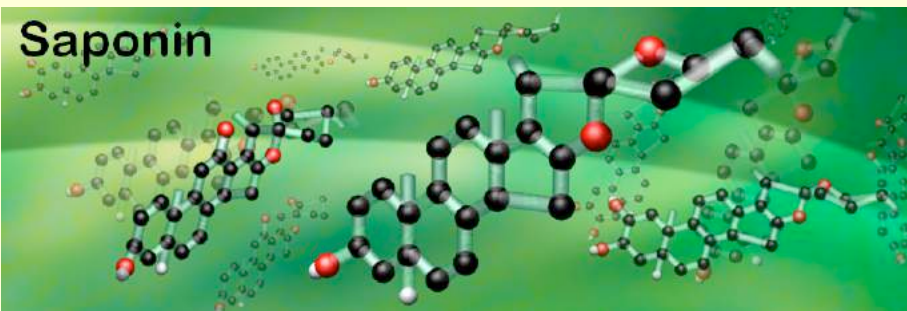
Caryophyllaceae - pink family



European species becoming invasive



Saponaria officinalis - bouncing bet, soapwort

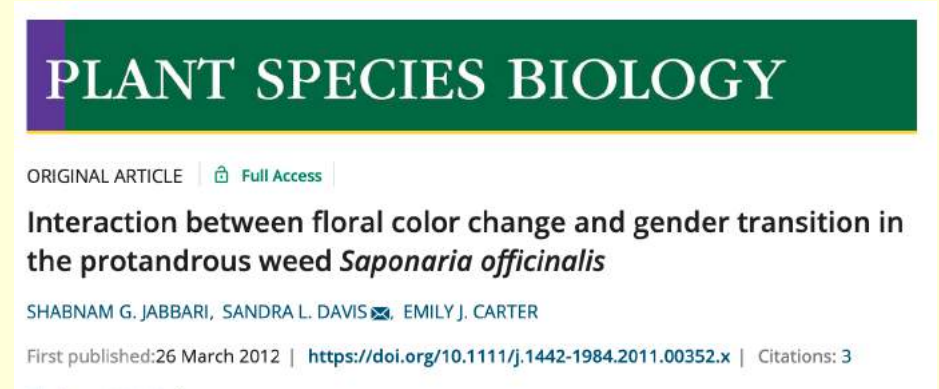


Caryophyllaceae - pink family



(1) Male phase & (2) female phase

Dichogamy
Why does it change color?



Saponaria officinalis - bouncing bet, soapwort

Phytolaccaceae - pokeweed family



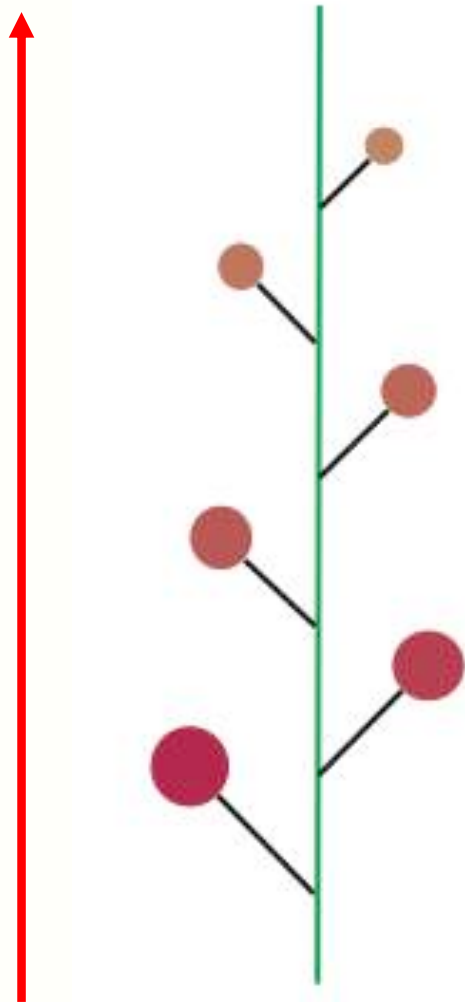
Family that is chiefly tropical and subtropical in distribution

In Wisconsin we have 2 species of *Phytolacca* - one native

Shrub with alternative simple leaves

Inflorescence typically an indeterminate **raceme**

Phytolacca americana - pokeweed



Raceme

- simplest inflorescence type is **indeterminate**
- oldest flowers at the base
- younger flowers progressively closer to the apical meristem of the shoot

= a **raceme**

Phytolaccaceae - pokeweed family

CA 5 CO 0 A 10 G (∞)

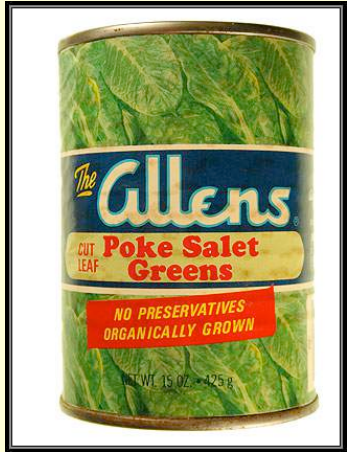
- No petals
- 2x as many stamens as sepals
- fused carpels but only 1 ovule per carpel
- berry fruited, bird dispersed, and a source of dye



Phytolacca americana - pokeweed



Phytolaccaceae - pokeweed family



Alice Tanksley Brown's Poke Salet

Alice Tanksley Brown grew up in Mississippi, a state rich in pokeweed. She remembers Dr. Pruett telling her mother, “Widow, if you give your children a mess of poke in the spring and some sassafras tea, you’ll save yourself doctor bills for a year.” The good doc was probably referring to pokeweed's leaves purgative powers as they contain toxic alkaloids that should not be eaten in large amounts. Most recipes call for the green to be parboiled, at least once and sometimes twice, and for the water to be discarded.

The genus is **poisonous**, containing a dense array of chemicals used in a variety of medicinal treatments.

Phytolaccaceae - pokeweed family



CA 5 CO 0 A 10 G ∞

our non-native species – **achenes!**



Phytolacca acinosa – Indian pokeweed



Phytolacca acinosa – Indian pokeweed

Portulacaceae - purslane family

Family comprises small **succulent** herbs with small flowers except for cultivated species.



Portulaca oleracea
Common purslane

Portulaca grandiflora
Rock rose (Argentina)

Portulacaceae - purslane family



Portulaca oleracea – little hogweed, purslane

Prostrate herb, leaves succulent; has been cultivated as a salad [‘oleracea’ = edible]

Flowers are small, yellow, 5-merous

Capsule opens via a cap or lid



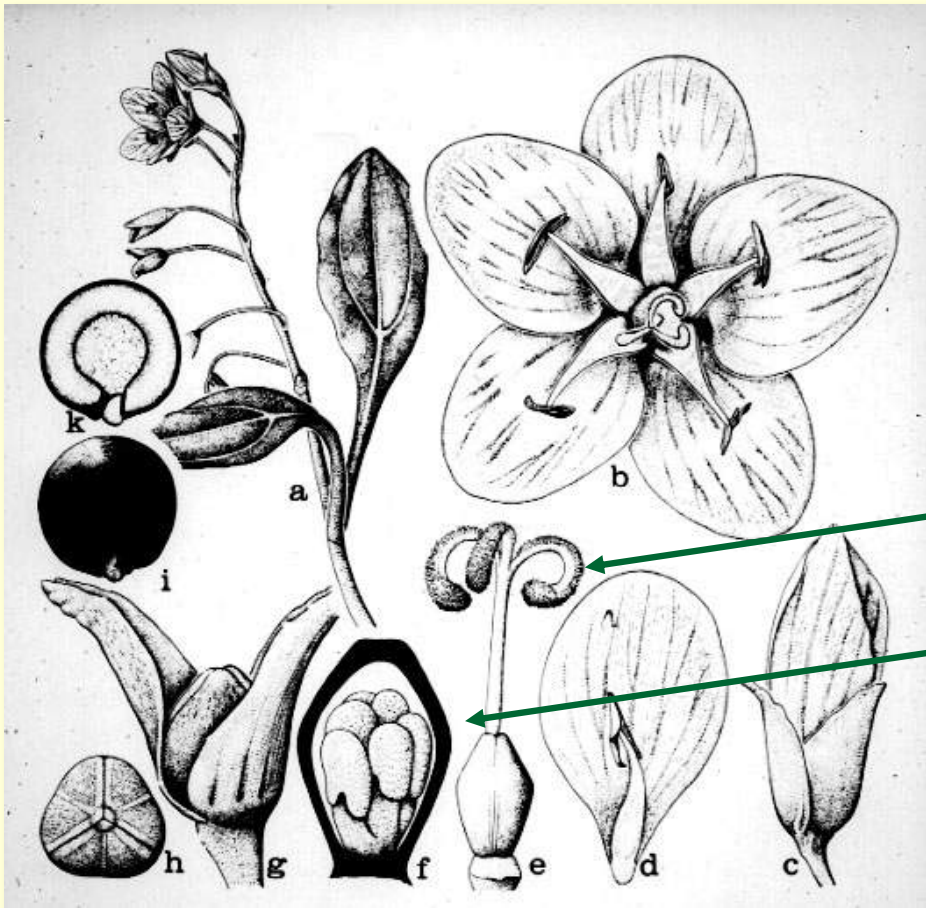
Portulaca oleracea
Portulacaceae
© G. D. Carr



“herbal minute with Brigitte Mars” @ <http://www.youtube.com/watch?v=C9bFtKMSnXs>

Montiaceae – spring beauty family

CA 2 CO 5 A 5+ G (3)



- 2 sepals, 5 showy petals, 5 stamens
- 3 fused carpels (note the 3 stigma)
- **Basal** placentation
- Fruit is a capsule “with a lid”

Montiaceae – spring beauty family



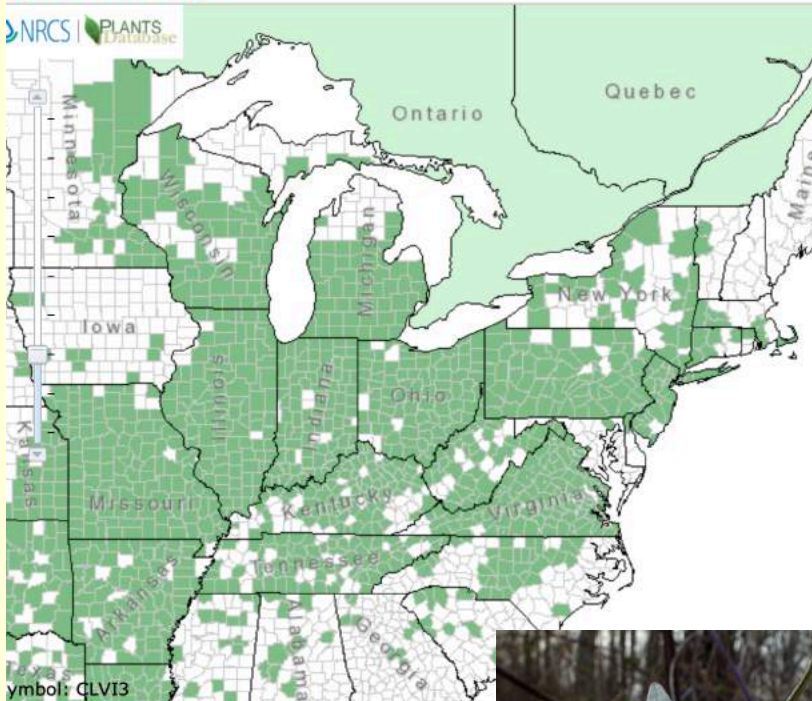
Claytonia virginica - spring beauty



Claytonia caroliniana - spring beauty



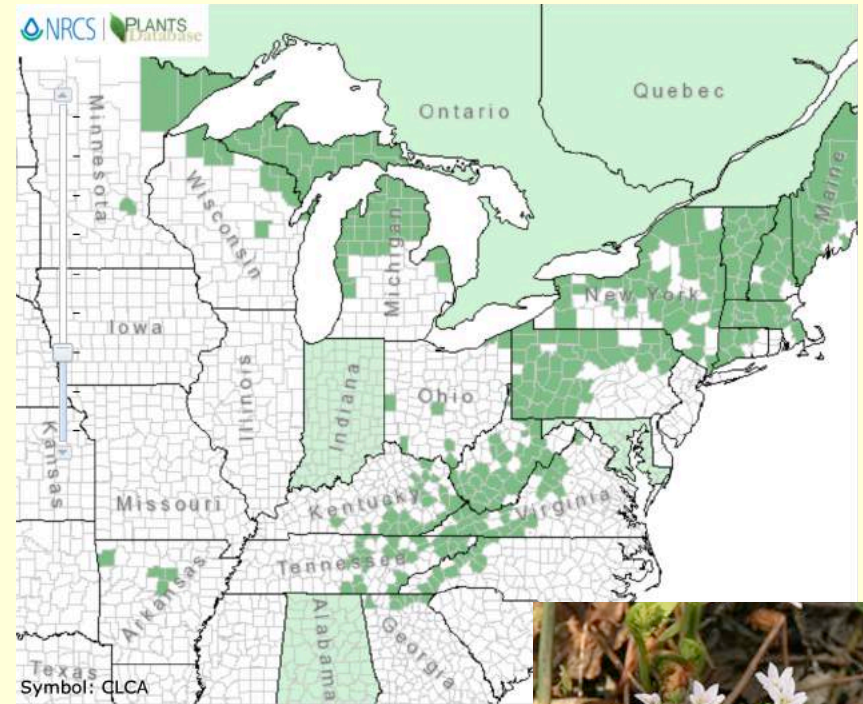
Montiaceae – spring beauty family



Claytonia virginica -
spring beauty



Lower elevation E NAm
S of Tension Zone Great Lakes



Claytonia caroliniana -
spring beauty



Higher elevation E NAm
N of Tension Zone Great Lakes

Cactaceae - cactus family

A New World family; xeromorphic trees, **stem succulents** and sometimes epiphytic

In Wisconsin we have 1 genus, *Opuntia*, with 2 recognized species



Opuntia macrorhiza –
plains prickly-pear



Opuntia fragilis –
brittle prickly-pear



Cactaceae - cactus family

- **Tepals**
- Ovary is inferior and consist of 4 fused carpels with **parietal placentation**
- Fruit a **berry** (jam, wine!)

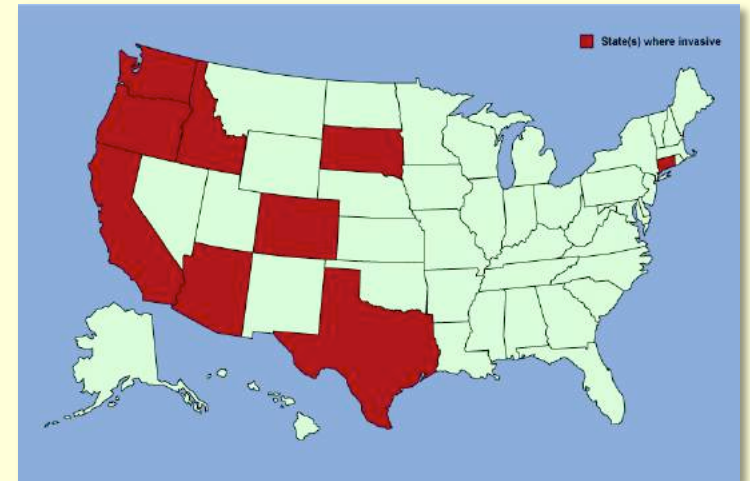
$P \infty$	$A \infty$	$G (4)$
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Opuntia macrorhiza - plains prickly-pear

Amaranthaceae - amaranth family

- large family (now includes Chenopodiaceae)
- abundant in desert and semi-desert regions & weeds here!
- **halophytic** - salt-loving; tumbleweeds



Bassia scoparia - summer cypress

Amaranthaceae - amaranth family

- large family (now includes Chenopodiaceae)
- abundant in desert and semi-desert regions & weeds here!
- **halophytic** - salt-loving; tumbleweeds
- many species exhibit **xerophytic** adaptations (succulence, C4 or CAM photosynthesis)

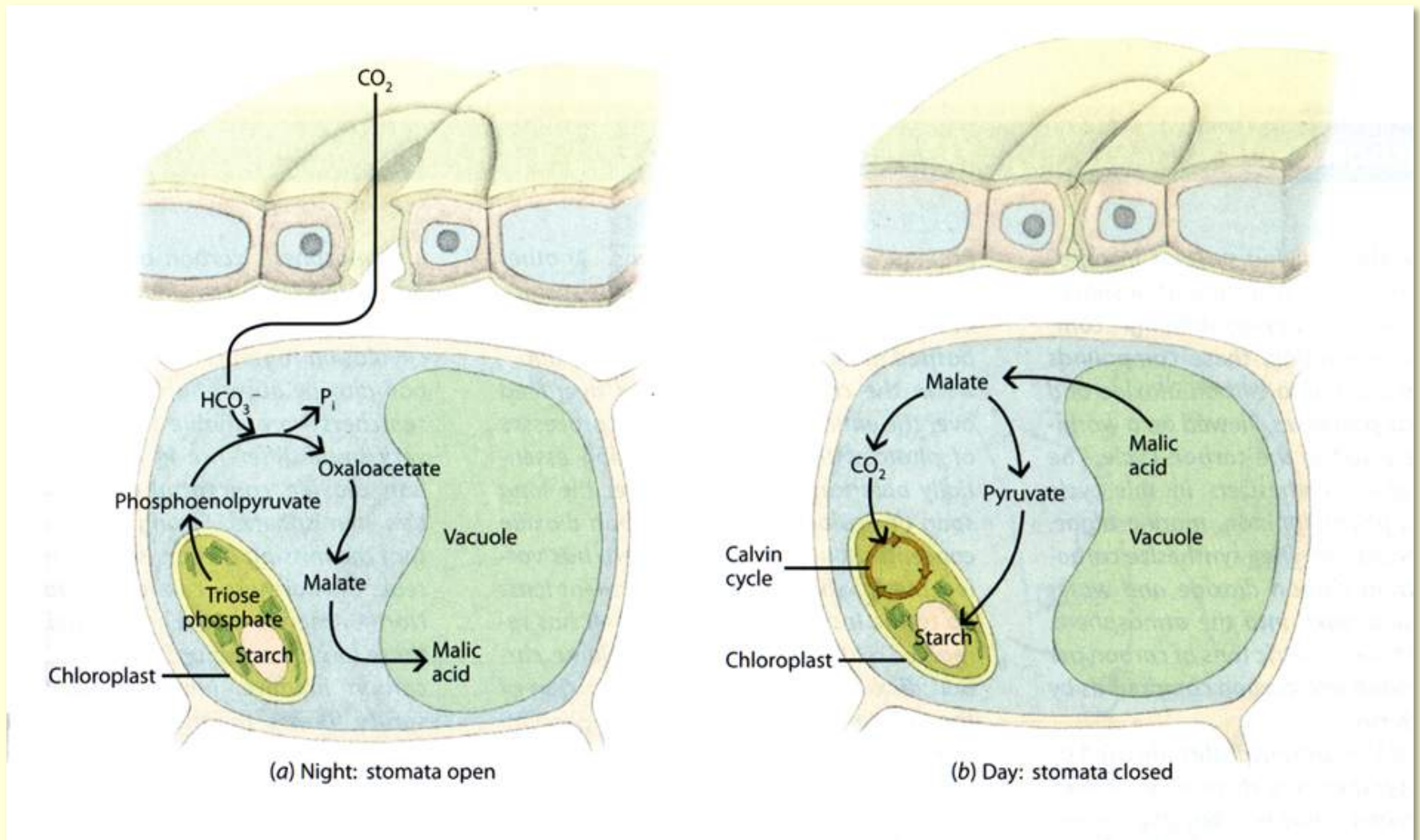


Salicornia virginica - glasswort



Chenopodium album - lamb's quarter

Amaranthaceae - amaranth family



C₄ and Crassulacean Acid Metabolism

Amaranthaceae - amaranth family

Flowers very small, greenish, **perfect or imperfect** (both monoecious and dioecious); congested inflorescences; wind pollinated

CA (2-5) CO 0 A 2-5 \bar{G} (2-3)

- Sepals only – persist in fruit
- Pistil with 1 locule and 1 ovule – **achene**



Chenopodium album - lamb's quarter

Amaranthaceae - amaranth family

Welcome to the Online Virtual Flora of Wisconsin

This site is a collaborative effort between the herbaria of the UW-Madison (WIS) and the UW-Steven's Point (UWS) plant species that occurs in Wisconsin, including photos, distribution maps, specimen records, and more.

Quick Search

Select a species to access available images.

Chenopodium [Goosefoot]
Chenopodium album [common lamb's-quarters; lamb's quarters; pigweed]
Chenopodium album f. *lanceolatum*
Chenopodium album var. *album*
Chenopodium album var. *lanceolatum*
Chenopodium album var. *missouriense*
Chenopodium album var. *stevensii*
Chenopodium ambrosioides
Chenopodium ambrosioides subsp. *eu-ambrosioides*
Chenopodium ambrosioides subsp. *eu-ambrosioides* var. *suffruticosum*
Chenopodium ambrosioides subsp. *eu-ambrosioides* var. *typicum*
Chenopodium ambrosioides subsp. *eu-ambrosioides* var. *typicum* f. *integrifolium*
Chenopodium ambrosioides var. *ambrosioides*
Chenopodium ambrosioides var. *integrifolium*
Chenopodium ambrosioides var. *suffruticosum*
Chenopodium ambrosioides var. *typicum*
Chenopodium ambrosioides var. *typicum* f. *integrifolium*
Chenopodium berlandieri [pit-seed goosefoot]
Chenopodium berlandieri subsp. *platyphyllum*
Chenopodium berlandieri subsp. *zschackei*
Chenopodium berlandieri var. *bushianum* [Bush's goosefoot; pit-seed goosefoot]
Chenopodium berlandieri var. *farinosum*
Chenopodium berlandieri var. *zschackei* [pit-seed goosefoot; Zschack's goosefoot]
Chenopodium bosclanum
Chenopodium botrys
Chenopodium bushianum
Chenopodium bushianum var. *acutidentatum*
Chenopodium calceoliforme
Chenopodium capitatum [blite goosefoot; Indian ink; Indian-paint; strawberry-blite]
Chenopodium capitatum var. *capitatum* [blite goosefoot; Indian ink; Indian-paint; strawberry-blite]
Chenopodium desiccatum var. *leptophylloides*
Chenopodium foliosum [leafy goosefoot]
Chenopodium gigantospermum
Chenopodium gigantospermum var. *standleyanum*
Chenopodium glaucophyllum
Chenopodium glaucum [oak-leaf goosefoot; oak-leaved goosefoot]
Chenopodium glaucum subsp. *euglaucum*
Chenopodium glaucum var. *glaucum* [oak-leaf goosefoot; oak-leaved goosefoot]
Chenopodium hybridum subsp. *gigantospermum*
Chenopodium hybridum var. *gigantospermum*
Chenopodium hybridum var. *simplex*
Chenopodium hybridum var. *standleyanum*
Chenopodium lanceolatum
Chenopodium missouriense
Chenopodium murale [nettle-leaved goosefoot; sowbane]
Chenopodium opulifolium [seaport goosefoot]
Chenopodium pagani
Chenopodium petiolare var. *leptophylloides*
Chenopodium platyphyllum
Chenopodium polyspermum [many-seed goosefoot]
Chenopodium polyspermum var. *acutifolium* [many-seed goosefoot]
Chenopodium pratericola [desert goosefoot; narrow-leaf goosefoot]
Chenopodium pratericola subsp. *eupratericola*
Chenopodium pratericola var. *leptophylloides*
Chenopodium pumilio
Chenopodium rubrum [alkali-blite; coast-blite; red goosefoot; red pigweed]
Chenopodium rubrum var. *rubrum* [alkali-blite; coast-blite; red goosefoot; red pigweed]
Chenopodium simplex [maple-leaved goosefoot]
Chenopodium standleyanum [Standley's goosefoot; woodland goosefoot]
Chenopodium strictum [late-flowering goosefoot]
Chenopodium strictum subsp. *glaucophyllum*
Chenopodium strictum subsp. *strictum*
Chenopodium strictum var. *glaucophyllum*
Chenopodium strictum var. *strictum*
Chenopodium subglabrum
Chenopodium suffruticosum
Chenopodium urticum [city goosefoot]

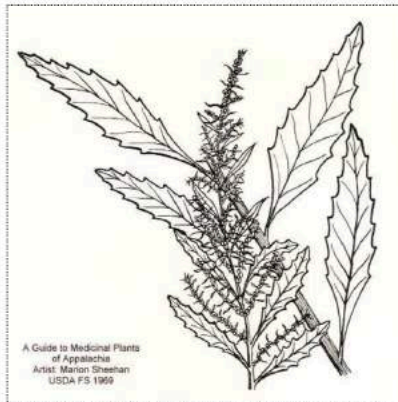
Chenopodium – big & messy!

Dysphania ambrosioides (L.) Mosyakin & Clemants (redirected from: *Chenopodium ambrosioides* subsp. *eu-ambrosioides*)

Family: Amaranthaceae

Mexican-tee, more...

[*Ambrina ambrosioides* (L.) Spach, more]



Traits

Links

Etymology: Dysphania: Greek dysphanis for "obscure," referring to the inconspicuous flowers

Plants: annual/perennial forb

Conservation Status: Introduced - adventive



*Chenopodium
ambrosioides*

*Dysphania
ambrosioides*

Amaranthaceae - amaranth family



Amaranthus retroflexus - rough amaranth, pigweed, redroot



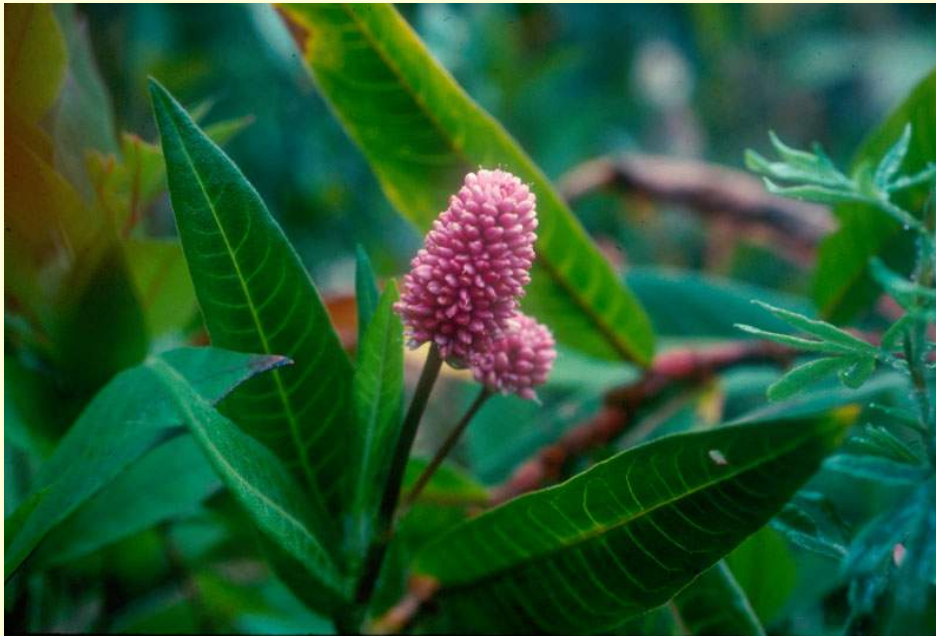
Froelichia floridana - cottonweed



Polygonaceae - smartweed family

Large, difficult family especially common in northern temperate regions – lots of generic changes!

In Wisconsin we have many *Persicaria* (smartweeds), *Fallopia* (bindweeds, giant knotweeds), *Polygonum* (knotweeds), *Rumex* (sorrels, docks)



Persicaria amphibia - water smartweed



Persicaria hydropiper - water pepper

Polygonaceae - smartweed family



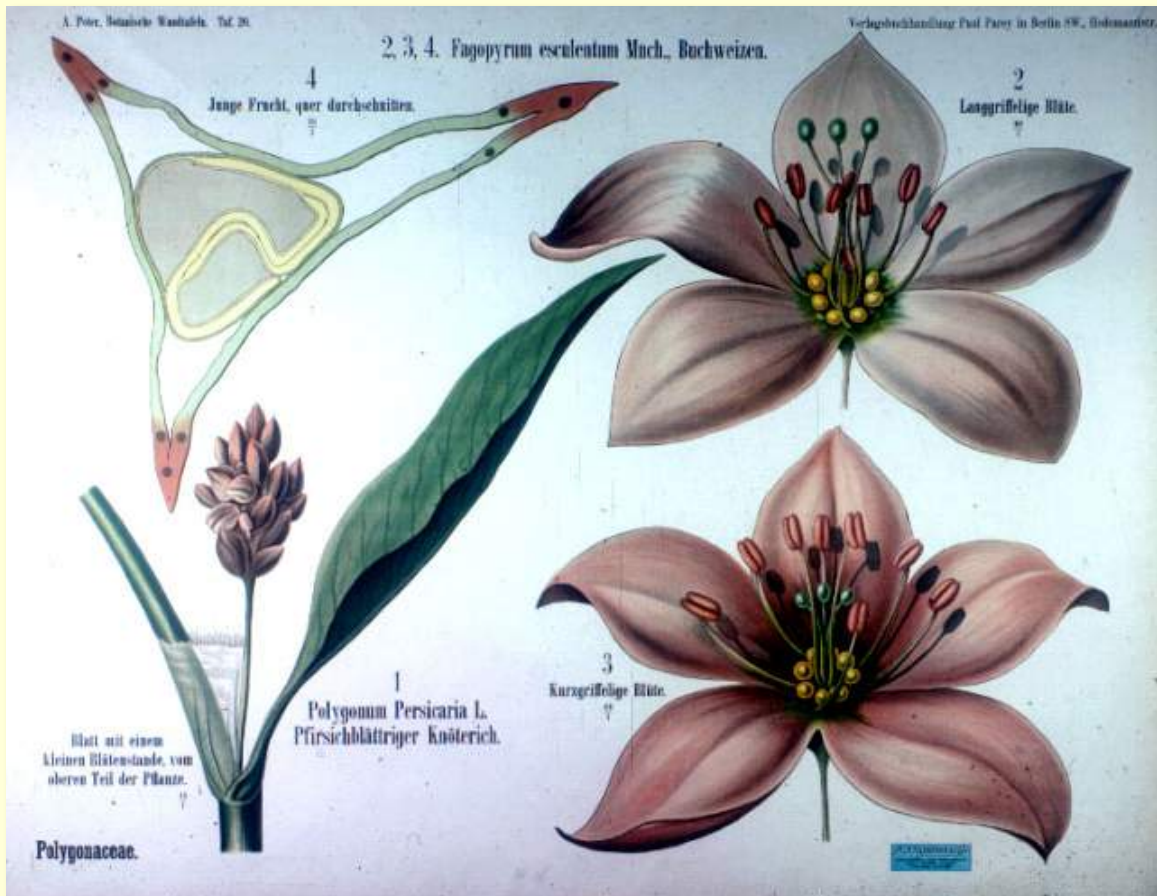
Herbs, shrubs with swollen nodes;
leaves typically alternate and
simple



Ocrea is a good character for the
family – membranous sheath (connate
stipule)

Polygonaceae - smartweed family

CA 5-6 CO 0 A 5-8 G (3)



- Flowers usually bisexual,
- Flowers are small often white to red
- 5 or 6 sepals (tepals) that often become large and membranous in fruit
- No petals
- Fruit is a triangular one-seeded **achene** (derivation of family name)

Polygonaceae - smartweed family



Rumex acetosella - sheep or red sorrel



Ubiquitous weed around the world, especially in pastures; distinctive leaf bases (**sagittate** or **hastate**); acetic acid taste (sour = 'sorrel')

Polygonaceae - smartweed family



Rumex crispus
Curly dock



Polygonella articulata
jointweed

Rumex brittanica
(*R. orbicularis*)
Water dock

One-seeded fruits
with 3 persistent
sepals or wings



Polygonaceae - smartweed family



Rheum rhabarbarum

Garden rhubarb - locally adventive



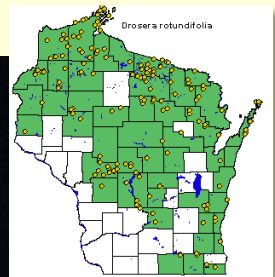
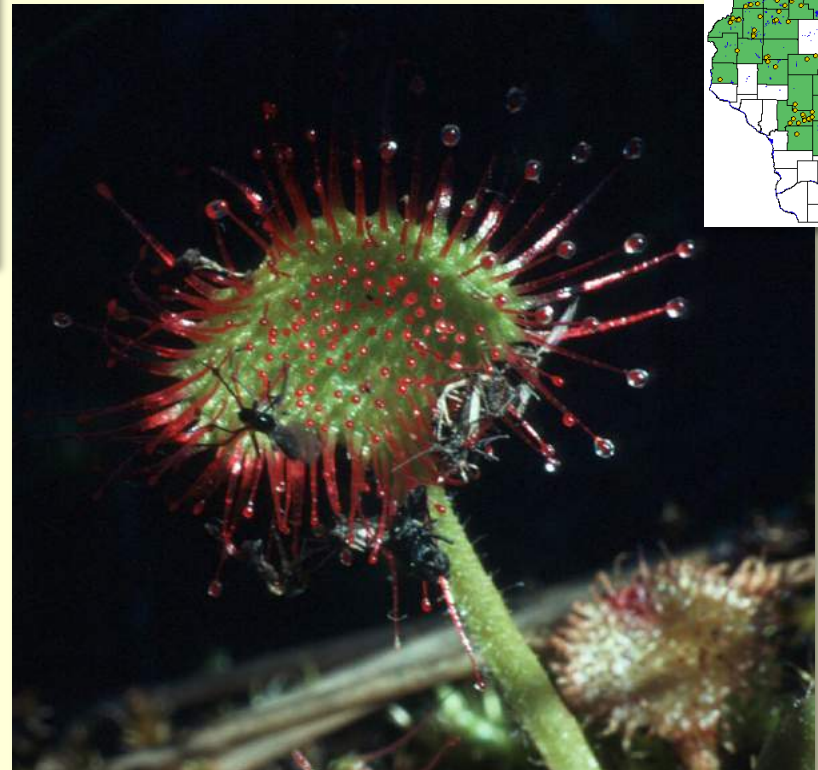
Droseraceae - sundew family



Drosera rotundifolia - round leaved sundew

The sticky **tentacles** are modified leaves with gland tipped hairs that capture the insects. Digestion and then absorption of amino acids follows.

Insectivorous family including snap traps (Venus fly trap) and sticky fly papers (sundews). In Wisconsin we have 4 species of *Drosera* (sundews) in nutrient poor soils or peat.





“sundew time lapse” @ <http://www.youtube.com/watch?v=frmyzIhD29Q>

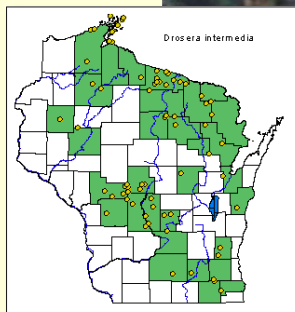
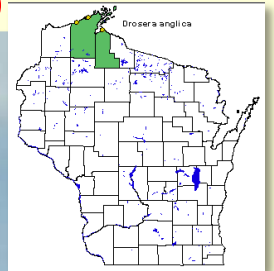
Droseraceae - sundew family



Different species vary in leaf shape

Flowers are small in a terminal raceme

Drosera anglica - English
sundew (threatened in WI)



Drosera intermedia - narrow-
leaved sundew (threatened in WI)

Droseraceae - sundew family

Unusual origin of *Drosera anglica*

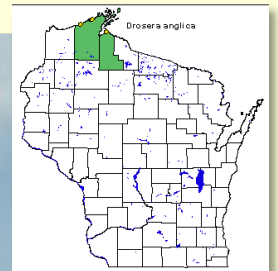
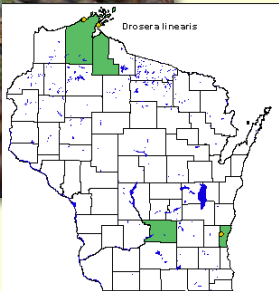
- all *Drosera* are $2n = 20$
- *D. anglica* is $2n = 40$
- *D. anglica* is hybrid of *D. rotundifolia* and *D. linearis*
- *D. anglica* is allopolyploid (tetraploid)



D. rotundifolia



D. linearis



Droseraceae - sundew family

Family shows **divergence** in insect capture



Drosera –
Sundews:
sticky flypaper



Dionaea–
Venus fly-trap: **steel trap**



Droseraceae - sundew family



Drosera –
Sundews:
sticky flypaper



Dionaea–
Venus fly-trap: steel trap

Family shows **divergence** in insect capture



Nepenthes (Nepenthaceae) –
Asian pitcher plants: **Pitfall trap**

Droseraceae - sundew family

Family shows **convergence** in insect capture



Drosera –
Sundews:
sticky flypaper



Pinguicula (Lentibulariaceae) –
Butterwort: **sticky flypaper**