

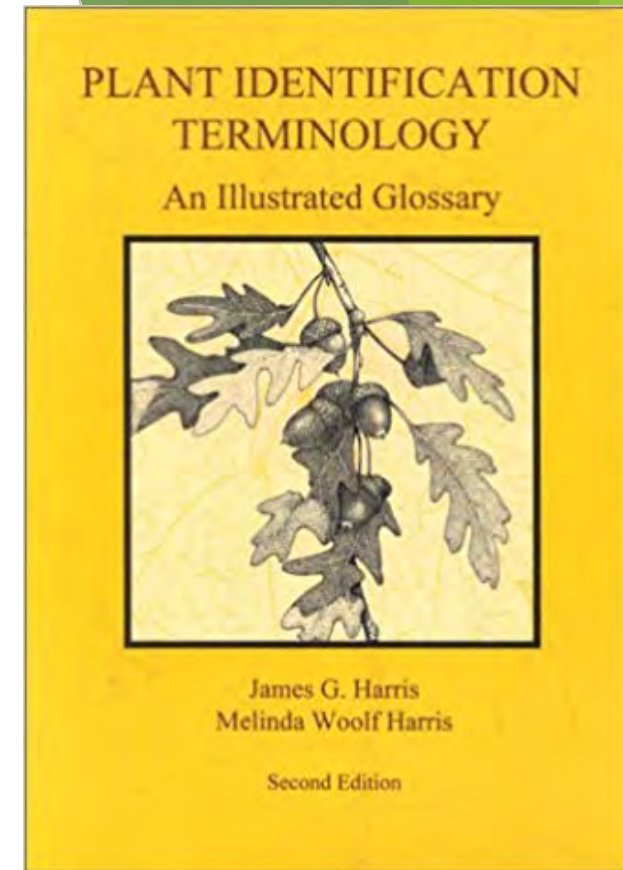
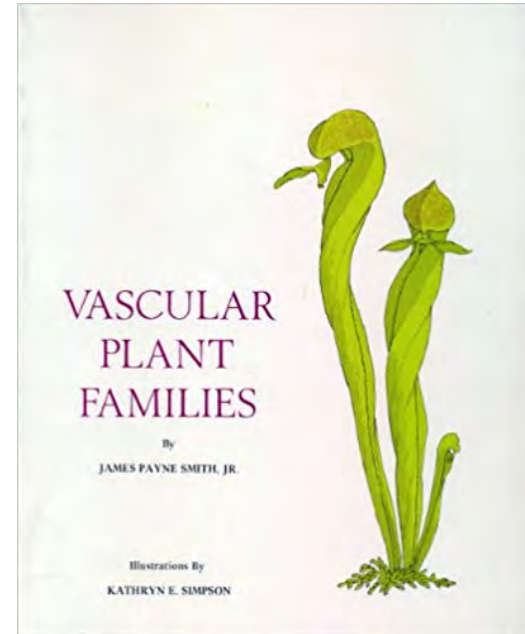
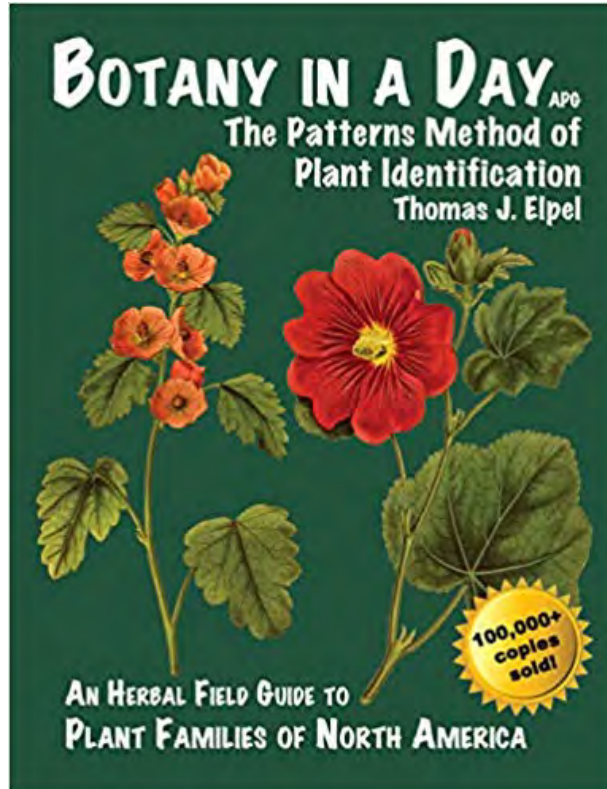
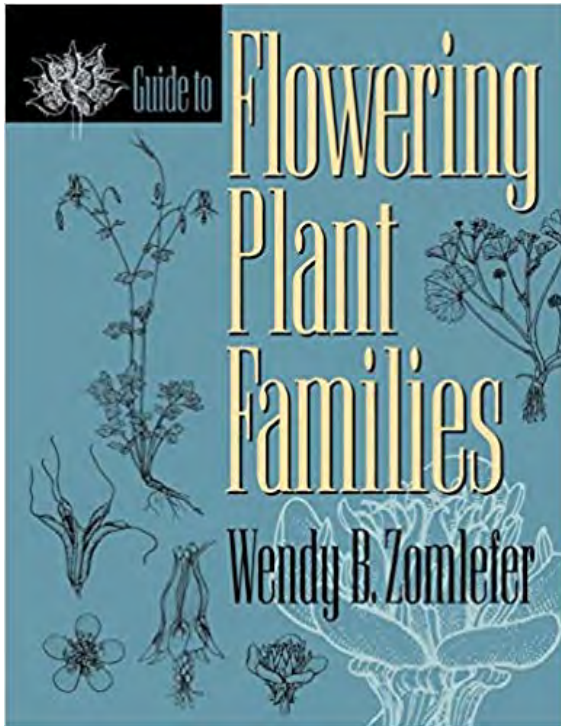
Botany of the Navajo Nation



An Introduction to Common Plant Families and their Characteristics

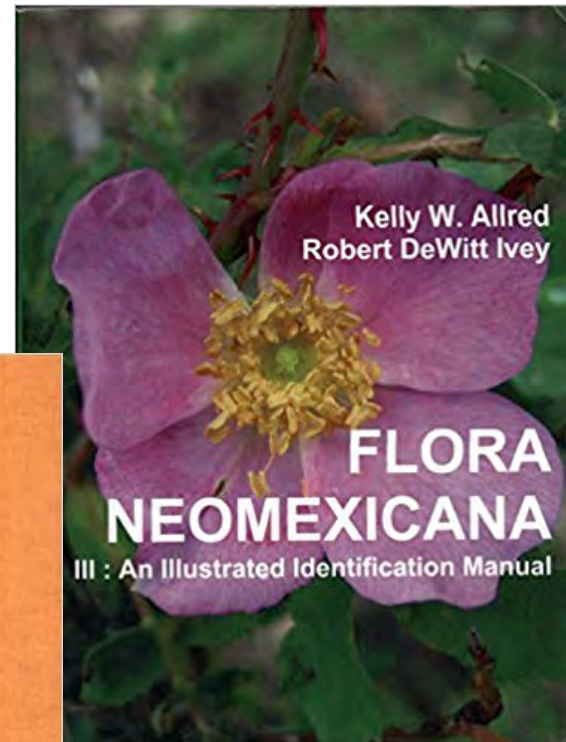
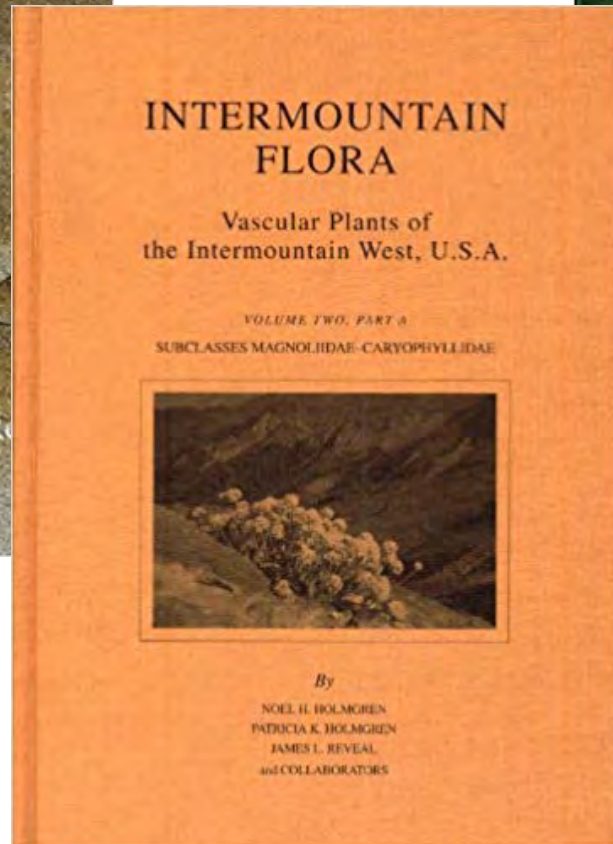
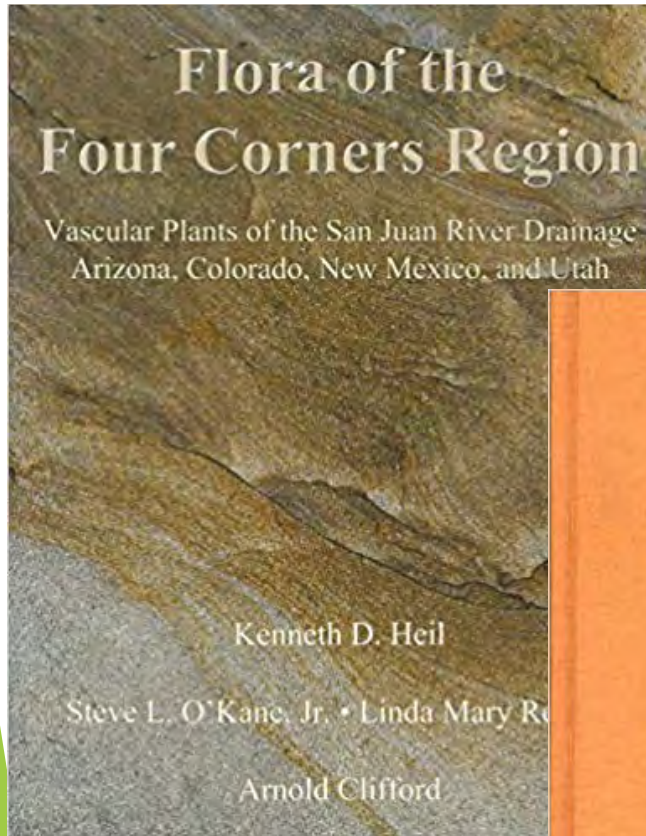
Navajo Nation Plant Guides/References

General Botany:



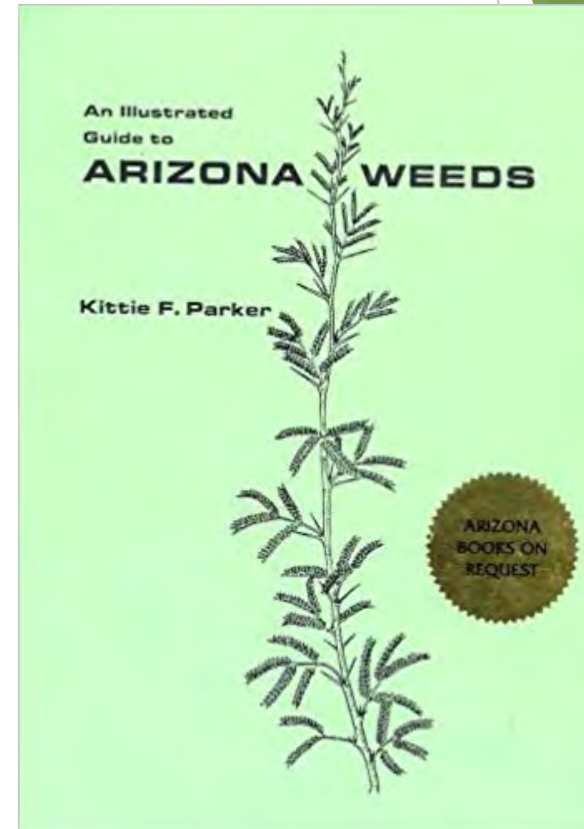
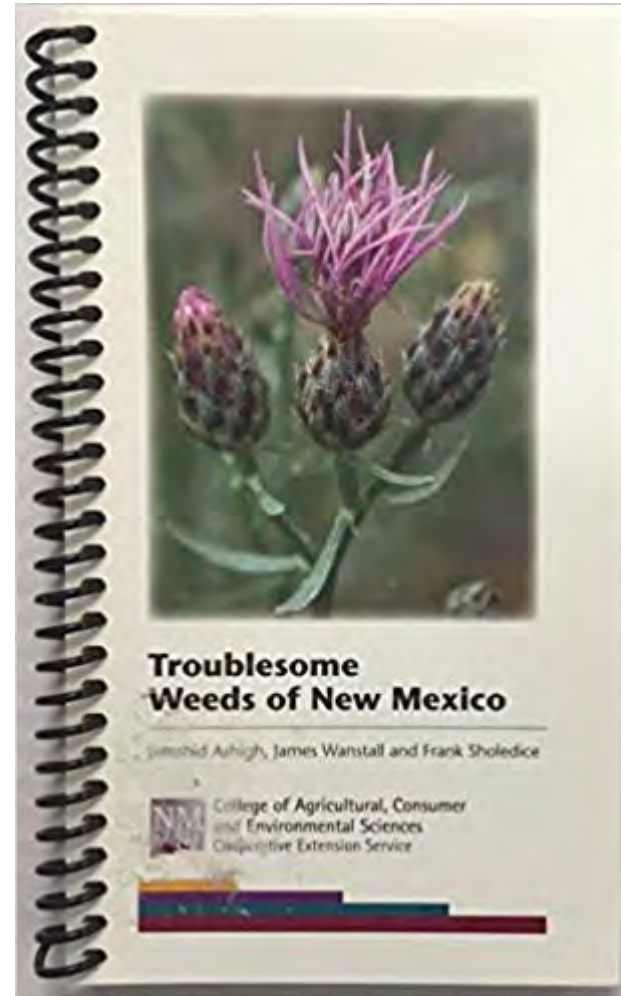
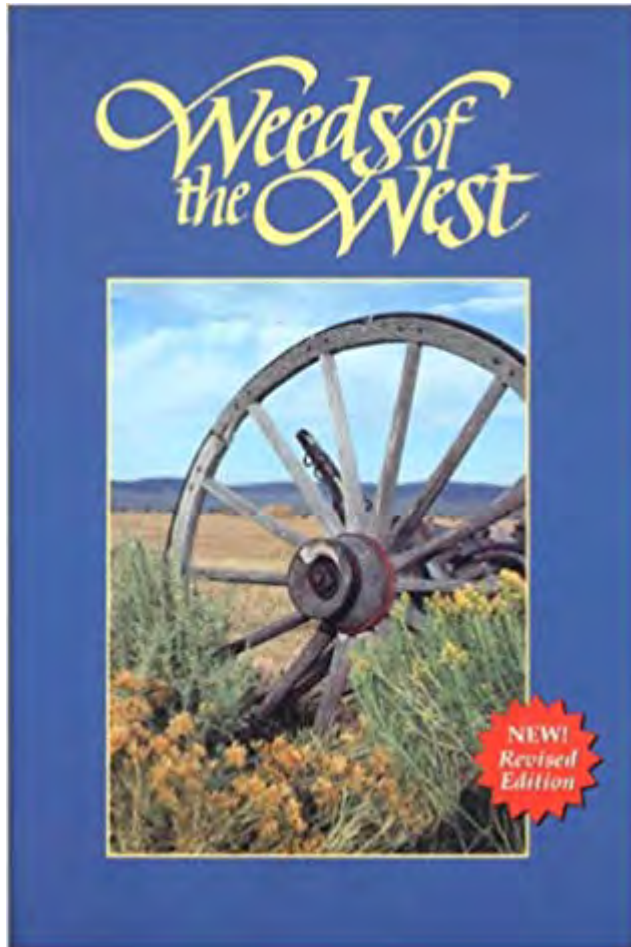
Navajo Nation Plant Guides/References

Dichotomous Keys:



Navajo Nation Plant Guides/References

Weeds:



Family Overview

- ▶ Asparagaceae (Agave)
- ▶ Amaranthaceae (Goosefoot)
- ▶ Apiaceae (Parsley)
- ▶ Asclepiadaceae (Milkweed)
- ▶ Asteraceae (Sunflower)
- ▶ Boraginaceae (Borage)
- ▶ Brassicaceae (Mustard)
- ▶ Cactaceae (Cactus)
- ▶ Euphorbiaceae (Spurge)
- ▶ Fabaceae (Pea)
- ▶ Geraniaceae (Geranium)
- ▶ Hydrophyllaceae (Waterleaf)
- ▶ Lamiaceae (Mint)
- ▶ Malvaceae (Mallow)
- ▶ Onagraceae (Primrose)
- ▶ Poaceae (Grass)
- ▶ Polemoniaceae (Phlox)
- ▶ Polygonaceae (Buckwheat)
- ▶ Ranunculaceae (Buttercup)
- ▶ Rosaceae (Rose)
- ▶ Scrophulariaceae (Figwort)
- ▶ Solanaceae (Nightshade)



Asparagaceae (Agave)

- ▶ Perennial: Shrub/Tree
- ▶ Parallel-veined
- ▶ Stiff, evergreen, dagger-like leaves in rosettes
- ▶ 6-parted perianth
- ▶ Large 3-locular capsules

Yucca baileyi





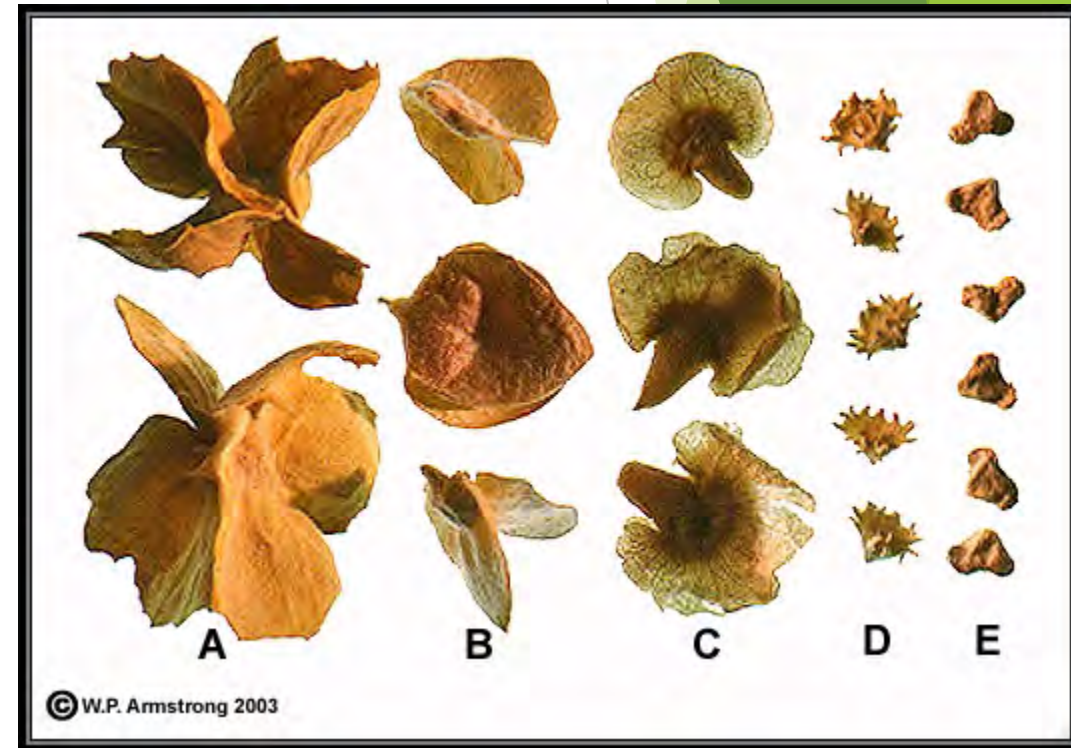
Showing damage by yucca moths. Plenty of black disc-like seeds
plants..



Amaranthaceae (Goosefoot)

- ▶ Tiny green flowers-bisexual or unisexual, petals absent
- ▶ Fruit is utricle or achene
- ▶ Scurfy leaf surface
- ▶ Striped or reddish stems

An assortment of winged, one-seeded fruits (utricles) of saltbushes (*Atriplex*) from the Mojave and Colorado Deserts of the southwestern United States



Salsola kali



Atriplex confertifolia
(female fruiting
bracts)



Atriplex confertifolia
(male flowers)



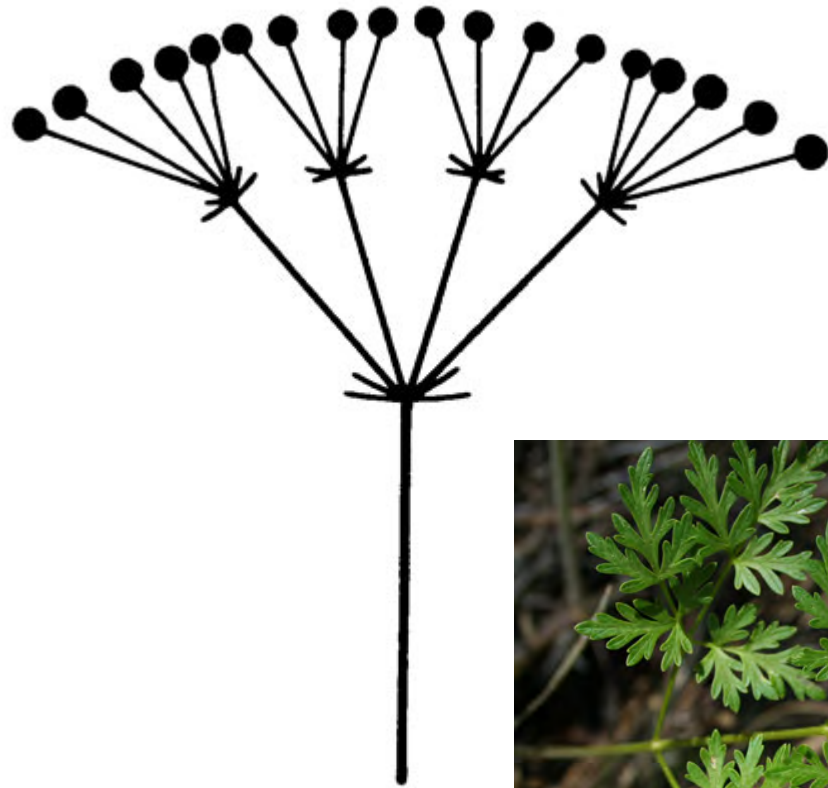
Daucus carota
Apiaceae



Apiaceae (Parsley)

- ▶ Compound umbel
- ▶ Small flowers-5 petals
- ▶ Dissected leaves (deeply divided into segments)
- ▶ Sheathing leaf base
- ▶ Hollow Stems
- ▶ Fruit Characters diagnostic

Compound umbel



Dissected leaves



Cymopterus



Fruit:
Schizocarp

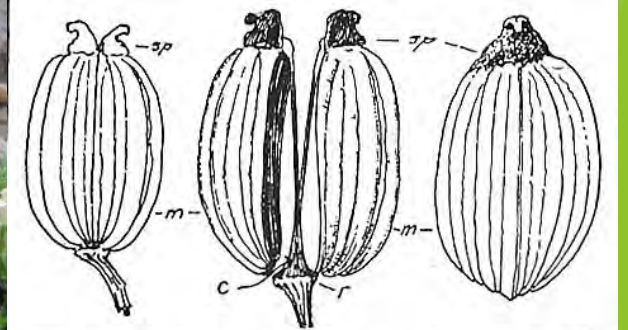
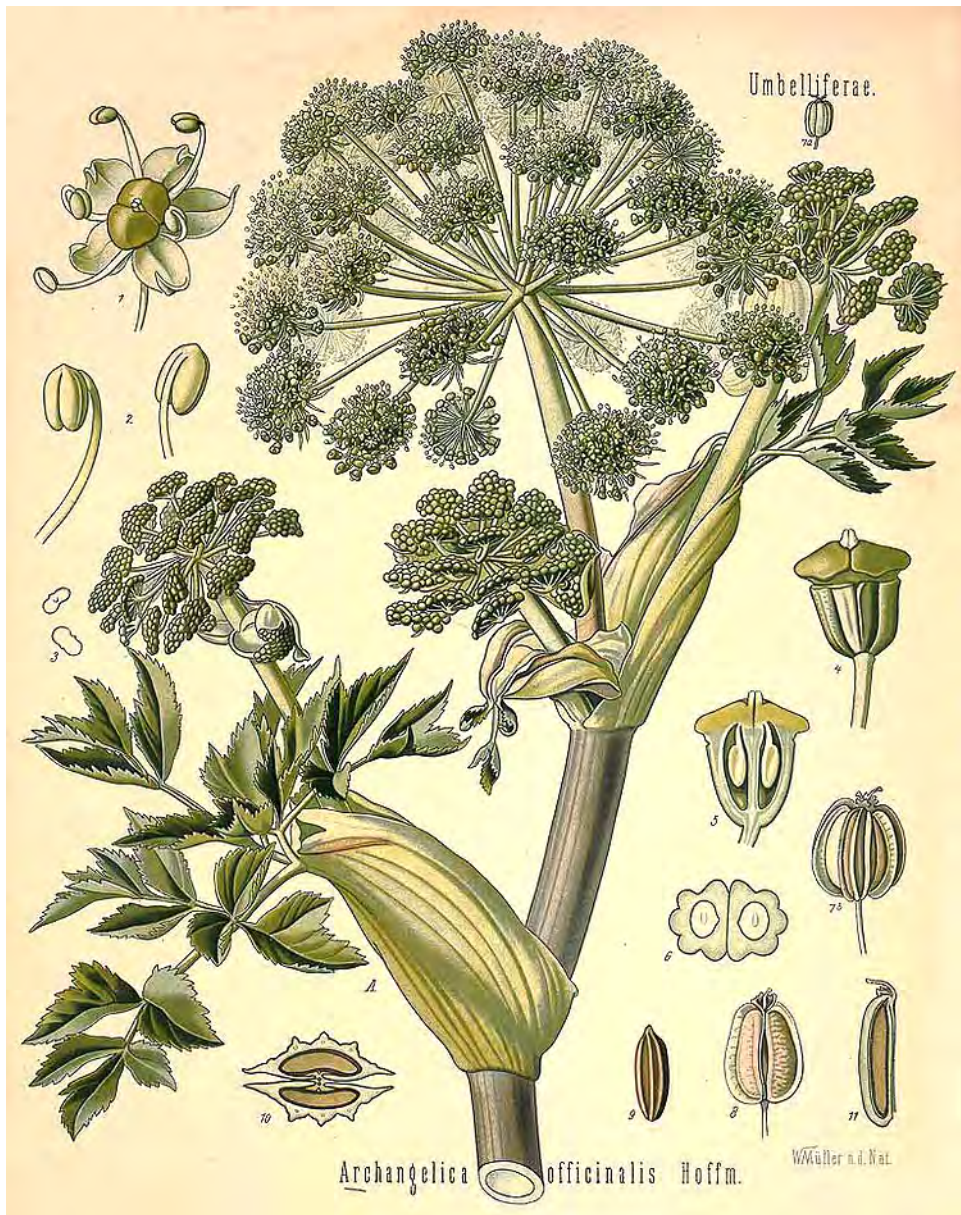


FIG. 64.—Fruit (schizocarp) of an umbellifer (*Foeniculum vulgare*): *sp*, stylopodium; *m*, mericarps; *r*, receptacle; *c*, carpophore.





Asclepidaceae (Milkweed)

- ▶ Herbs w/ opposite or whorled leaves
- ▶ Milky latex
- ▶ 5-merous flowers:
distinctive corona, pollinia,
translators, corpuscular
- ▶ Fruit is a follicle
- ▶ Comose seeds



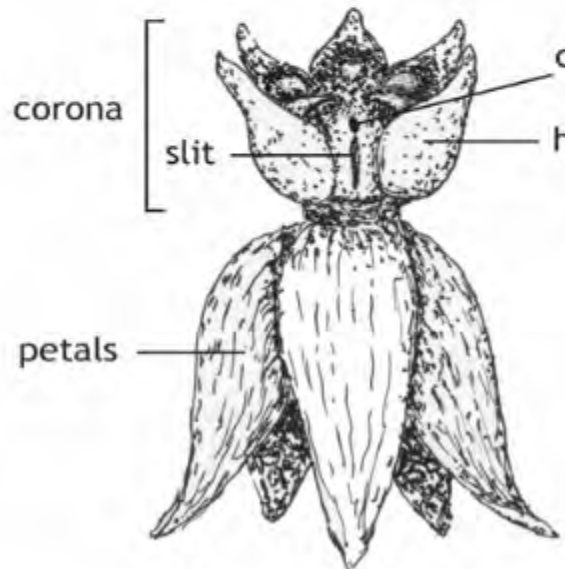
side view of flower



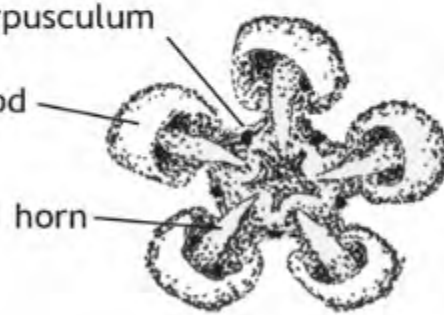
corona from above



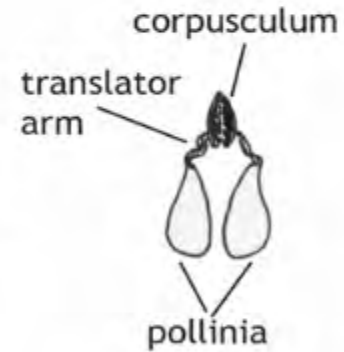
corona from the side with two pollinia visible



flower side view



corona from above



pollinarium



©Susan Pelton, UConn



Comose seeds:
With tufts of hair



2003 © Peter M. Dziuk



© Al Schneider



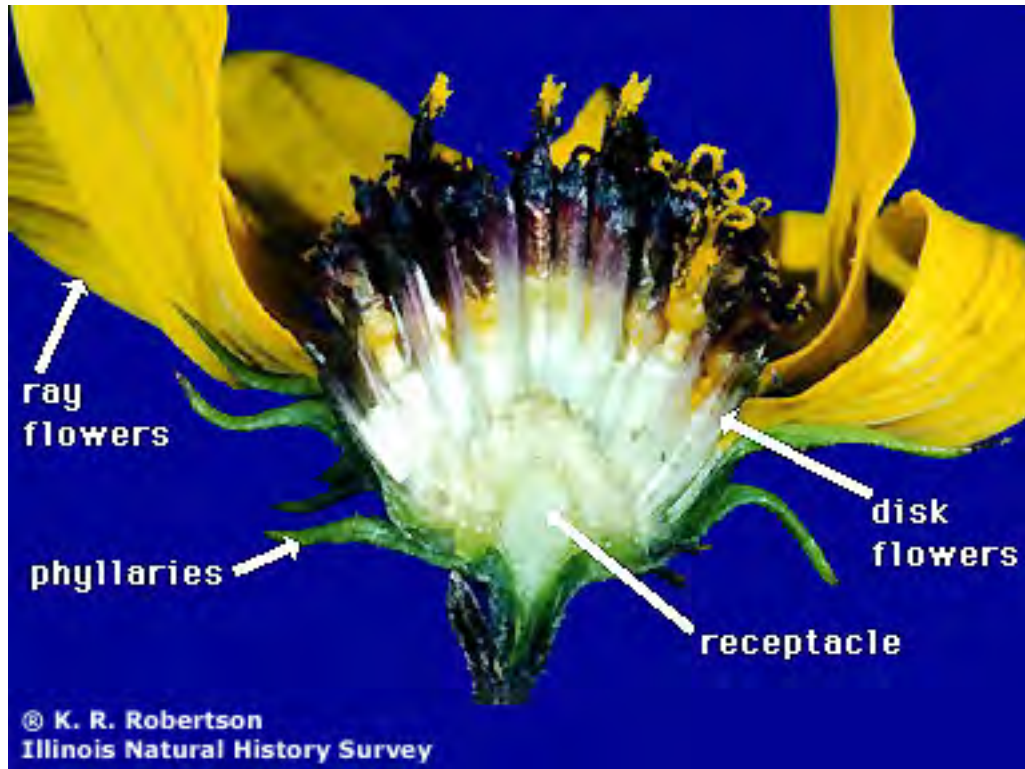
Asteraceae (Sunflower)

- ▶ Head Inflorescence
- ▶ Milky sap sometimes
- ▶ Phyllaries (bracts) and pappus important for species ID
- ▶ Petals united
- ▶ Ovary inferior



Head Inflorescence:
Made up of many
individual flowers

- Two types of Asteraceae flowers:
 - Ray flowers and disk flowers
 - Both types are not always present



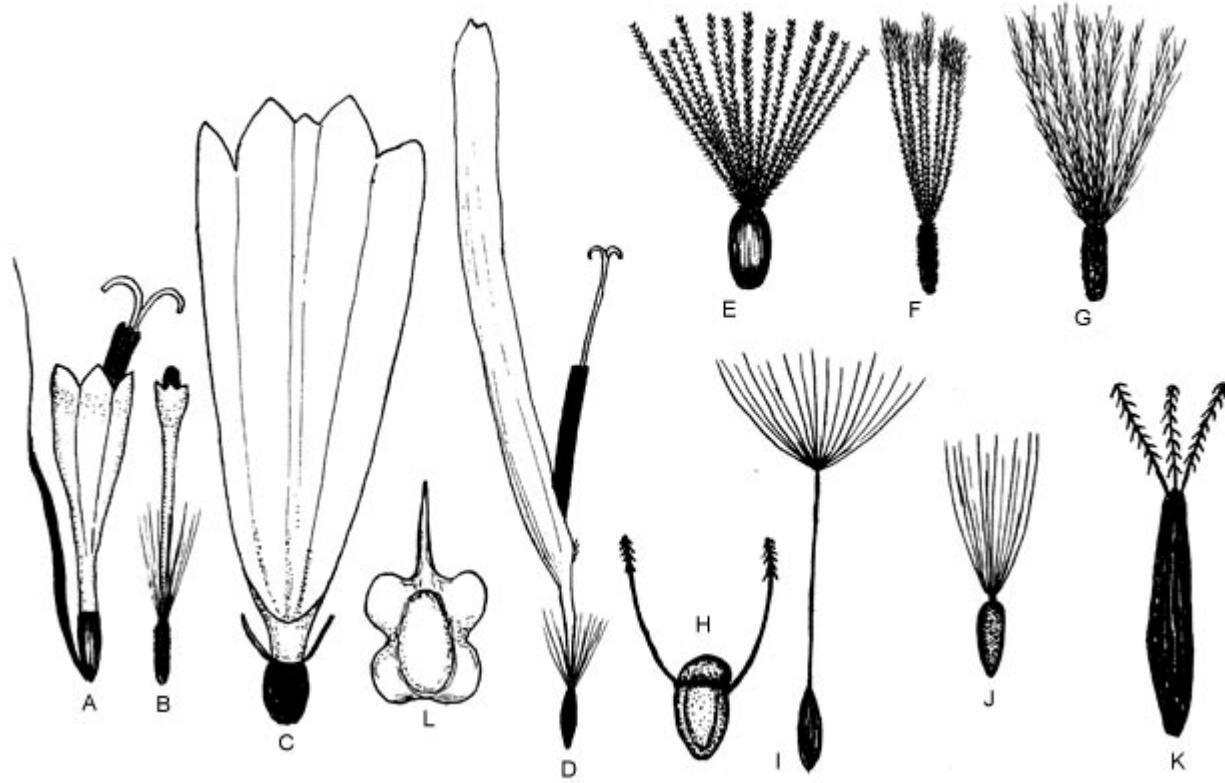
None of these Asteraceae have disk flowers:



None of these Asteraceae have ray flowers:



Pappus And Phyllaries



Pappus: A crown of bristles or scales at the top of the achene (seed)



Phyllary: Reduced leaf-like structures occurring immediately below the flower head.

Artemisia tridentata-
Big Sagebrush



Ray or Disk flowers or both?

Erigeron flagellaris



Ray or Disk flowers or both?



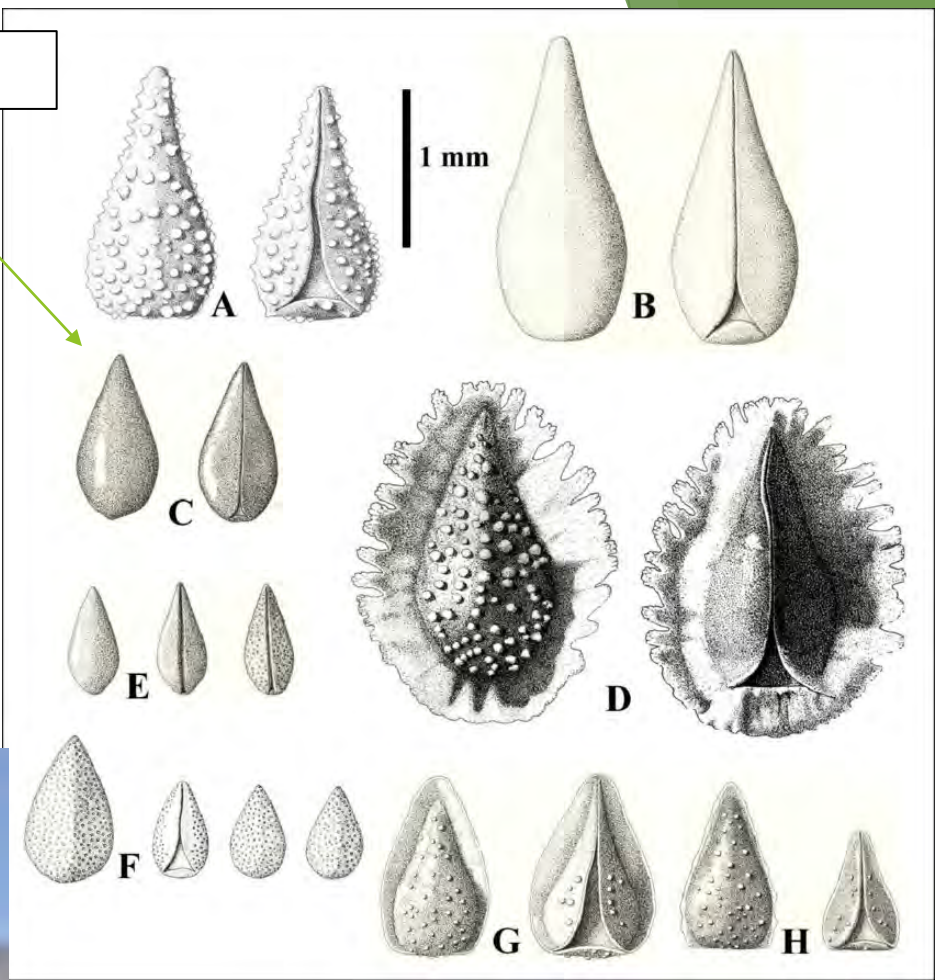


Boraginaceae (Borage)

- ▶ Fruit- 4 nutlets
- ▶ Inflorescence coiled cluster (scorpioid cyme)
- ▶ Hairy
- ▶ Leaves simple, usually alternate



Nutlets



Scorpiod
cyme



Hackelia floribunda



Lithospermum incisum



Brassicaceae (Mustard)

- ▶ 4 petals (cross-shaped)
- ▶ 4 long + 2 short stamens
- ▶ Fruit is a silique/Silicle (2-loculed)
- ▶ Bare seeds
- ▶ Superior ovary

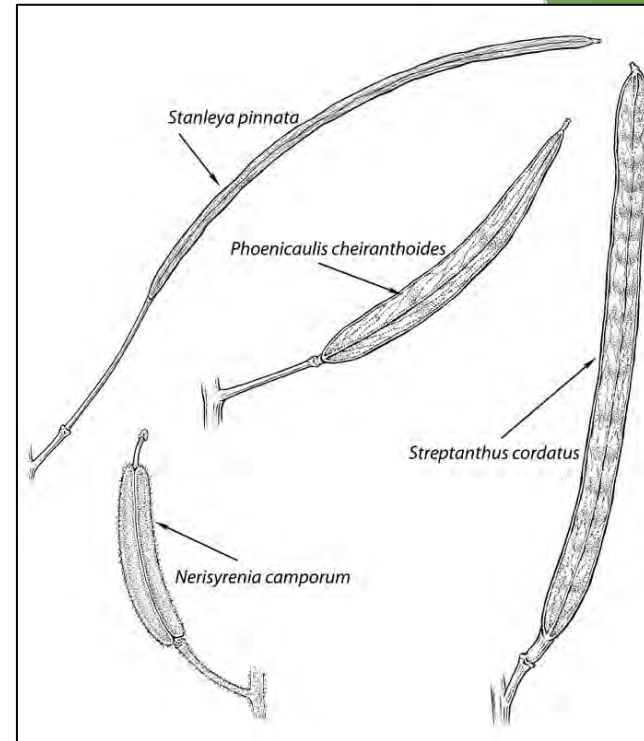
4 Petals



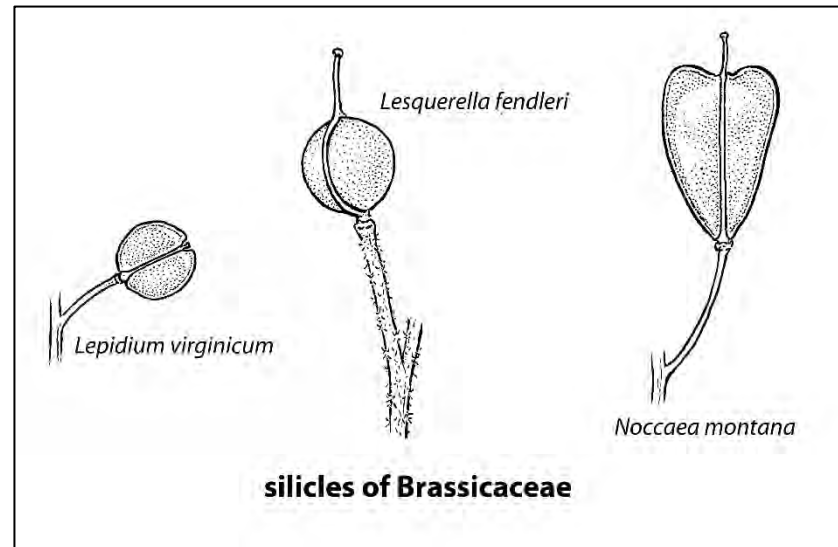
4 long + 2 short stamens



Silique



Silicles



Physaria fendleri

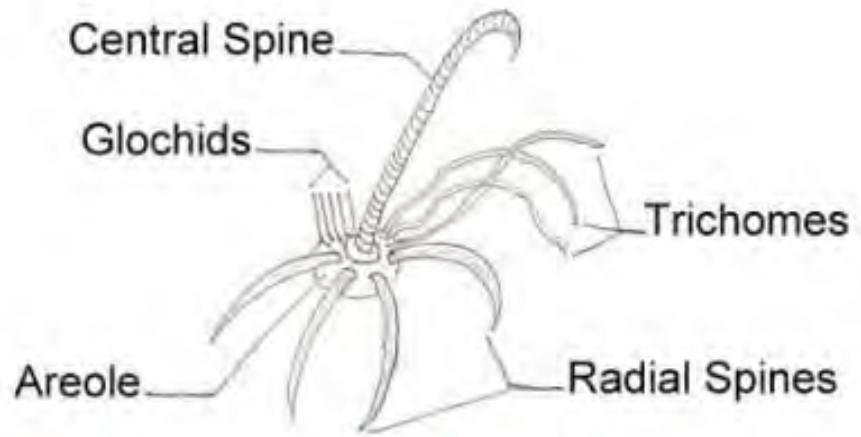


Lepidium montanum

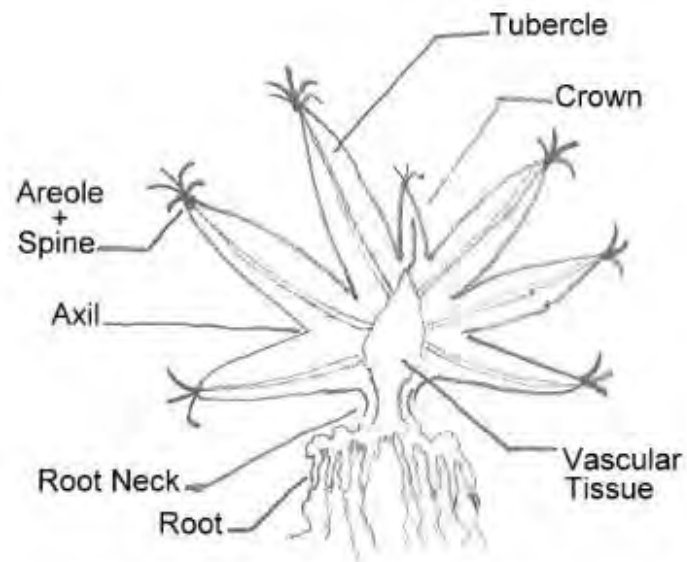


Cactaceae (Cactus)

- ▶ Areoles
- ▶ Stems thick and succulent
- ▶ Plants spiny
- ▶ True leaves absent, or greatly reduced and deciduous
- ▶ Ovary inferior



Cactus Areole Structures



Longitudinal section of a tuberculate cactus





Glochids: tiny, finely barbed hair-like spines found on the areoles of most opuntia species.

Opuntia fragilis

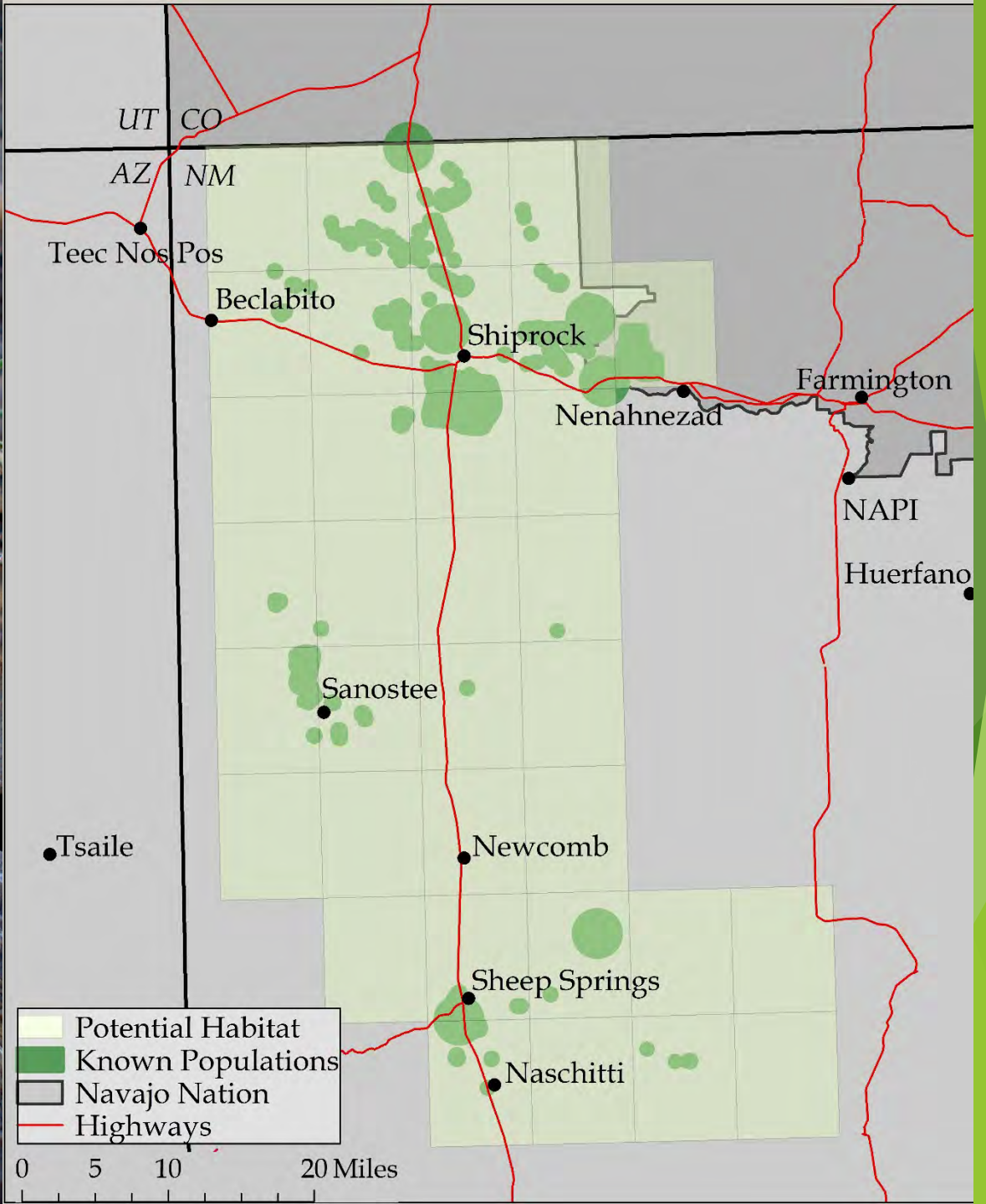


Echinocereus triglochidiatus

Sclerocactus mesae-verdae



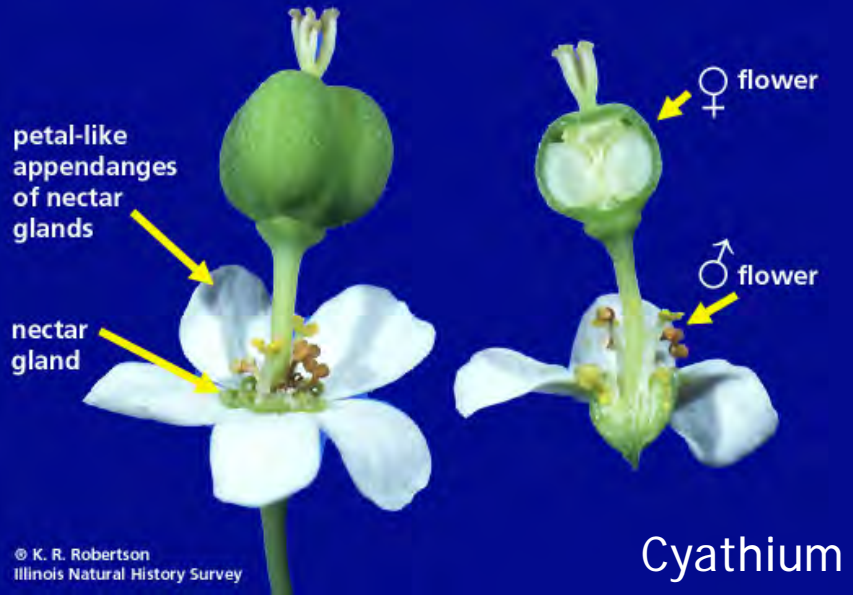
- ▶ Mesa Verde cactus
- ▶ Federally threatened, NESL G2
- ▶ **Habitat:** Clay-rich shale soils derived from Fruitland and Mancos shale formations.
- ▶ Salt desert-scrub communities with little vegetative cover
- ▶ If found, email ntalkington@nndfw.org
 - ▶ GPS location
 - ▶ Photo
 - ▶ Associated species list
 - ▶ Estimated number of plants



Euphorbiaceae (Spurge)

- ▶ Cyathium (involucre cup)
- ▶ Unisexual flowers
- ▶ 3-lobed capsule
- ▶ Milky Sap (latex)
- ▶ Colored upper leaves

Cyathium of *Euphorbia corollata*



Euphorbia fendleri

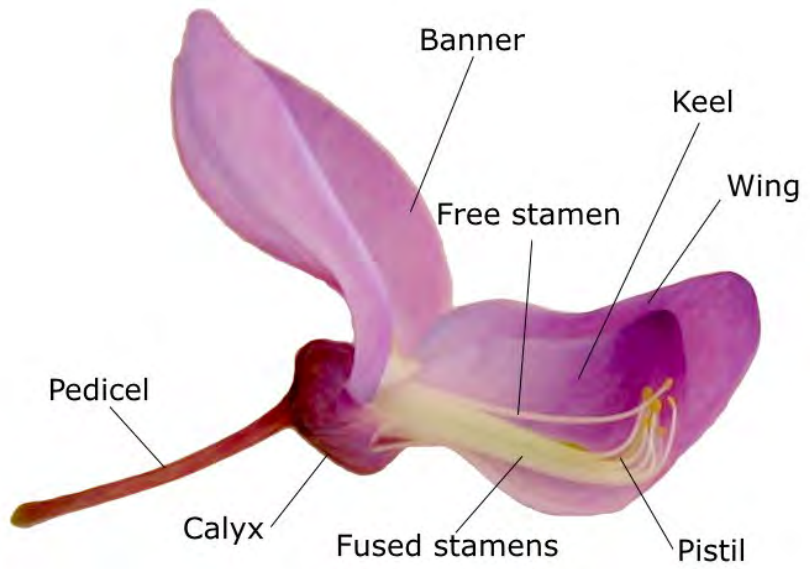


Chamaesyce revoluta



Fabaceae (Pea)

- ▶ Papilionaceous flower
- ▶ (1 banner, 2 wings, 2 keels)
- ▶ 1 single + 9 fused stamens
- ▶ Legume fruit (pod)
- ▶ Compound leaves

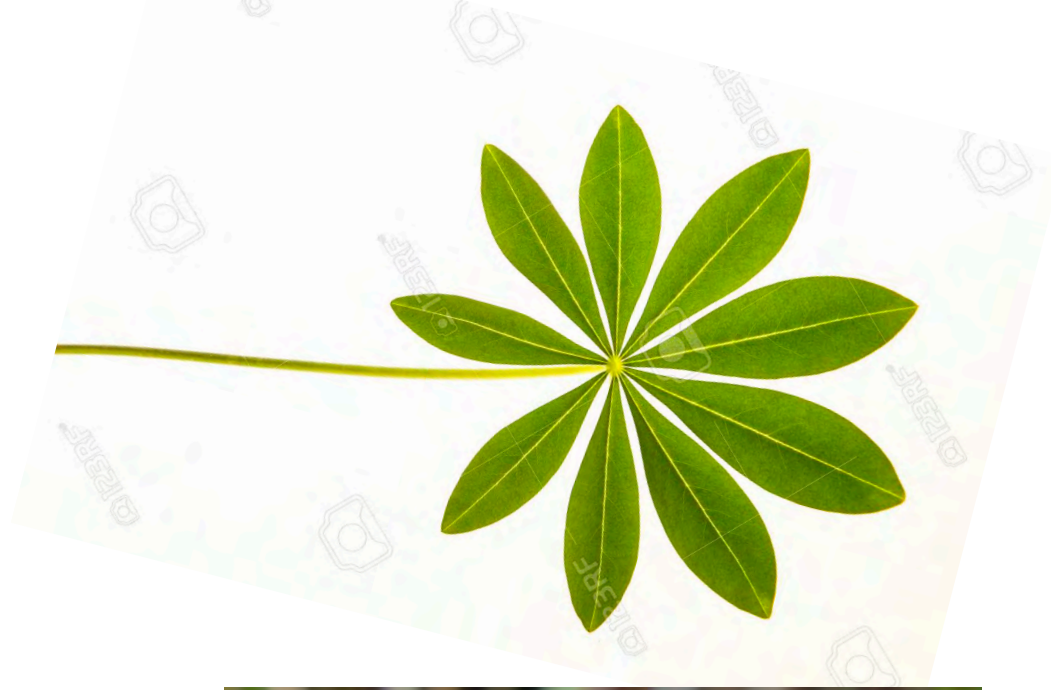


Papilionaceous flower

Legume fruit: pod



Palmately compound leaves



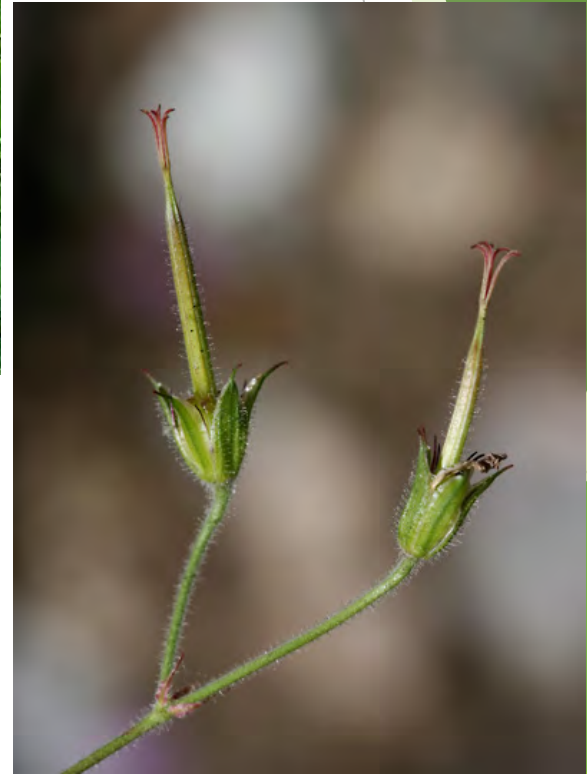
Pinnately compound leaves



Astragalus amphioxys



Lupinus argenteus



Geraniaceae (Geranium)

- ▶ Herbs with palmately or pinnately lobed to compound leaves
- ▶ Flowers 5-merous
- ▶ Fruits: elastically dehiscent schizocarps which curl up on a beak



Schizocarps: Elastically dehiscent

Flowers: 5-merous



Geranium caespitosum



Erodium cicutarium



© 2011 lara hartley

Hydrophyllaceae (Waterleaf)

- ▶ Usually hairy herbs
- ▶ Coiled cymose inflorescence
- ▶ 5-merous flowers
- ▶ Usually exerted stamens

Phacelia hastata

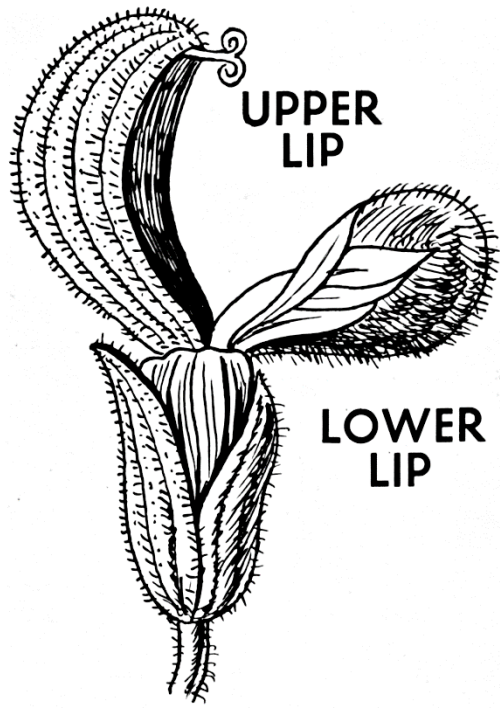


Nama hispidum



Lamiaceae (Mint)

- ▶ Square stem
- ▶ Bilabiate flower (2-lipped)
- ▶ Aromatic leaves (oil glands)
- ▶ Opposite leaves
- ▶ 4-lobed ovary



Bilabiate flower



Square stems

4-lobed ovary



Hedeoma drummondii



Monarda fistulosa



Malvaceae (Mallow)

- ▶ Numerous stamens united into a tube
- ▶ Stellate hairs
- ▶ “Cheese wheel” fruits
- ▶ Palmately lobed and veined leaves
- ▶ Epicalyx-small bracts on sepals



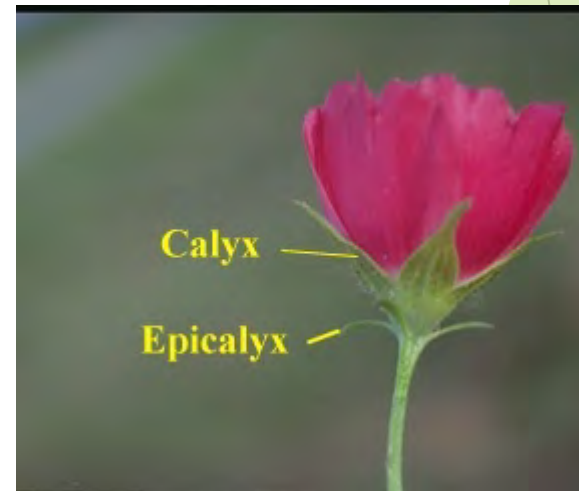
Fused stamens



Stellate hairs



Cheese wheel fruits



Calyx

Epicalyx

Sphaeralcea coccinea



Sphaeralcea leptophylla



Evening Primrose



@easal



©2006 Jeffrey Pippen

Onagraceae (Primrose)

- ▶ Flower parts usually in 4s
 - ▶ 4 Sepals
 - ▶ 4 Petals
 - ▶ 4 or 8 stamens
- ▶ Stigma is 4-lobed
- ▶ Fruit is usually a capsule



Oenothera capsule



4-branched stigma



4-parted flower



Hawk moth pollinated

Oenothera caespitosa

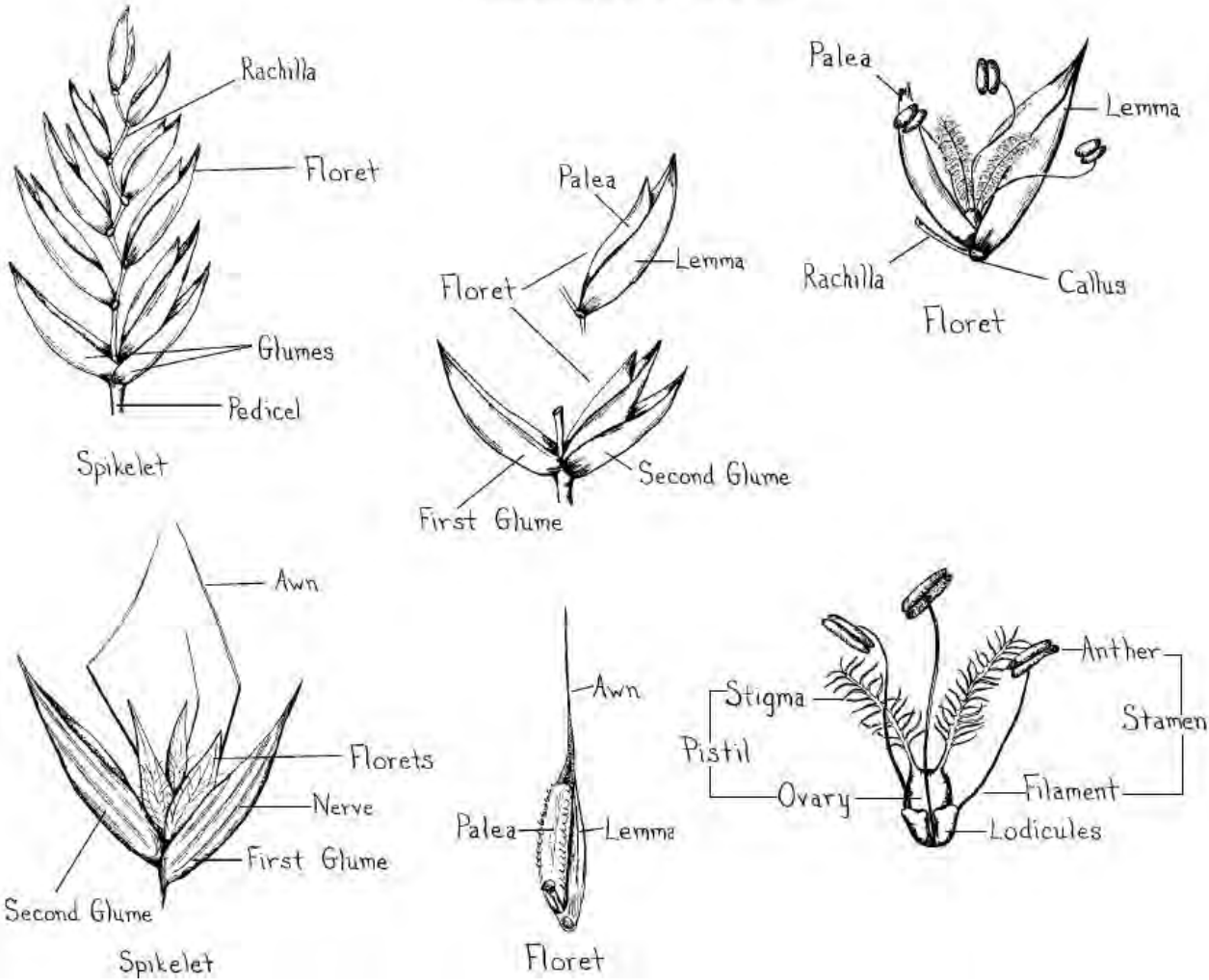


Oenothera pallida

Poaceae (Grass)

- ▶ Monocot
- ▶ Palea and Lemma
- ▶ 2-Ranked leaves
- ▶ Collar (ligule/auricles)
- ▶ Parallel leaf veins

GRASS FLORAL PARTS



Sedges=3-Ranked

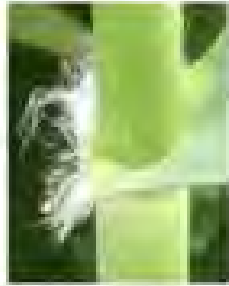


2-Ranked Leaves: Leaves come out on the two opposite sides of the stem

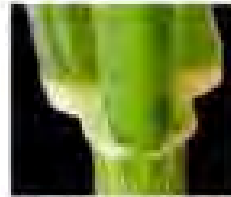
Ligule: thin outgrowth (membrane) at the junction of leaf and leafstalk



Rough and Smooth Meadow grasses
Poa trivialis and *Poa pratensis*



Common Reed
Phragmites australis



Perennial Rye-grass
Lolium perenne



Common Couch
Elytrigia repens

Awn: A hair or bristle-like appendage



Aristida purpurea

Bouteloua eriopoda



Poa fendleriana

Polemoniaceae (Phlox)

- ▶ 5-merous
- ▶ Sysepalous: fused sepals
- ▶ Symetalous: fused petals
- ▶ Calyx of 5 united petals
- ▶ Corolla of 5 united petals
- ▶ Tricarpellate gynoecium (3 united carpels)



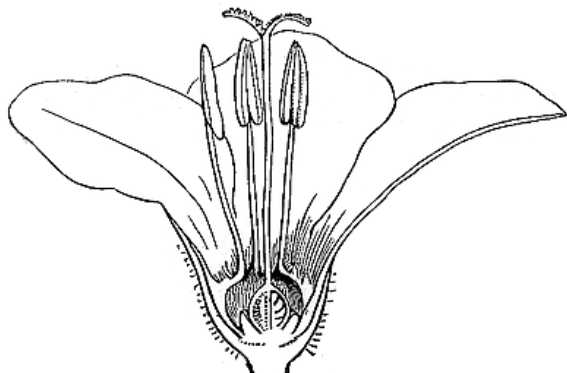
Polemonium caeruleum.



Polemonium. Flower (mag.).



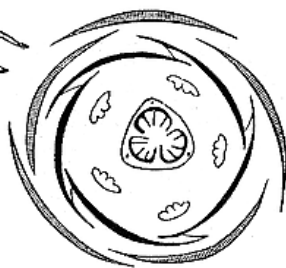
Polemonium. Pistil (mag.).



Polemonium. Flower cut vertically (mag.).



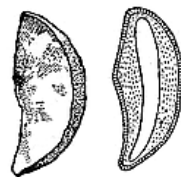
Polemonium. Stamen, inner face (mag.).



Polemonium. Diagram.



Polemonium. Fruit (mag.).



Polemonium. Seed, entire and cut vertically (mag.).



Gilia inconspicua



Ipomopsis longiflora



Polygonaceae (Buckwheat)

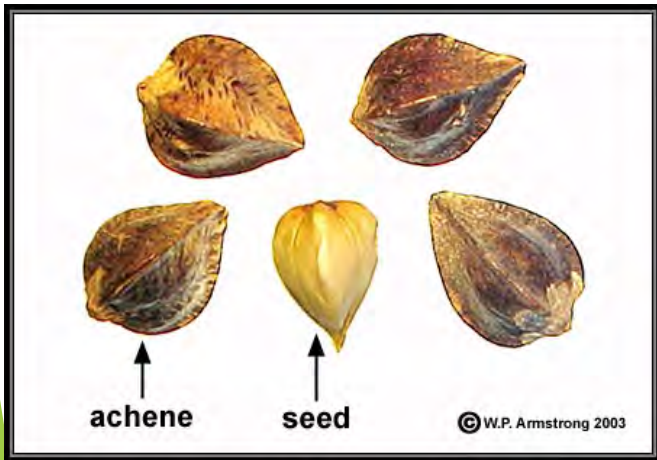
- ▶ Papery sheath at nodes
- ▶ Swollen stem nodes
- ▶ Tiny flowers-perianth parts 2-6, generally in 2 whorls
- ▶ Colored tepals-petals absent
- ▶ Leaves alternate
- ▶ Fruits are achenes



Papery sheath at nodes



Tiny flowers



Achenes

Eriogonum inflatum



Rumex crispus

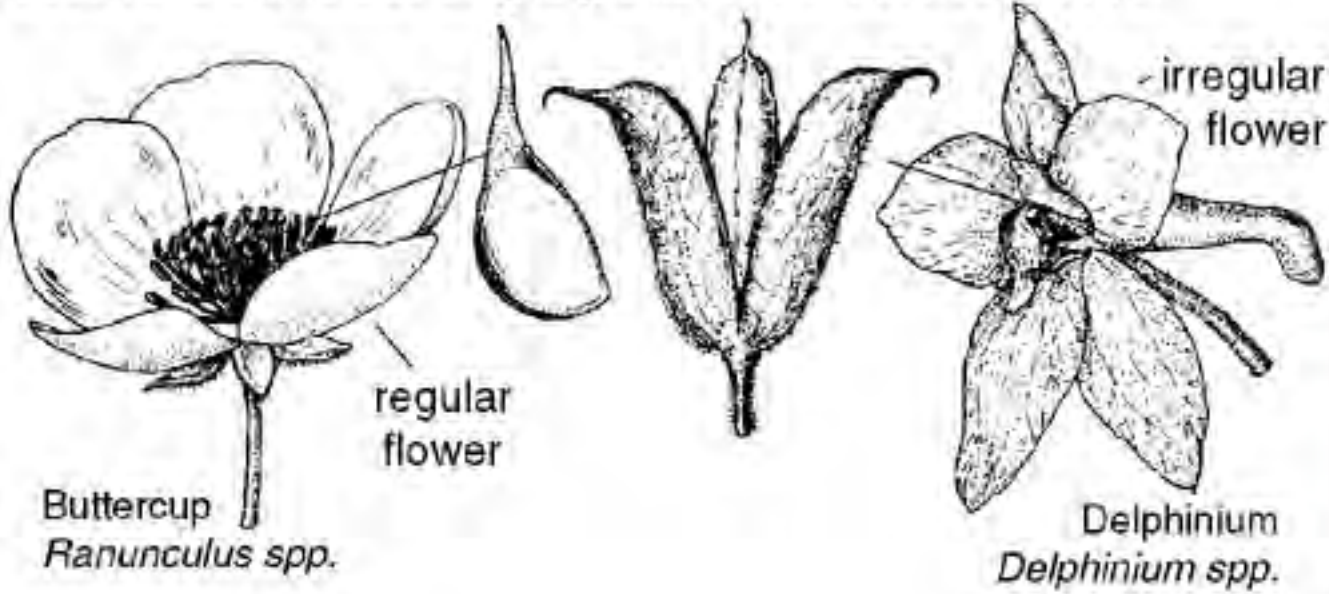


Ranunculaceae (Buttercup)

- ▶ Herbs w/ compound leaves
- ▶ Sheath-forming leaf bases
- ▶ Flowers with numerous stamens and carpels
- ▶ Typically actinomorphic
 - ▶ Zygomorphic in Delphinium and Aconitum

Patterns of the Buttercup Family

Look for 3-numerous simple pistils, often with hooked tips.



Regular=Actinomorphic

Irregular=Zygomorphic



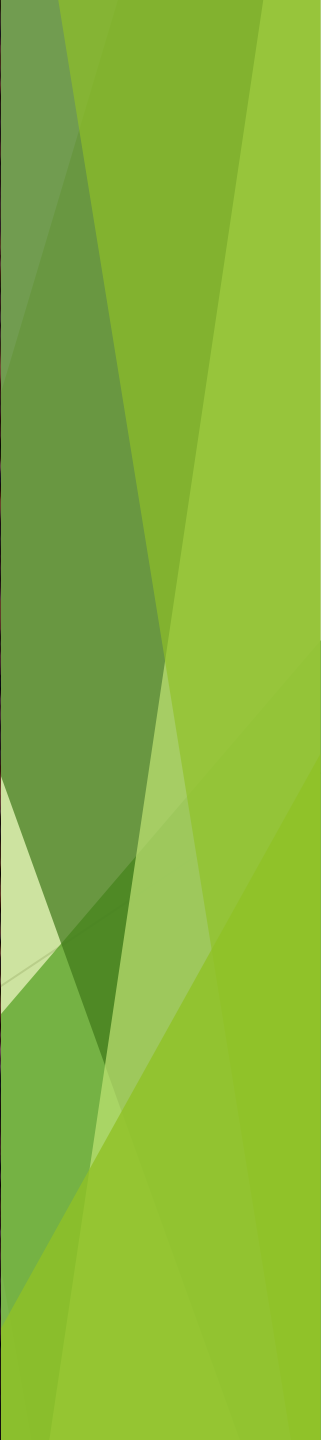
Compound leaf



Aquilegia micrantha



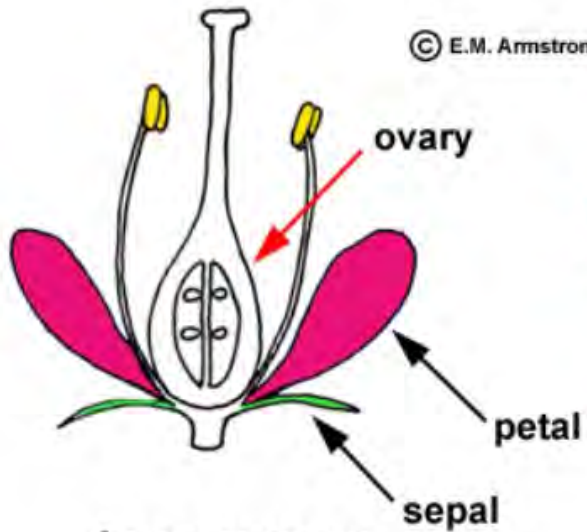
Delphinium andersonii
var. scaposum



Rosaceae (Rose)

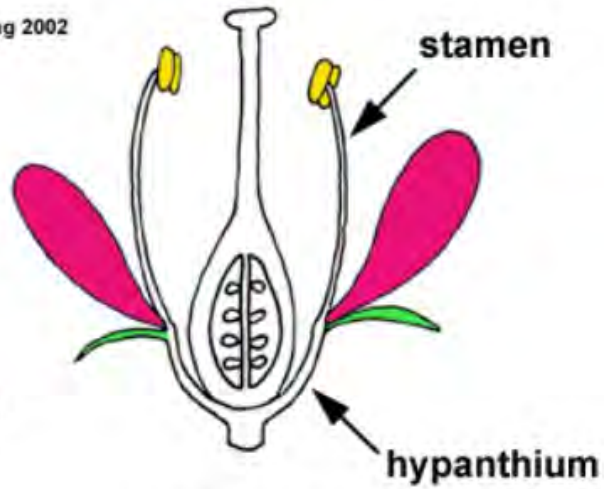
- ▶ Flower perigynous (superior ovary)
- ▶ Stamens usually >10
- ▶ Hypanthium
- ▶ Leaves usually have stipules and toothed margins

© E.M. Armstrong 2002



hypogynous

petals, sepals & stamens
attached at base of ovary



perigynous

petals, sepals & stamens
on the rim of hypanthium



Hypanthium=floral cup

Stipule=Outgrowth on the
base of the leaf stalk



Amelanchier utahensis



Rosa woodsii

Scrophulariaceae (Figwort)

- ▶ Irregular flower
 - ▶ Spurred, tubular, 2-lipped
 - ▶ Mullein exception
- ▶ 2-4 Stamens
- ▶ Capsule fruit (2-loculed)
- ▶ Superior ovary
- ▶ Staminode

Diagnostic characters



Leaves opposite



Flowers irregular



Mimulus guttatus
Plantaginaceae
(Scrophulariaceae)
© G. D. Carr



Corolla tubular



Corolla often 2-lipped



Stamens often 4



Stamens inserted on corolla tube

Capsule



Ovary superior

Castilleja chromosa

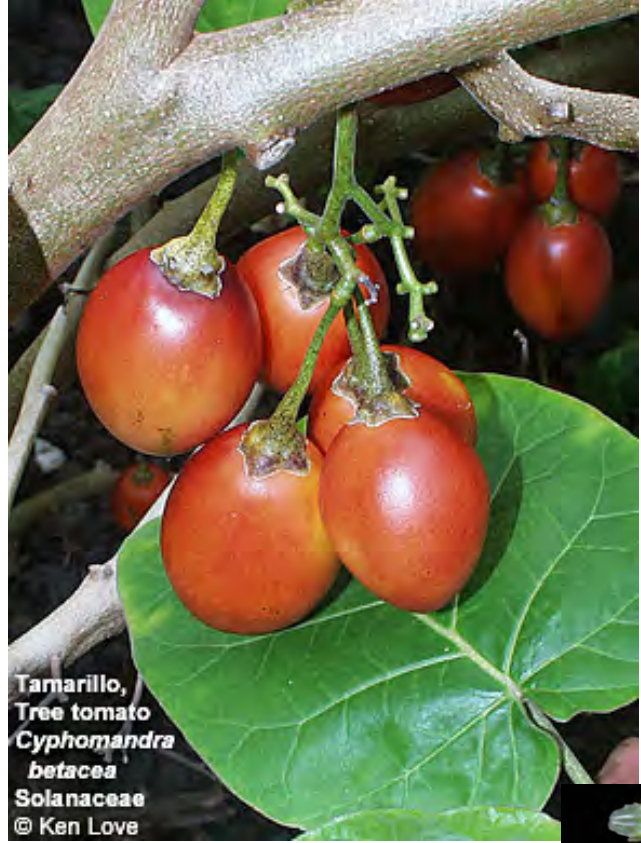


Penstemon linarioides



Solanaceae (Nightshade)

- ▶ Star-Shaped flower: corolla radial cylindric to rotate, lobes generally 5
- ▶ 5 stamens on corolla tube, alternate lobes
- ▶ Berry or capsule fruit
- ▶ Simple, alternate leaves



Tamarillo,
Tree tomato
*Cyphomandra
betacea*
Solanaceae
© Ken Love



Brugmansia candida
Solanaceae
© G. D. Carr



Physalis affekengii
Solanaceae
© G. D. Carr



Lycianthes rantonnetii
Solanaceae
© G. D. Carr



Nicotiana glauca
Solanaceae
G. Daida

Lycium pallidum



Solanum elaeagnifolium