

Field Characteristics of Common Plant Families in New Mexico



Introduction

- Major classification, the Angiosperms
- Monocots vs. Dicots
- What is a plant Family?
- Floral morphology and ovary position
- Fruit morphology
- Major plant family characteristics

Classification

- In this discussion, there are a few taxonomic categories that will be used.
- **Division-** Anthophyta (Angiosperms, or flowering plants)
- **Class-** Monocotyledons and Dicotyledons, and
- **Family-** frequently correspond to well-known groups, such as grasses (Poaceae), orchids (Orchidaceae), mustards (Brassicaceae), or beans (Fabaceae).
- But, let's back up, we need to review...

Major Classification

The Kingdom Plantae

- The Kingdom **Plantae** has many **Divisions**, including distinct Divisions for the liverworts, mosses, ferns, and conifers.
- Our focus is on the **Division Anthophyta**, also known as the **Angiosperms** or “flowering plants”
- Angiosperms are borne in an enclosed ovary

Angiosperms

the “flowering plants”

- Angiosperms- are divided into two large subdivisions, the **Class Monocotyledons**, (the monocots) and the **Class Dicotyledons** (the dicots).
- When you look at a plant to identify, one of the first questions to determine is, which major division does it belong?

Monocots vs. Dicots

- Monocotyledons
- Flower parts usually in threes
- Leaf venation usually parallel
- ~65,000 species
- Dicotyledons
- Flower parts usually in fours or fives
- Leaf venation usually netlike
- ~170,000 species



Classified by shared morphology

- Members of a family typically share many morphological, chemical, or anatomical features that set them apart from other families.
- Many of the morphological features that define families are characteristics of their flowers or fruits, such as the arrangement of florets in a sunflower (Asteraceae), or the pod in the bean family (Fabaceae).
- These shared features are often seen as evidence that members of a family share a single common ancestor.

Classification for Corn

Kingdom

Plantae

Division

Anthophyta

Class

Monocotyledones

Order

Commelinaceales

Family

Poaceae

Genus

Zea

Specific epithet *mays*

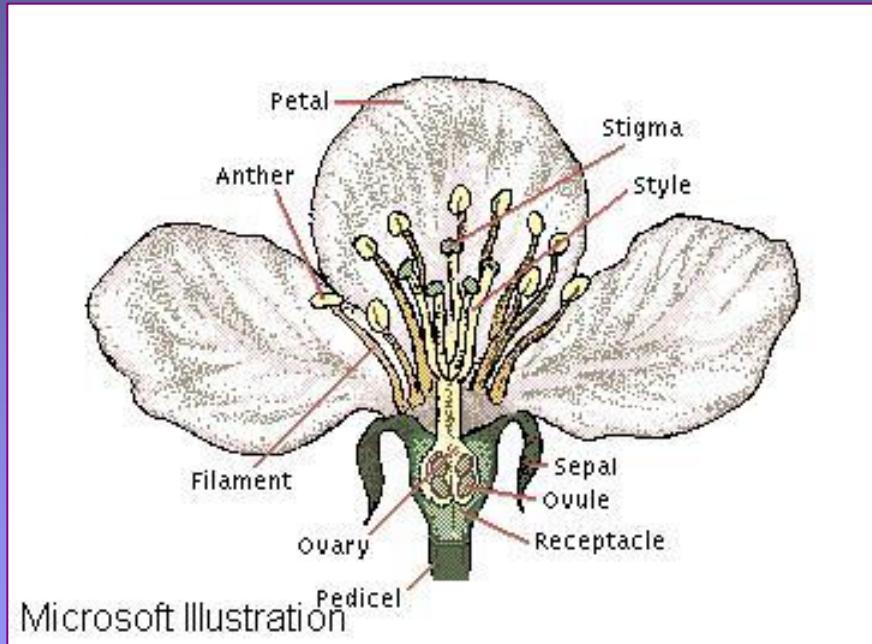
Species *Zea mays*



Scientific name of Family

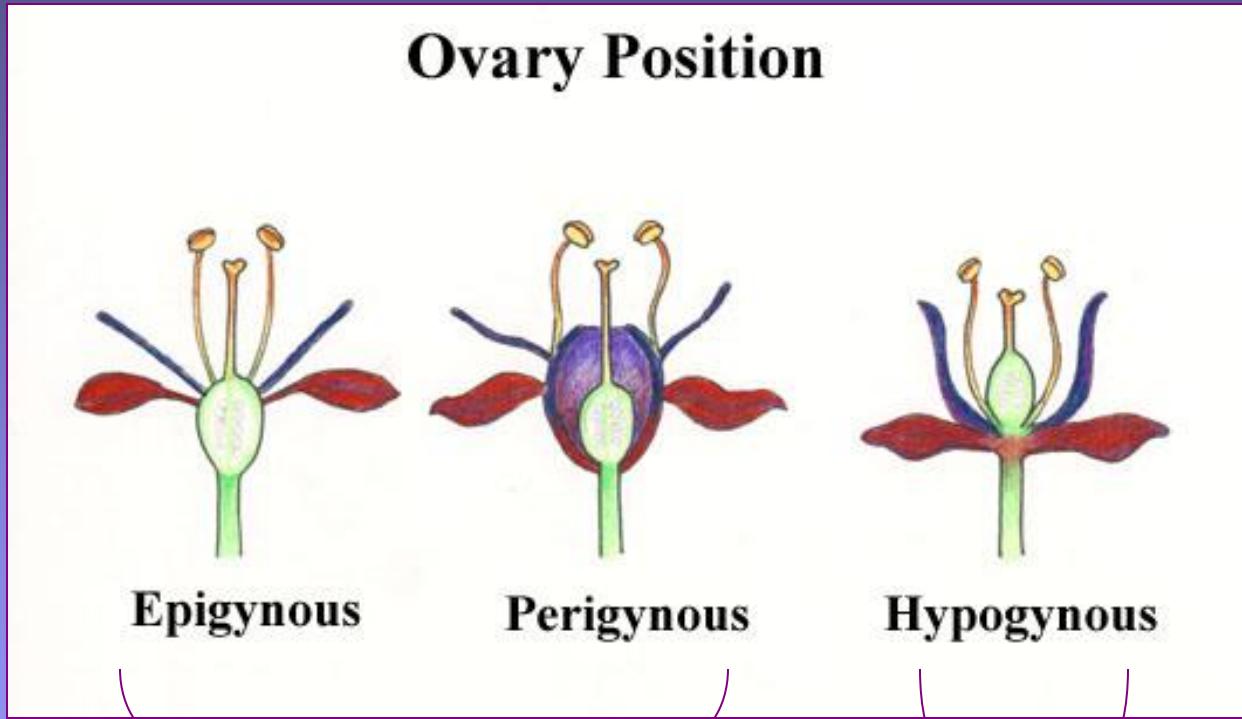
- Is formed by the name of an included genus, or *kind* of plant, plus the ending -aceae. However, some families may also have older names that do not conform to this pattern (for instance, "Compositae" is an older name for the daisy family, Asteraceae).
- The genus **Poa** + aceae = **Poaceae**
and **Brassica** + aceae = **Brassicaceae**

Morphology: the floral organs



- Sepal (Calyx)
- Petal (Corolla)
- Stamen (male)
- Pistil (female)
 - Stigma
 - Style
 - Ovary

Ovary positions



Epigynous

Perigynous

Hypogynous

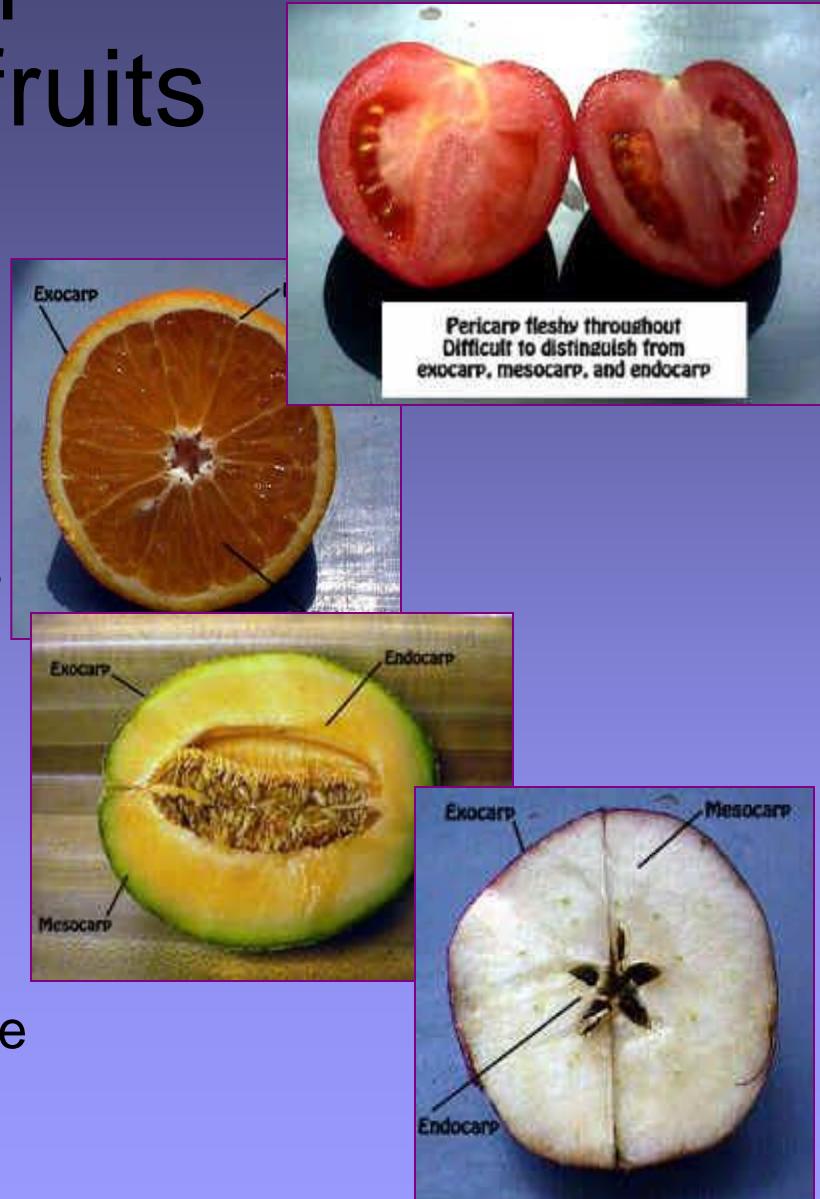
= Inferior
ovaries

= Superior
ovary

Fruit types

Fleshy fruits

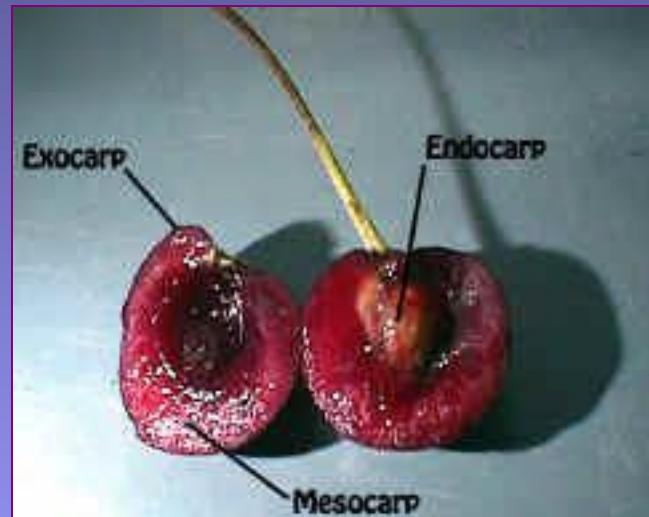
- **Berry** - fruit with the pericarp fleshy throughout and seeds inside the fruit (e.g. Tomato)
- **Specialized Berries** -
- **Hesperidium** - a berry with leathery exocarp and mesocarp; the endocarp is segmented and very juicy (e.g. Orange)
- **Pepo** - a berry with a hard and very thick exocarp or rind (e.g. Cantaloupe)
- **Pome** - a fleshy fruit produced by an inferior ovary; the endocarp enclosing many seeds is commonly called the core (e.g. Apple)



Fruit types

Stone or Drupe

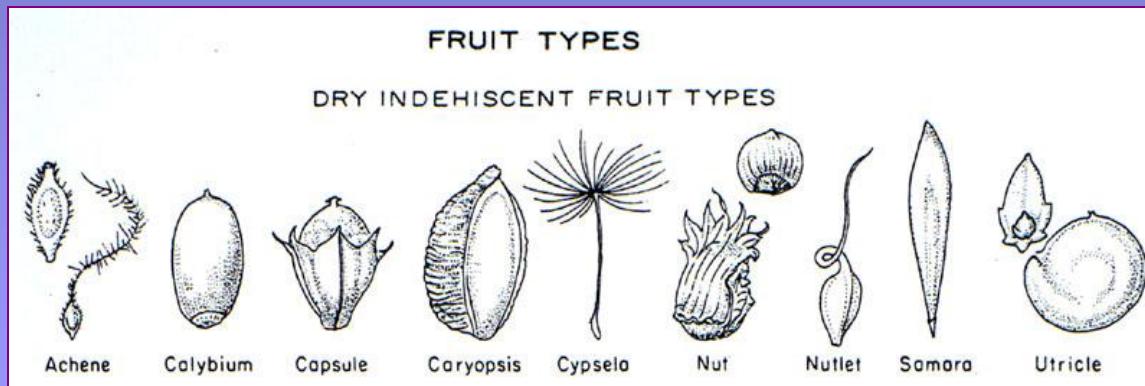
- A **fleshy fruit, usually one seeded; the seed is enclosed in a stony endocarp** (e.g. Cherry)



Fruit types

Dry Non-Dehiscent Fruits

- Dry fruits which do not split along definite lines to release seeds at maturity
- **Acorn** - single celled, single seeded fruit of oaks
- **Samaras** - a dry, non-dehiscent, winged fruit



Fruit types

Dry Dehiscent Fruits

- Dry fruits which split along definite lines to release seeds at maturity
- Legume - single celled, splits along two sutures releasing the seeds
- Siliques - consists of two cells, splits along two sutures releasing the seeds
- Capsule - short and rounded fruit, consists of more than one carpel



Common Plant Families In New Mexico

Dicots

- Salicaceae
- Polygonaceae
- Chenopodiaceae
- Amaranthaceae
- Nyctaginaceae
- Portulaceae
- Caryophyllaceae
- Ranunculaceae
- Brassicaceae
- Rosaceae
- Fabaceae
- Euphorbiaceae
- Malvaceae
- Cactaceae
- Onagraceae
- Apiaceae
- Asclepiadaceae
- Apocynaceae
- Convolvulaceae
- Polemoniaceae
- Hydrophyllaceae
- Boraginaceae
- Verbenaceae
- Lamiaceae
- Solanaceae
- Scrophulariaceae
- Asteraceae

Monocots

- Juncaceae
- Cyperaceae
- Liliaceae
- Agavaceae
- Orchidaceae
- Poaceae

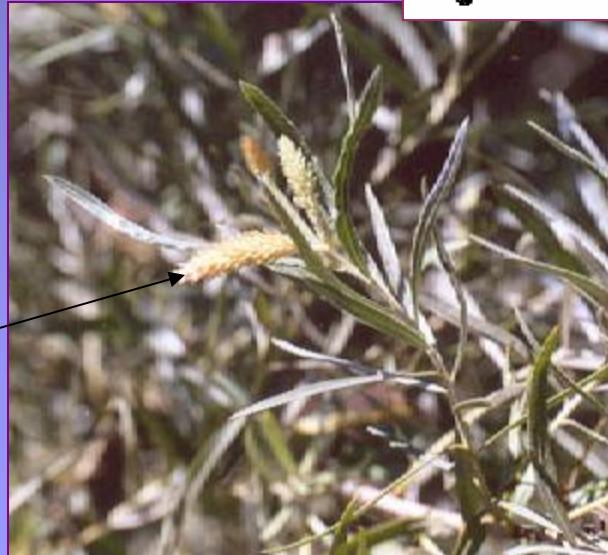
The Dicots

- Monocotyledons
- Flower parts usually in threes
- Leaf venation usually parallel
- ~65,000 species
- Dicotyledons
- Flower parts usually in fours or fives
- Leaf venation usually netlike
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Salicaceae (Willows)

- Trees and shrubs
- Calyx: 0-few
- Corolla: 0
- Stamens: 2-few
- Carpels: 2, fused,
superior ovary
- Fruit: capsule
- Seeds comose, plants
dioecious, flowers in
catkins



Salix exiguua

NM Salicaceae



Salix exigua
Sandbar willow

Capsules



Populus deltoides
Cottonwood



Polygonaceae (Knotweeds)

- Herbs and shrubs
- Calyx: 5 or 3+3
- Corolla: 0
- Stamens: 3-9
- Carpels: 3, fused, superior ovary
- Fruit: achene
- Calyx often petaloid, achene often triangular, lvs alternate





Chenopodiaceae (Goosefoots)

- Herbs and shrubs
- Calyx: 5
- Corolla: 0
- Stamens: 5
- Carpels: 2, fused,
superior ovary
- Fruit: nutlet
- Lvs alternate, simple,
perianth green and
inconspicuous



Chenopodium album
Flower detail

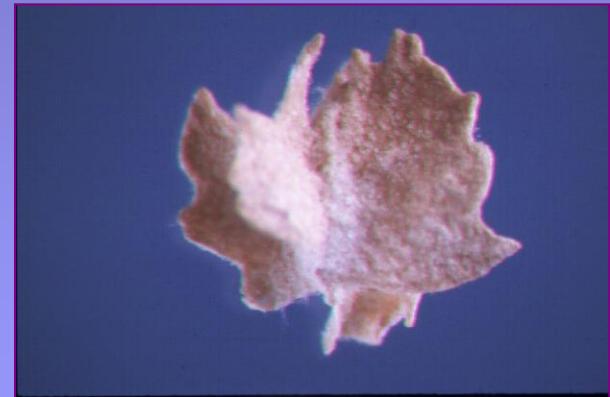
Chenopodiaceae



Goosefoots
vs.
goosefeet



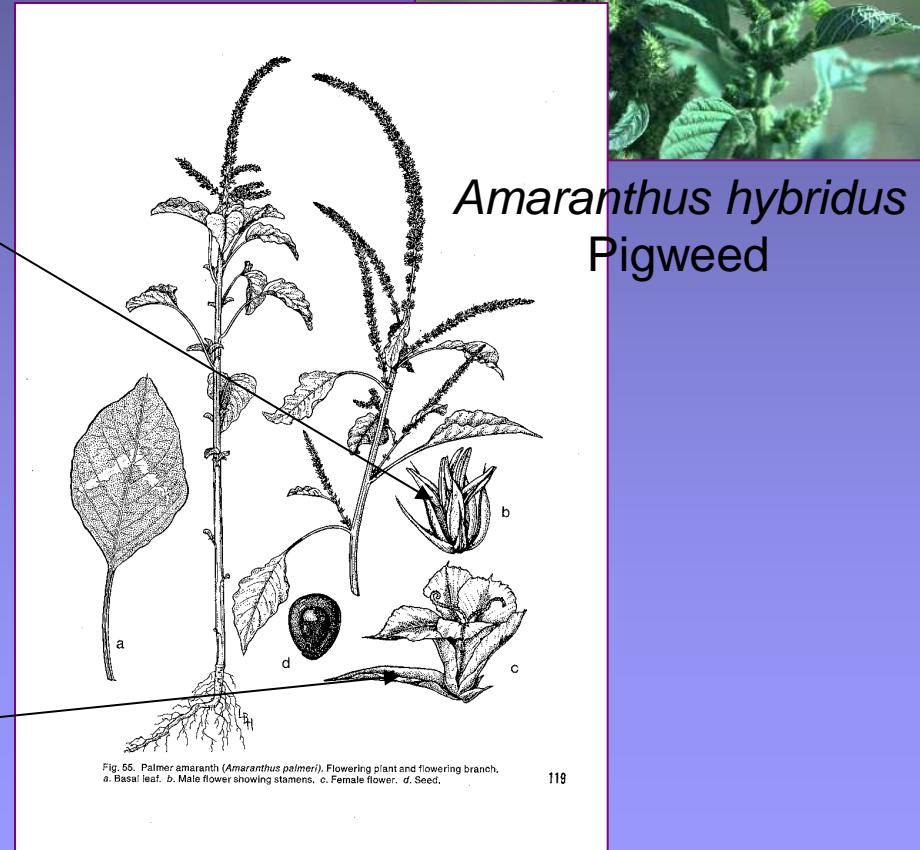
Sarcobatus vermiculatus
Greasewood



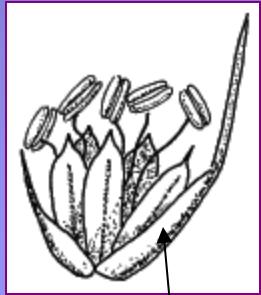
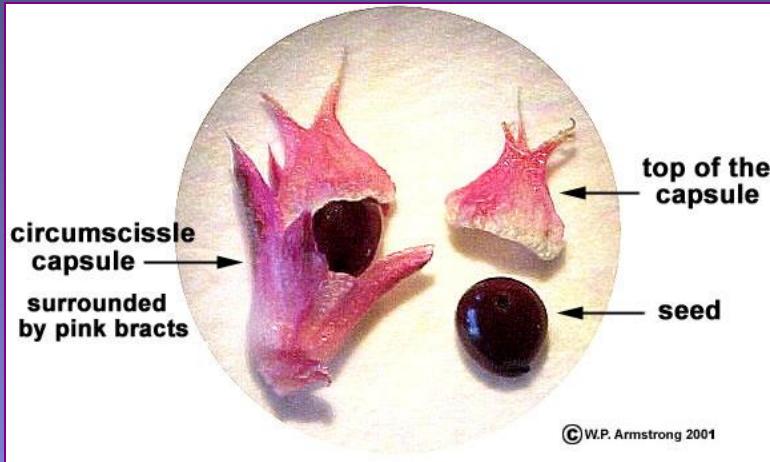
Nutlet of *Atriplex canescens*
Four-wing salt bush

Amaranthaceae (Pigweeds)

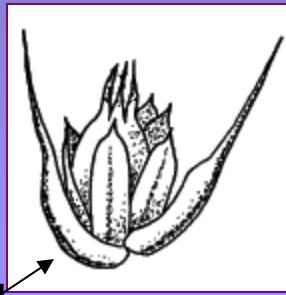
- Herbs and shrubs
- Calyx: 4-5
- Corolla: 0
- Stamens: 4-5, fused
- Carpels: 2-3, fused, superior ovary
- Fruit: utricle, pyxis
- Flowers subtended by papery bracts (similar to goosefoots)



Amaranthaceae



Female flower
with subtending
bracts



Nyctaginaceae (Four o' clocks)

- Herbs, shrubs, or trees
- Calyx: 5
- Corolla: 0
- Stamens: 5
- Carpel: 1, superior ovary
- Fruit: achene
- Bracts mimic petals,
sepals mimic petals, lvs
simple, opposite stems
tend to branch
dicotomously





Mirabilis nyctaginea

Nyctaginaceae

Flower detail



Mirabilis multiflora
Four o' clock



Abronia fragrans
Sand verbena

Fruit an achene

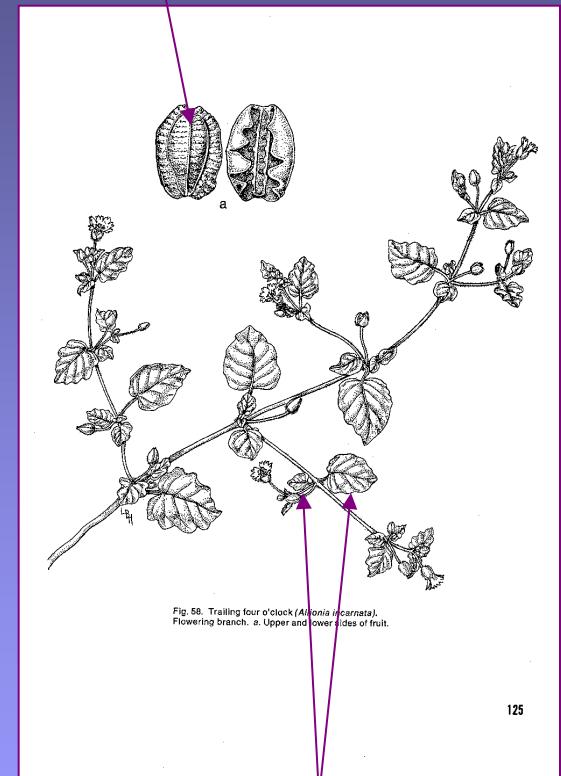


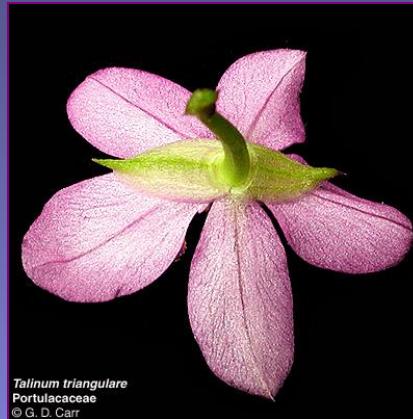
Fig. 58. Trailing four o'clock (*Abronia incarnata*). Flowering branch. a. Upper and lower sides of fruit.

125

Note unequal sizes of
opposing leaves

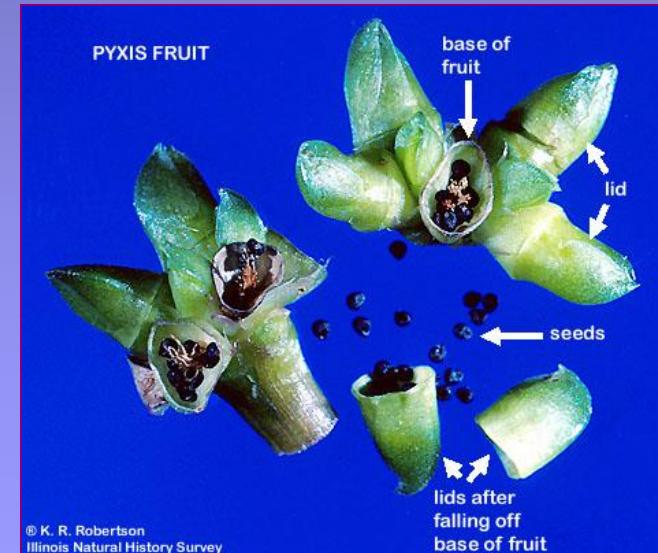
Portulaceae (Purslanes)

- Herbs, fleshy
- Calyx: 2
- Corolla: 4-6
- Stamens: 4-∞
- Carpels: 2-8, superior ovary
- Fruit: Capsule
- Capsules dehisces longitudinal or circumscissile



Talinum triangulare
Portulacaceae
© G. D. Carr

Portulaca oleracea



Portulacaceae



Claytonia lanceolata

western claytonia



Talinum
Fame flower



Montia chamissoi

toad lily



Portulaca pilosa
Rose purslane



Caryophyllaceae (Pinks)

- Herbs
- Calyx: 5 or (5)
- Corolla: 5[0] often notched (pinned)
- Stamens: 5-10
- Carpels: 2-5, ovary superior
- Fruit: capsule, utricle
- Leaves opposite, linear or lanceolate, stem nodes swollen



Dianthus caryophyllus

Caryophyllaceae



Silene drummondii
Drummond campion



Silene laciniata
Indian pink



Arenaria fendleri
sandwort



Cerastium arvense
Meadow chickweed



Stellaria longifolia
Chickweed



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Ranunculaceae (Buttercups)

- Herbs, shrubs & vines
- Calyx: 3-x
- Corolla: 0-∞
- Stamens: ∞
- Carpels: ∞, superior ovary
- Fruits: follicles, achenes, berry
- Leaves often palmately dissected, exstipulate with a sheathing base



© 2002 Jennifer Ackerfield



NM Ranunculaceae

Variable sepal shapes within the family



Aquilegia chrysantha
Sepals with spurs



Clematis columbiana
Clinging vine



Thalictrum fendleri
Female and
Male



Ranunculaceae

Variable fruit types, including:

Achenes, Follicles
and Berries



Ranunculus



Clematis

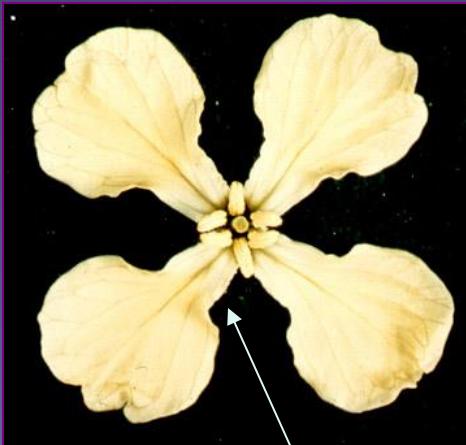


Lili-Ann Lindgren 2001

Actaea rubra
Baneberry



Aquilegia



Brassicaceae (Mustards)

- Herbs and shrubs
- Calyx: 4
- Corolla: 4, cruciform, often clawed
- Stamens: 4+2
- Carpels: 2, fused, ovary superior
- Fruit: silicles and siliques



Erysimum asperum
= E. capitatum

Brassicaceae

Silicles

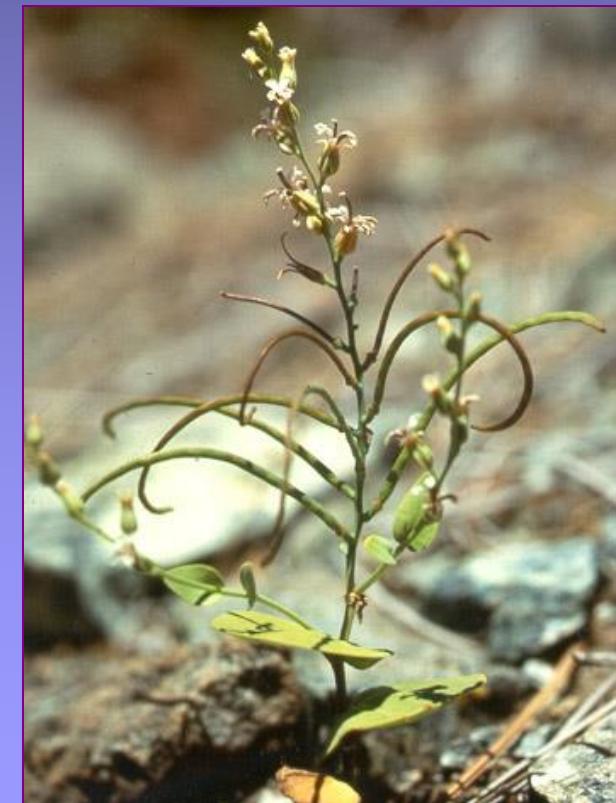
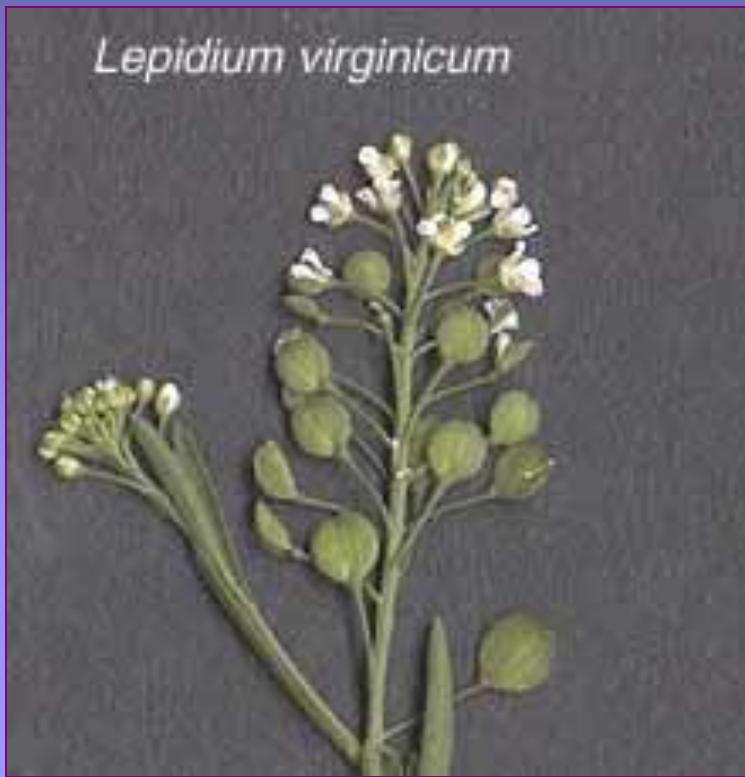


Fruit types

Siliques



Lepidium virginicum



NM Brassicaceae



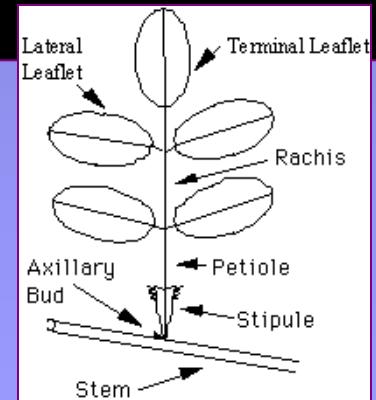


Rosaceae (Roses)

- Herbs, shrubs and trees
- Calyx: 5
- Corolla: 5[0]
- Stamens: ∞
- Carpels: ∞ (5)1,
- Fruits: achenes, drupes, pomes, follicles
- Hypanthium present, lvs alternate, usually stipulate



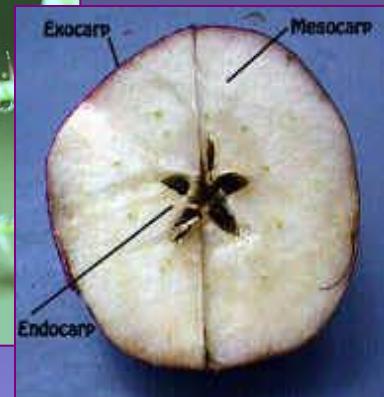
Prunus sp.
Rosaceae
© G. D. Carr



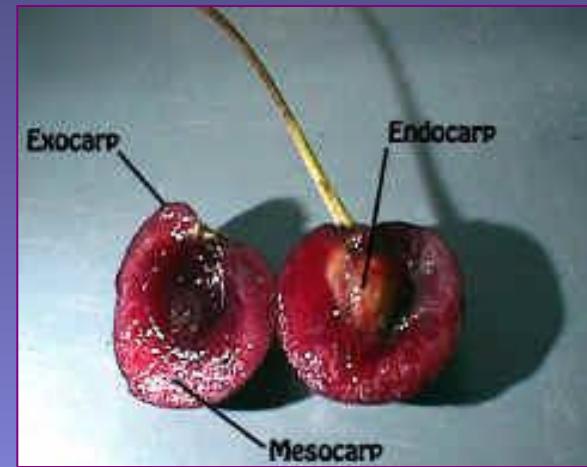
Rosaceae

Fruit types

Pomes



Drupe



Achenes



Drupelets
an aggregate fruit



NM Rosaceae



Rosa woodsii
Wild Rose



Prunus americanus
Wild plum



Geum triflorum
Prairie smoke



Geum macrophyllum, cut leaved avens



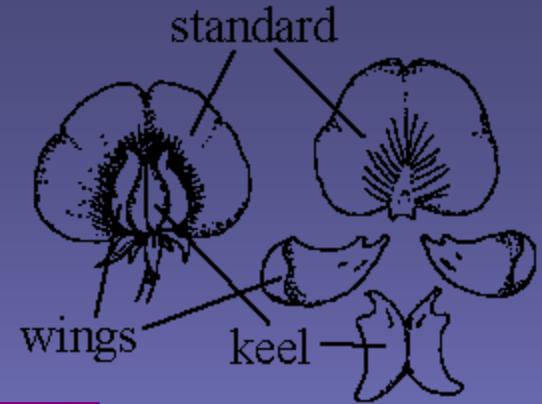
Copyright CJB 2002
Rubus idaeus
Red raspberry



Holodiscus dumosus
Mountain spray

Fabaceae (Peas)

- Herbs, shrubs, trees and vines
- Calyx: 5, fused
- Corolla: 5 or 5z
- Stamens: 5-∞
- Carpels: 1, superior
- Fruits: legumes
- Leaves alternate, mostly compound, stamens usually 10

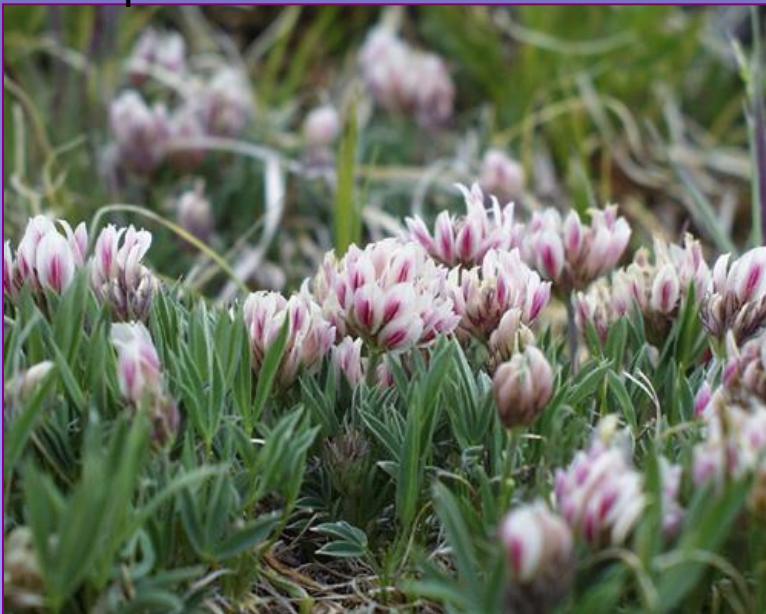




Lupinus argenteus
Alpine lupine



Astragalus nuttallianus



Trifolium dasypyllosum
Alpine clover

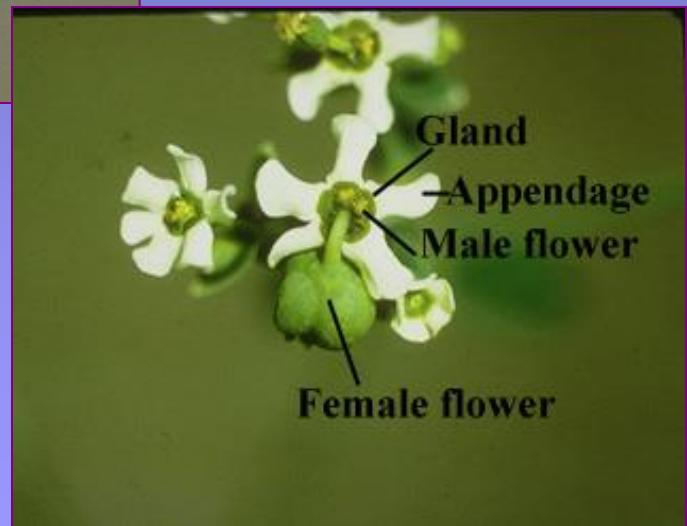
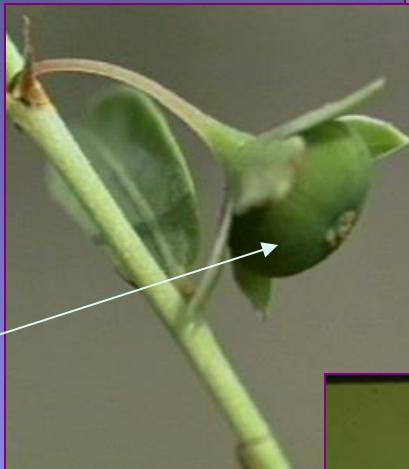
NM Fabaceae



Dalea purpurea
purple prarie clover

Euphorbiaceae (Spurges)

- Herbs, shrubs and trees
- Calyx: 0 or 5
- Corolla: 0-5
- Stamens: 1-∞
- Carpels: (3), superior
- Fruits: schizocarps
- Often with milky latex,
fruit 3 nutlets, flowers
unisexual usually much
reduced





NM Euphorbiaceae



Tragia ramosa
Nose burn



Chamaesyce polycarpa, prostrate spurge



Euphorbia dentata, Toothed poinsettia

Malvaceae (Mallows)

- Herbs, shrubs and trees
- Calyx: 3-5, lower parts fused
- Corolla: 5
- Stamens: ∞ , fused
- Carpels: $(5-\infty)$, superior
- Fruits: capsules, schizocarps
- Often with stellate pubescence, leaves alternate, palmately veined and/or lobed



Cactaceae (Cacti)



*Echinocereus
triglochidiatus*

- Herbs and shrubs
- Calyx: x
- Corolla: ∞
- Stamens: ∞
- Carpels: (2- ∞), inferior
- Fruits: berries
- Usually spiny succulents



Onagraceae (Evening primroses)

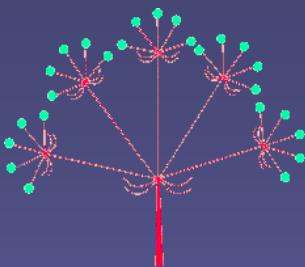
- Herbs and shrubs
- Calyx: 2 or 4
- Corolla: 2 or 4
- Stamens: 4 or 8
- Carpels: (4), inferior ovary
- Fruits: capsules, berries, nutlets
- Hypanthium present, stigmas often 4 lobed



Oenothera



Epilobium angustifolium
Fireweed



Apiaceae (Parsleys)

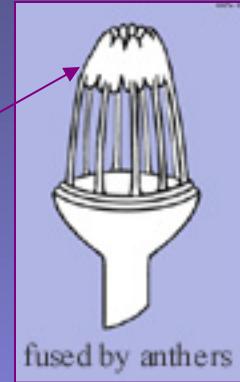
- Herbs
- Calyx: 5
- Corolla: 5
- Stamens: 5
- Carpels: (2), inferior
- Fruits: schizocarps
- Typically with a compound umbel, stems hollow, lvs compound, petioles sheathing at base



Apiaceae=Umbelliferae. The Latin word *umbellula* which means “a little shade” alludes to the flowers being produced in parasol shaped clusters

Asclepiadaceae (Milkweeds)

- Herbs, shrubs and vines
- Calyx: 5
- Corolla: (5)
- Stamens: 5, fused by upper parts
- Carpels: (5), fused by upper parts, superior
- Fruits: follicles
- Often with milky sap, lvs opposite or whorled, corona and other specialized parts

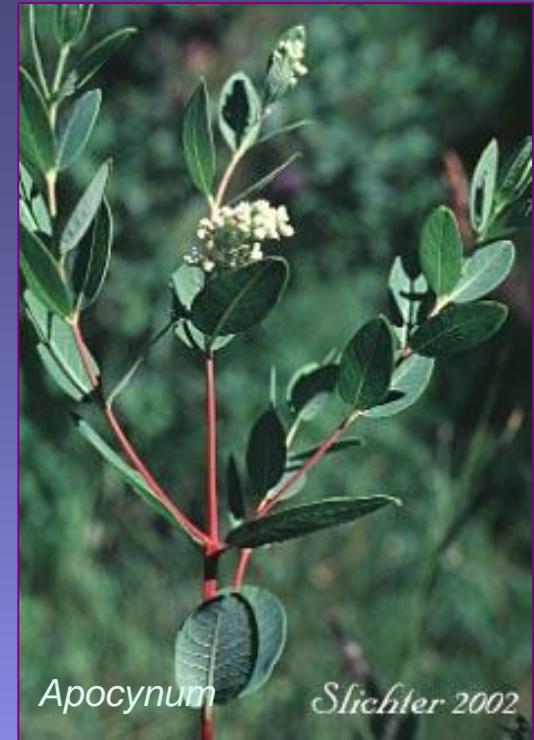
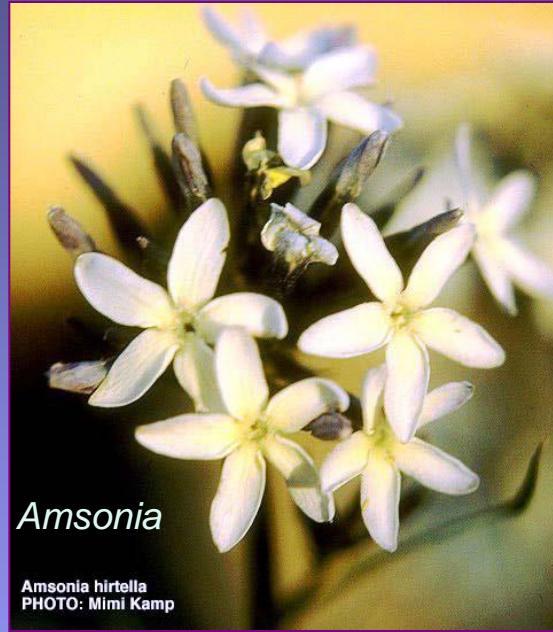


Asclepias tuberosa
Butterfly milkweed



Apocynaceae (Dogbanes)

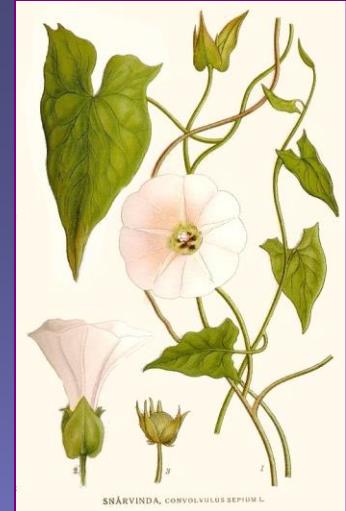
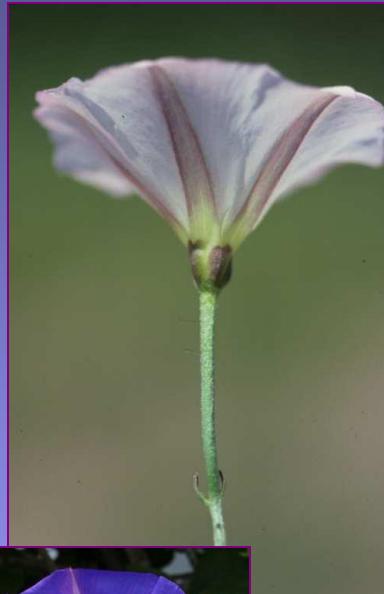
- Herbs, shrubs and vines
- Calyx: (5)
- Corolla: (5)
- Stamens: 5
- Carpels: (2), fused by upper parts, superior
- Fruits: follicles, berries, capsules
- Often with milky sap, leaves entire, opposite or whorled, carpels free at base, lacking specialized parts of milkweed





Convolvulaceae (Morning glories)

- Herbs, shrubs and vines
- Calyx: 5
- Corolla: (5)
- Stamens: 5
- Carpels: (2), superior
- Fruits: capsules, berries, nutlets
- Often with milky sap, twining herbaceous vines in N Hemisphere, corolla plaited





Polemoniaceae (Phloxes)

- Herbs
- Calyx: (5)
- Corolla: (5)
- Stamens: 5
- Carpels: (3), superior
- Fruit: capsules
- Flowers often funnelform or salverform, stamens often inserted at different levels, 3 stigmas



Polemonium



Gilia

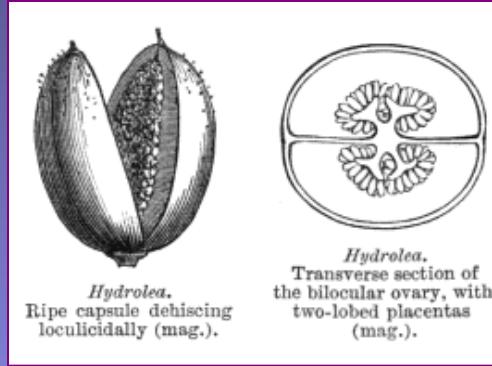


Ipomopsis aggregata



Hydrophyllaceae (Waterleafs)

- Herbs and shrubs
- Calyx: (5)
- Corolla: (5)
- Stamens: 5
- Carpels: (2),
superior ovary
- Fruits: capsules
- Flowers usually
scorpioid, unilateral,
bristly hairy



Phacelia

©2000 Barbara J. Collins



Boraginaceae (Borages)

- Herbs
- Calyx: 5, fused by lower parts
- Corolla: (5)
- Stamens: 5
- Carpels: (2), superior
- Fruits: nutlets, achenes, drupes
- Ovary 4-lobed, scorpioid cymes, lvs simple, sessile, alternate, bristly hairy



Verbenaceae (Verbena)

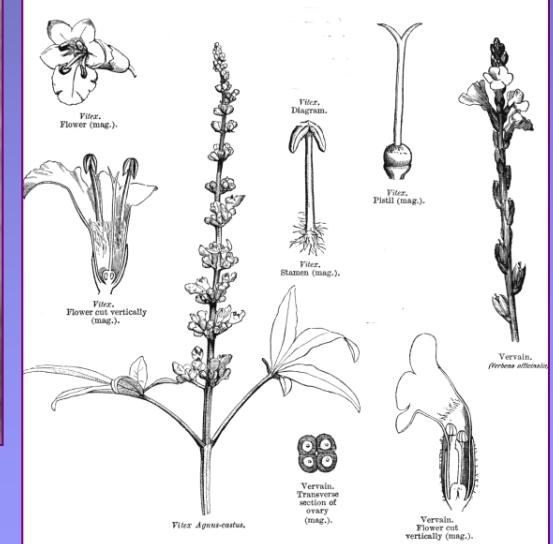
- Herbs, shrubs, trees
- Calyx: (5)
- Corolla: (5) zygomorphic
- Stamens: 2+2
- Carpels: (2), superior
- Fruits: drupes, 2 or 4 nutlets
- Leaves opposite or whorled, single terminal style, stem often 4-angled



Verbena macdougalii



Verbena bipinnatifida





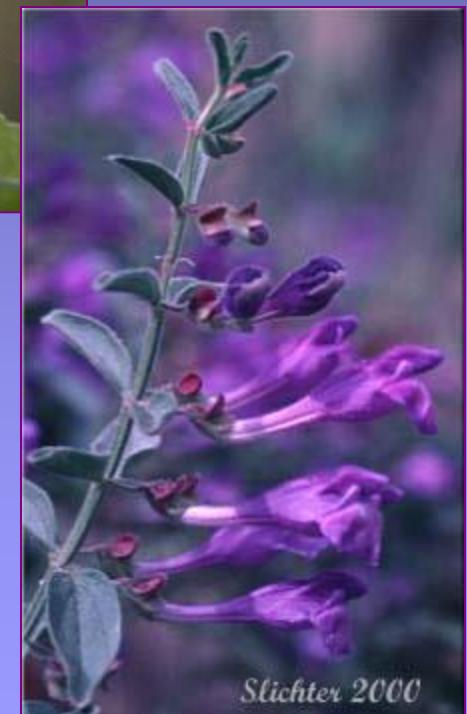
Mentha julepia

Lamiaceae (Mints)

- Herbs and shrubs
- Calyx: (5)
- Corolla: (5)
zygomorphic
- Stamens: 2 or 2+2
- Carpels: (2), superior
ovary
- Fruits: drupes, nutlets
- Ovary 4-lobed, 4 angled
stems, style bifid at apex
with unequal lobes



Prunella vulgaris



Scutellaria angustifolia
Slichter 2000



Solanaceae (Nightshades)

- Herbs, shrubs, vines and trees
- Calyx: (5)
- Corolla: (5)
- Stamens: 5
- Carpels: (2), superior ovary
- Fruits: berries, capsules
- Leaves alternate



Solanum



Tomatillo



Datura wrightii



Scrophulariaceae (Figworts)

- Herbs and shrubs
- Calyx: (5)
- Corolla: (5)
zygomorphic
- Stamens: [2] 2+2[5]
- Carpels: (2), superior
ovary
- Fruits: berries,
capsules
- Stamens usually
didynamous with a
sterile filament

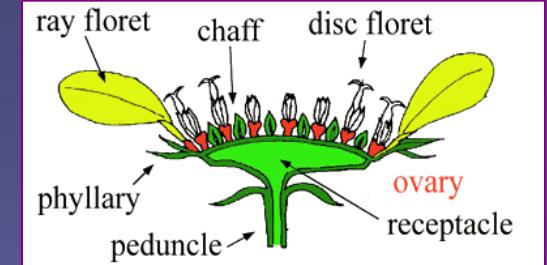


Penstemon cobaea



Asteraceae (Sunflowers)

- Herbs and shrubs
- Calyx: low unstable number
- Corolla: (5) or (5) zygomorphic
- Stamens: 5, fused by upper parts
- Carpels: (2), inferior
- Fruits: achenes
- Inflorescence in heads



The Monocots

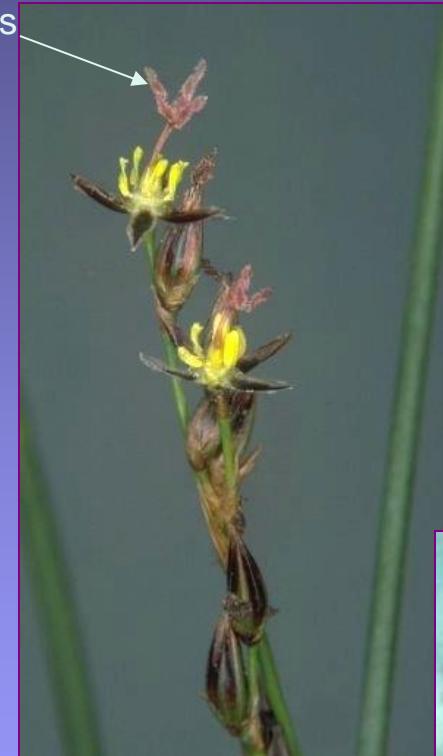
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- Leaf venation usually parallel
- ~65,000 species
- Dicotyledons
- Flower parts usually in fours or fives
- Leaf venation usually netlike
- ~170,000 species





Juncaceae (Rushes)

- Herbs (stems round)
- Perianth of tepals: 6
- Stamens: 6
- Carpels: (3),
superior ovary
- Fruits: capsules
- Small grass-like
herbs, 3-many
seeded capsule,
perianth scarious,
green or brown



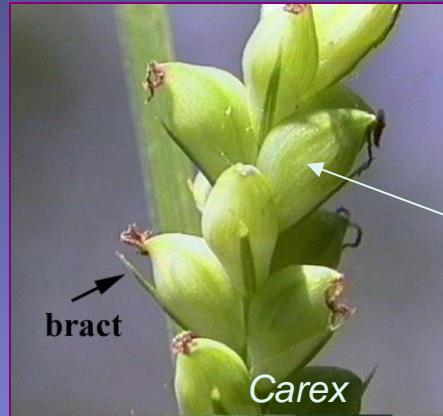
Stamens



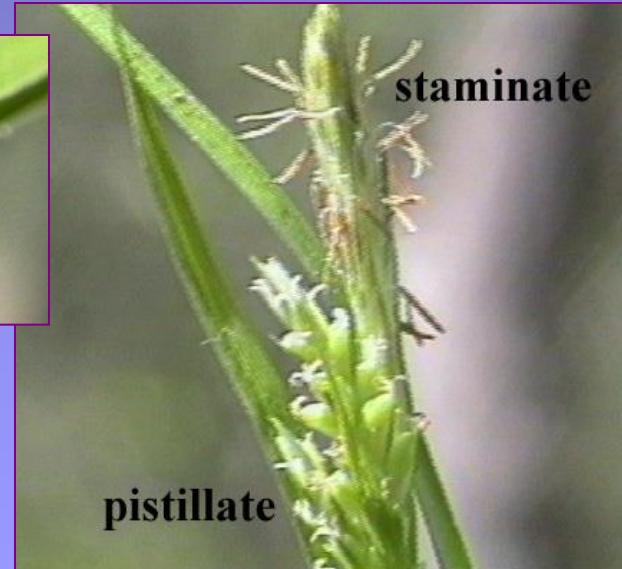
Tepals

Cyperaceae (Sedges)

- Herbs
- Calyx: low, unstable number, often reduced to bristles or scales
- Corolla: 0
- Stamens: 3
- Carpels: (2-3), superior ovary
- Fruits: achenes, nutlets
- Grass-like, stems often 3-sided, solid, nodes not apparent



Subtending bracts;
one for male flowers
and two for female,
the second bract of the
female flower a 'perigynium'
which surrounds the pistil





Allium cernuum

Liliaceae (Lilies)

- Herbs
- Perianth of “tepals” (usually), or Calyx 3 and Corolla 3
- Stamens: 6[3]
- Carpels: 3, superior
- Fruits: capsules, berries



Capsule with seeds



Calochortus gunnisonii



Lilium philadelphicum



Zigadenus elegans



Agavaceae (Agaves)

- Herbs and shrubs
- Calyx: 3
- Corolla: 3
- Stamens: 6
- Carpels: (3), superior or inferior ovary
- Fruits: capsules, berries
- Flowers subtended by spathelike bracts, lvs persisting in basal rosette



Orchidaceae (Orchids)



Corollorrhiza maculata

- Herbs
- Calyx: 3
- Corolla: 2+1z
- Stamens: 1-2,
arranged in pollinia
- Carpels: (3), inferior
- Fruits: capsules
- Lip often elaborate



Orchid pollinia



Calypso bulbosa



Cypripedium pubescens

Poaceae (Grasses)



Bouteloua gracilis



Bouteloua curtipendula

- Herbs
- Calyx: 2-3
- Corolla: 0
- Stamens: 3
- Carpels: (2-3), superior ovary
- Fruits: caryopsis
- Glumes present, stems hollow with obvious nodes



That's all folks!

