Plant Family Characteristics of Prohibited & Noxious Weeds

Cory Jacob, PAg
Acting Provincial Specialist - Weed Control
Saskatchewan Agriculture

Saskatchewan

Cover 3 plant families

- Aster/Sunflower (Asteraceae)
- Mustard (Brassicaceae)
- Pink (Caryophyllaceae)

Aster/Sunflower (Asteraceae) Family

- Largest family of flowering plants
  - More than 1,000 genera
  - Over 20,000 species
- Economic importance
  - Sunflower and safflower oil
- Many species are prized ornamentals
- Many species are weedy!

Photos: SA, Agrium Weed Identification CD-ROM and G. Bowes, AAFC

Photos: Department of Crop and Soil Sciences, Michigan State University and Ronald Calhoun

Prohibited Weeds in this Family

- Diffuse Knapweed
- Spotted Knapweed
- Squarrose Knapweed
- Common Cupina
- Yellow Star-Thistle

Photos: Saskatchewan Agriculture and Nature Conservancy & UC Davis

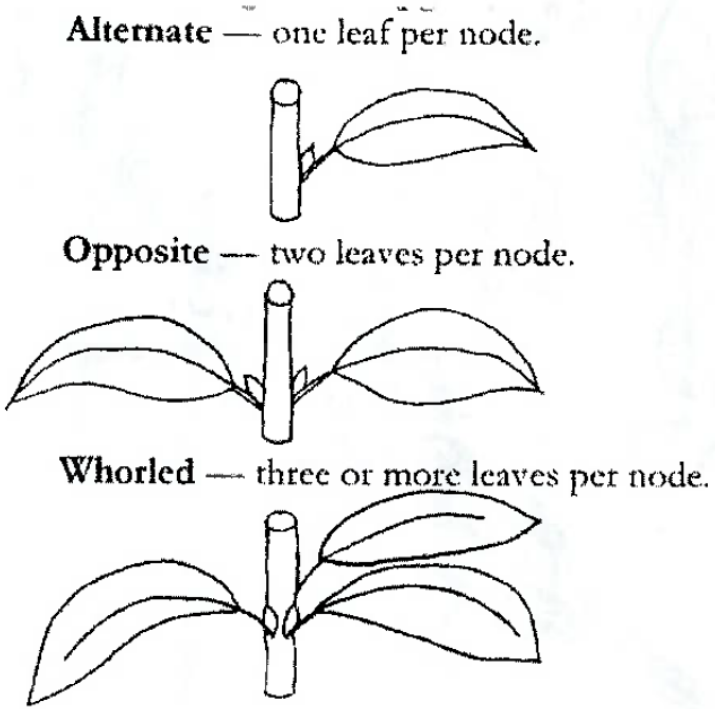
Noxious Weeds in this Family

- Absinthe
- Oxeye Daisy
- Narrow Leaved Hawk's Beard
- Russian Knapweed
- Prickly Lettuce
- Annual, Perennial and Spiny Annual Sow Thistle
- Bull, Common and Nodding Thistle
- Common Tansy
- Common Burdock

Photos: Saskatchewan Agriculture and Nature Conservancy

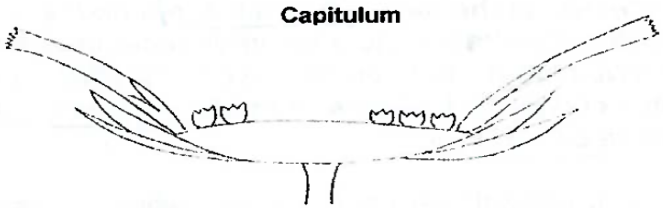
Sunflower Family Characteristics

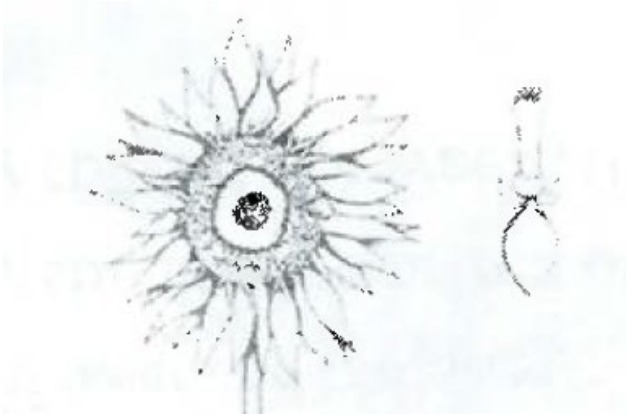
- May be annual, biennial or perennial
- Stems usually erect
- Leaves may be alternate or opposite (rarely whorled); variable shapes and textures
- Inflorescence is **a capitulum**; it is the defining family characteristic



Capitulum

- An inflorescence consisting of a head of small closely packed stalkless flowers or florets arising at the same level on a flattened axis
- The whole is surrounded by an involucre of bracts
- The combination of flowers and bracts gives the appearance of a single large flower
- An involucre bract is often mistaken for a calyx



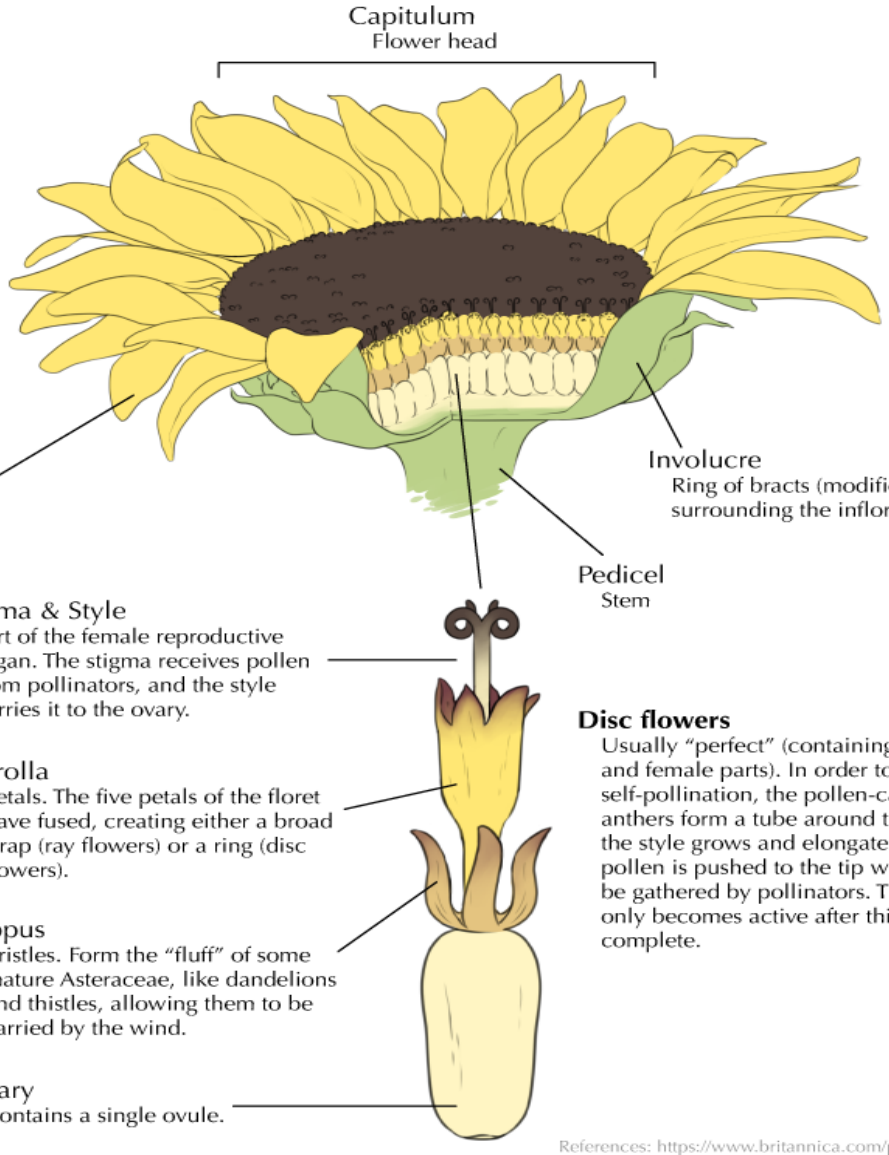


- When both types of florets are present the tubular florets form the centre of the capitulum and the ligulate florets are arranged around the edge

Asteraceae

Asteraceae is a family of over 25,000 flowering plant species—roughly 10% of all flowering plants—with members ranging from lettuce to artichokes to dandelions to sunflowers. The defining characteristic of Asteraceae is its flower structure. What appears to be one flower is actually a grouping, or inflorescence, of many smaller flowers. These individual flowers are sometimes referred to as florets.

There are two main types of flowers: disc flowers and ray flowers. Some species have both types, while others have one.



Ray flowers

Most ray flowers are pistillate (contain only female parts), though they are sterile in some species. Some plants may instead have lingulate flowers, which are essentially ray flowers but are "perfect" (containing both male and female parts).

Disc flowers

Usually "perfect" (containing both male and female parts). In order to avoid self-pollination, the pollen-carrying anthers form a tube around the style. As the style grows and elongates, the pollen is pushed to the tip where it can be gathered by pollinators. The stigma only becomes active after this process is complete.

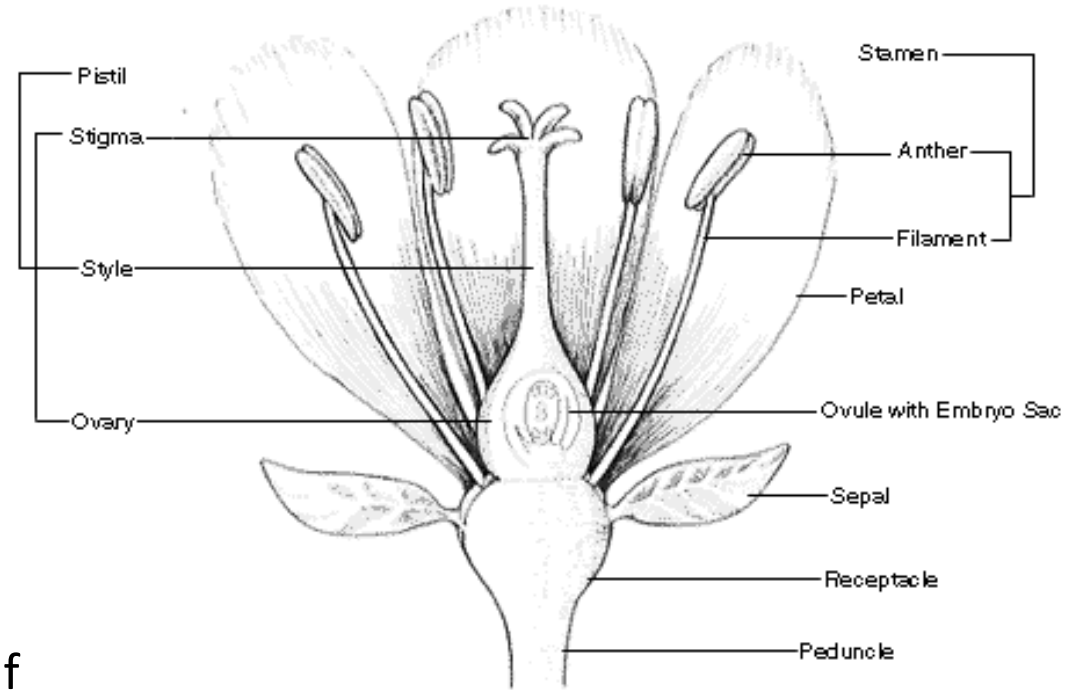
ALITHOGRAPHICA

References: https://www.britannica.com/plant/Asteraceae
http://www.sci.sdsu.edu/plants/fieldbotany/ch8-Asterales-Asterac.pdf

https://www.smmtc.org/plantofthemonth/Common_Sunflower.php

Calyx

CALYX: collective term for sepals

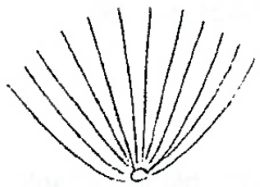


SEPALS: The outer parts of a flower stalk (often green and leaf like) that encloses a developing bud

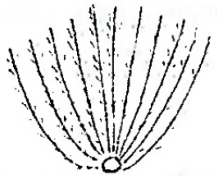
https://www.amnh.org/learn-teach/curriculum-collections/biodiversity-counts/plant-identification/plant-morphology/parts-of-a-flower

Calyx

- Often absent or replaced by chaffy bracts, or a tuft of hairs known as a PAPPUS
  - Pappus aids in wind dispersal



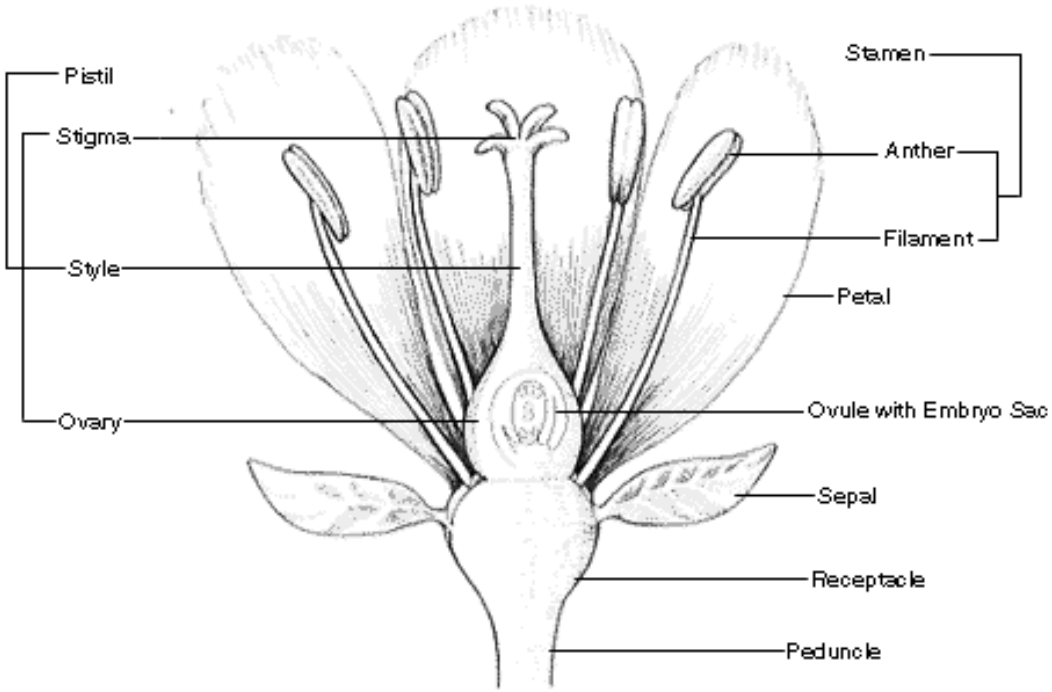
Simple Pappus



Feathery Pappus

Corolla

- COROLLA: Collective term for petals
- PETAL: The parts of a flower that are often noticeably colored



https://www.amnh.org/learn-teach/curriculum-collections/biodiversity-counts/plant-identification/plant-morphology/parts-of-a-flower

Corolla (Tubular and Ligulate Floret

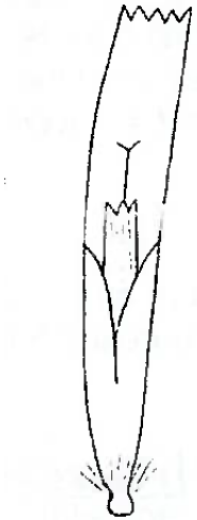
Tubular Floret

- Five pointed tube
- **Gamopetalous** – petals fused together to form a tub

Tubular Floret

Ligulate Floret

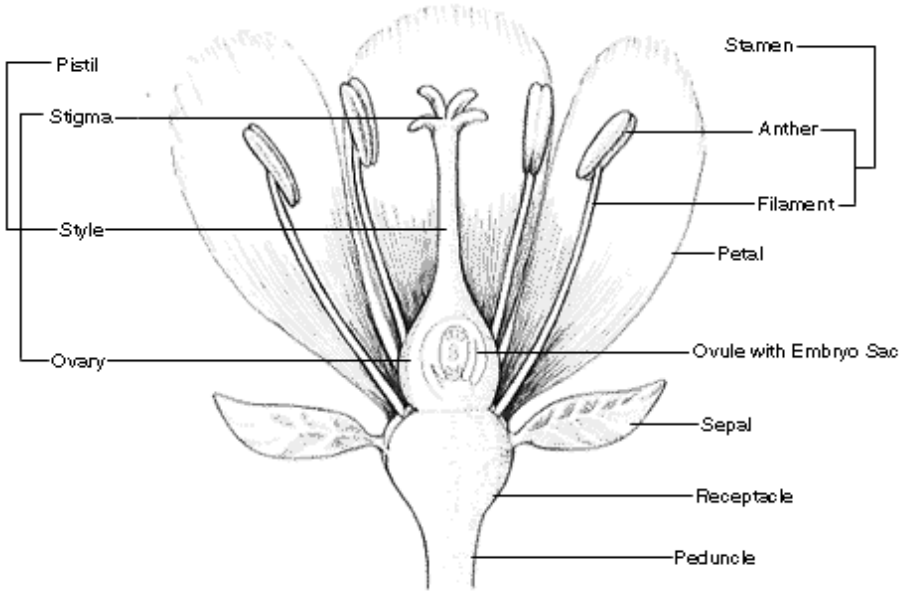
- Corolla has become fused and one side to form a flat linear “petal like” flower
- Often a very short tube at the base of the floret



Ligulate Floret

Androecium

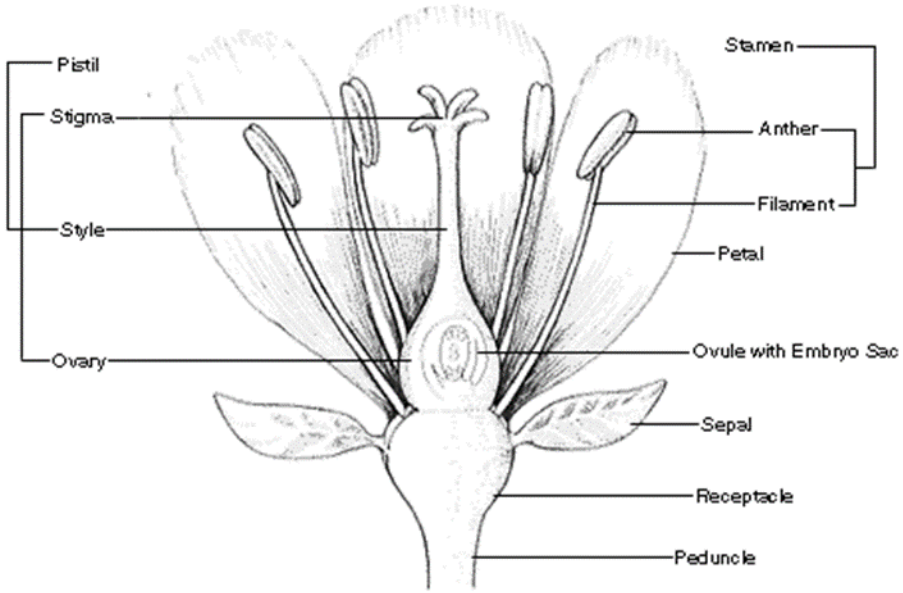
- ANDROECIUM: Collective term for stamens
- STAMEN: The male part of a flower consisting of anther and filament
- ANTHER – contains pollen
- FILAMENT – Stalk supporting the anther



https://www.amnh.org/learn-teach/curriculum-collections/biodiversity-counts/plant-identification/plant-morphology/parts-of-a-flower

Gynoecium

- GYNOECIUM: Collective term for pistils
- PISTIL: The female part of a flower, consisting of Ovary, Style and Stigma
- OVARY: base of pistil, at maturity the ovary wall enclosed, seed form the fruit
- STYLE: Connects ovary to Stigma
- STIGMA: top of style, adapted to receive pollen. May be sticky or feathery



https://www.amnh.org/learn-teach/curriculum-collections/biodiversity-counts/plant-identification/plant-morphology/parts-of-a-flower

Androecium and Gynoecium

Androecium

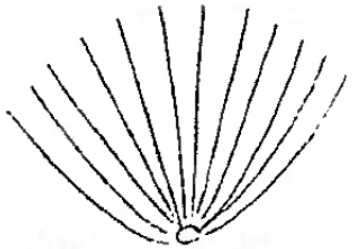
- Consists of five stamens with linear anthers
- May be united into a sheath around the style and if so is term **syngenesious**

Gynoecium

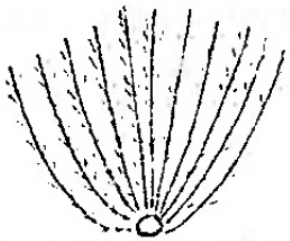
- Consists of an inferior ovary (situated below the other floral organs
- One seeded
- Long Style
- Two-forked stigma

Fruit

- Fruit is an **achene**
- Fruit often bears a pappus developed from the calyx
- Pappus aids in wind dispersal
- Pappus may be simple or feathery



Simple Pappus



Feathery Pappus

Seed is a slender achene with a pappus for wind dispersal.

https://www.treehugger.com/how-dandelions-decide-to-spread-their-seeds-5324703

- Seed is an achene with a feathery pappus.
- https://commons.wikimedia.org/wiki/File:Dandelion_seed_head_closeup.jpg

Asteraceae Divisions

- Three Divisions Based on Floral Structure

Group 1 Asteraceae Division

- Capitulum composed of **imperfect tubular florets**
  - Imperfect flowers lack either stamen or pistils
- Heads tend to droop
- Plants may be:
  - Monoecious (male flowers and female flowers on the same plant)
  - Dioecious (male flowers and female flowers on separate plants)
- Example: Poverty weed (*Iva axillaris*)

Arrow pointing to Female flowers

Arrow pointing to male flowers

Poverty weed

- https://www.saskwildflower.ca/nat_Iva-axillaris.html, photo credit to Glen Lee

Group 2 Asteraceae Division

- Capitulum composed entirely of **perfect ligulate florets**
  - Perfect flowers contain both stamens and pistils
- Stamens are united and plants contain a milky sap
- Example: Dandelion (*Taraxacum officinalis*)

Dandelion

Capitulum contains perfect ligulate florets

http://prairiewildflowers.blogspot.com/2013/06/dandelion-flower-up-close-and-beautiful.html, photo credit Shelley Banks

- White sticky latex exudes from the plant when tissue is broken.
- https://www.ontario.ca/document/weed-identification-guide-ontario-crops/perennial-sow-thistle

Group 3 Asteraceae Division

- Either all florets tubular or tubular florets surrounded by ligulate florets
  - Ligulate florets are either female or sterile
- Stamens are united

- Tubular florets are usually perfect

- Scentless chamomile inflorescence
- Branches terminate in radiate flowering heads with white ray florets surrounding yellow tubular florets.
- Flowers can reach 1 m in height.
- http://biodiversity.sk.ca/Docs/InvasiveSpeciesCouncilFactSheets/Scentless%20Chamomile.pdf

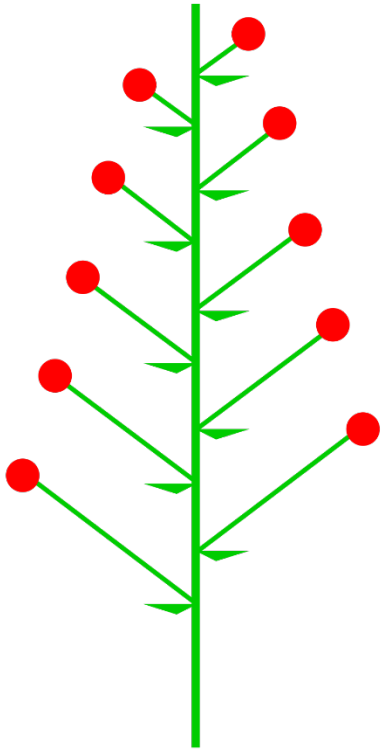
- Capitulum with tubular florets surrounded by ligulate florets
- https://mbcropalliance.ca/market-development-access/crop-profiles/sunflower/

Mustard (Brassicaceae) Family

- Large family of extremely high economic importance to the world
- Members of this family have a long association with humans and agriculture, providing many vegetables, oilseeds, mustards, spices and herbs

Family Characteristics

- Contain **glucosinolates**
- **Annuals, winter annuals, biennials or perennials** (many members of this family are winter annuals)
- **Erect stems; alternate leaves** with variable shapes and margins
- Leaves maybe covered with hairs Inflorescence is typically an indeterminate or axillary **raceme**



Raceme: an indeterminate inflorescence in which a main axis produces a series of flower on lateral stalks, the oldest at the base and the youngest at the top. Flowers attached by pedicels

https://en.wikipedia.org/wiki/Raceme

Prohibited Weeds in this Family

- Perennial Pepperweed
- Garlic Mustard

Photo credit: Clark Brenzil

Noxious Weeds in this Family

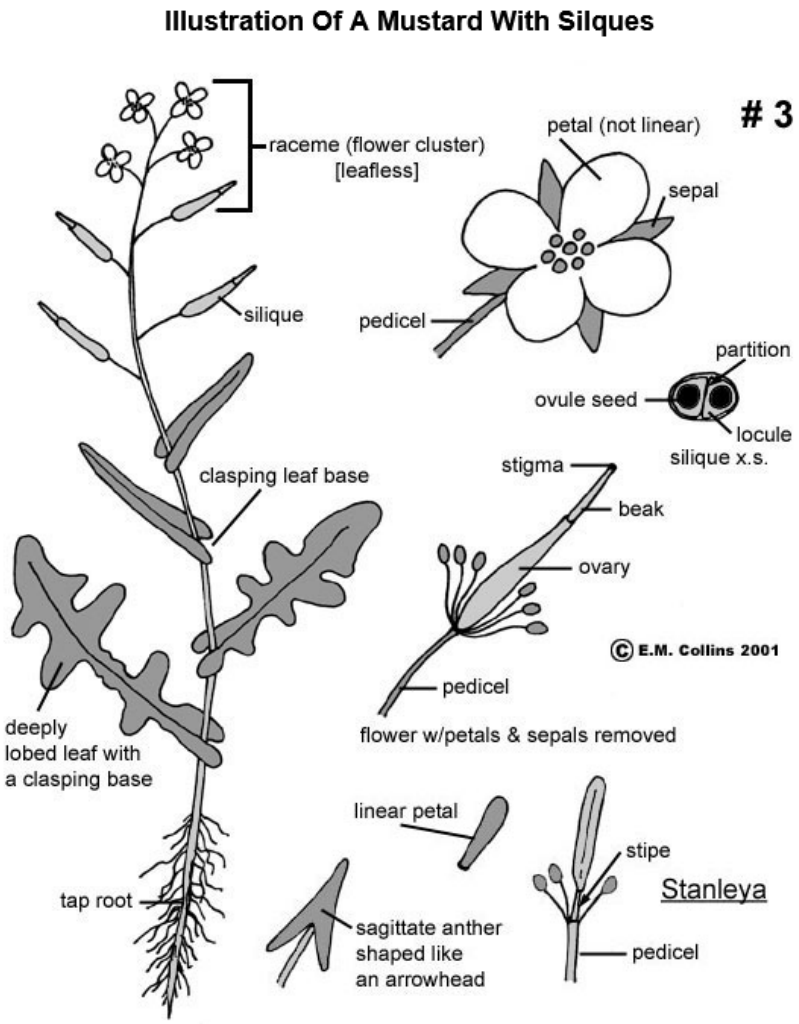
- Dame's Rocket
- Hoary Alyssum

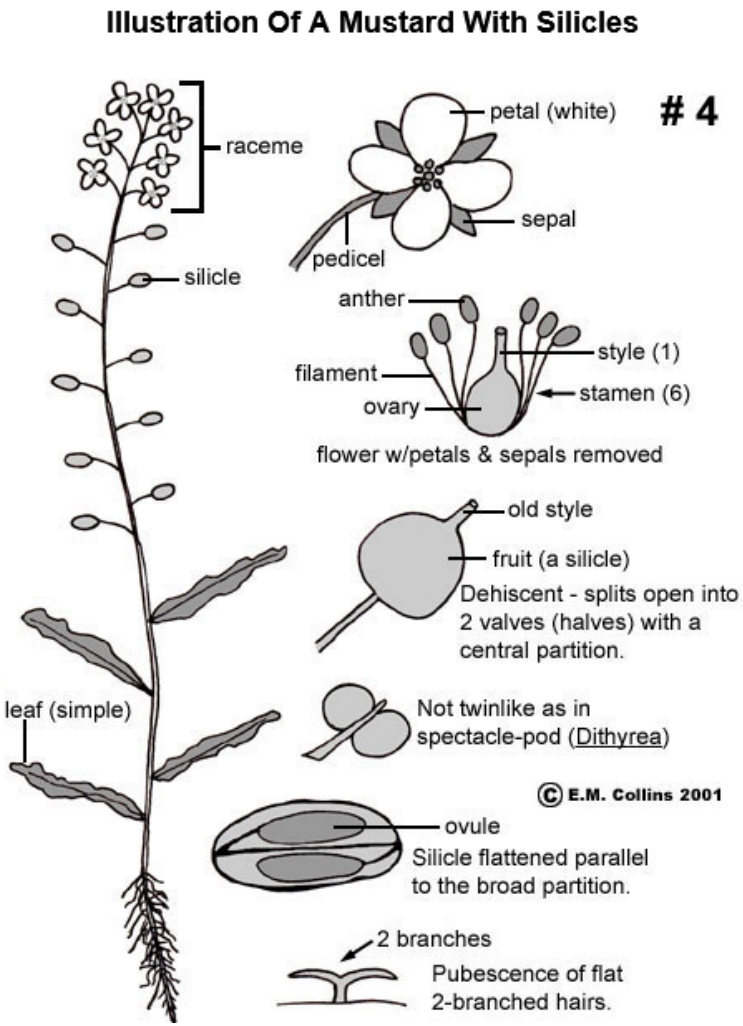
Photo credit: Clark Brenzil

Family Characteristics

- Calyx with four sepals
- Corolla has four free petals
- Petals are yellow, white or purple
- Androecium contains six stamens
- Gynoecium consists of a two-celled ovary with split stigma

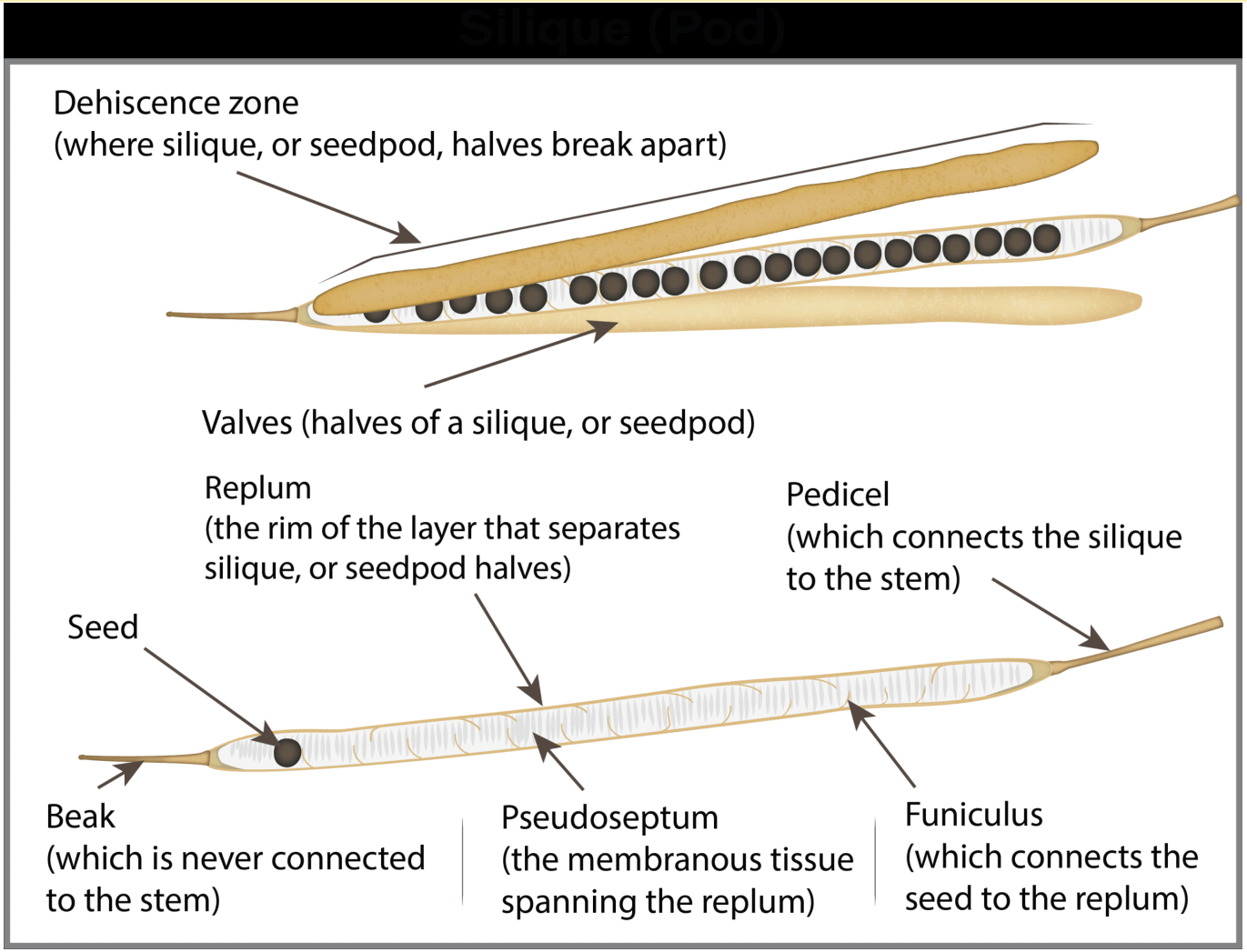
- Brassica Flower
- https://www.saskwildflower.ca/nat_Sinapis-arvensis.html, photo credit Glen Lee





https://www.waynesword.net/fruitid7.htm

- Close-up of the heart-shaped seed pod containing numerous small orange-brown oblong seeds
- https://www.ontario.ca/document/weed-identification-guide-ontario-crops/shepherds-purse



- Canola silique
- https://www.canolacouncil.org/canola-encyclopedia/history-of-canola-seed-development/

Pink (Caryophyllaceae) Family

- The pink family, Caryophyllaceae consists of about 75 genera and 2,000 species
- The family is not of great economic importance, containing few well-known ornamentals

Family Characteristics

- Annuals, biennials and herbaceous perennials
- **Stems are mostly erect (sometimes prostrate) and have distinctly swollen nodes**
- Contains the well-known ornamental flower, the carnation
- Also contains a number of troublesome weeds

Prohibited Weeds in this Family

- None that I can identify

Noxious Weeds in this Family

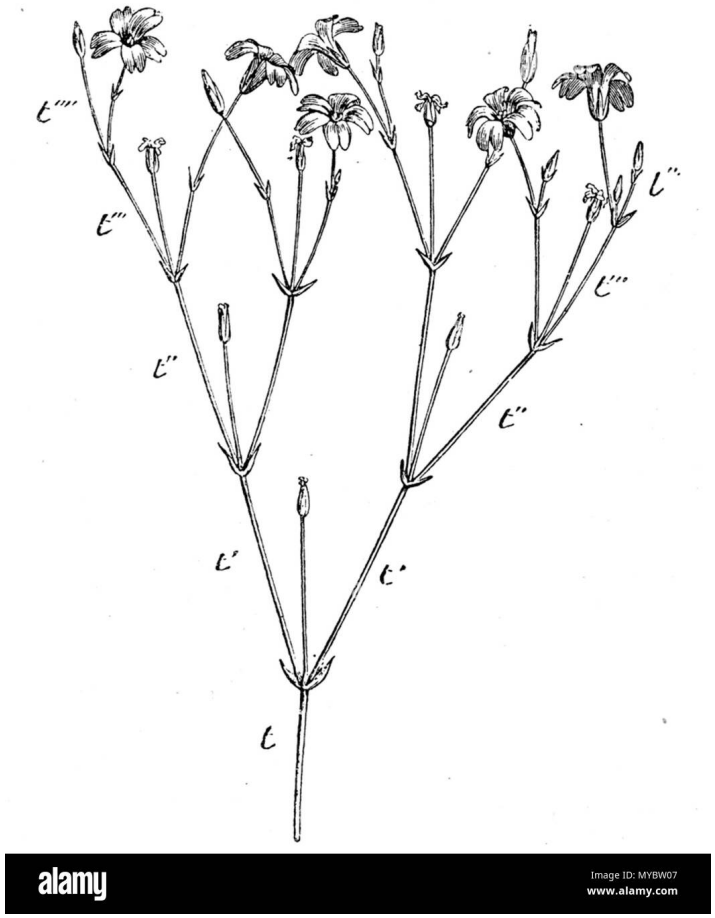
- Baby's Breath
- Night-Flowering Catchfly
- White Cockle
- Bladder Campion

https://www.saskwildflower.ca/nat_Gypsophila-paniculata.html, photo credit Glen Lee

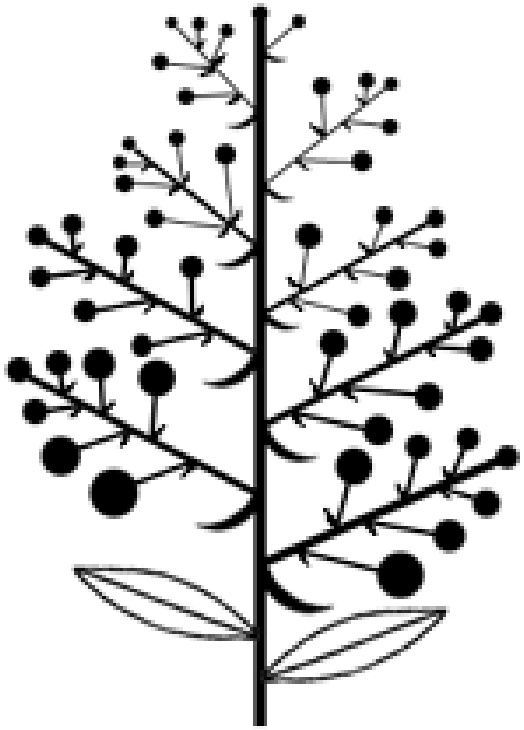
Photo credit: Government of Manitoba

- Pink Family: Stems
- STEMS are mostly erect (sometimes prostrate) and have distinctly SWOLLEN NODES
- https://gobotany.nativeplanttrust.org/species/silene/latifolia/

- Pink Family: Leaves
- Leaves are also OPPOSITE, ENTIRE, OFTEN SESSISLE
- https://www.canr.msu.edu/pestid/uploads/images/White-campion-leaf.jpg

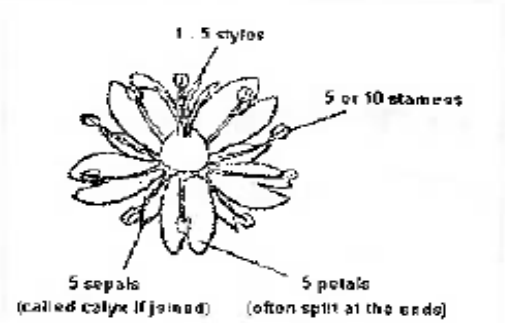


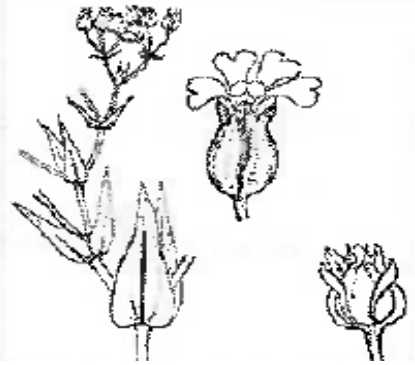
- Pink Family: Inflorescence
- Often a double CYME, a determinate inflorescence
- Cyme: the first flower to open is at the upper tip of the stem, with subsequent flowers arising from axillary buds lower on the stem
- https://www.alamy.com/inflorescence-of-cerastium-caryophyllaceaecymser-bltenstand-von-cerastium-t-t-aufeinander-folgende-achsen-scanned-17-july-2006-debenutzergriensteidl-103-cerastium-inflorescence-image188960471.html?imageid=ECAD4EBA-7BD3-4F07-80AB-50B0482E18D2&p=650648&pn=1&searchId=62aebbb7c7b76060d3d41e9213506927&searchtype=0



- Pink Family Inflorescence may be a PANICLE
- Panicle: Flowers are formed on stalks arising from a main axis
- https://www.waynesword.net/terminf1.htm

Typical Pink Family Flower Structure





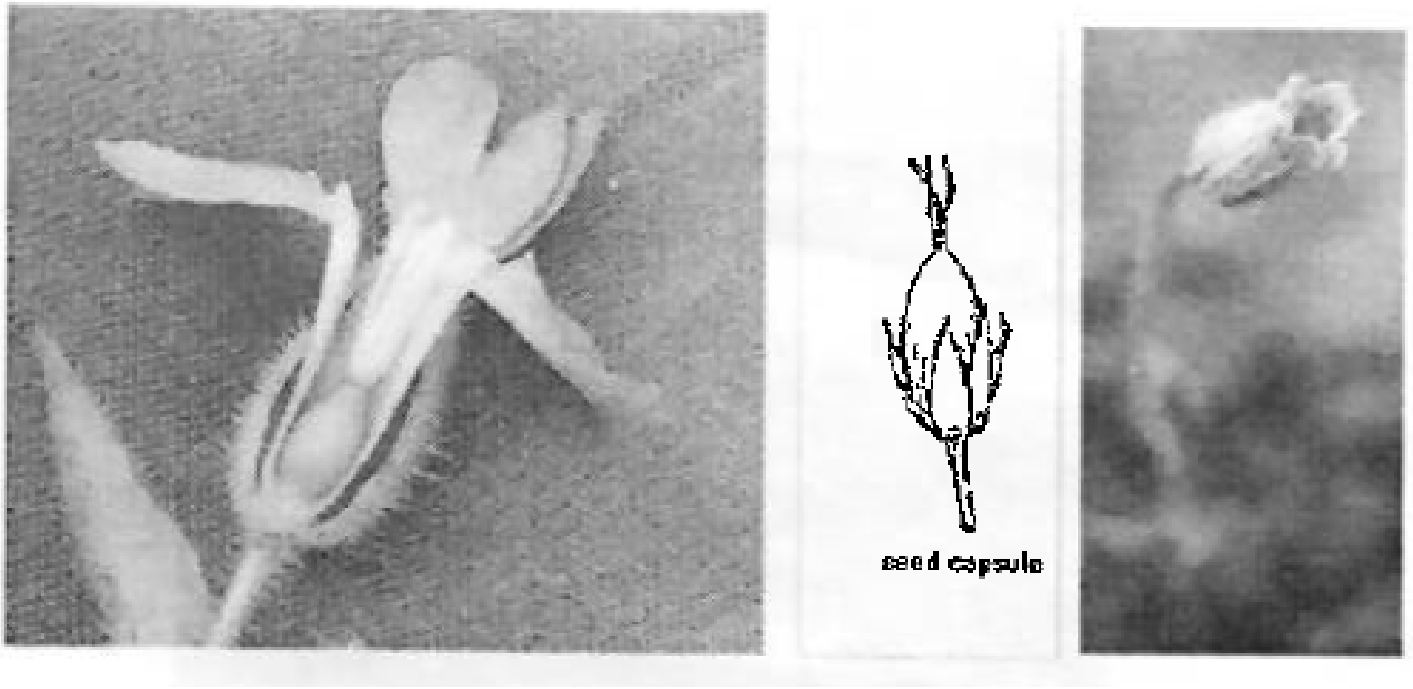
CALYX: (collective term for sepals) free or united

COROLLA: (collective term for petals) five petals, often cleft and often large and conspicuous

ANDROECIUM: (collective term for stamens) 5 or 10 stamens in 1 or 2 whorls

GYNOECIUM: (collective term for pistils) one celled ovary with 2 to 5 styles, which is stigmatic along their entire length (catches and traps pollen

Pink Family Fruit Structure



- One-celled capsule opening at the top by **twice as many teeth as styles**
- Contains many seeds adhered to a central column
- Persistent calyx often covers the seed capsule

Thank You!

- Cory.jacob@gov.sk.ca
- 1 306 570 1086

- Questions

saskatchewan.ca