

Plant Identification

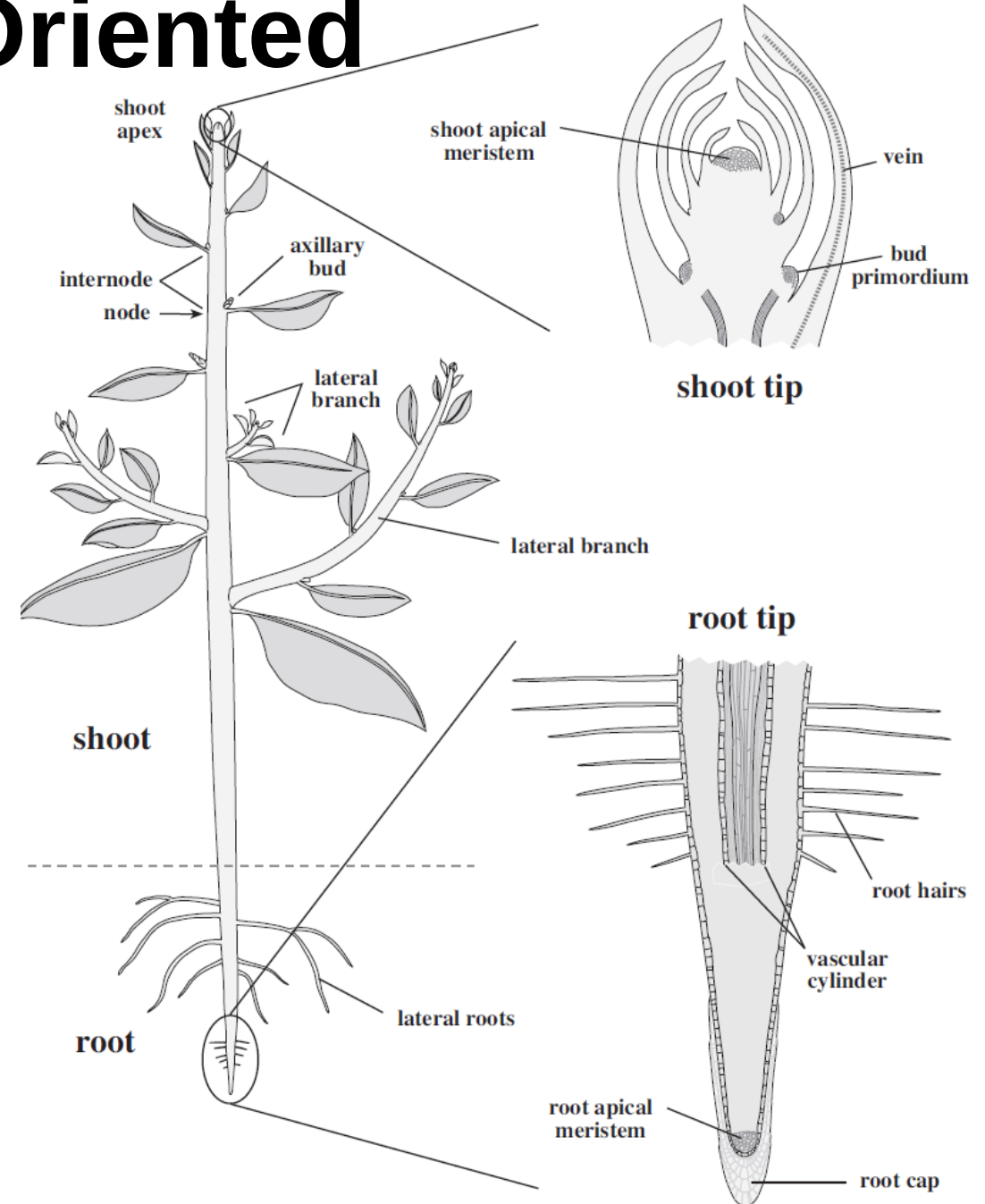
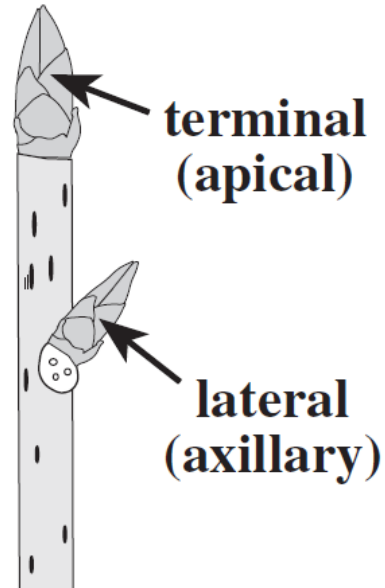
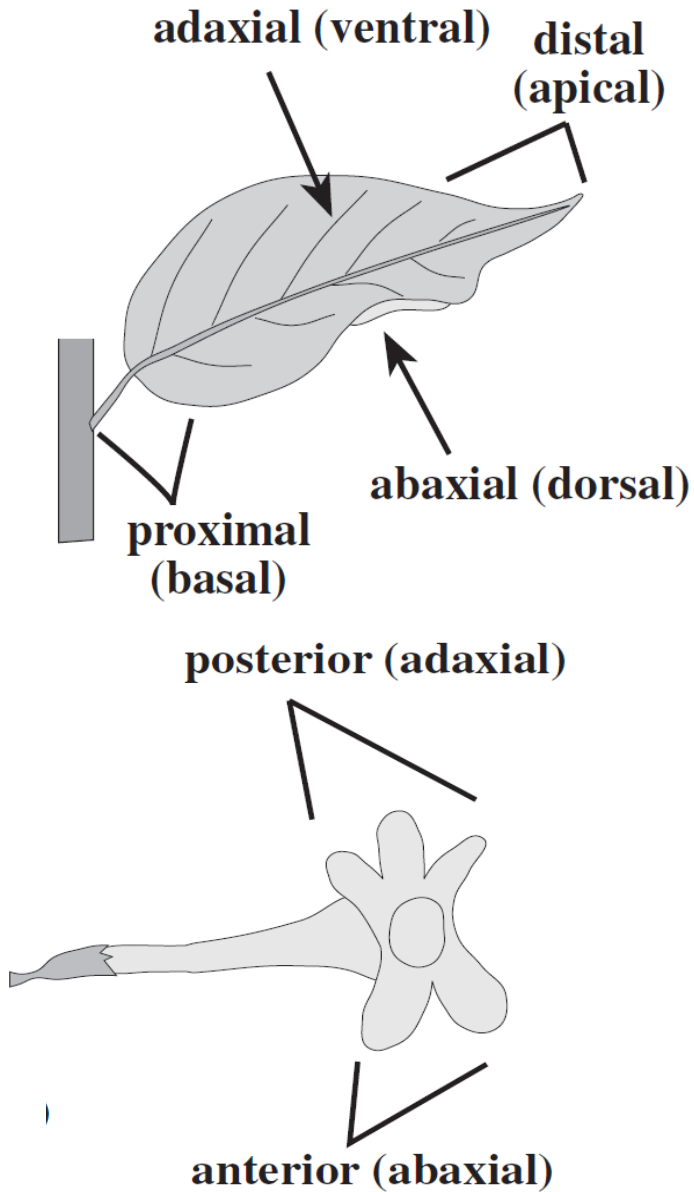
Methods and Resources



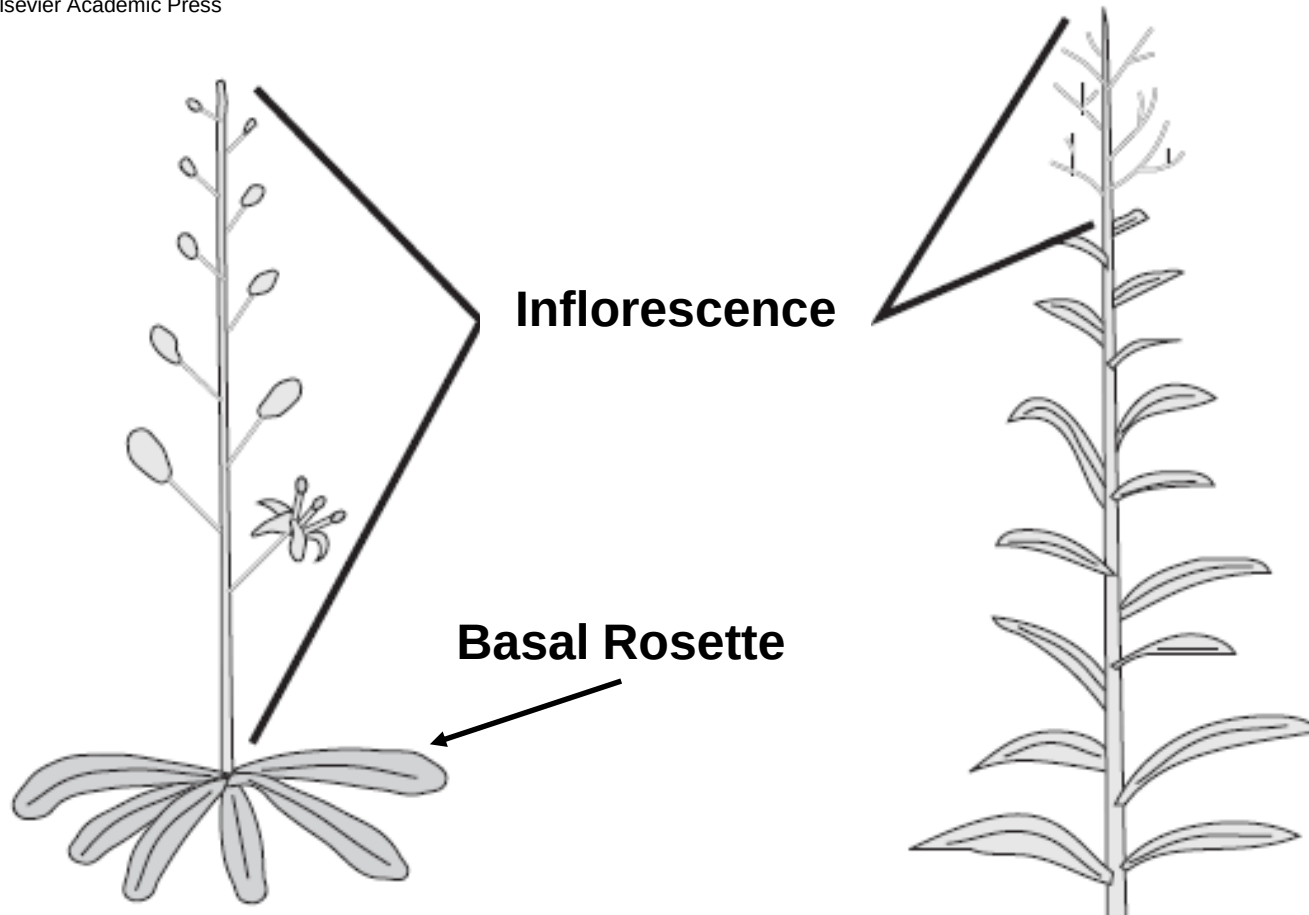
Matt Jones
Horticulture Extension Agent
NCCE Chatham County Center

Part II

Getting Oriented



Stem Morphology



Acaulescent

Caulescent



Leaf Anatomy

Functions of a Leaf

- Photosynthesis
- Transpiration

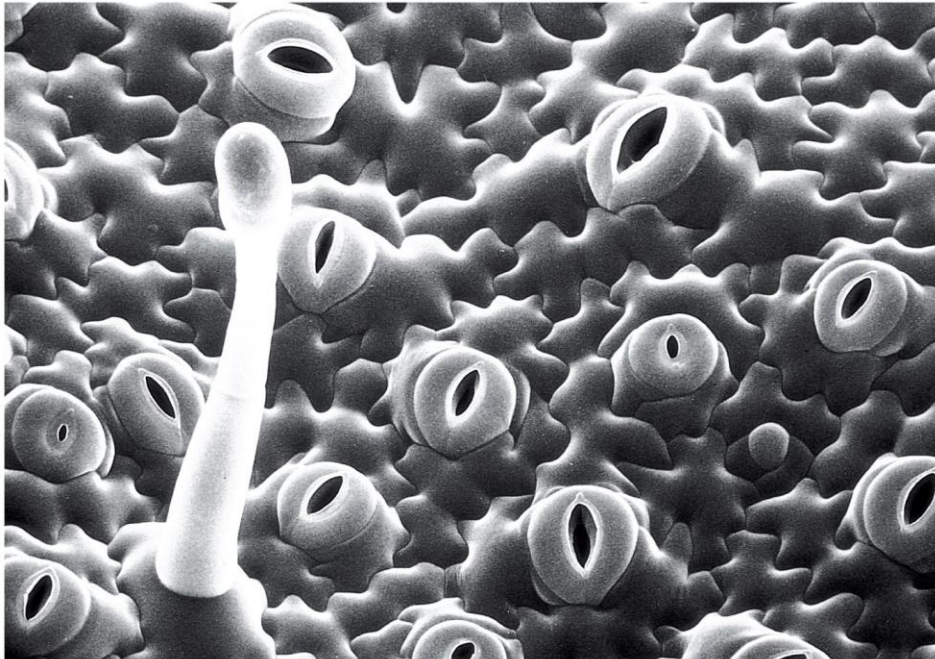
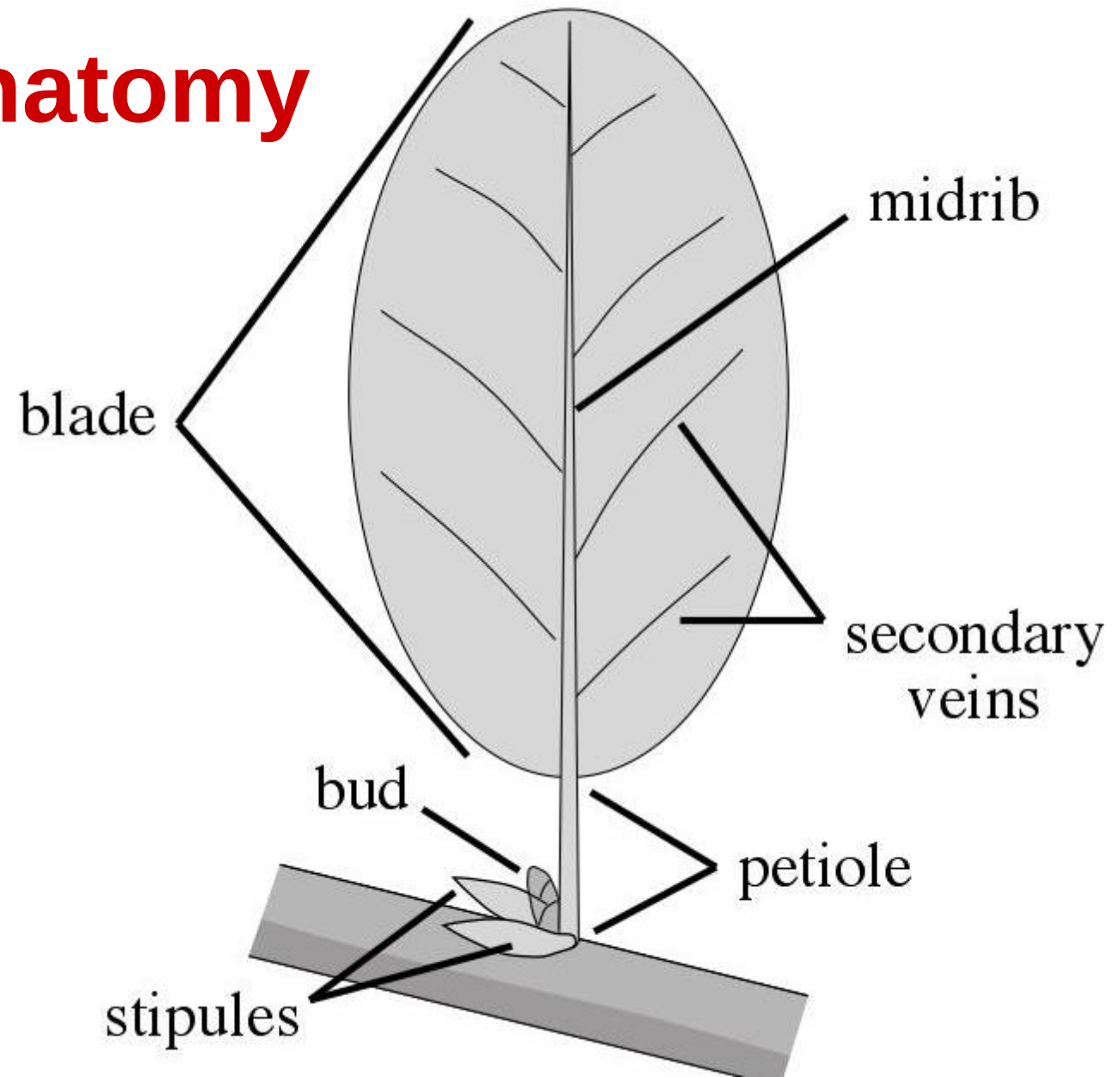


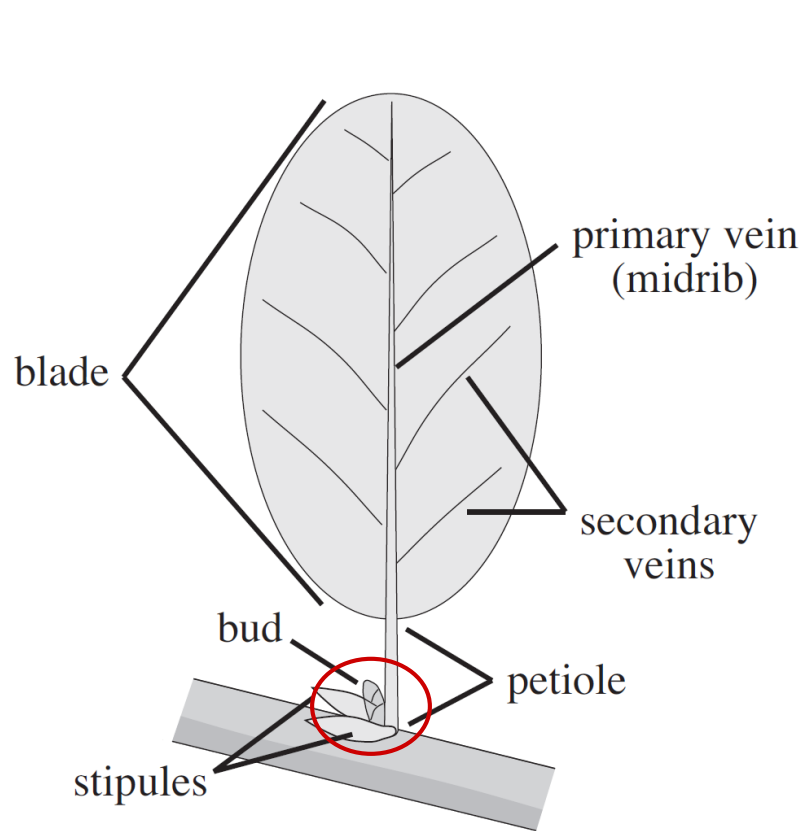
Figure 7-15
Raven Biology of Plants, Eighth Edition
© 2013 W. H. Freeman and Company



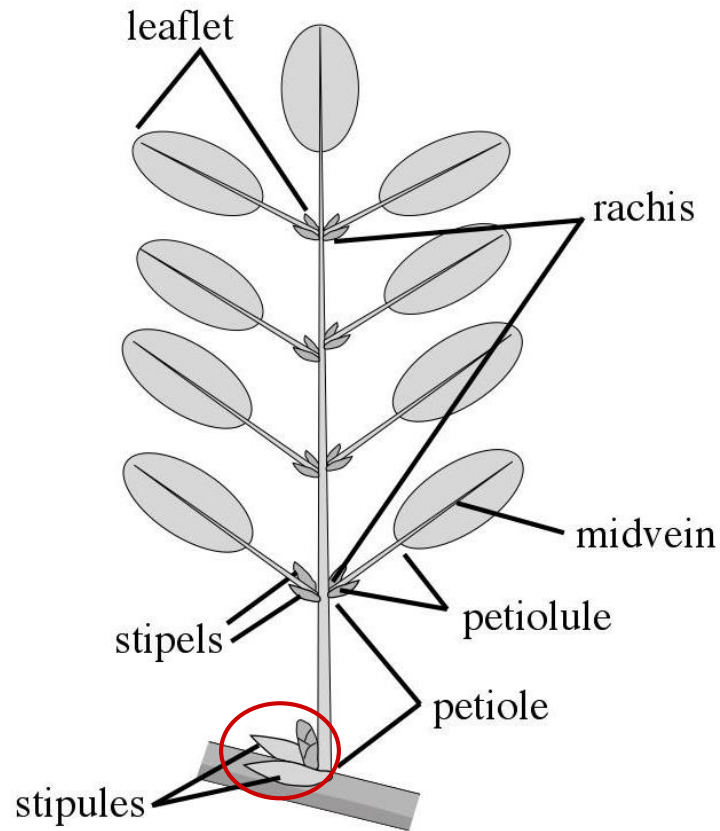
Simpson *Plant Systematics* 2006

Raven Biology of Plants 8th ed.

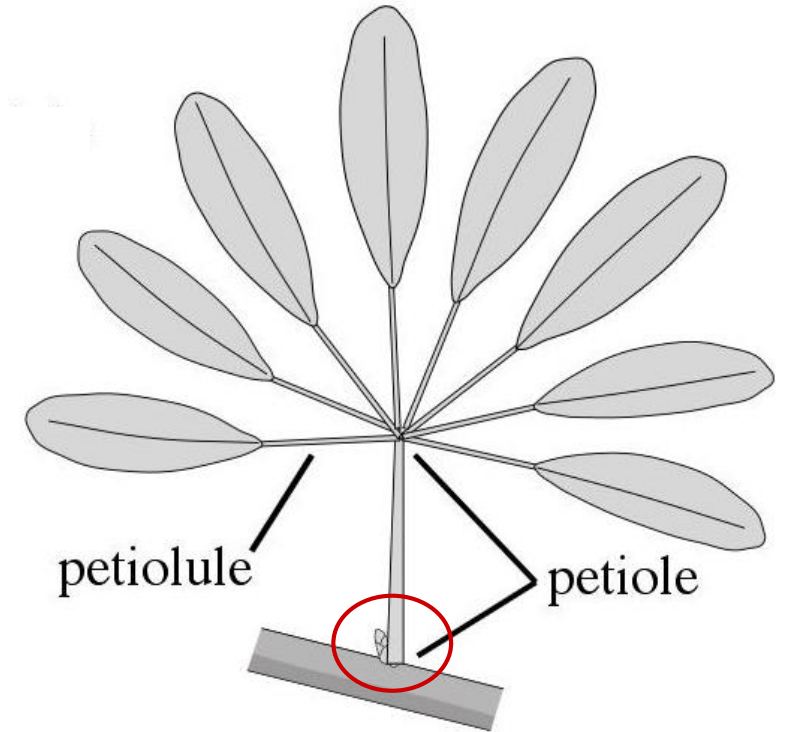
Leaf Blade Division



Simple



Pinnately Compound



Palmately Compound

To distinguish between simple and compound leaves, look for **axillary buds**.

Leaf Blade Division



Simple

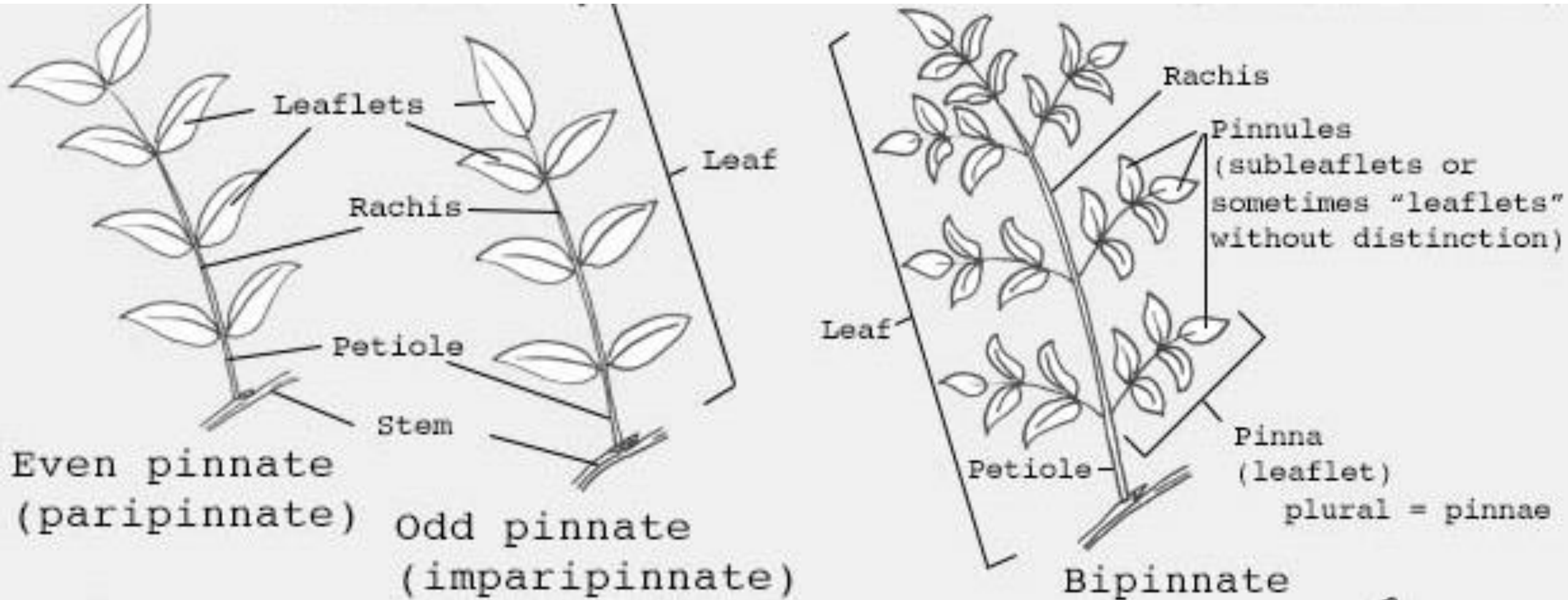


Pinnately Compound



Palmately Compound

More Blade Division



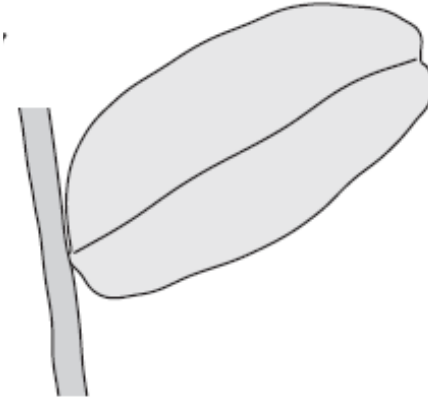
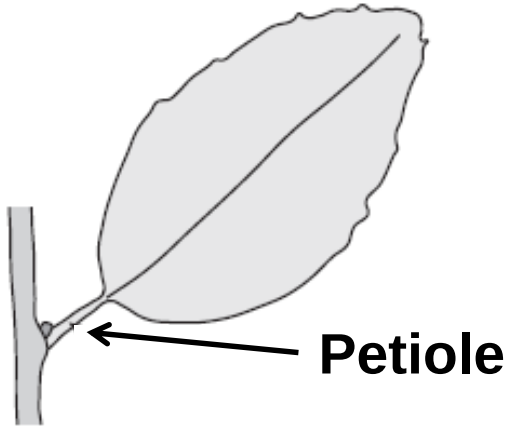
More Blade Division



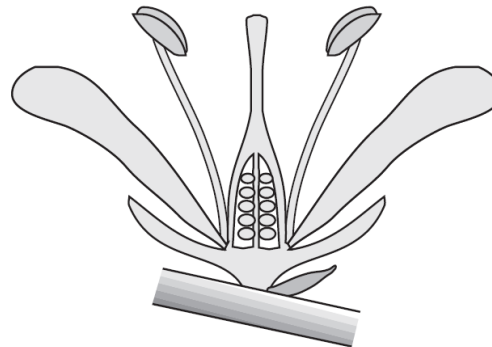
Bipinnatey Compound Leaves

Leaf Blade Division

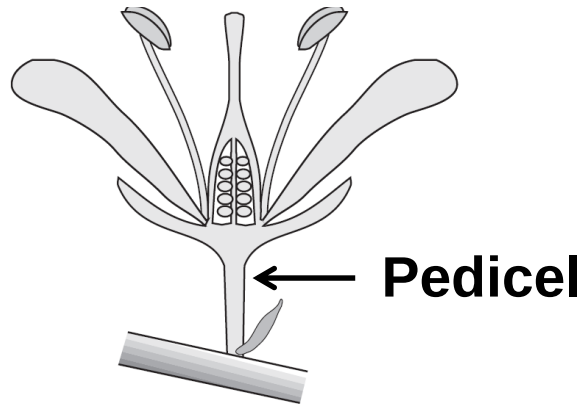
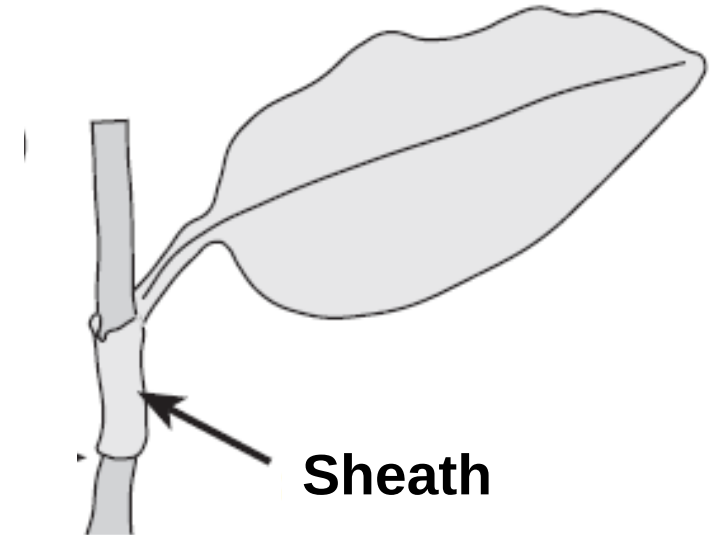
Petiolate



Sessile



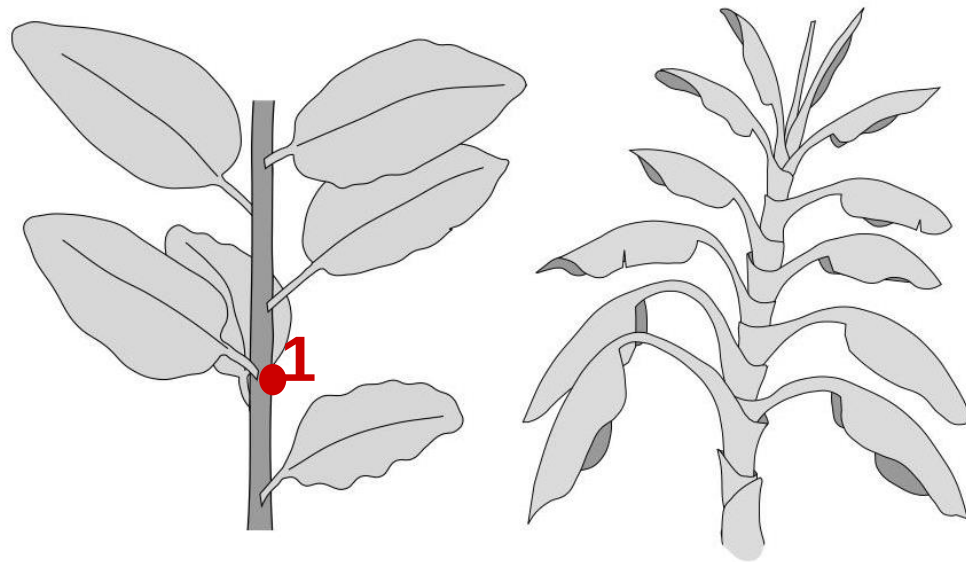
Sheathing



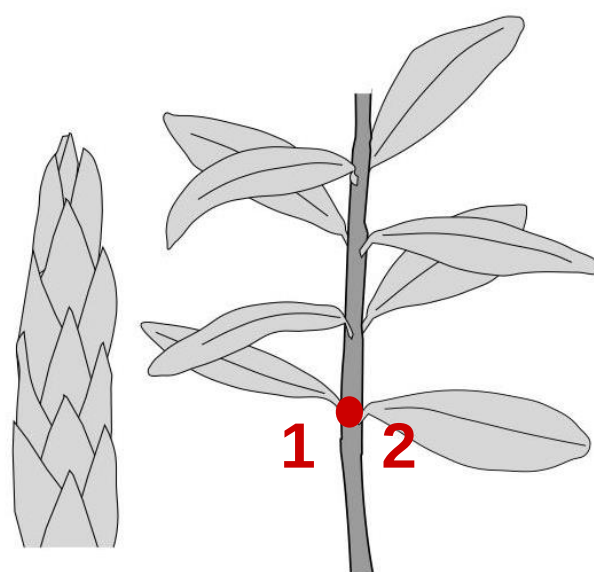
Pedicellate

Phyllotaxy

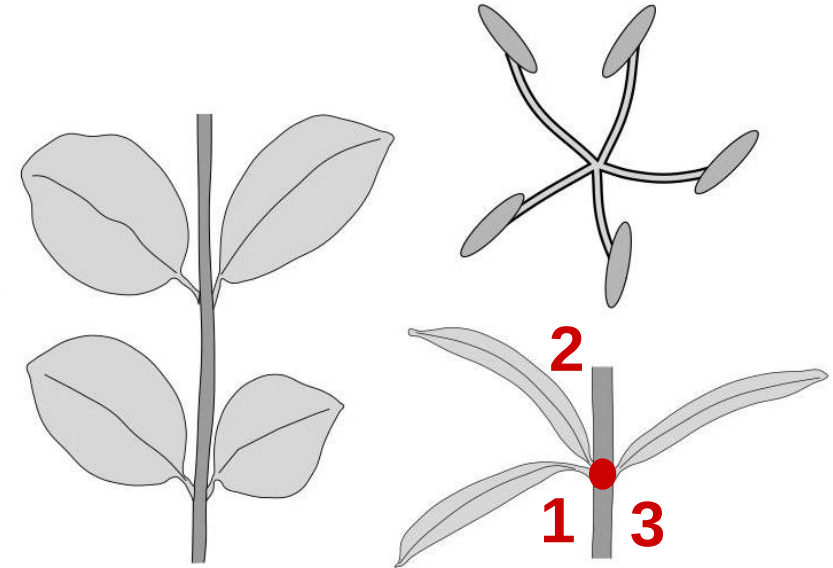
Leaf arrangement around the stem



Alternate



Opposite



Whorled

Leaf arrangement is related to the number of **leaves per node**.

Phyllotaxy

Leaf arrangement around the stem



Alternate

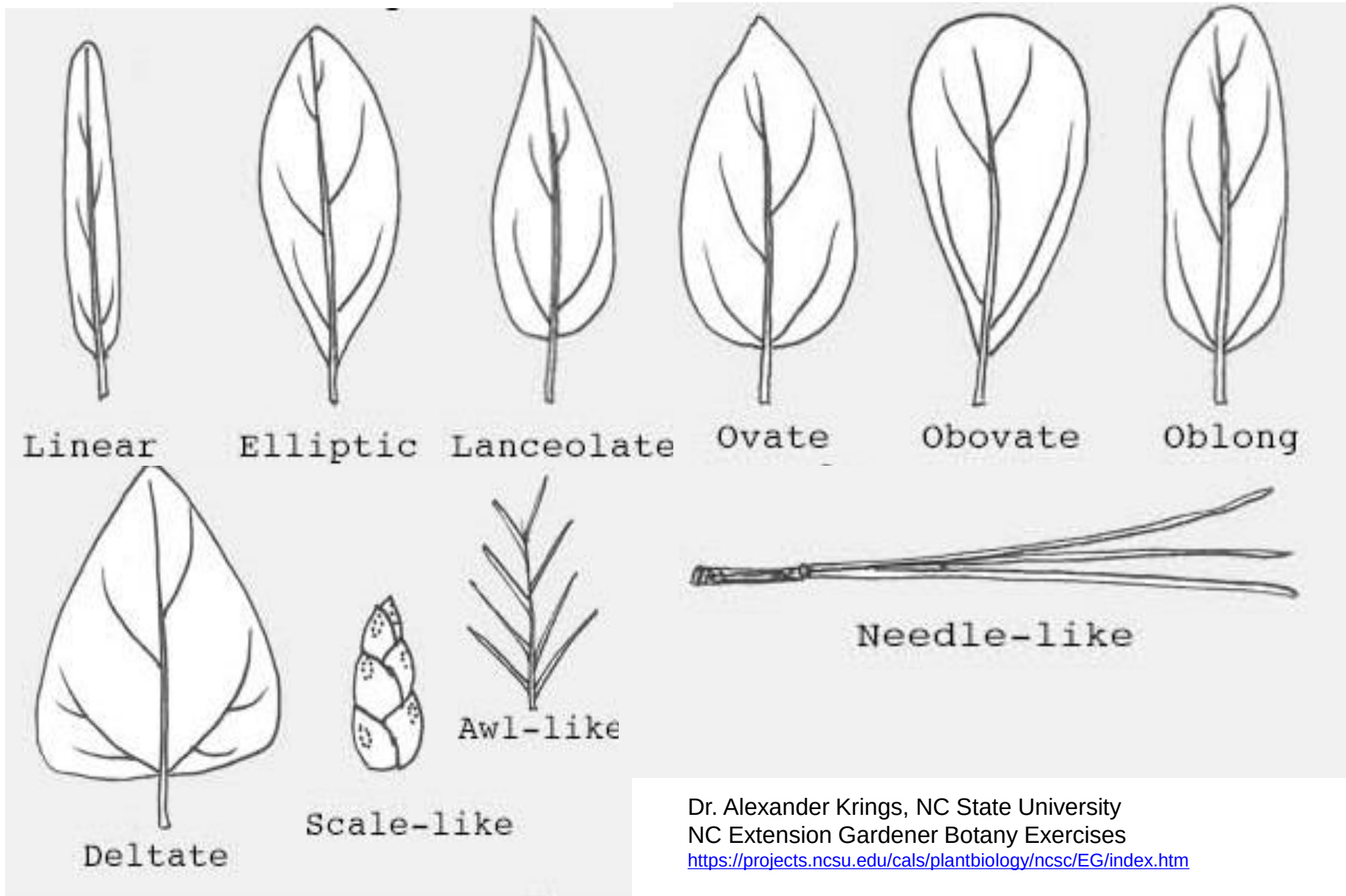


Opposite

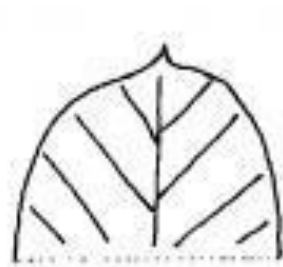


Whorled

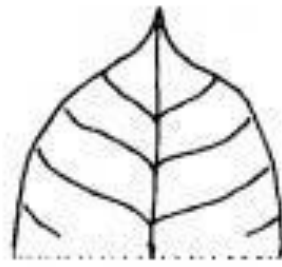
Leaf Shape



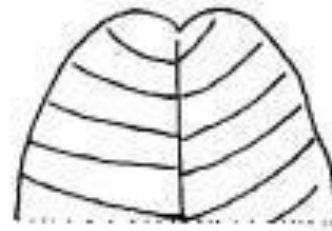
Leaf Apices



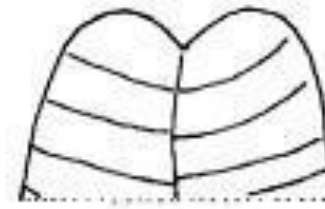
Mucronate



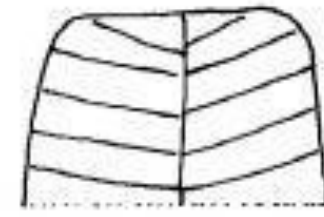
Cuspidate



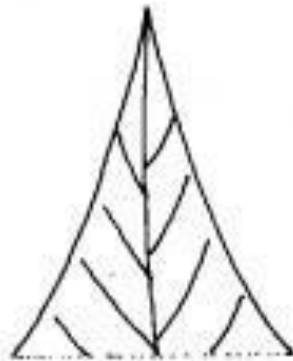
Retuse



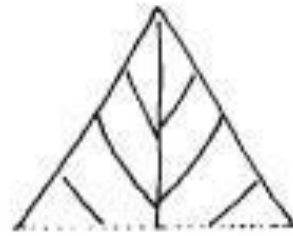
Emarginate



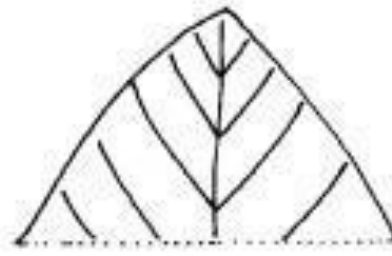
Truncate



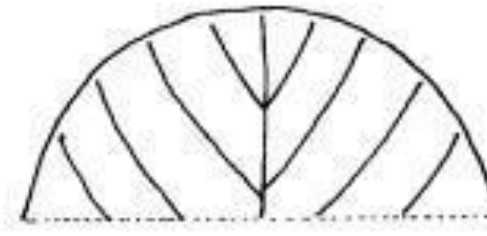
Acuminate



Acute



Obtuse



Round

Leaf Bases



Cuneate



Cordate



Inequilateral



Acuminate



Acute



Obtuse



Round



Truncate



Sagittate



Hastate

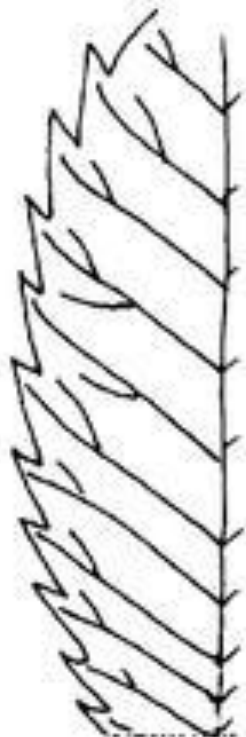


Auriculate

Leaf Margins



Entire



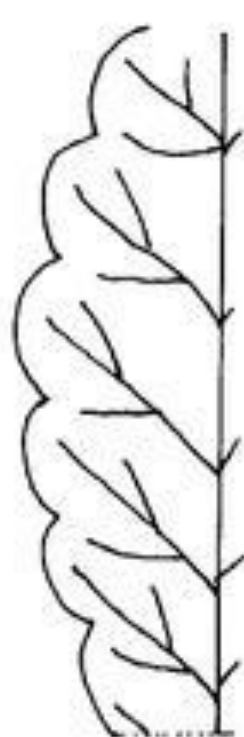
Serrate



Undulate



Sinuate



Crenate



Crenulate

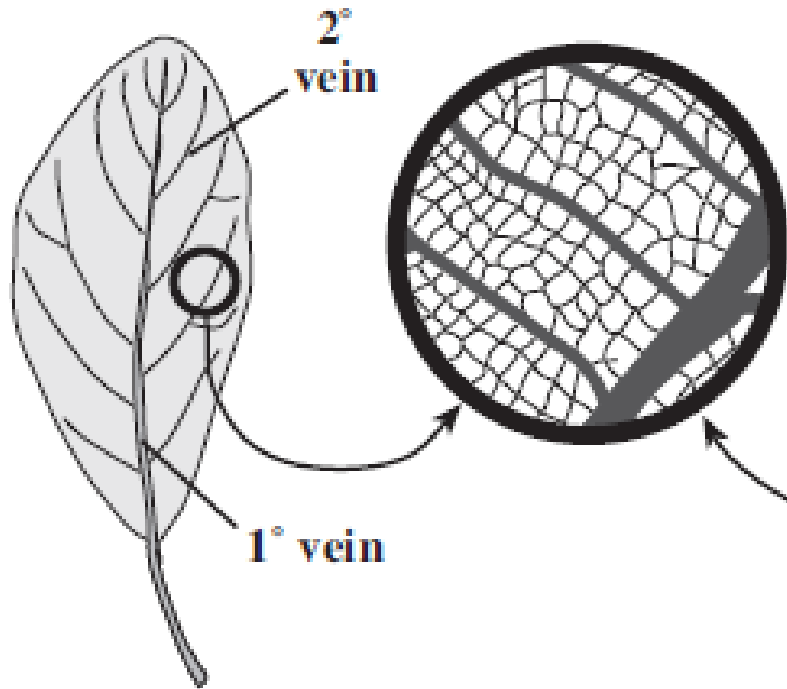


Dentate

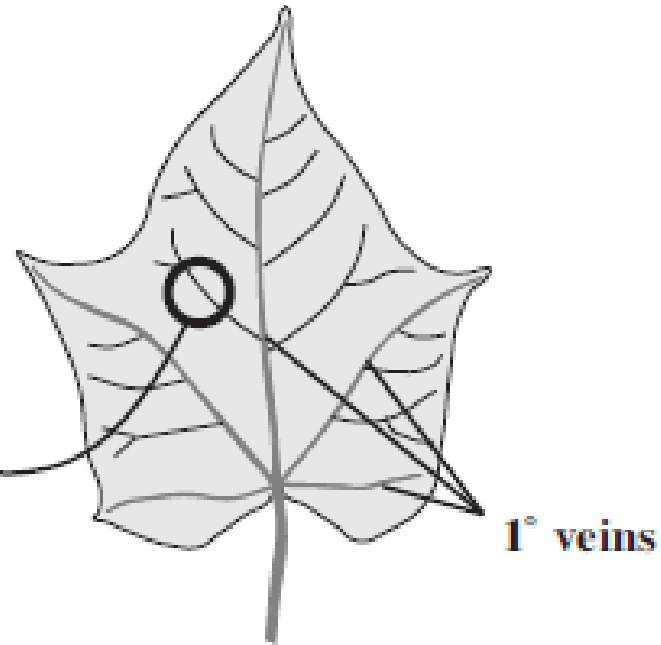


Denticulate

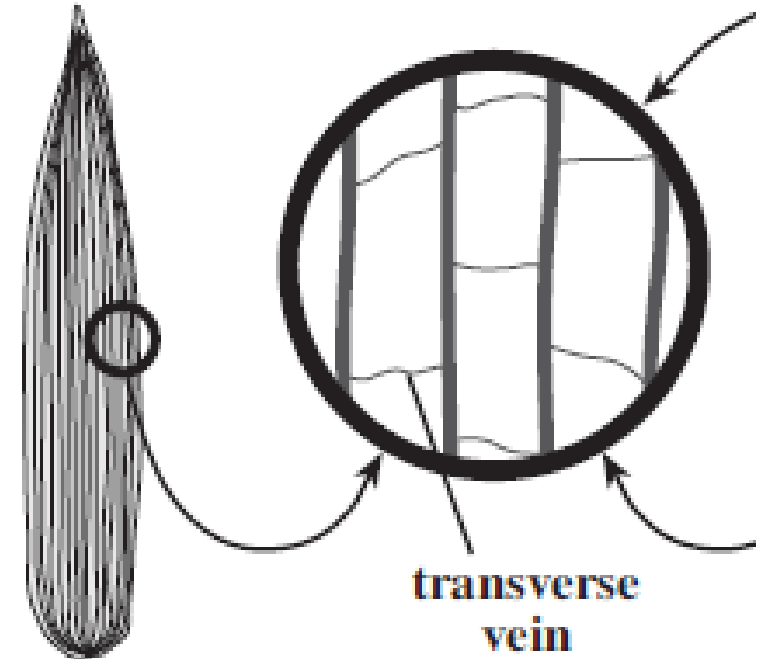
Leaf Venation



Pinnately Netted



Palmately Netted



Parallel

Leaf Shape



Shape

Broadly Elliptic - Obovate

Base

Cuneate

Apex

Obtuse

Margin

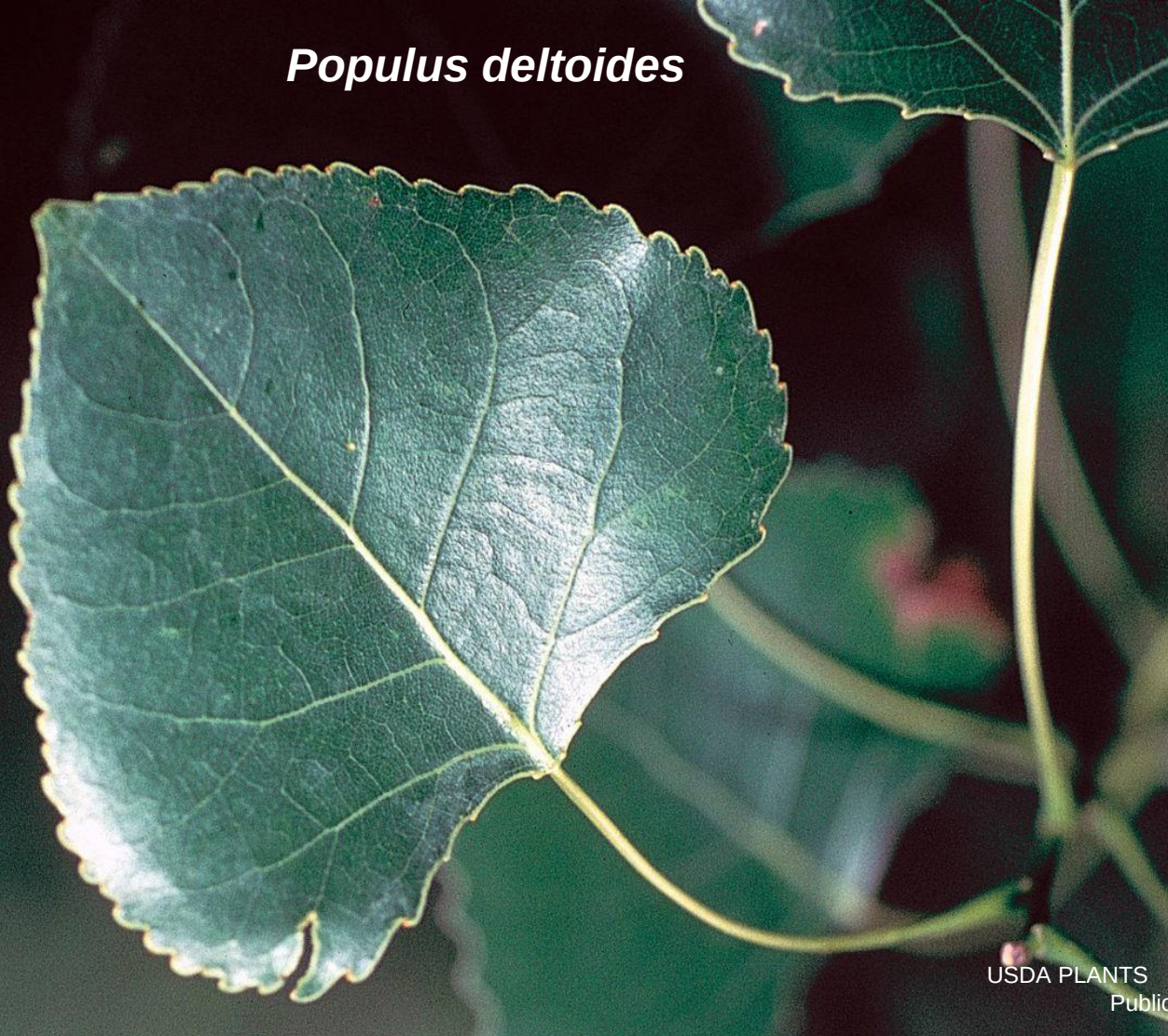
Serrulate (minutely serrate)

Venation

Pinnately Netted

Leaf Shape

Populus deltoides



USDA PLANTS
Public

Shape

Triangular-Ovate

Base

Truncate

Apex

Obtuse-Acuminate

Margin

Crenate-serrate

Venation

Pinnately Netted

Leaf Shape

Cornus amomum

Shape

Ovate

Base

Rounded

Apex

Acuminate

Margin

Entire

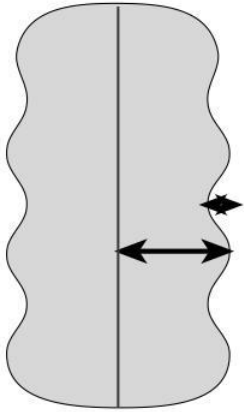
Venation

Pinnately Netted

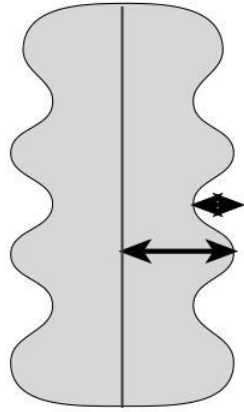
A. Krings
CC BY-NC-SA 3.0

Leaf Division

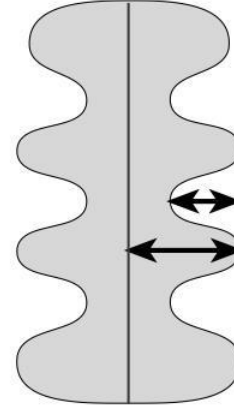
More than a margin, less than a leaflet



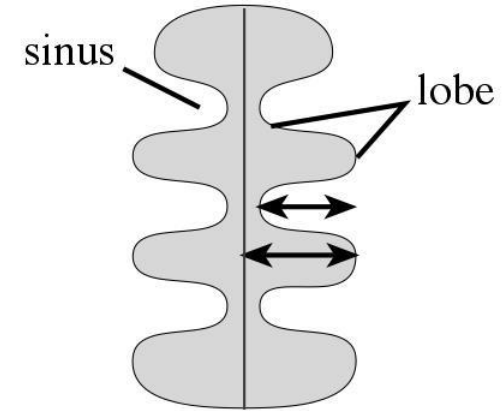
pinnately lobed
 $1/8 - 1/4$



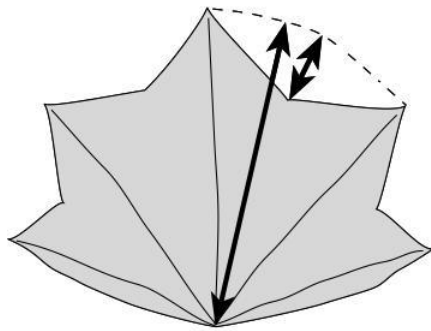
pinnately cleft
 $1/4 - 1/2$



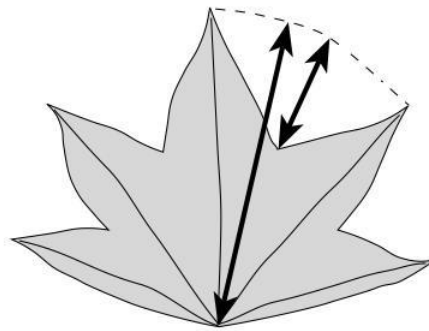
pinnately parted
 $1/2 - 3/4$



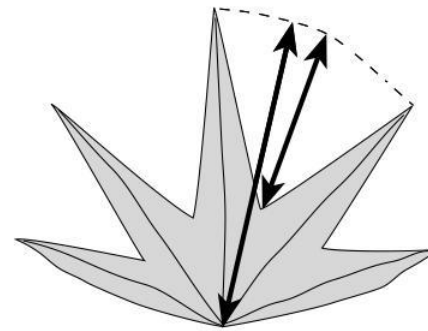
pinnately divided
 $3/4 - \text{ca. } 1$



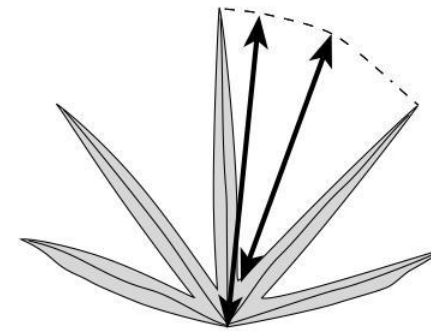
palmately lobed
 $1/8 - 1/4$



palmately cleft
 $1/4 - 1/2$

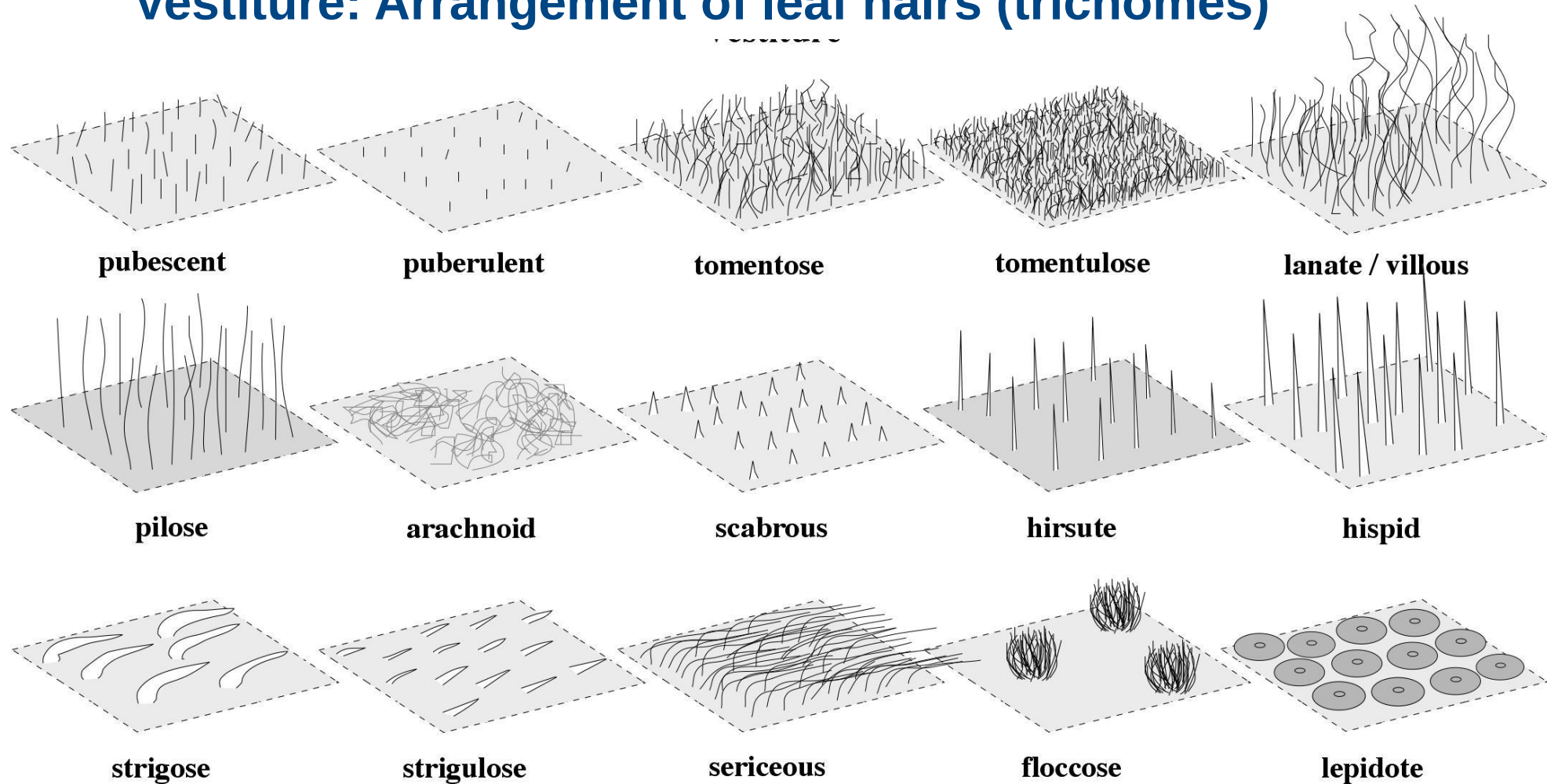


palmately parted
 $1/2 - 3/4$



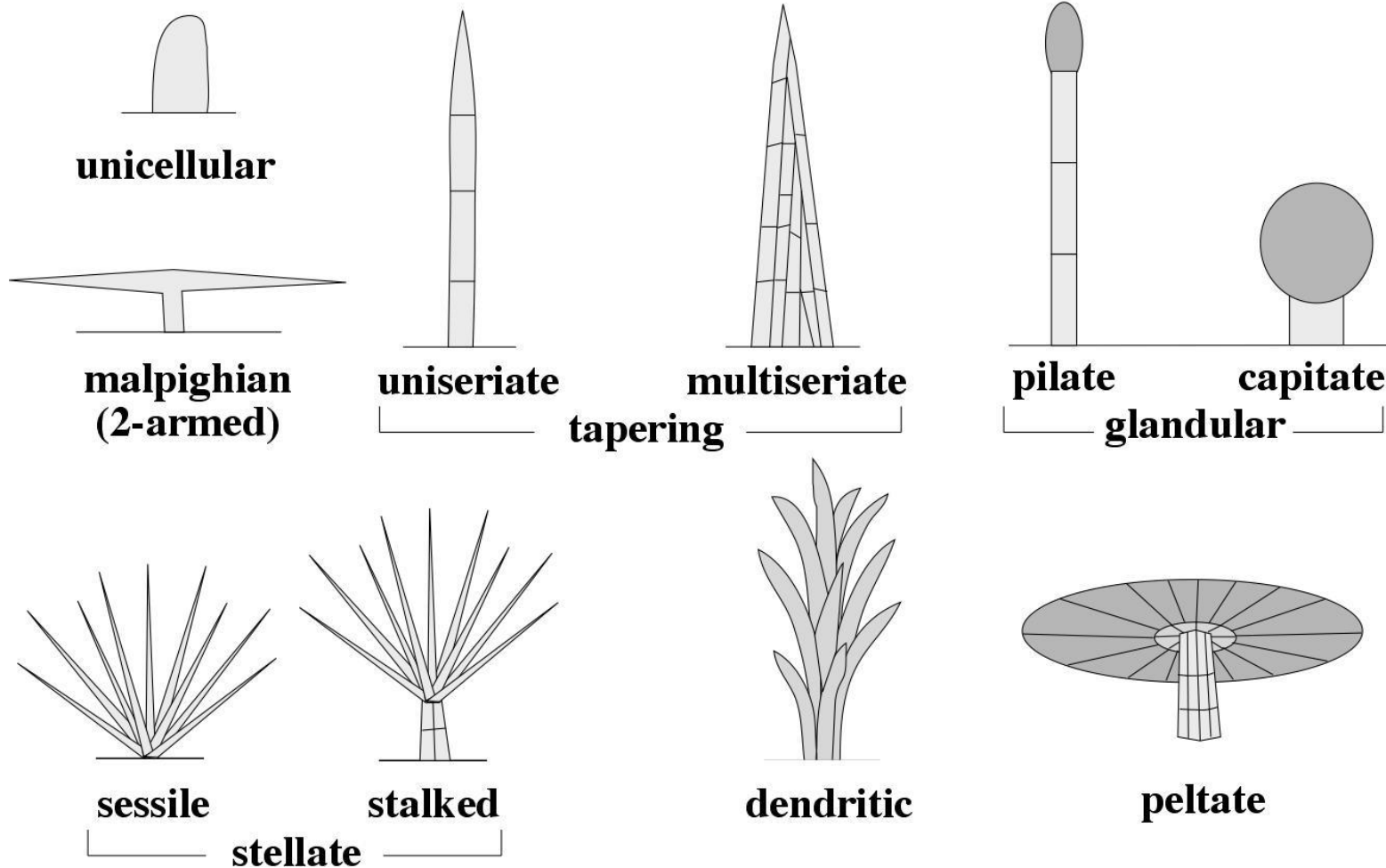
palmately divided
 $3/4 - \text{ca. } 1$

Vestiture: Arrangement of leaf hairs (trichomes)

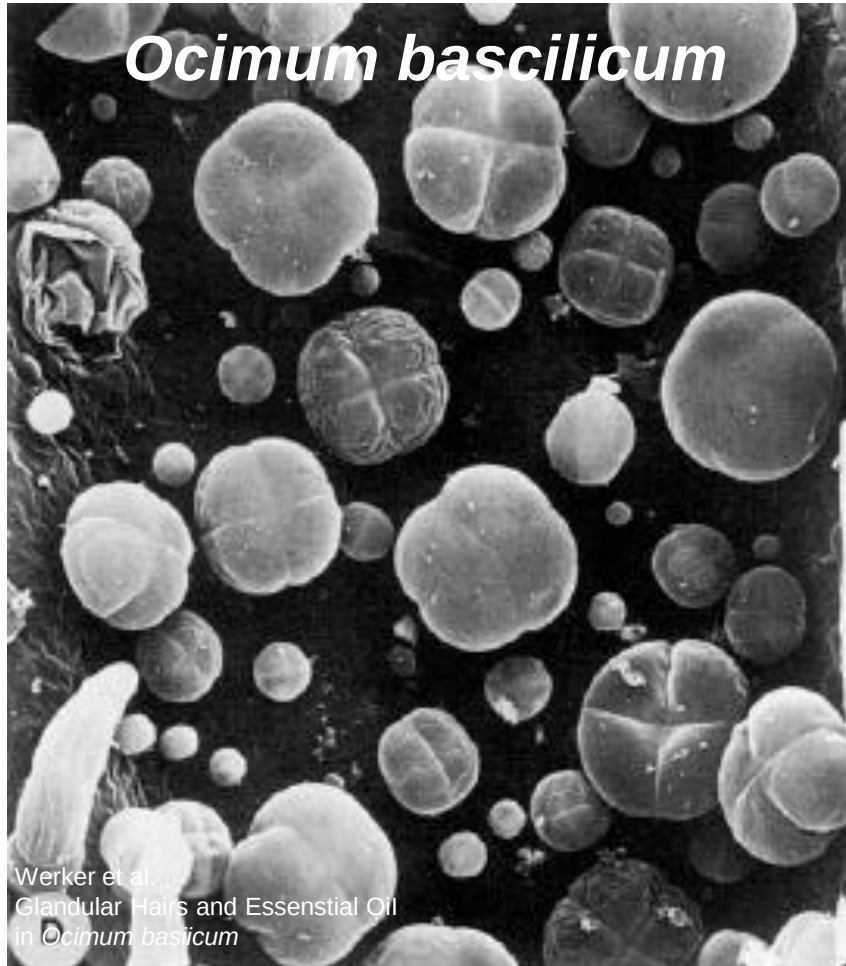


Leaf Surfaces

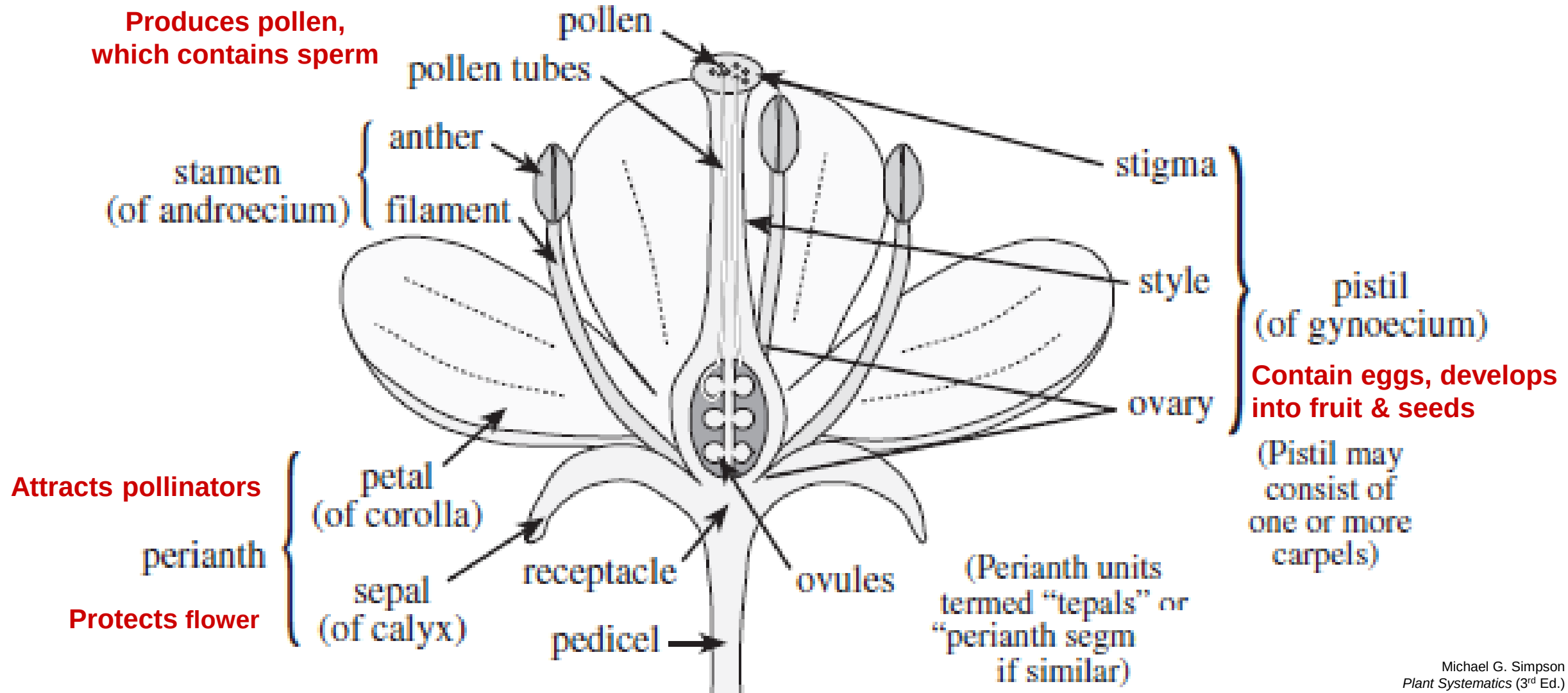
Trichome Types



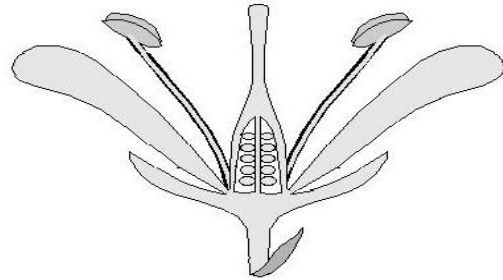
Leaf Surfaces



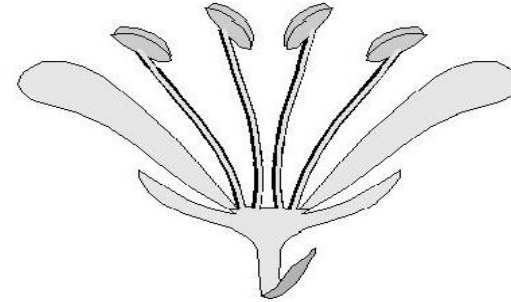
Floral Morphology



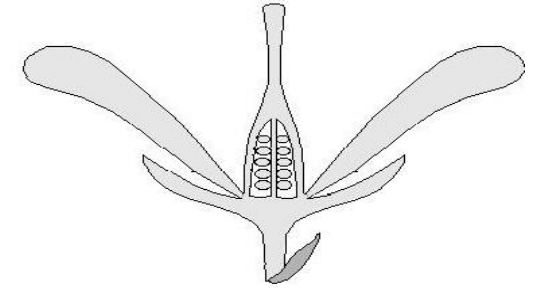
Floral Sexual Diversity



perfect/bisexual



staminate



pistillate

unisexual



A flower is **perfect** if it is bisexual (has both stamens and pistils)

A flower is **complete** if it has all four parts: (sepals, petals, stamens, & pistils).

Floral Sexual Diversity

Plants with unisexual flowers can be:

Monoecious



♂



♀

Pecan
Carya illinoensis

Separate male & female flowers
on the same plant

Dioecious



♂



♀

American Holly
Ilex opaca

Separate male & female flowers
on separate male & female plants

or*

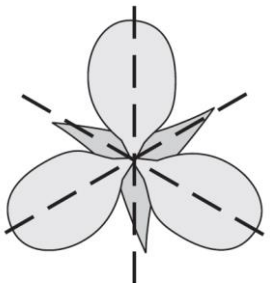
**sometimes and*

Floral Symmetry



Actinomorphic
(radially symmetric)

actino- (Greek) = ray or beam

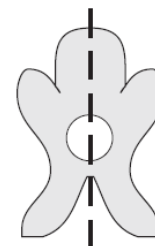


Radial



Zygomorphic
(bilaterally symmetric)

zygo- (Greek) = a yoke



Bilateral

Petal Fusion



Free



Fused

Ovary Position

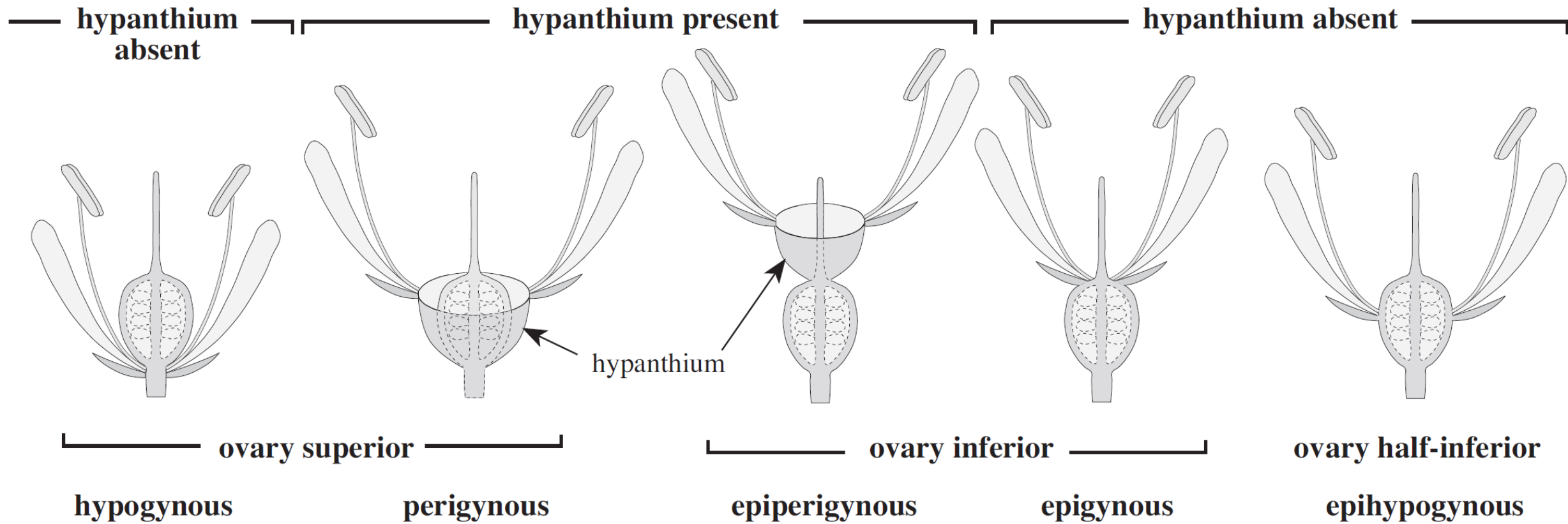
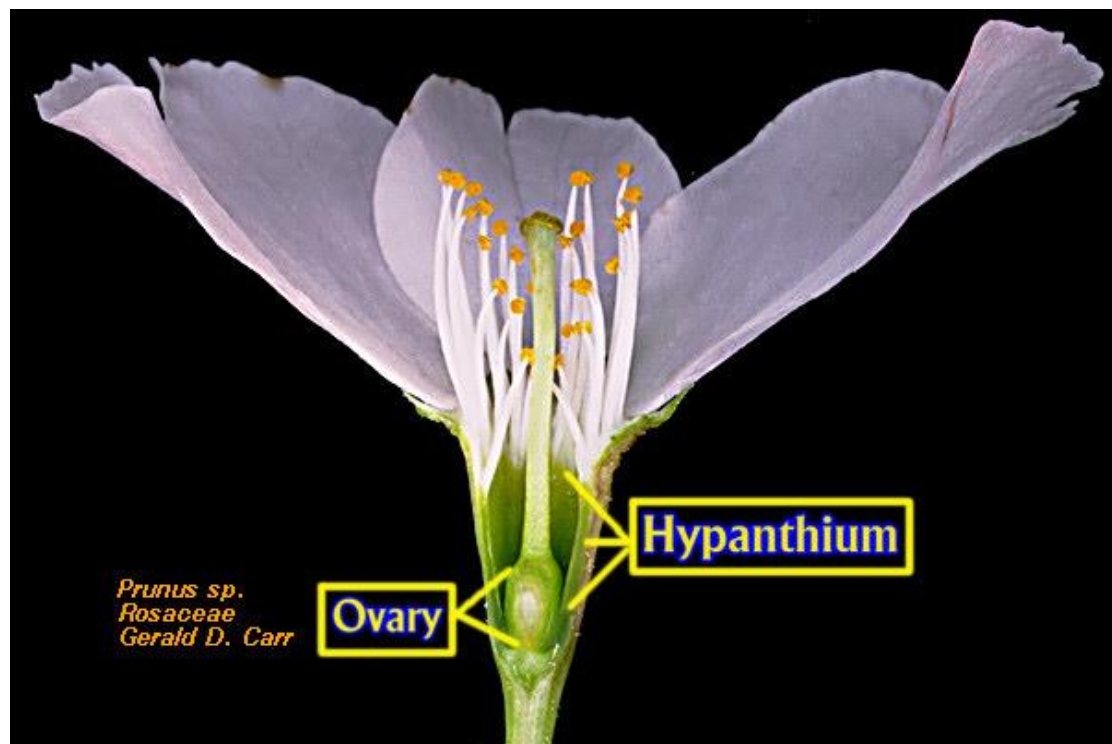


Figure 9.33 Ovary position and perianth/androecial position.

Ovary Position

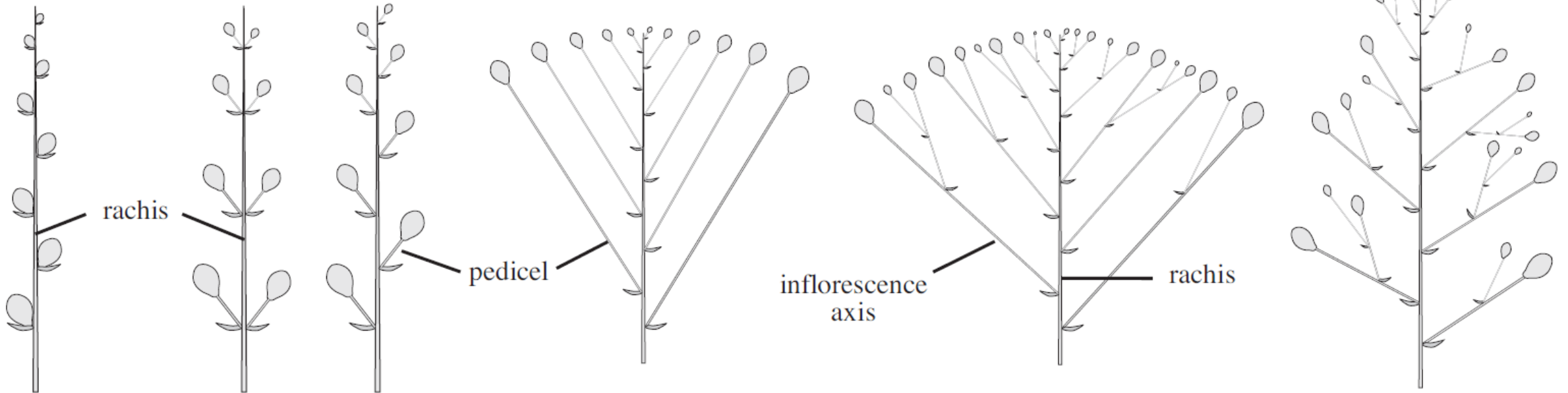


Superior
Prunus sp.



Inferior
Juglans nigra.

Inflorescences



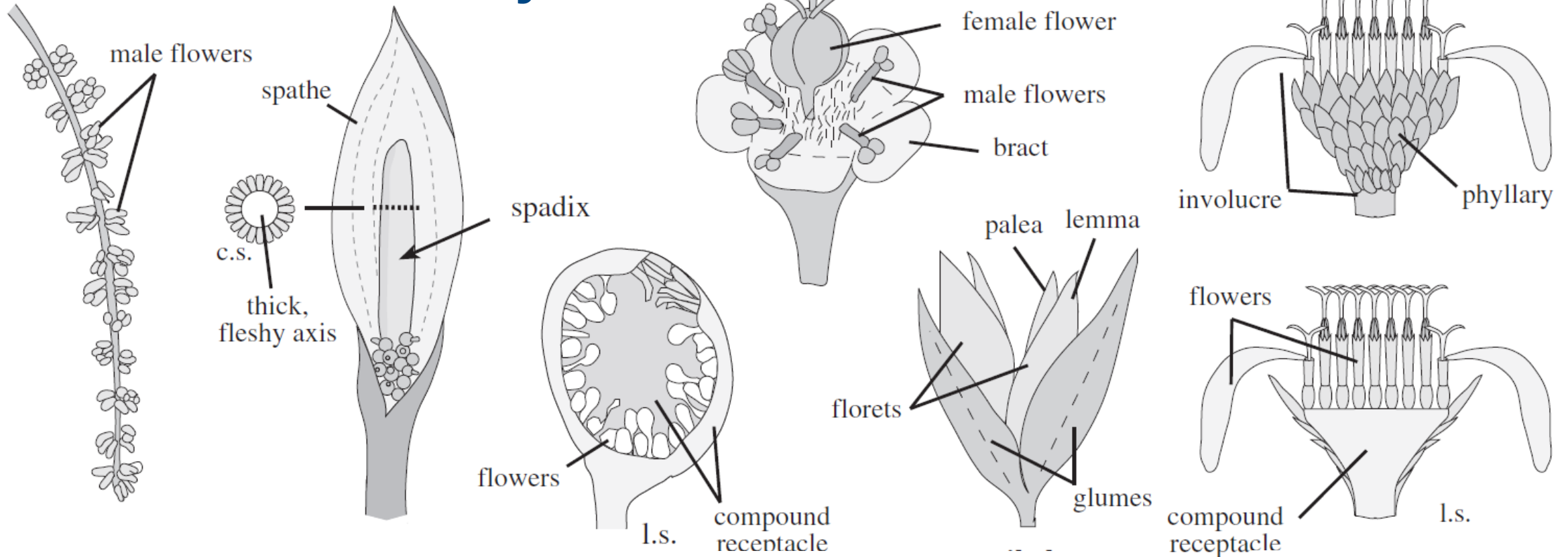
Spike

Raceme

Corymb

Panicle

Cyathium



Catkin

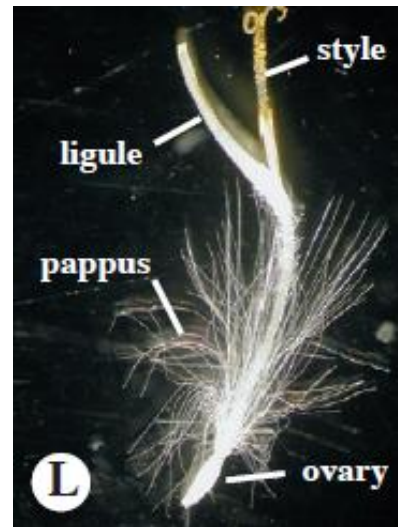
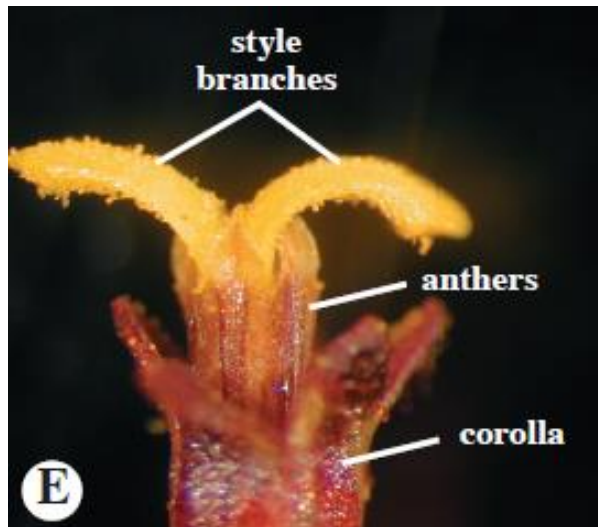
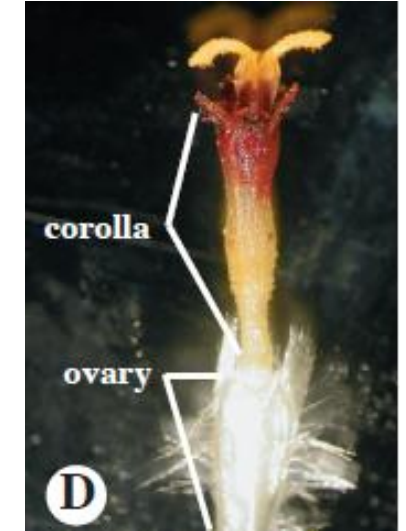
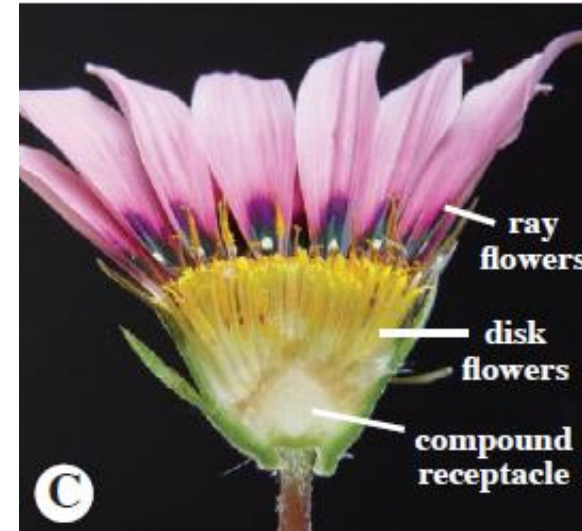
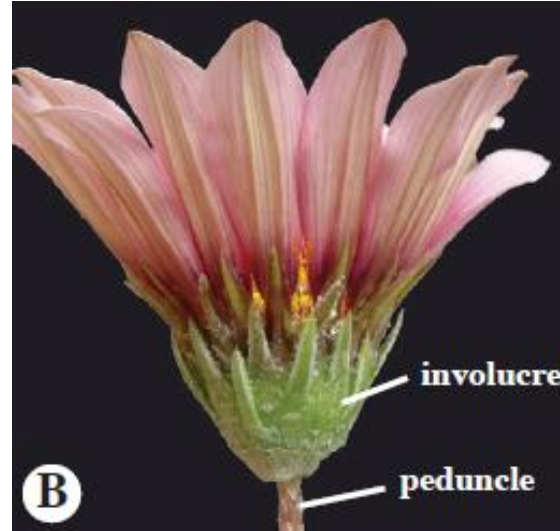
Spadix

Hypanthodium

Spikelet

Head

Head (Capitulum) in Asteraceae



Images
Michael G. Simpson
Plant Systematics (3rd Ed.)
Elsevier Academic Press

Fruit Classification

1) Number and fusion of flowers

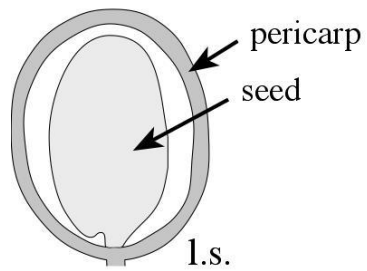
- **Simple fruits:** derived from one ovary of one flower
- **Aggregate fruits:** derived from many ovaries of one flower
- **Multiple fruit:** derived many ovaries from many flowers fused together

2) Dry or fleshy?

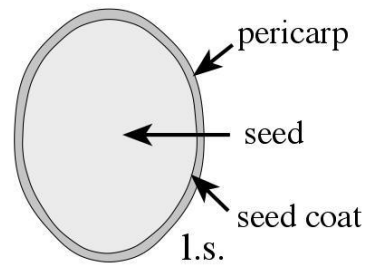
3) Split at maturity (dehiscent or indehiscent)?

4) Other features

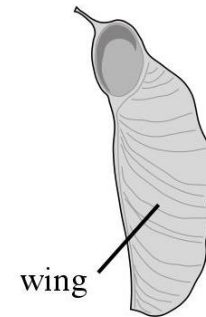
Simple, Dry, Indehiscent Fruits



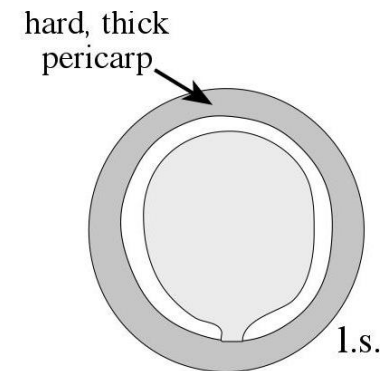
achene



grain / caryopsis



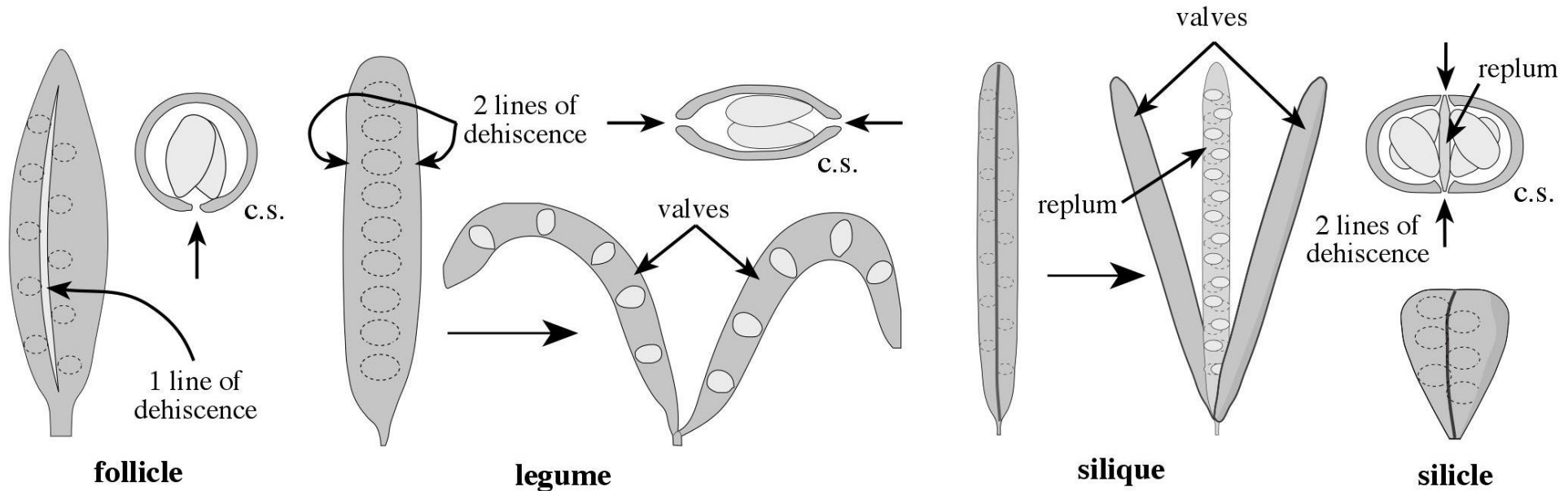
samara



nut

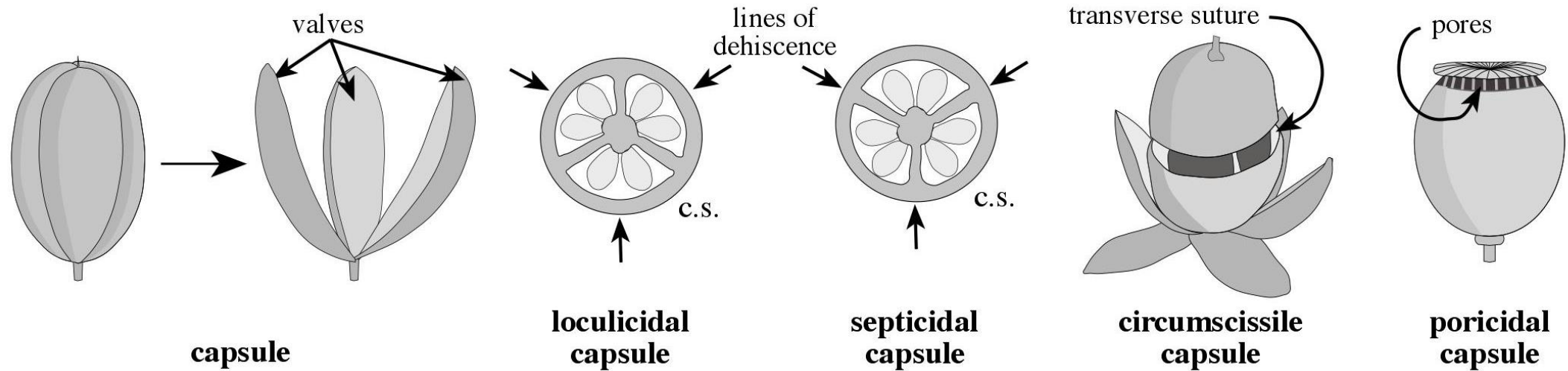


Simple, Dry, Dehiscent Fruits

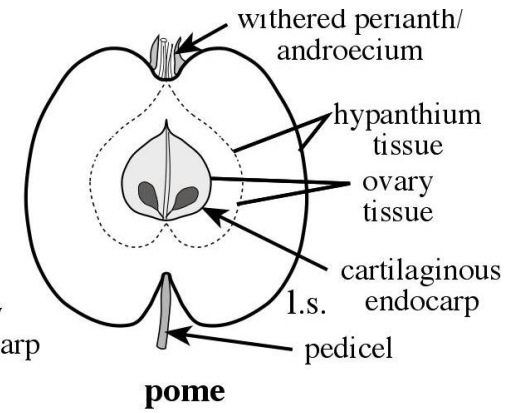
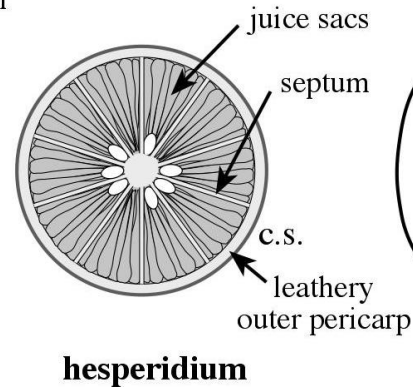
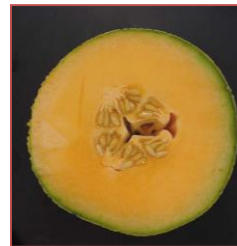
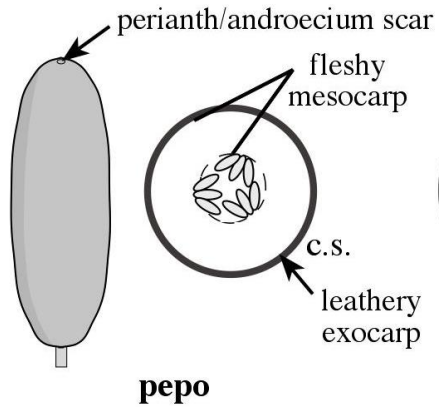
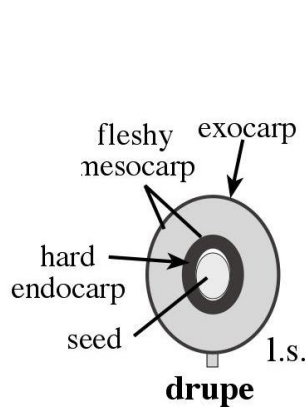
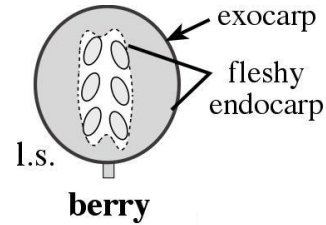


Joan Avise
UC Irvine

Simple, Dry, Dehiscent Fruits



Simple, Fleshy Fruits



Accessory Fruit

Tree ID Using Winter Features

Bud Arrangement



Alternate



Sub-opposite



Opposite



Whorled

Leaf Scars



Leaf (Scar) Arrangement



Opposite



Alternate

Bud Position



Terminal



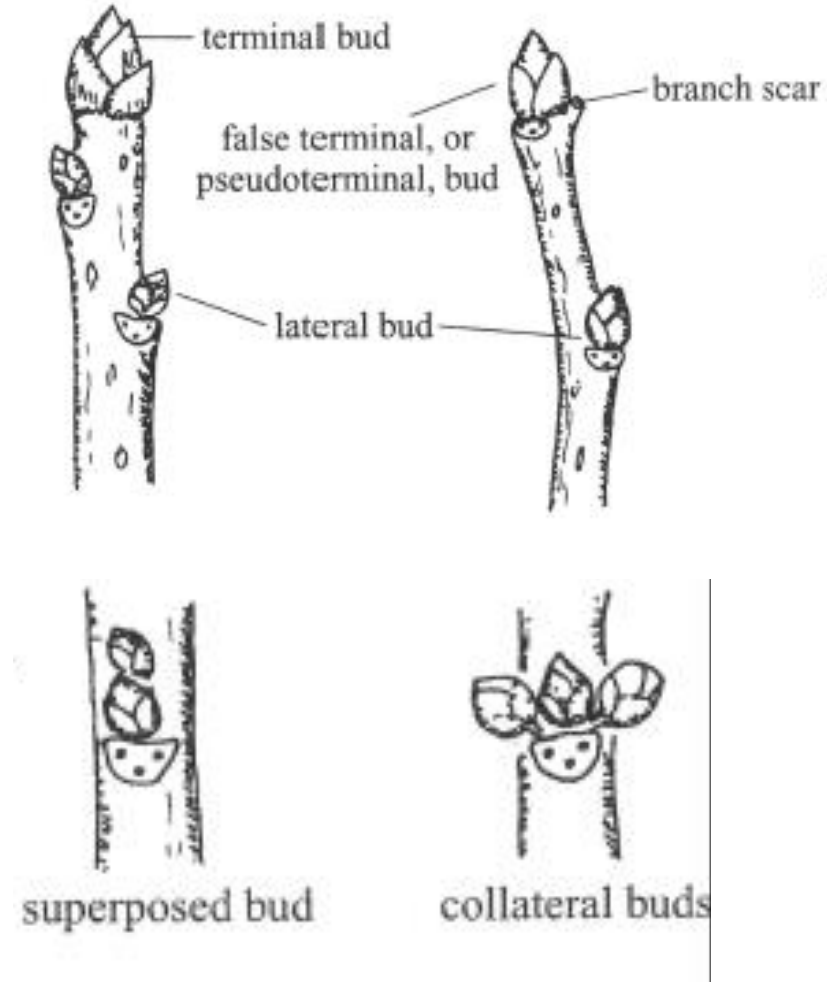
Pseudo-terminal



Lateral



Superposed

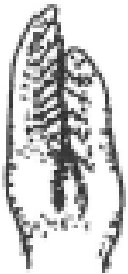


Images:
Prof. Bob Klips, OSU ohioplants.org
Ron Lance, *Woody Plants of the Southeastern US*

Bud Scales



ohioplants.org



Naked!



© A. Krings 2012

- **Single**
- **Capitate**
- **Capped**



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Valvate

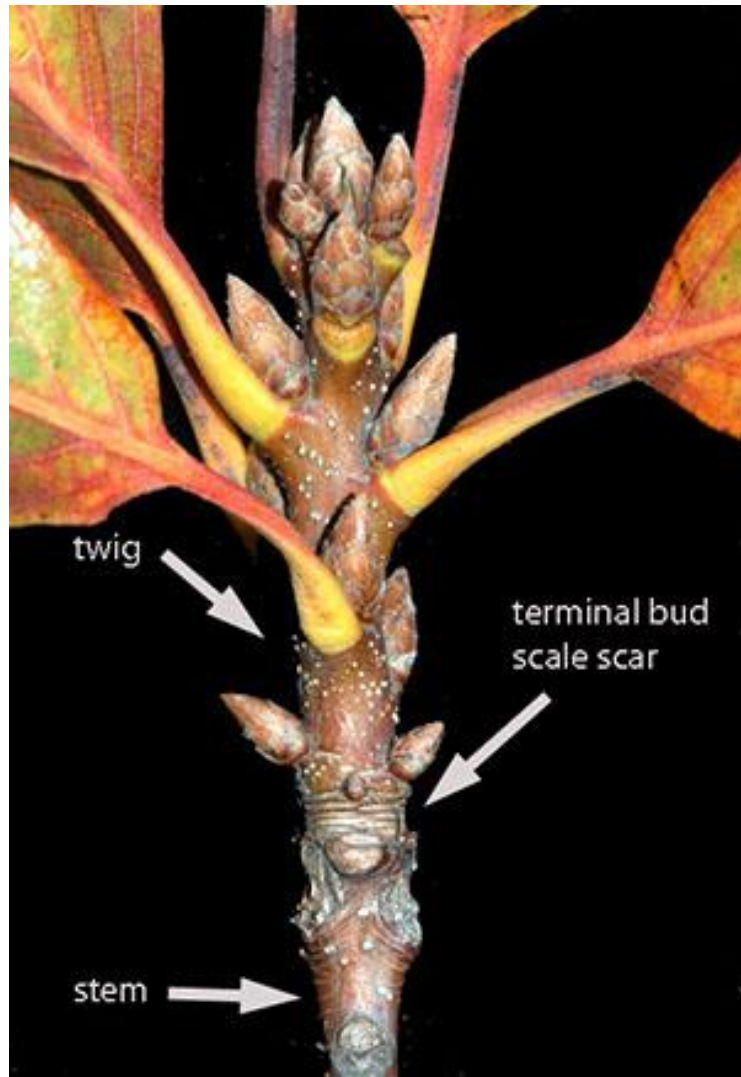


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Imbricate



Bud Scars

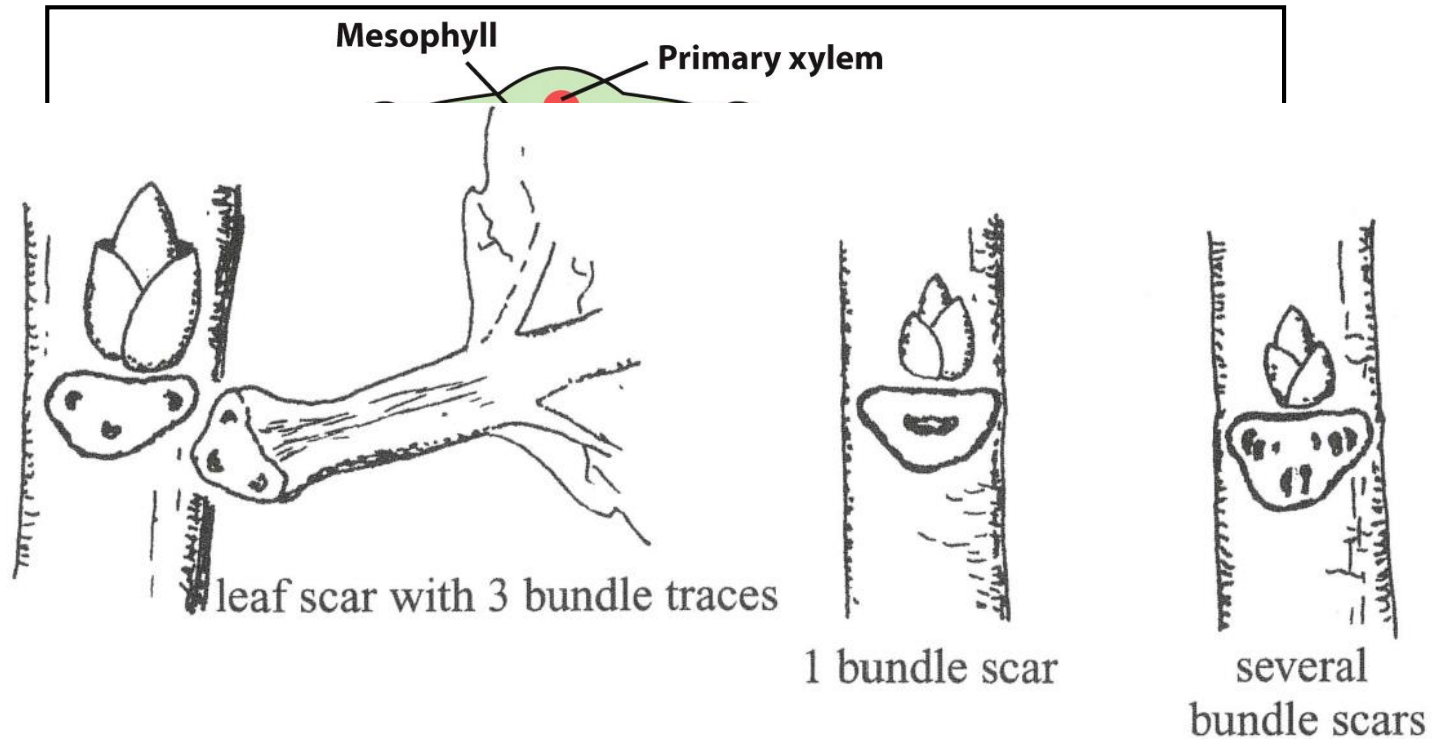


Images: Norton Brown Herbarium, UMD

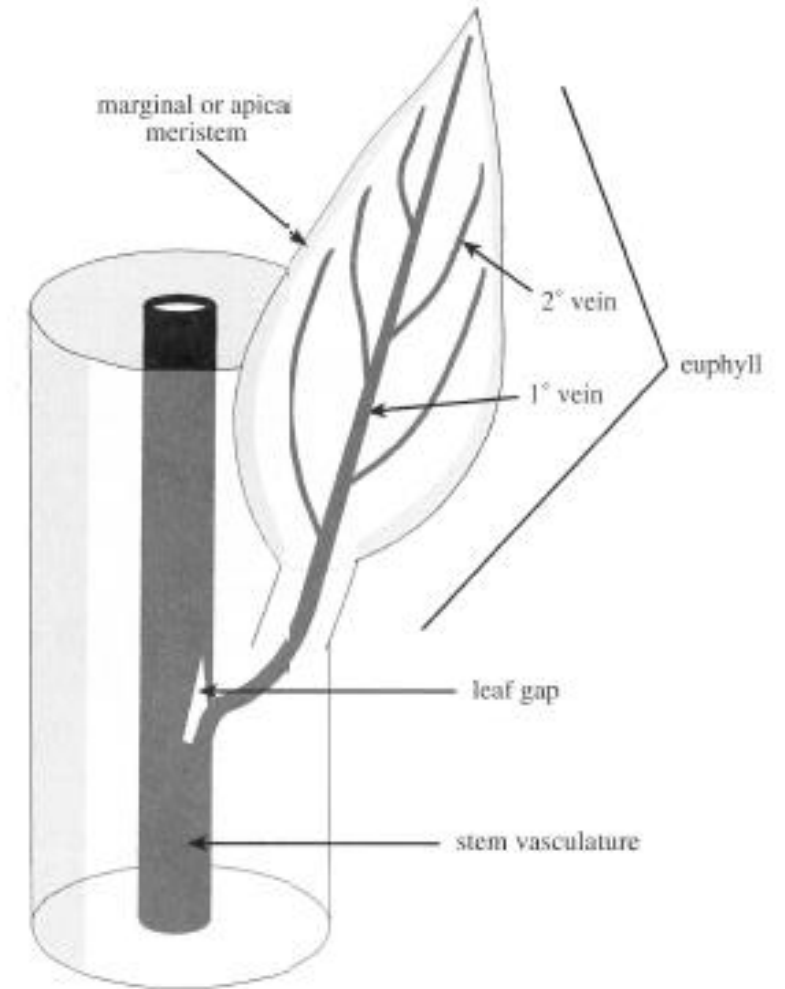


**Concentric rings formed by bud scales
from the previous year's terminal bud**

Vascular Bundle Scars



Raven Biology of Plants, Eighth Edition
© 2013 W. H. Freeman and Company



Images:

Raven et al., *Biology of Plants*, (8th Ed.)
Ron Lance, *Woody Plants of the Southeastern US*
Michael G. Simpson *Plant Systematics* (1st Ed.)

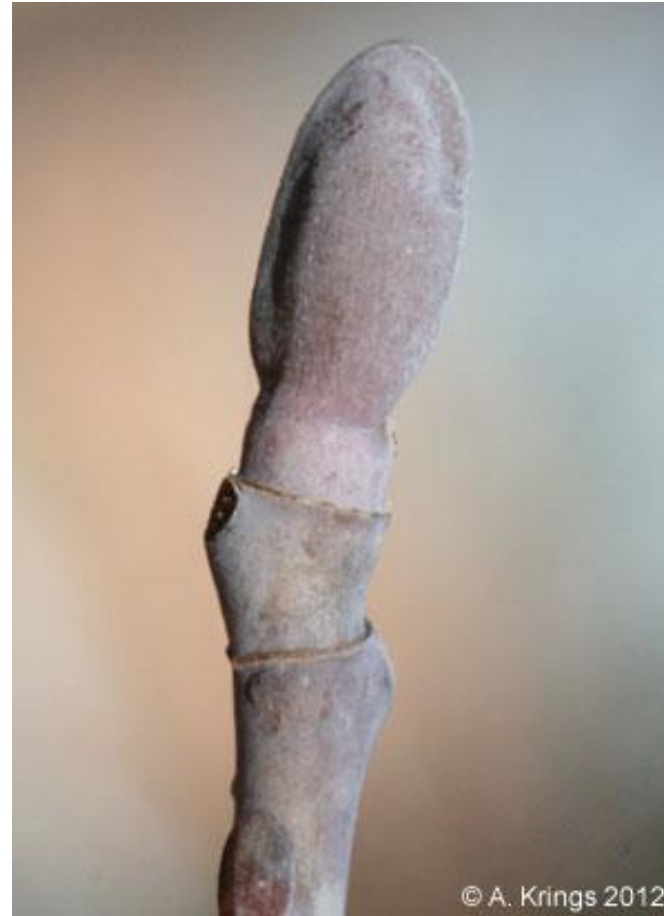
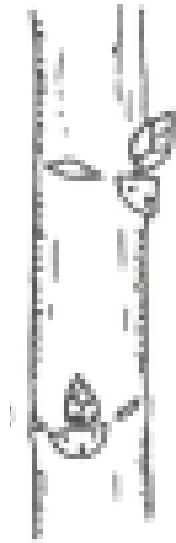
Vascular Bundle Scars



Stipular Scars



Slit-like



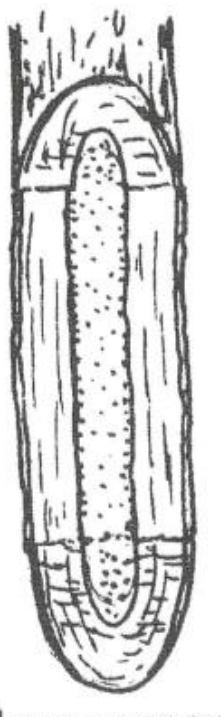
Ring-like



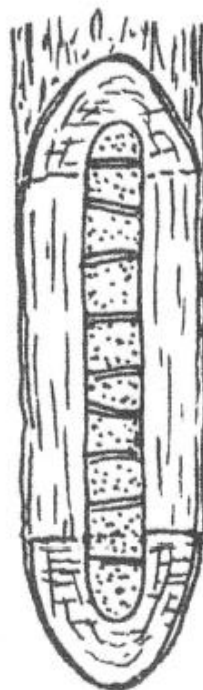
Images:
Prof. Bob Klips, OSU ohioplants.org
Prof. Alexander Krings, NCSU
Paul G. Davidson
Ron Lance, *Woody Plants of the Southeastern US*

Pith Anatomy

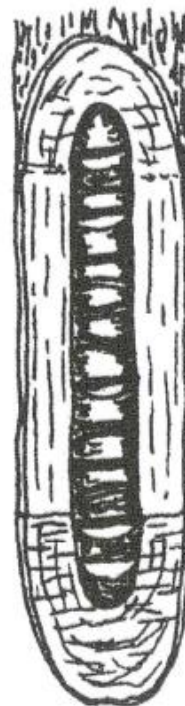
Images:
Prof. Bob Klips, OSU ohioplants.org
Ron Lance, *Woody Plants of the Southeastern US*



Homogenous



Diaphragmed



Chambered



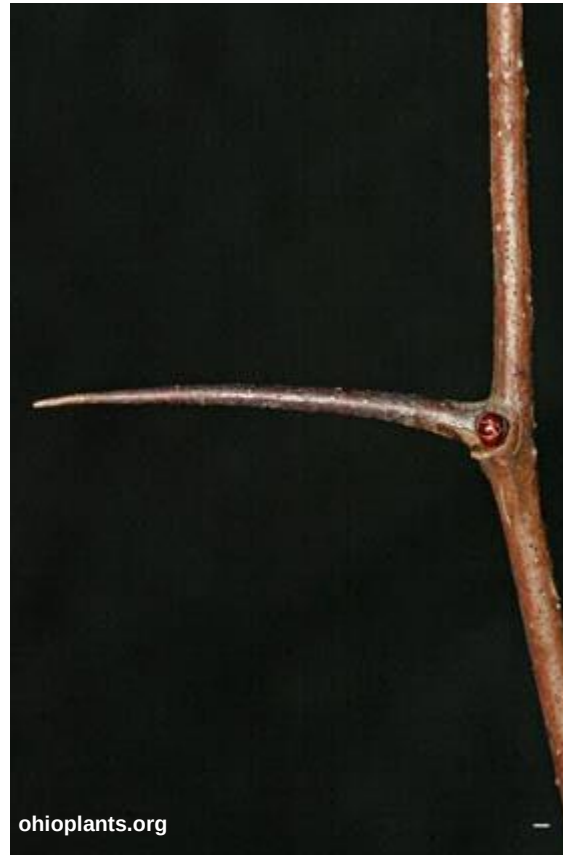
Excavated

Armament (“thorns”)

Spines



Thorns



Prickles



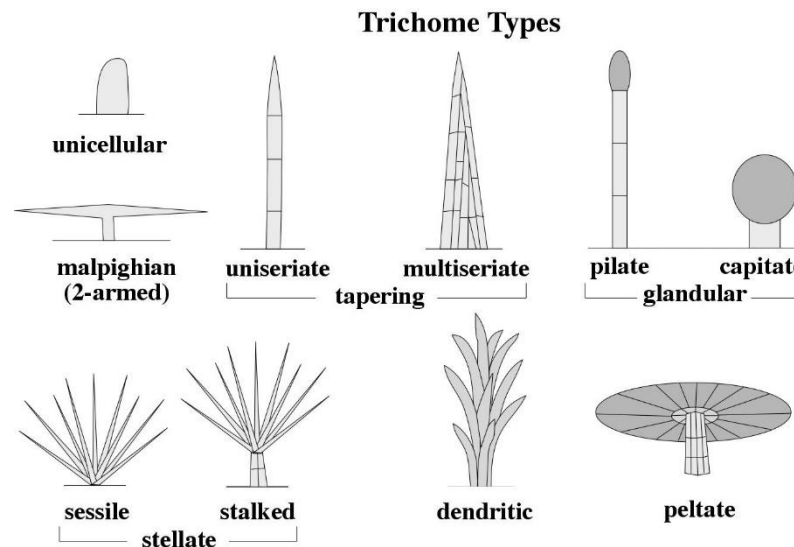
Leaves/Stipules

Stems

Epidermis

Other Characters

- Presence/absence of trichomes (hairs)
- Presence/absence of a scent
- Position, number, color, & shape of parts
- Habitat
- Growth habit



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