



FLORIDA
**MASTER
GARDENER**

Botany Basics



What is Botany?

The science of plants, their classification and study



What is Horticulture?



The art and science of cultivating flowers, fruits, vegetables, and ornamental plants

What is a Plant?

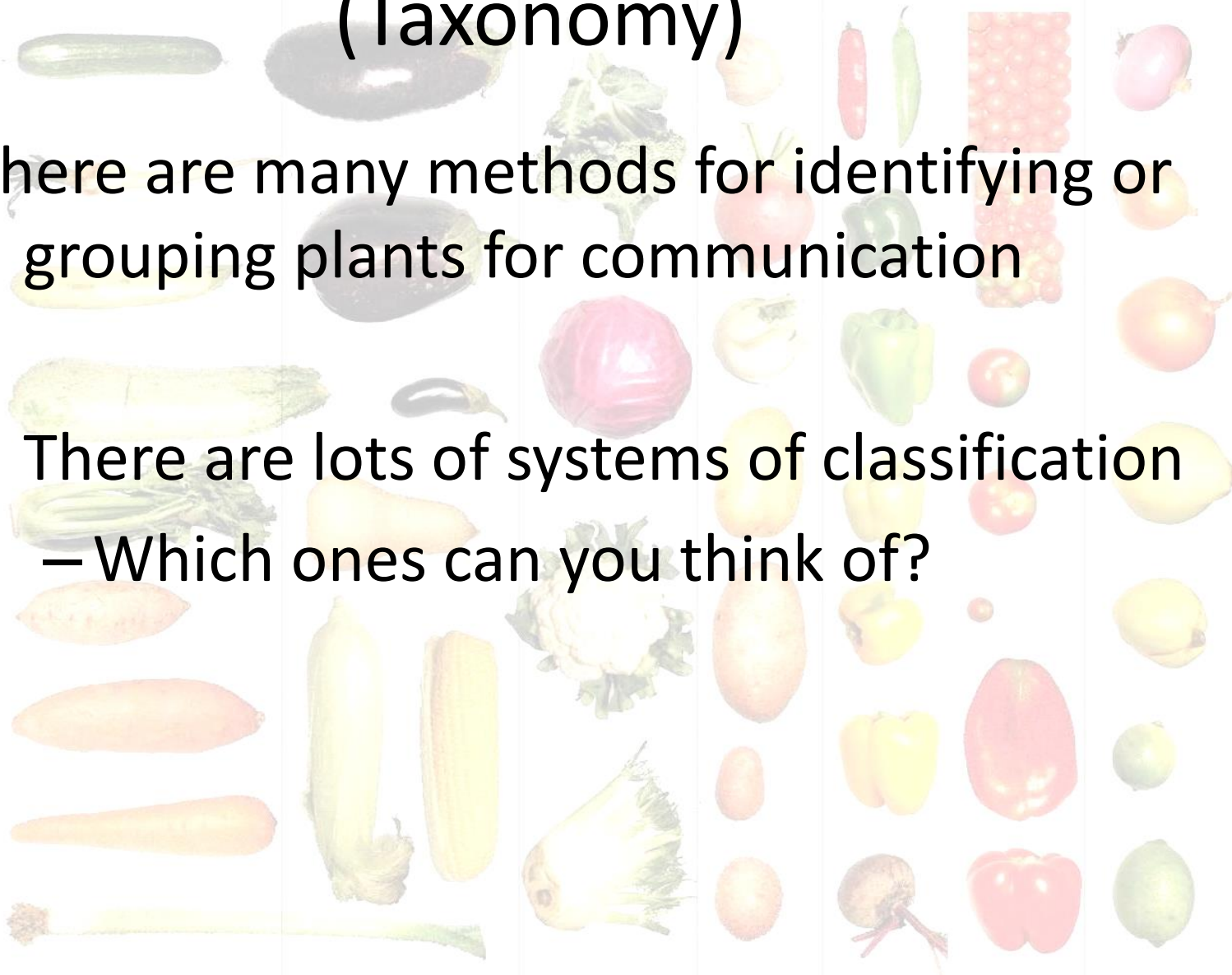


- A plant is: photosynthetic, multicellular organism
- Capable of manufacturing its own food!

Plant Classification (Taxonomy)

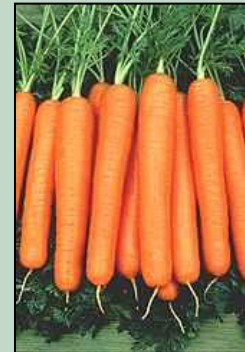
There are many methods for identifying or grouping plants for communication

- There are lots of systems of classification
 - Which ones can you think of?



Life cycle

- **Annual**
 - Short-lived plant. The entire life cycle is completed in one growing season.
- **Biennial**
 - Two seasons to complete life cycle
- **Perennial**
 - Live from year to year, either woody or herbaceous.



Morphology or Appearance

- Evergreen, deciduous
- Woody, herbaceous
- Vines, trees, shrubs
- Opposite or alternate leaves
- Fruit, seed, etc. types



We'll get to more "mor-phology" in a minute!

Environmental

- Xerophyte, halophyte, hydrophyte
- Hardy, tender
- Temperate, tropical, subtropical
- Warm season, cool season

*When do you plant **cool**
season crops in southern
Florida?*



Usage

- fruit, vegetable, ornamental



*What is the difference between a fruit
and a vegetable?*

Scientific nomenclature



Kingdom

Animalia

Others

Plantae

Division (several, those with horticultural interest-)

Pterodophyta - ferns

Spermatophyta – seed bearing plants

Class

Gymnospermae – naked seeds

Angiospermae

Subclass

Monocotyledonae (monocots) - 49,000 types

Dicotyledonae (dicots) - 237,000 types

And this is only half of it...

Scientific Names cont.

Order

Family - 'aceae' usual ending

- First place you may start in identification

Genus

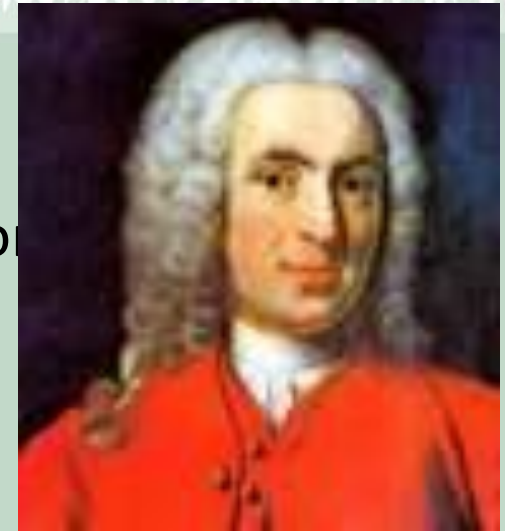
Species

- Authority -

- Cultivar - cultivated variety

Variety - botanical variety

etc.

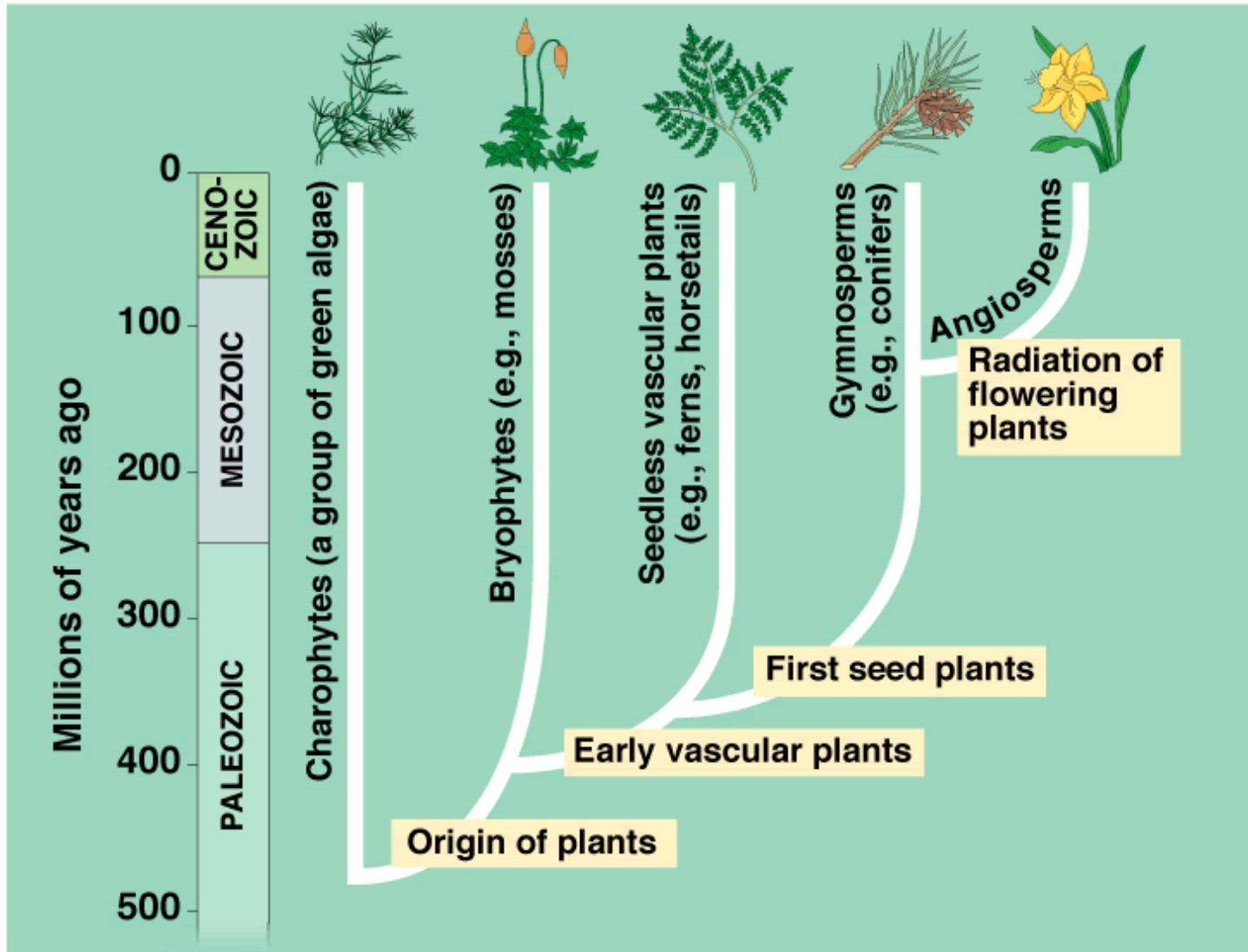


Binomial nomenclature

genus and *species*

You can thank Linnaeus
for all this!

The Family Tree of Plants



Plant Groups in Landscape



- Spore-bearing plants
 - Ferns
- Seed plants
 - Gymnosperms: Cone-bearing plants
 - Angiosperms: Flowering Plants



- Botany Handbook <http://edis.ifas.ufl.edu/MG012> (offline, being updated)

Gymnospermae

Gymno = naked spermae = seed

- Plant Family examples:
 - Cupressaceae
 - Cycadaceae
 - Ginkgoaceae
 - Pinaceae
 - Podocarpaceae
 - Taxaceae
 - Zamiaceae



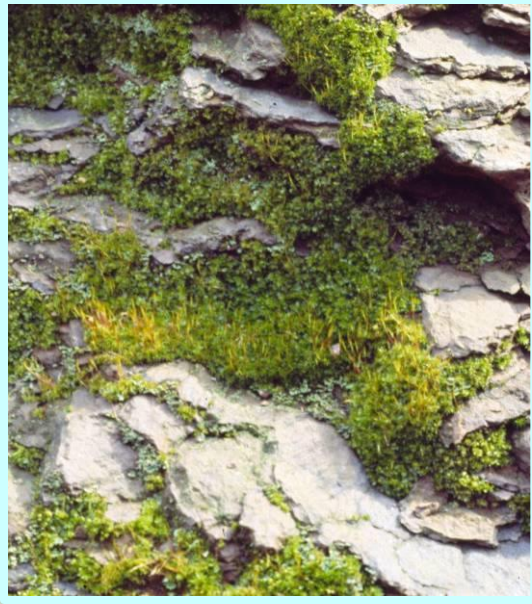
Angiospermae

Angio = “container” Spermae = seed

- Flowering plants: (Tribe)
 - Monocotyledoneae
 - Dicotyledoneae



Plants without seeds



Seed Plants without Fruit

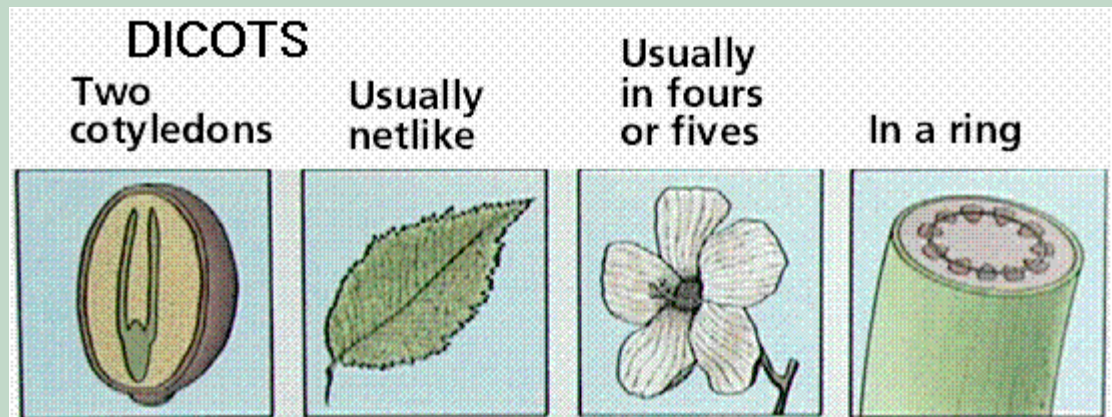
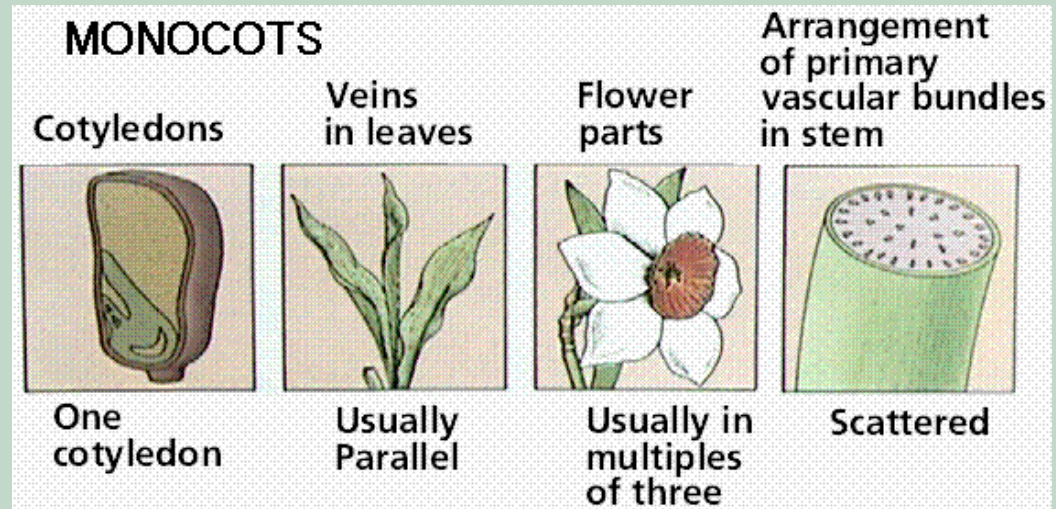
Cycads and Conifers
produce separate male
& female cones =
dioecious



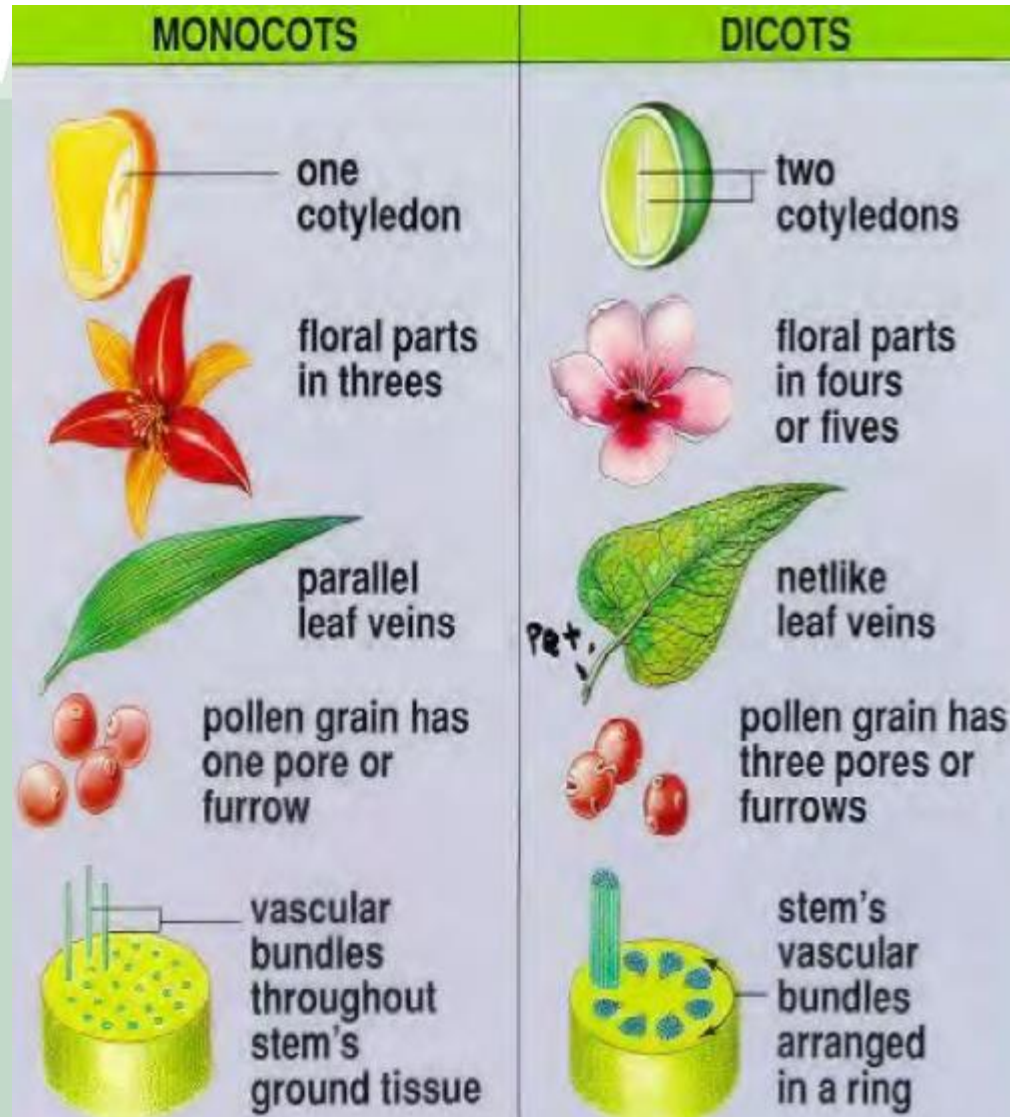
Plant ID by the numbers:

One or two, and threes or fours/fives

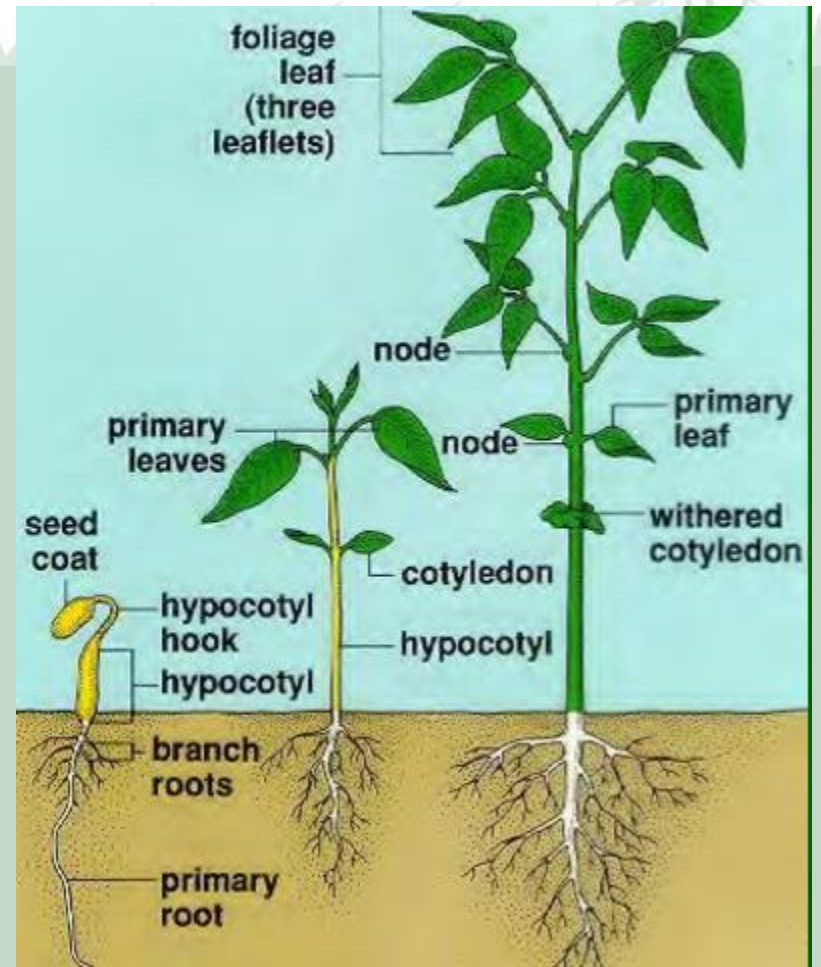
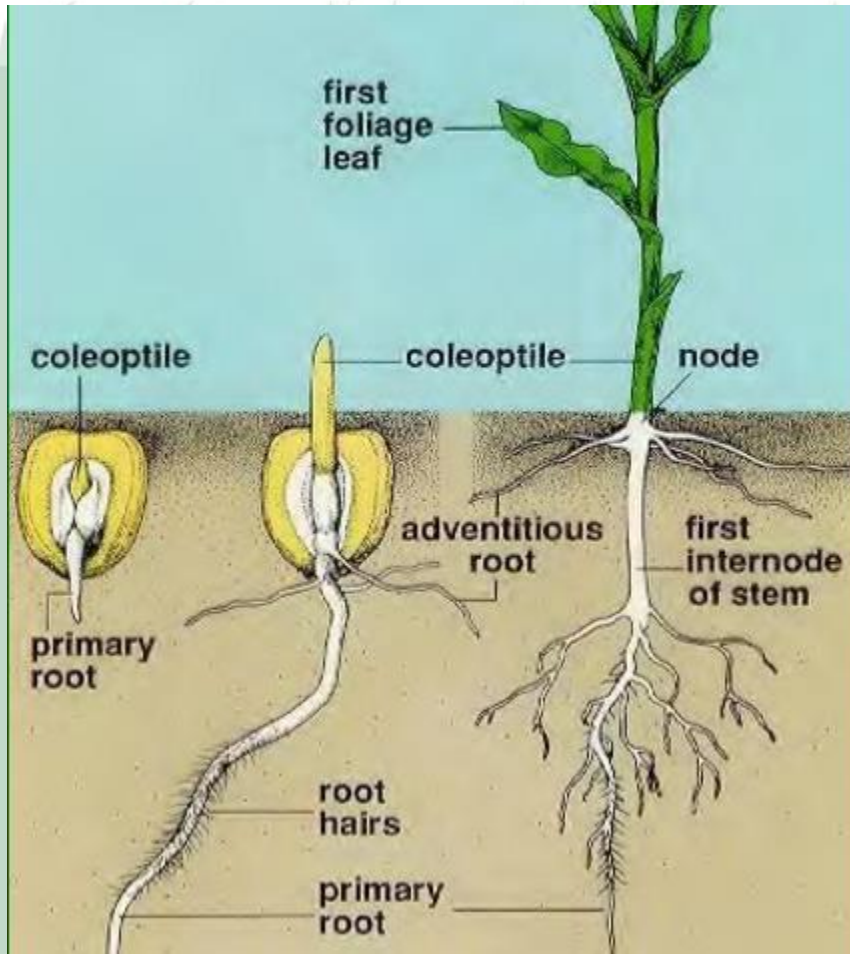
A big first step in plant ID is to determine if it is more like a palm or an oak, i.e., a corn plant or a petunia



Is it a Monocot or Dicot ?



Monocot vs Dicot



CULTIVAR = CULTIVATED VARIETY



“Assemblage of cultivated plants which is clearly distinguished by any characters and which, when reproduced (sexually or asexually) retains its distinguishing characters.”

- Liberty Hyde Bailey

- Botanical **varieties** naturally breed true from seed
- **Cultivars** are asexually cloned or by controlled sexual crossing of breeding lines

Even More on Scientific Nomenclature

- Most commonly used system of nomenclature
- System is not static
- As you move down through the sections, plants are more closely related
- Based on flower and plant morphology



It's all in the Family

- Being able to identify an unknown plant to its family is a valuable skill
- Look at botanical characteristics and see if it reminds you of another plant
- Look at references under the name of the family to speed up your search



Common Plant Families

- Anacardiaceae
- Apocynaceae
- Cruciferae
- Fagaceae
- Gramineae
- Labiatae
- Leguminosae
- Rosaceae



*The [rose](#) is a rose
and was always a rose;
But the theory now goes
That the apple's a rose,
And the pear is, and so's
The plum, I suppose.
The dear only knows
What will next prove a rose.
You, of course, are a rose,
but were always a rose.*

- [Robert Frost](#), "The Rose Family"



More Common Plant Families

- Asteraceae
- Brassicaceae
- Poaceae
- Clusiaceae
- Lamiaceae
- Fabaceae
- Arecaceae
- Apiaceae
- Zamiales

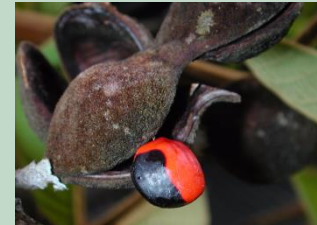
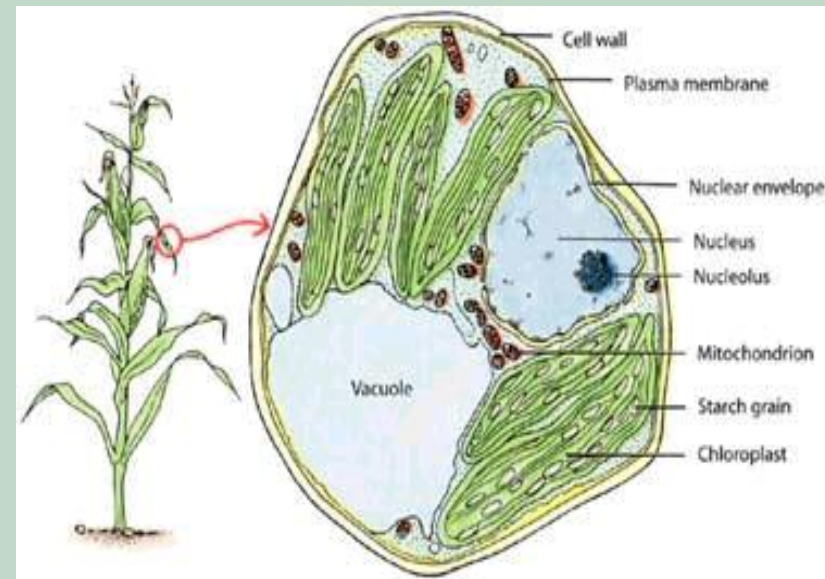


A Family Portrait



What makes a plant a plant and not an animal?

- Cell walls
- Ability to make own food
- Special kinds of anatomical (plant) parts



Plant Growth



- Plants make their own food - by converting energy from sunlight.
- All living things require energy, not just for growth and reproduction, but also for the maintenance of life.
- To produce food, plants require energy, carbon dioxide, water, and the essential nutrients.

Plants and energy (simplified)

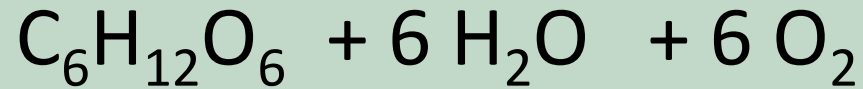
The background features a light green gradient. At the top right, there are stylized, spiky plant silhouettes. Along the top edge, there is a horizontal band of grass-like silhouettes.

- **Photosynthesis**

- The process of turning light energy into energy that can be transported and stored by the plant

Why not just use the energy directly?

Eek! Chemistry!



*What does this
mean to you?*

Eek! Chemistry! cont.

- $6 \text{ CO}_2 + 12 \text{ H}_2\text{O} + \text{light} + \text{chlorophyll} = \text{C}_6\text{H}_{12}\text{O}_6 + 6 \text{ H}_2\text{O} + 6 \text{ O}_2$
- $\text{C}_6\text{H}_{12}\text{O}_6$ is the general formula for carbohydrates
 - Sugars can be transported
 - Starches can be stored

Both are forms of carbohydrates – as anyone on the Atkins diet can tell you!

More Energy Stuff

- **Respiration**

- Breaking the carbohydrates into a form of energy the plant can use



*Although we think of **respiration** in humans as breathing, breathing is really the gas exchange that supports respiration.*

A Balance

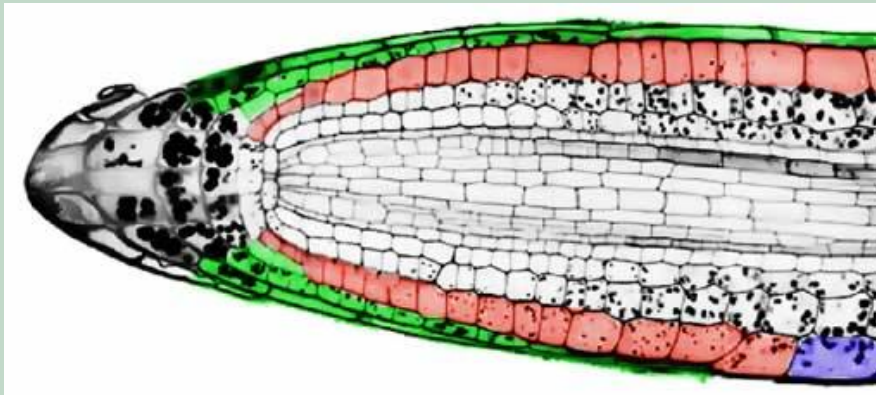
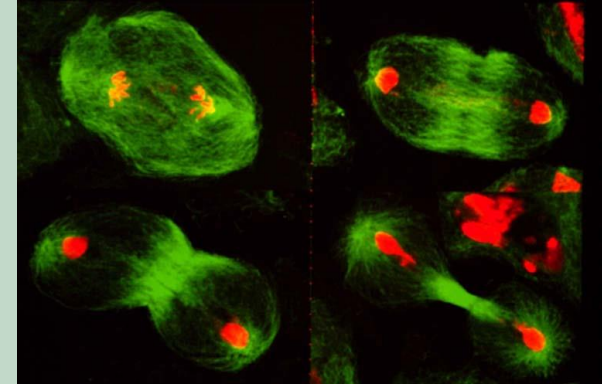


- **Photosynthesis**
 - Produces food
 - Energy is Stored
 - Occurs in Cells with Chloroplasts
 - Oxygen is released
 - CO₂ is used
 - Occurs in light

- **Respiration**
 - Uses food for Energy
 - Energy is released
 - Occurs in all cells
 - Oxygen is used
 - Water is produced
 - CO₂ is produced
 - Occurs in Dark or Light

What's all this used for, anyway?

- Plant growth and development
 - Cell division
 - Cell elongation
- Where does growth occur in plants?
 - Meristems



Gross Anatomy

Major plant organs include:

roots

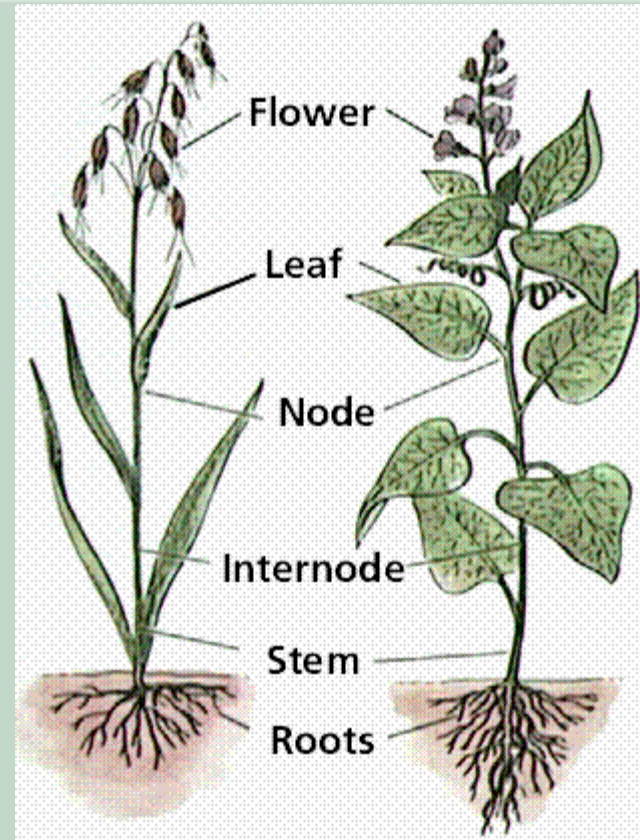
stems

leaves

reproductive organs:

flowers or cones

fruits and seeds

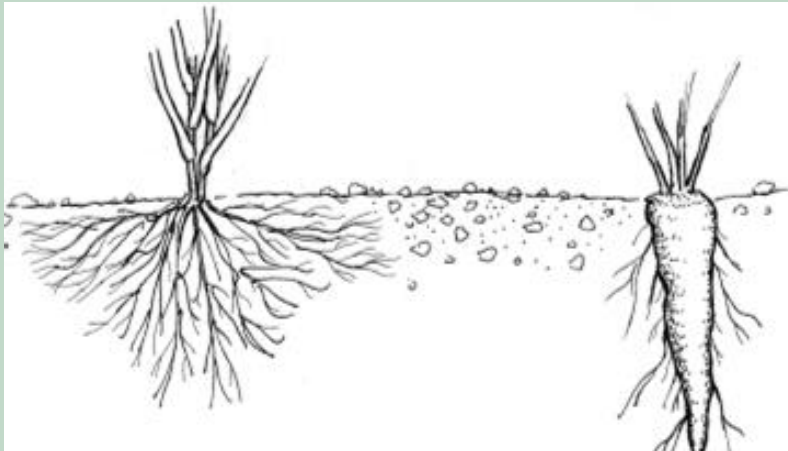


Know the Node!

Roots

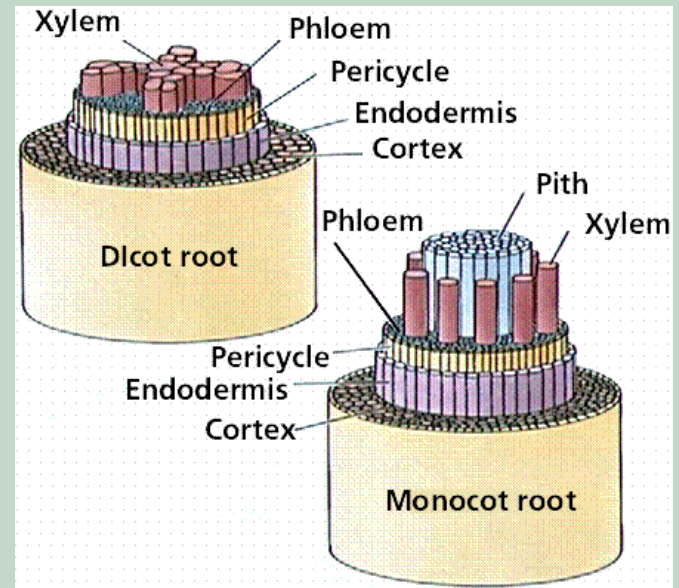
Functions

1. Absorption of water & nutrients
2. Anchoring
3. Conductance
4. Storage



Fibrous roots

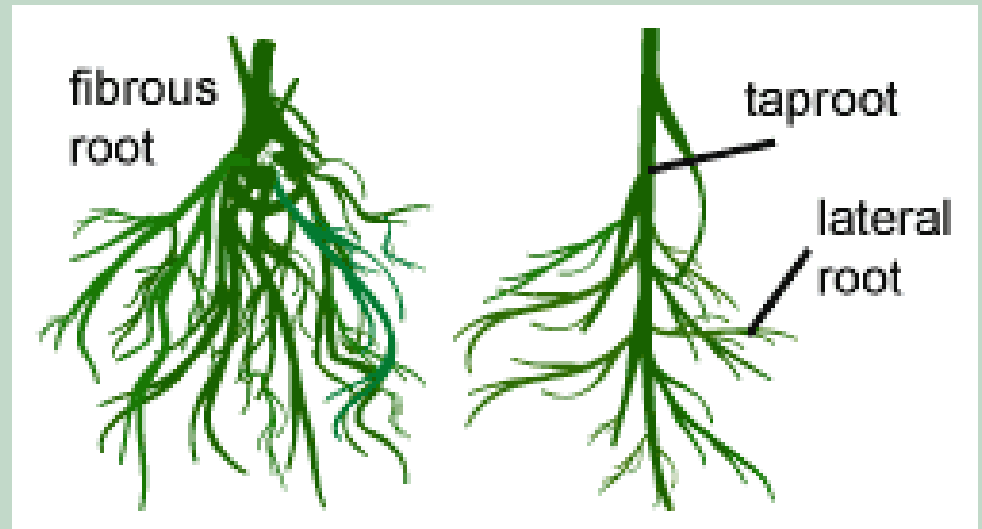
Taproot



Roots cont.

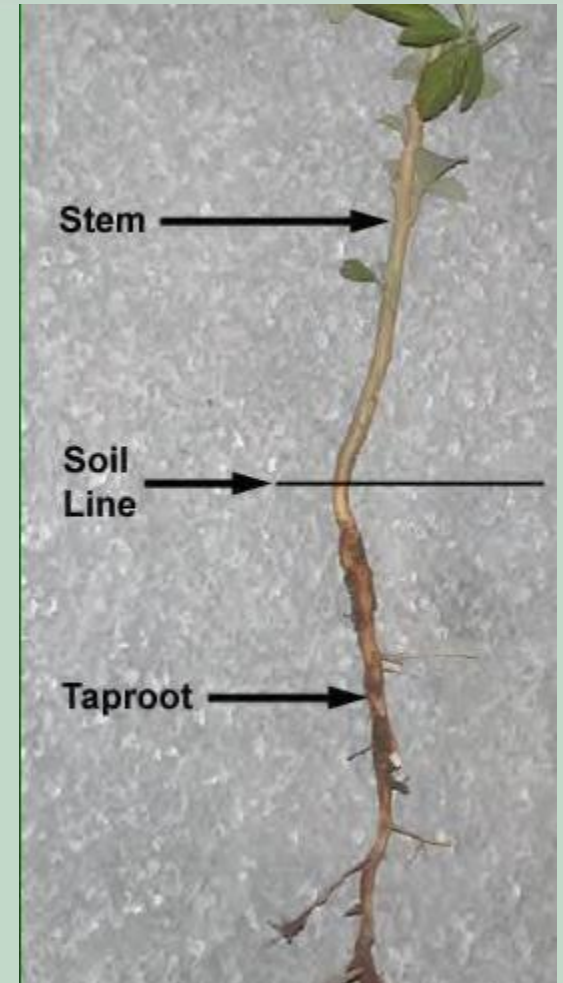
Morphology

- *primary roots/
secondary roots
- *tap root/fibrous roots
- *adventitious roots
- *root hairs

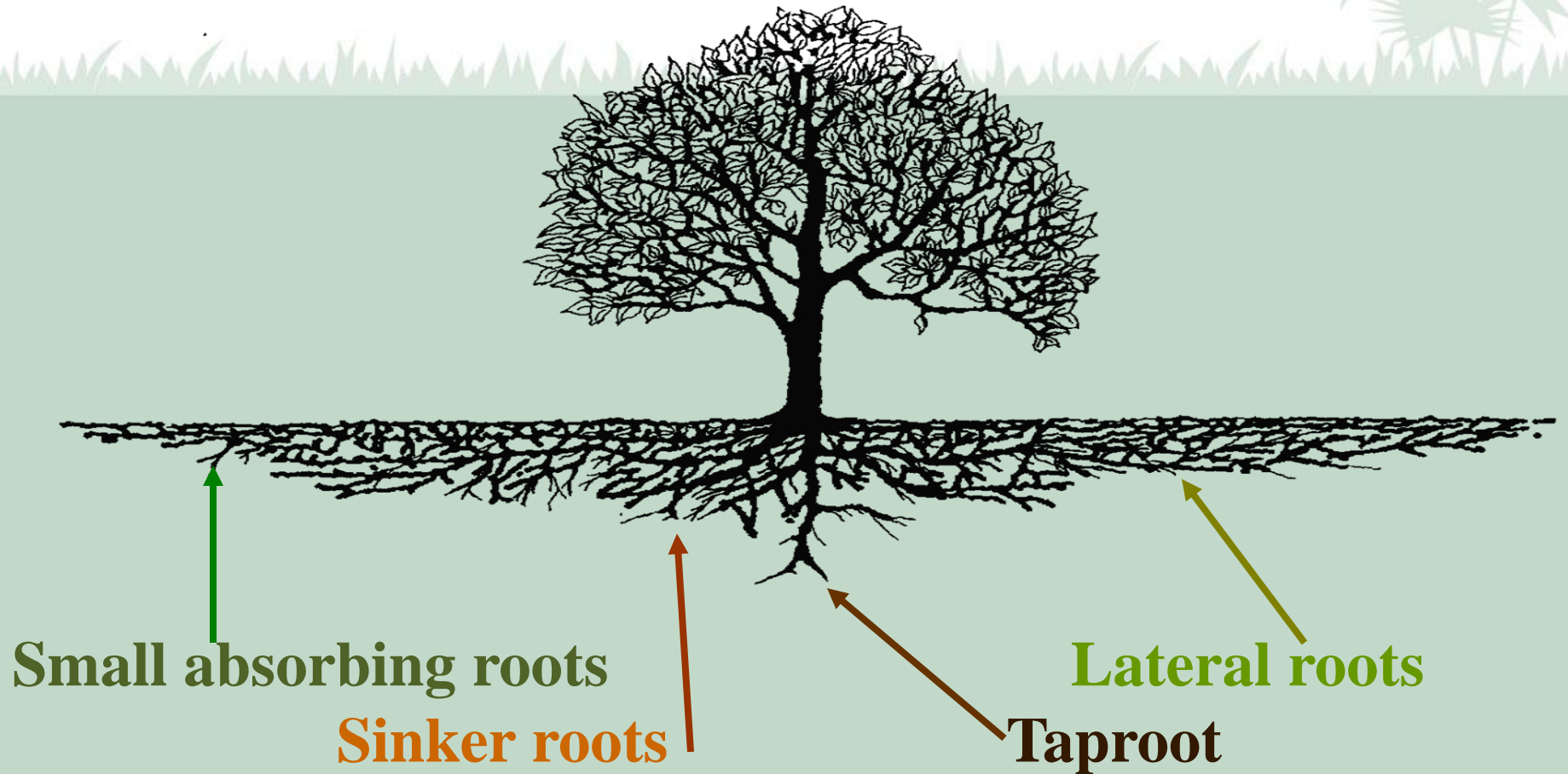




Tap Root



Types of Tree Roots



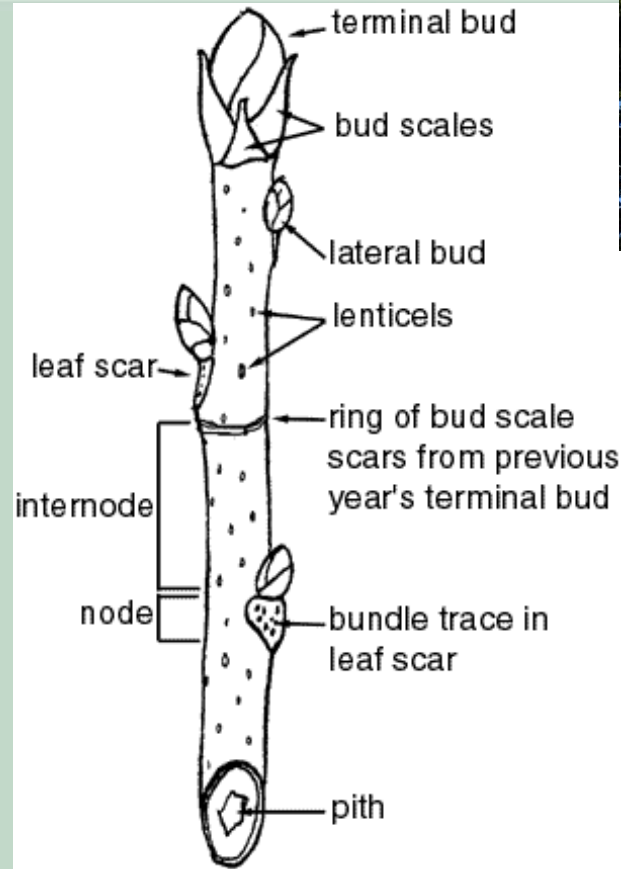
Stems

- **Functions**

- Conductance
- Support
- Photosynthesis
- Gas exchange
 - lenticels

- **Morphology**

- Nodes/internodes
- Modifications
 - tendrils
 - thorns



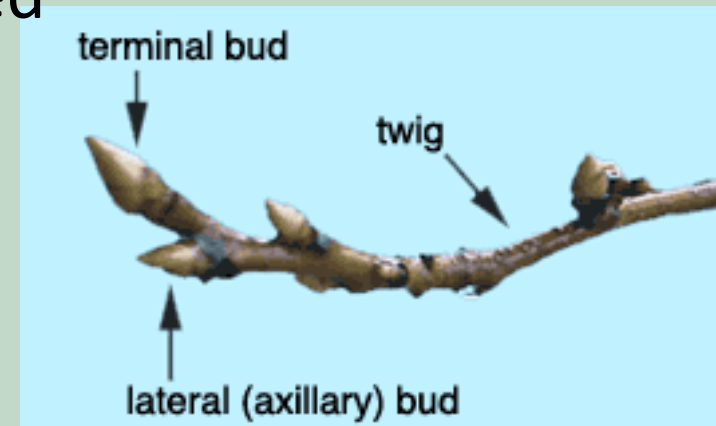
This Bud's for You!

- Nodes

- Points on a stem where a leaf or leaves are attached.
- Spaces between nodes are called Internodes.

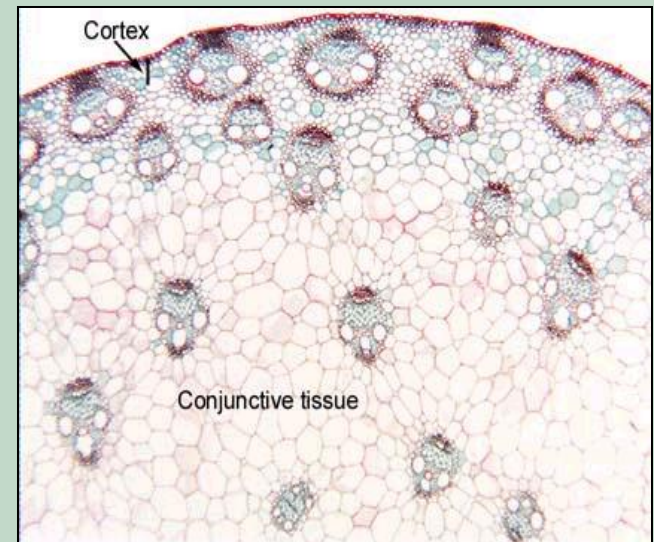
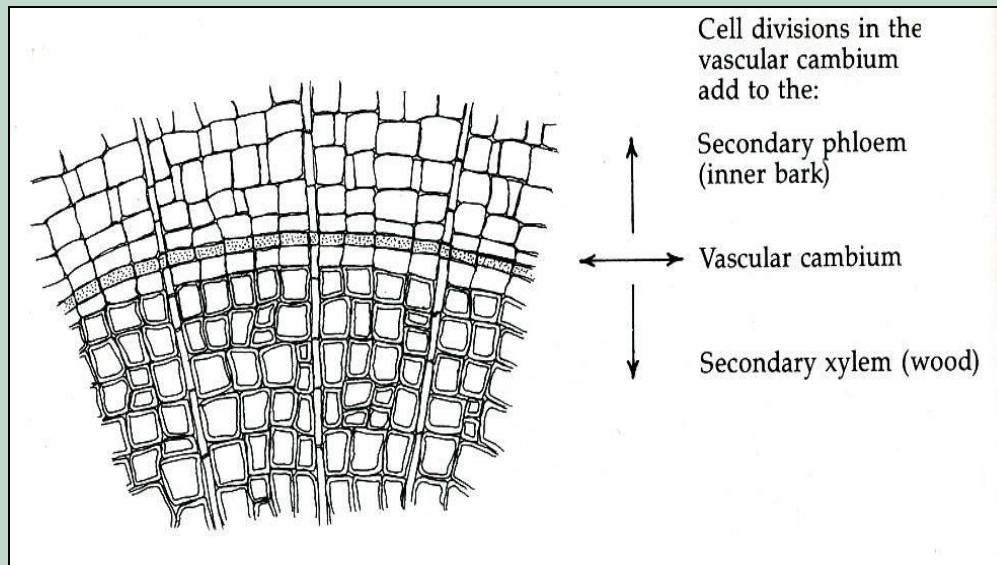
- Buds

- Lateral buds at the base of leaves.
- Terminal buds at the apex of stems.
- Adventitious buds on stems.



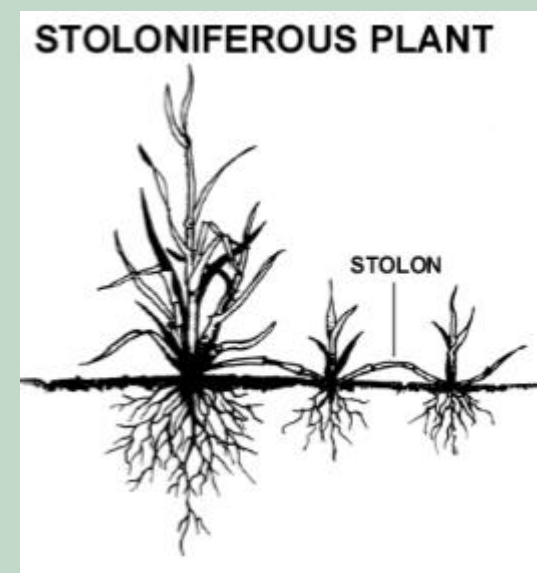
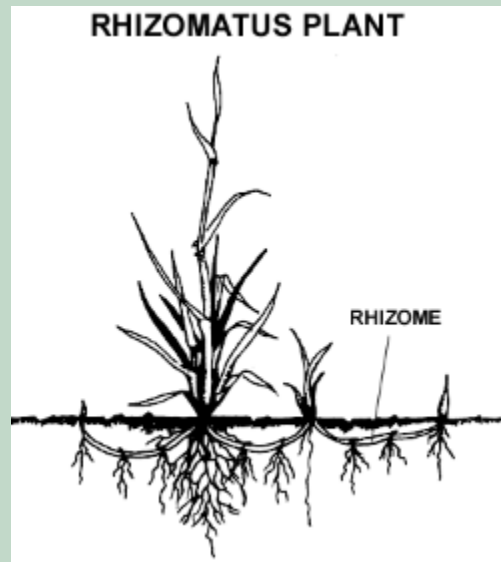
Stem: *Movin' on up (and down)*

- **Phloem** – tubes that conduct food & hormones produced by the plant, from leaves to entire plant
- **Xylem** – tubes that conduct water and minerals from roots to entire plant
- These tissues are formed by the **vascular cambium**



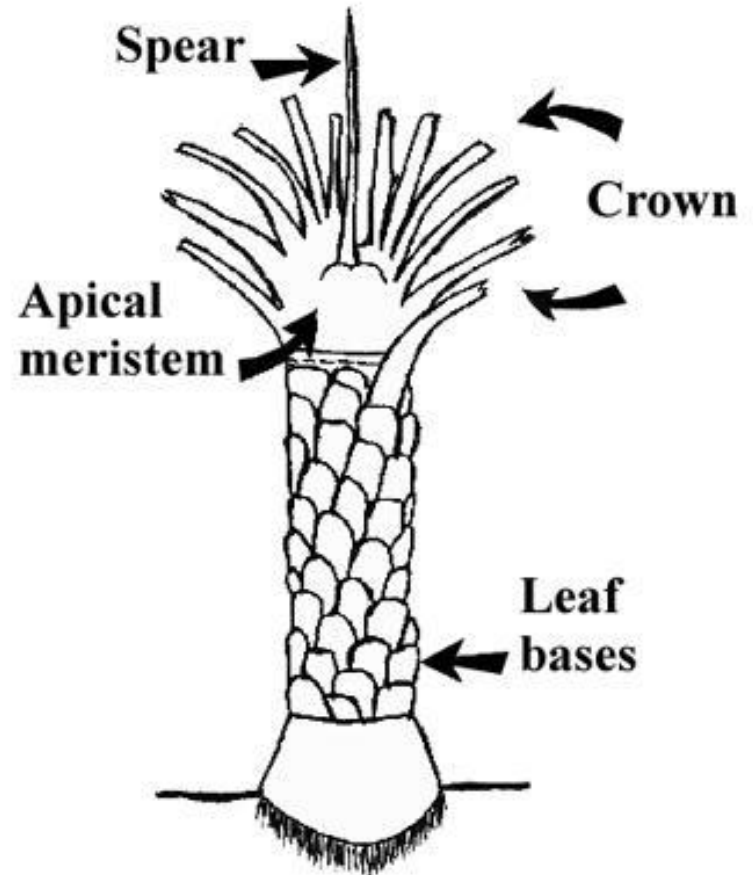
Stem Types

- Crowns
- Simple
- Branched
- Climbing
- Creeping
- Rhizomes
- Stolons



Palms are different!

- * Palms only have one bud at the top of the stem
- * Many palm roots do not have the ability to branch if they are cut



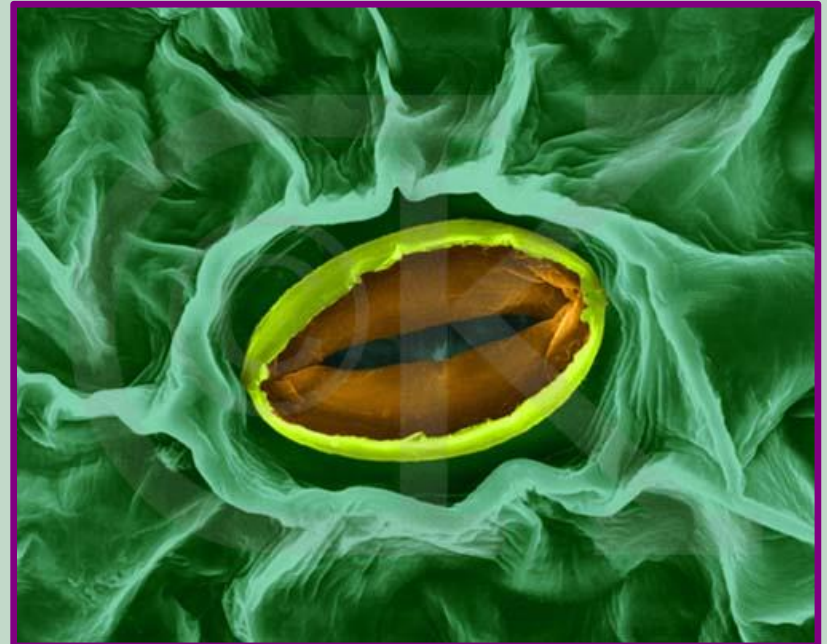
The Leaf

Functions

1. Collection of light
2. Photosynthesis
3. Gas exchange
4. Storage

What's a C3 plant?

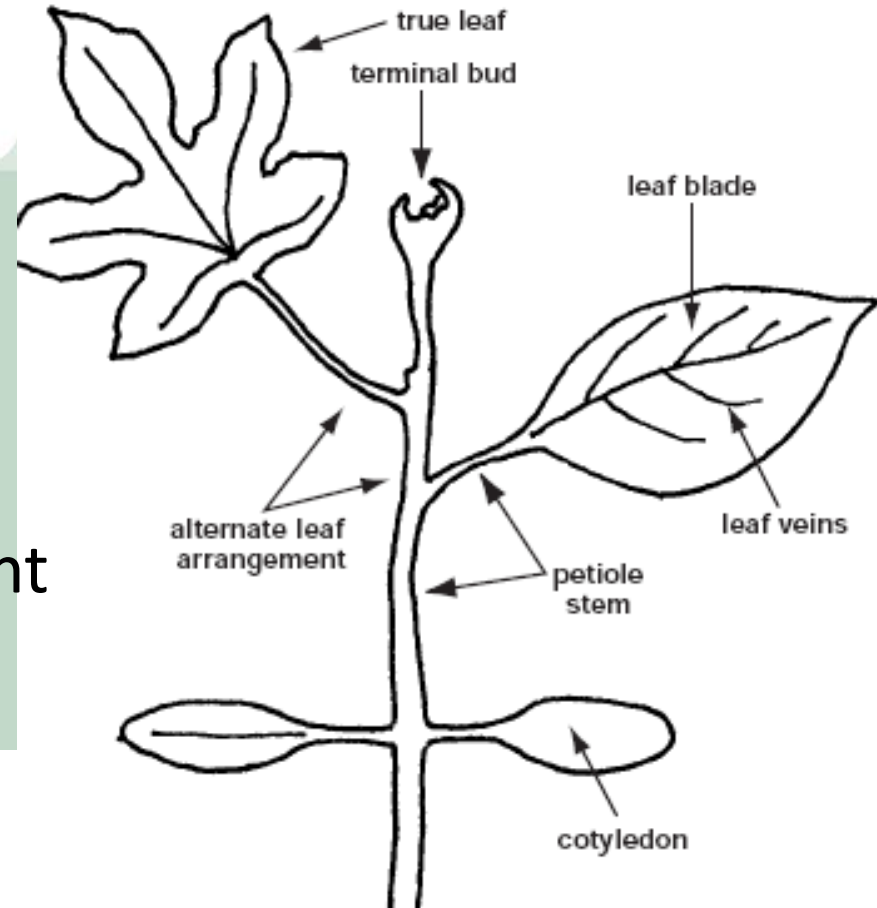
What's a C4 plant?



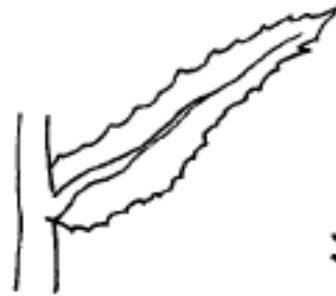
Leaf cont.

Morphology

- Blade/petiole
- Shape of blade
- Margin
- Attachment to stem
- Number and arrangement of leaflets



petiolate



sessile

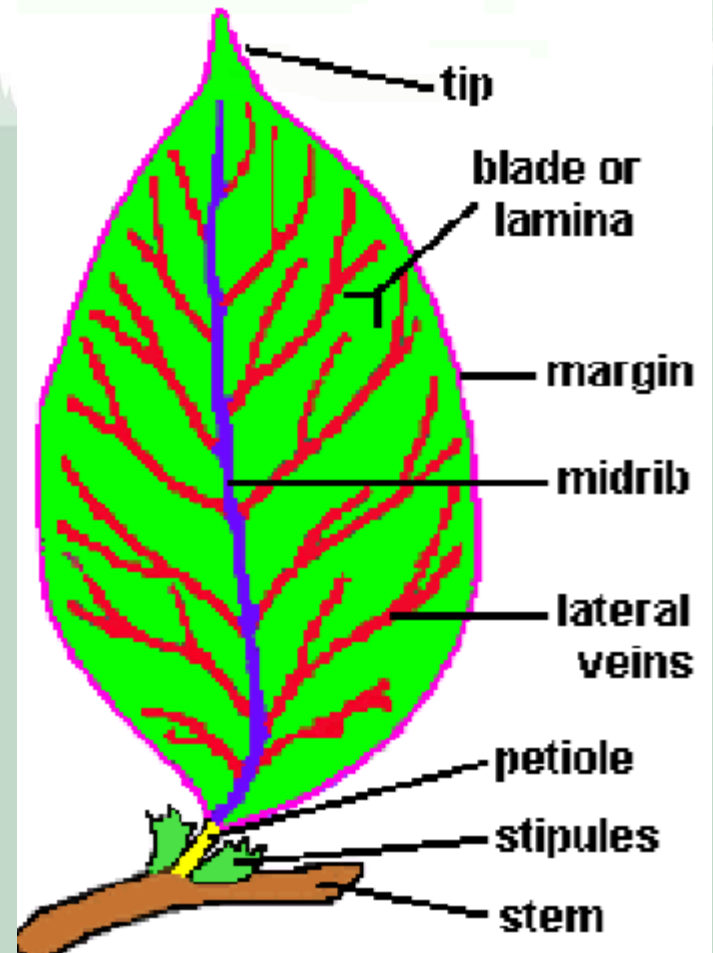


clasping

Simple Leaf

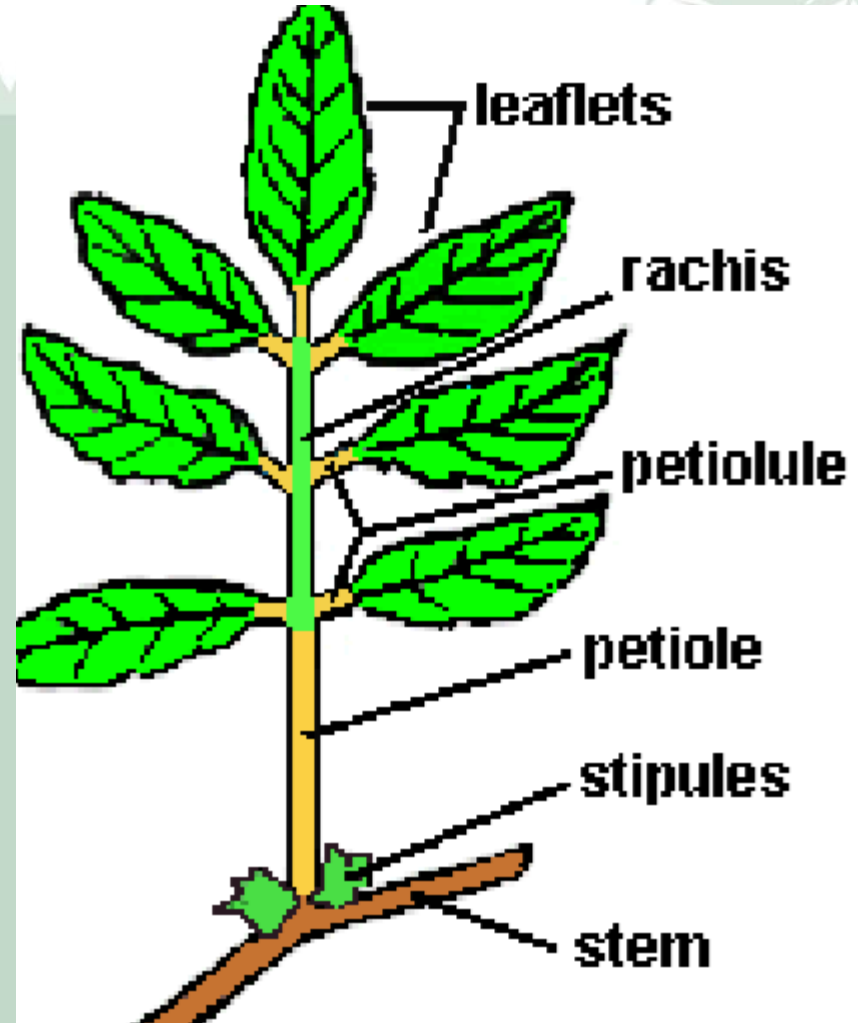
- tip- the terminal point of the leaf.
- blade-the flattened, green, expanded portion of a leaf.
- margin- edge of a leaf.
- midrib-the most prominent central vein in a leaf.
- lateral veins-secondary veins in a leaf.
- petiole-the leaf stalk (connects blade to stem).
- stipules-leaf-like appendages (at the base of petiole of some leaves).

<http://generalhorticulture.tamu.edu/h202/labs/lab2/index.html>



Compound Leaves

- leaflet- secondary leaf of a compound leaf.
- rachis- an extension of the petiole bearing leaflets.
- petiolule- the leaflet stalk.
- petiole- the leaf stalk
- lateral veins- secondary veins in a leaf.
- stipules- leaf-like appendages (at the base of petiole of some leaves).



Common Leaf Shapes



linear



oval



oblong



ovate



obovate



deltoid



cordate



elliptical



lanceolate

I'm Getting Edgy!



entire



undulate



finely
serrate



coarsely
serrate



doubly
serrate



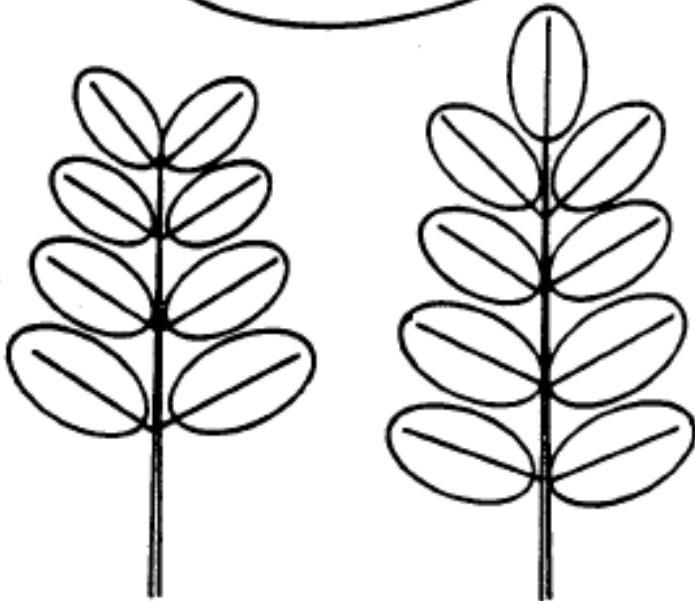
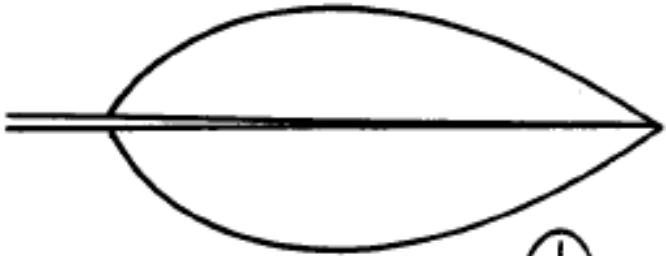
crenate



lobed

Leaf Me Alone!

Simple

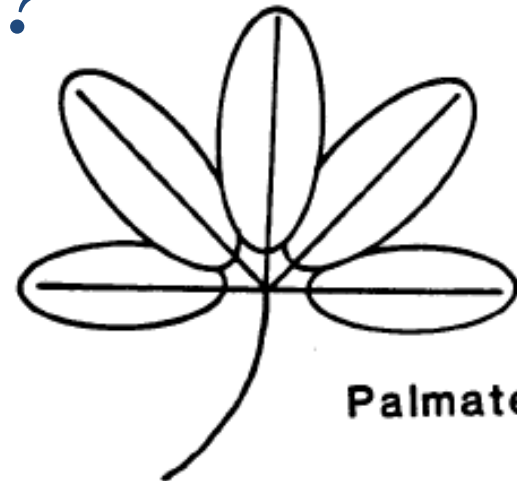
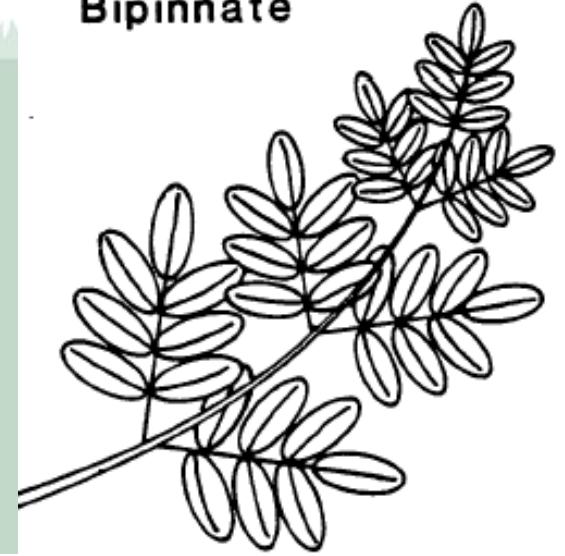


Even Pinnate

Odd Pinnate

How many leaves are on this slide?

Bipinnate

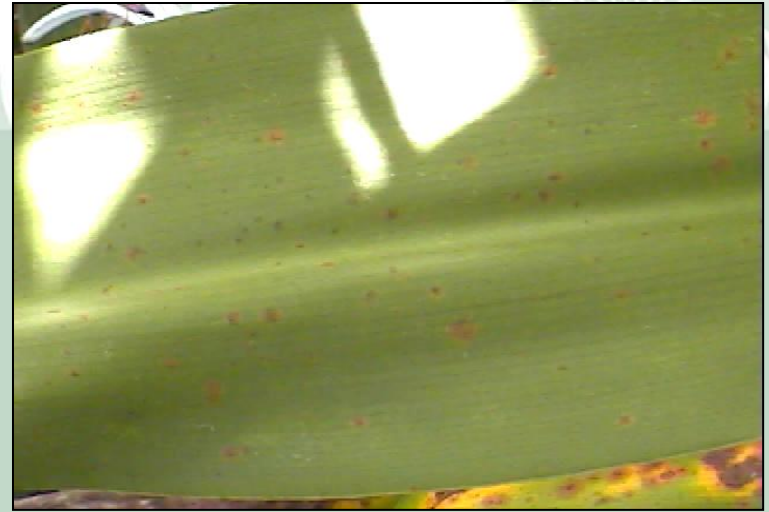


Palmate

Leaves are different

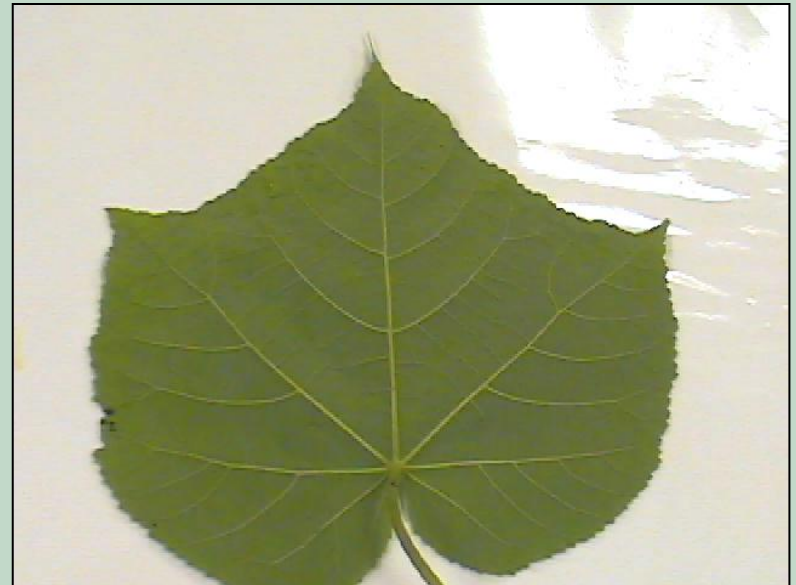
Monocot Leaf

- Chief veins are parallel or nearly so.
- Typically grasses, palms



Dicot Leaf

- Veins form a net-like pattern.
- Commonly referred to as “Broadleaves”.



Flowers

- **Function**
 - Control pollination
 - Develop into fruit and seed
- **Morphology**
 - We need many slides for this!

Remember – much of the classification of plants is based on *floral morphology*



Flower Types

- Single

- A solitary flower at the end of a peduncle (a stem supporting a flower or flower cluster). Ylang Ylang



- Cluster

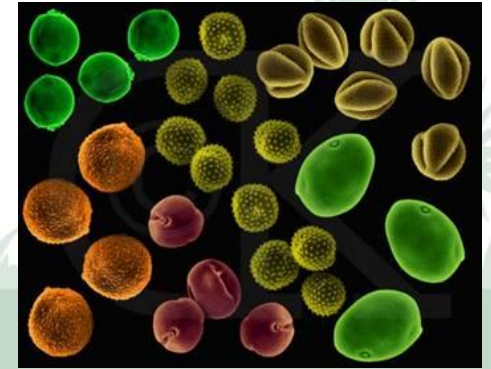
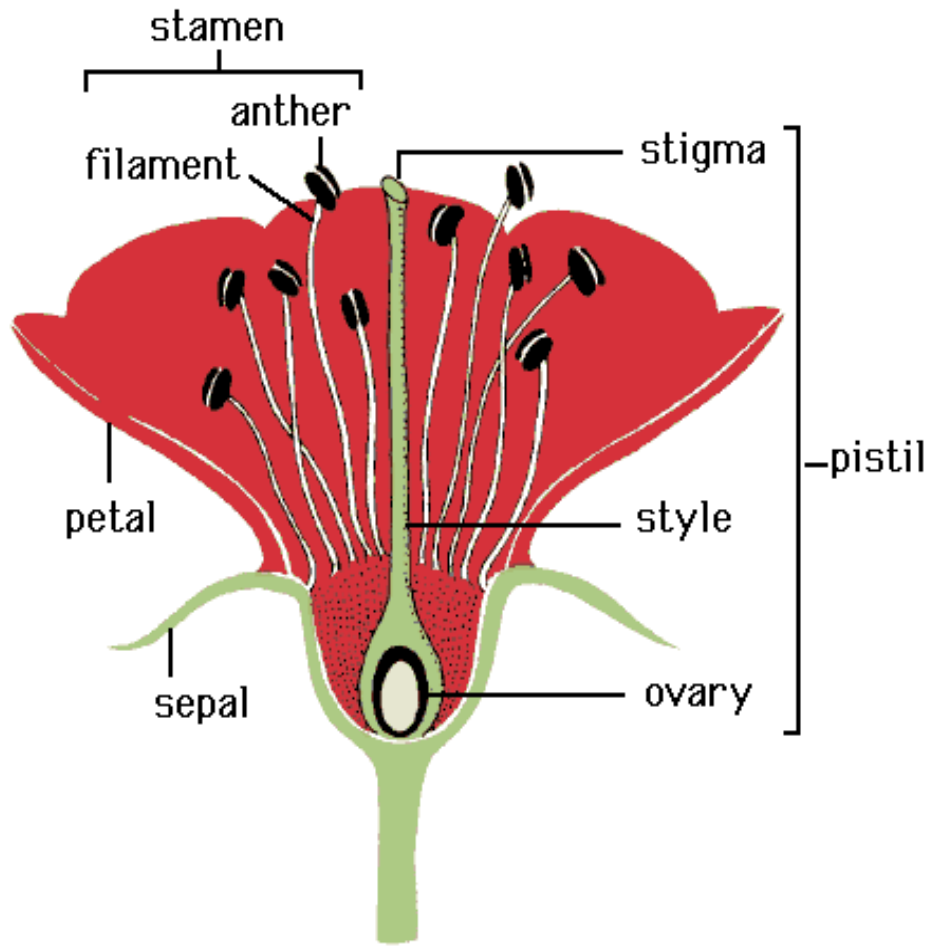
- Three or more flowers gathered closely together in simple or branched groups. Can be Racemose or Cymose. Pentas, Mango



Flower Morphology

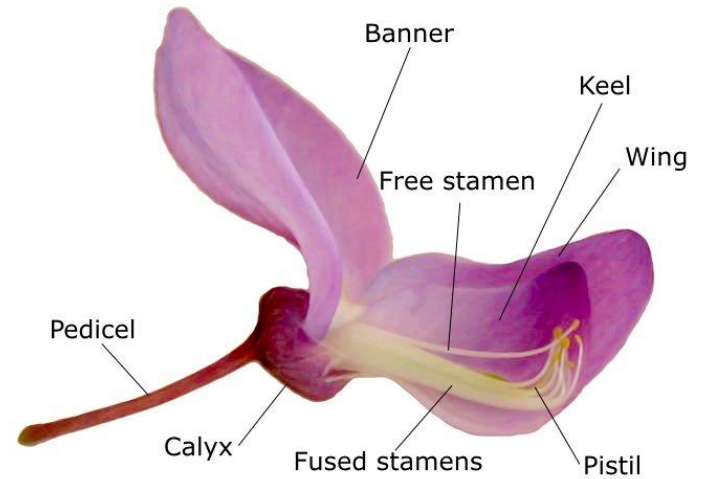
- petals - corolla
- sepals - calyx
- receptacle
- pistil
- ovary/ovules
- style
- stigma
- stamen
- filament
- anther
- pollen





Pollen Grains

Peas, if you please...



More-phology

- **Complete**

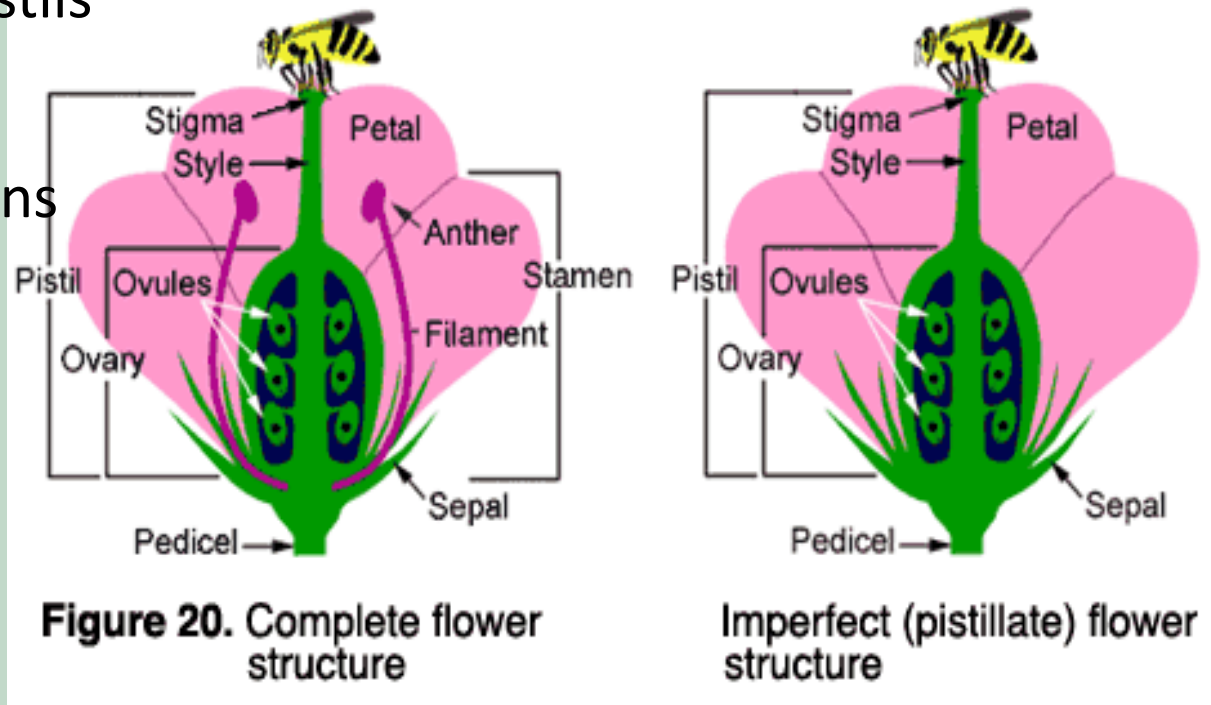
- has petals, sepals, stamens and pistils

- **Perfect**

- has both stamens and pistils
- staminate
- pistillate

- **Flower types**

- monoecious
- dioecious



Fruits and Seeds

- Function
 - seed dispersal
 - seed protection
 - contain genetic information for next generation and structures to create new plant
- Morphology
 - Ovary development
 - Cotyledons/endosperm, embryo



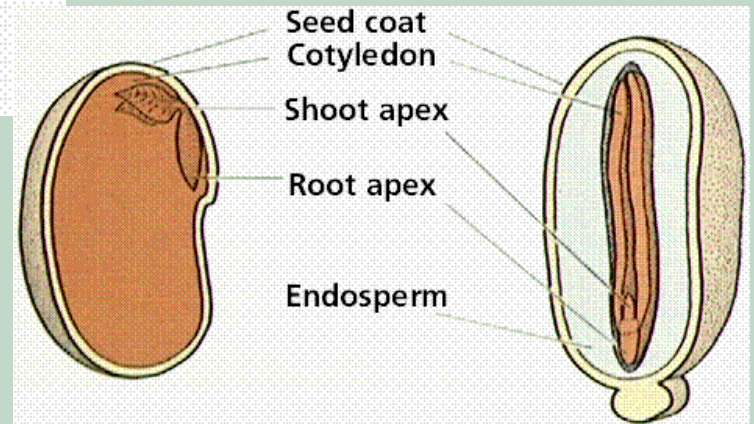
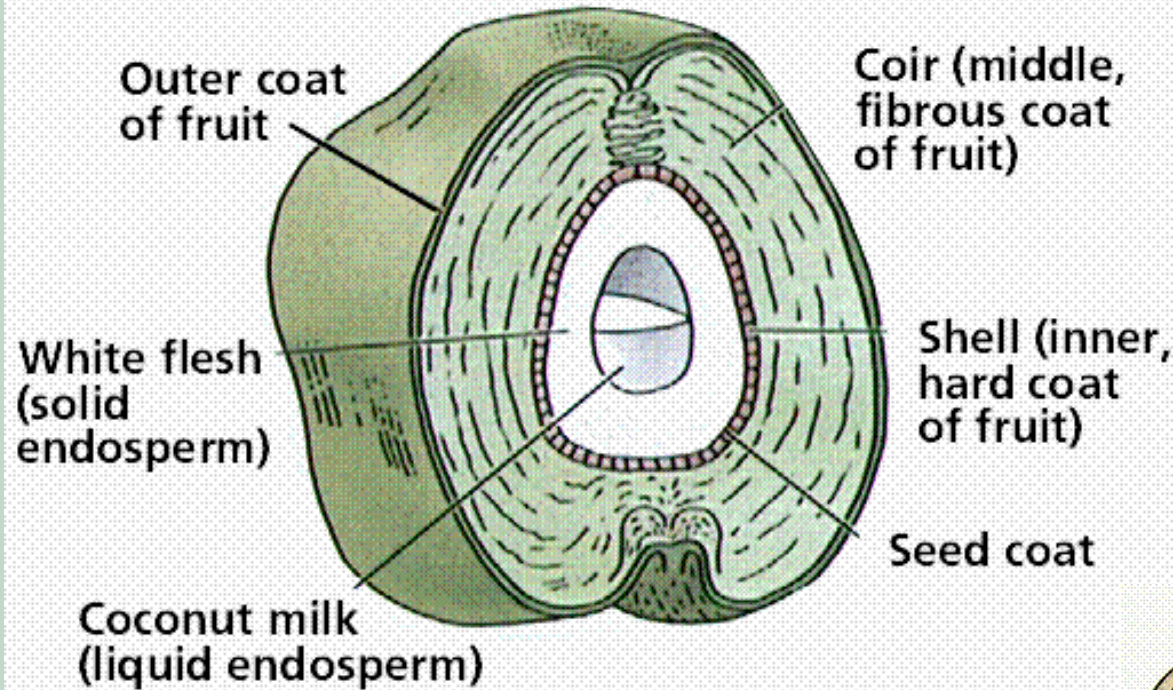
Seeds



- Have an outer coat, usually tough (like an egg shell).
- Typically have endosperm (like egg white).
- Have one or two inner embryos (like egg yolk).
- Range in size from dust-sized to Avocado- sized.
- Contains one or two cotyledons, or seed- leaves.
 - Monocot - one cotyledon - grasses, sedges, palms.
 - Dicot - two cotyledons - broadleaves

Seed Parts

Coconut Palm



Fruits



- Ripened and seed-bearing ovaries of flowers.
- Nearly as varied in color, form, size, texture and number as are flowers.
- Can be used as the distinguishing characteristic of a species or variety.
- Divided into two large categories
 - Dry
 - Fleshy

Dry Fruits

- Achene
- Samara
- Nuts
- Grain
- Capsule
- Silique
- Legume
- Follicle



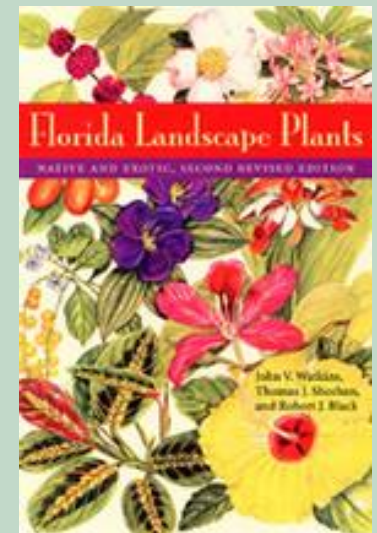
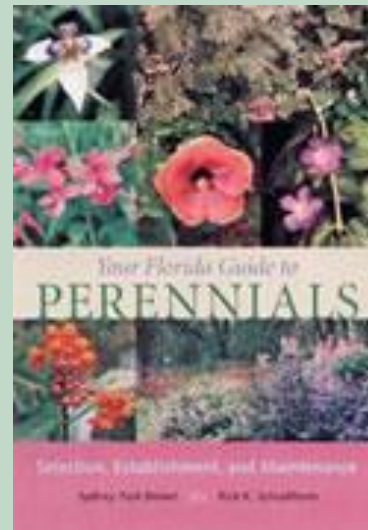
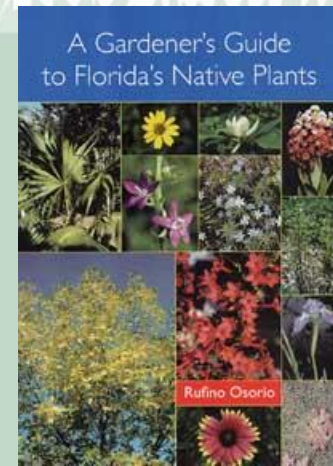
Fleshy Fruits

- Simple
 - Drupe
 - Berry
 - Pepo
 - Hesperidium
 - Pome
- Compound
 - Aggregate
 - Multiple



So when someone brings me a plant, how do I get to the scientific name?

- Dichotomous keys
- Plant ID books
- Glossaries of terms
- Websites





FloraGator

a multiple-entry key for
flowering plant family identification

the key

the families

FAQs (frequently asked
questions)

sources / credits

<http://hort.ifas.ufl.edu/floragator/index.html>

FloraGator is a multiple-entry key to the families of flowering plants as defined by the Angiosperm Phylogeny Group in 2009.

Users can identify an unknown plant to the correct family by reporting the visible details of the leaves, flowers, fruits, and other parts. The choice of information to report is entirely up to the user. The order in which information is entered does not affect the identification. Some families can be identified by a single feature. Other families may require up to 20 pieces of information.

We welcome your comments, feedback, and suggestions about this site.

Visitors

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GB 117	IN 61	DE 17	IR 13	AL 9	RS 7	EC 7	LY 6
AU 83	PH 21	PE 14	IT 11	CN 9	CO 7	SG 6	PK 5

See more ▶

DDIS Plant and Weed sample

The screenshot shows a Microsoft Internet Explorer browser window displaying the DDIS (Distance Diagnostic and Identification System) website. The browser's address bar shows the URL: <http://ddis.ifas.ufl.edu/ddisx/submit/sample?pageID=1>. The website header includes the DDIS logo and the text "Distance Diagnostic and Identification System". A navigation menu on the left lists various options such as Home, MyDDIS, Sign Out, Resources, Diagnostic Labs, and Help. The main content area is titled "MyDDIS > Submit a Sample" and features a three-step process flow: 1. Select Sample Type, 2. Fill Sample Data, and 3. Upload Digital Sample. The current step is "Fill Sample Data", which contains a form for "Customer and Sample Information". The form includes fields for Customer name, Address, City, County, State (set to FL), Zip, Email, and Phone. A note states: "We recognize the confidentiality of the information above. Grower information provided here are revealed for the submitter only." Below this, there are fields for "A short name for this sample", "Sample source", "Choose a security option" (set to Public), "Sample was collected on" (with a date picker), and "Physical sample has been sent on" (with a date picker). A checkbox is present for "If physical sample, check here." At the bottom of the form, there are fields for "Longitude/Latitude" and a note "(WGS84 -- DDD decimal degree)". A context menu is open on the right side of the browser window, showing options like Back, Forward, Save Background As..., Set as Background, Copy Background, Set as Desktop Item..., Select All, Paste, Create Shortcut, Add to Favorites..., View Source, Encoding, Print, Refresh, Convert to Adobe PDF, Convert to existing PDF, Export to Microsoft Excel, Google Search, Send To, Page Info, and Properties.

(2)

Distance Diagnostic and Identification System at University of Florida/IFAS - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Address: <http://ddis.ifas.ufl.edu/ddis/submit/sample?pageID=1>

Search DDIS
Search

UF UNIVERSITY OF FLORIDA
IFAS Extension

Plant/Weed Data *required

cultivated native/undisturbed weed unknown other

Prevalence: unknown Habit: unknown

Sample growth stage: unknown

Height:

Flower color:

Habitat:

Location:
(street address or direction and distance to nearest major landmark, highway, lake, town, etc.)

Foliage fragrant Flower fragrant Sap: none

Additional Description of the Sample: Updated

Select a Lab/specialist to send Sample

Choose labs or specialist(s) from the list below and click on the "Add to my list" button to add your selections to the mailing list.

Select diagnostic labs or clinics Help

- "Herbarium"<plantid@flmnh.ufl.edu>
- "Insect/Arthropod ID - Gainesville"<ufinsectid@ifas.ufl.edu>
- "Plant Disease Clinic - Gainesville"<pdcc@ifas.ufl.edu>
- "Plant Disease Clinic - Immokalee"<rmm1@ifas.ufl.edu>
- "Plant Disease Clinic - Fort Pierce"<pdcc@fortpierce@ifas.ufl.edu>

Done Internet

start 2 Inte... 7 Micr... Bobany Plant an... Microsoft... 11:27 AM

(3)

The screenshot shows a Microsoft Internet Explorer browser window titled "Distance Diagnostic and Identification System at University of Florida/IFAS". The address bar contains the URL "http://ddisx.ifas.ufl.edu/ddisx/submit/sample?pageID=1". The main content area is a form for selecting diagnostic labs or specialists. It includes three sections: "Select diagnostic labs or clinics", "Select a specialist(s)", and "Select an external specialist(s)". Each section has a list of options with an "Add to my list" button. Below these sections are fields for "Email to:", "CC:", and "Message:". The "Email to:" field has a "Remove" button. The "CC:" field has a note "Separate multiple emails with commas." The "Message:" field is empty. The browser's taskbar at the bottom shows the start button, several open applications, and the system clock at 11:21 AM.

Distance Diagnostic and Identification System at University of Florida/IFAS - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Home Search Favorites Refresh Print

Address http://ddisx.ifas.ufl.edu/ddisx/submit/sample?pageID=1

Google Go Links

Go Bookmarks Popups okay Check AutoLink Send to Settings

Select a Lab/Specialist to send Sample

Choose labs or specialist(s) from the list below and click on the "Add to my list" button to add your selections to the mailing list.

[Help](#)

Select diagnostic labs or clinics

- *Herbarium" <plantid@flmnh.ufl.edu>
- *Insect/Arthropod ID - Gainesville" <ufinsectid@ifas.ufl.edu>
- *Plant Disease Clinic - Gainesville" <pdcc@ifas.ufl.edu>
- *Plant Disease Clinic - Immokalee" <rmm1@ifas.ufl.edu>
- *Plant Disease Clinic - Homestead" <ajpalmateer@ifas.ufl.edu>

Add to my list

Select a specialist(s) (sorted by last name)

- *Gabriel Altman" <altmangf@ufl.edu>
- *asdf asdf" <jhf0551@ufl.edu>
- *Patrick Baker" <pkbaker@ufl.edu>
- *Shirley Baker" <sbaker25@ufl.edu>
- *Robert Black" <hcoop@ufl.edu>

[Find more about specialists](#)

Add to my list

Select an external specialist(s) (sorted by last name)

- *Wanda Almodovar" <w_almodovar@cca.uprm.edu>
- *Stephen Beidler" <beidles@doacs.state.fl.us>
- *Irma Cabrera" <irma_cabrera@cca.uprm.edu>
- *Wayne Dixon" <dixonw@doacs.state.fl.us>
- *Consuelo Estévez" <elva_estevez@cca.uprm.edu>

Add to my list

Email to:

CC: *Separate multiple emails with commas.*

Message:

Remove

Internet

start 2 Inte... 2 Mic... Botany Plant an... Microsoft... 11:21 AM

Plant Identification Learning Module

Firefox

Gatorlink Webmail :: MG Project Web... x Plant Identification Learning Module ... x +

gardeningsolutions.ifas.ufl.edu/mastergardener/outreach/plant_id/index.shtml

Most Visited Pin It UF Gatorlink Webmail UF e-Learning UF ISIS UF UF Group Fitness Sche... AKO Army Knowledge Online Amazon.com - Online... Bookmarks

Plant florIDa Identification

UNIVERSITY of FLORIDA IFAS Extension

Master Garden Home Florida 4-H Home Search GO

► **Return to Education and Outreach**

Plant Identification Learning Module

This Plant Identification Learning Module is an online tool for learning about plants. It is useful to plant enthusiasts as well as Florida 4-H Youth and Master Gardeners preparing for state contests.

Images and information on 200 vegetables, fruits, flowers and landscape plants are included. Use the handy self-test option to judge your progress.

How to Use the Learning Module

The module is broken into four plant categories: fruits and nuts, vegetables, flowers and indoor plants, and ornamentals. After choosing a category, you'll find a list of plants that are included in the competition. Each of these links will take you to a page going into more detail about that plant. At the end of the list, there is a self-guided quiz you can take.

- **Fruits and Nuts**
- **Vegetables**
- **Flowers and Indoor Plants**
- **Ornamentals**

- **Glossary of terms used in the module**
- **Thanks and acknowledgments to those who made the module**



Contest Rules & Glossary

EDIS publication for Florida 4-H members and Master Gardeners participating in state contests:
"Florida 4-H Horticulture Identification and Judging: Contest Rules and Glossary"

Competition Forms

- Flowers and Foliage Plants List (PDF)
- Fruits and Nuts List (PDF)
- Ornamentals List (PDF)
- Vegetables List (PDF)
- Judging contest form (PDF)

6:56 PM 7/31/2013

Distance Diagnostic and Information System

The screenshot shows a Firefox browser window displaying the DDIS website. The address bar shows the URL `ddis.ifas.ufl.edu/ddis/home.jsp`. The page header includes the University of Florida IFAS Extension logo and navigation links: Home, Media Library, Diagnostic Labs, Equipment, Training, and Contact Us. A login form is visible with fields for 'user name' and 'password', and a 'Sign In' button.

The main content area features a microscopic image of blue-stained spores. To the right of the image, the following information is displayed:

- Scientific Name:** *Colletotrichum sp./spp.*
- Sample Type:** Plant Disease
- Sample Location:** Florida, USA
- Photographer:** Rachel Brown

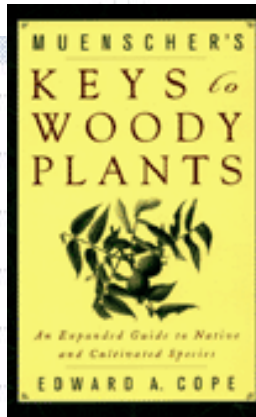
A **Note** states: "The pathogen was grown on culture media Acidified Potato Dextrose Agar. The spores were obtained with a tape mount which was stained with Lactophenol Blue and viewed with a compound scope at 40x."

Below the image, the text reads: "Distance Diagnostic and Identification System (DDIS) The DDIS for Extension is developed jointly by the extension agents, specialists and faculty of UF/IFAS Information Technology. The system is designed specifically for university agricultural specialists and diagnostic laboratories or clinics. DDIS provides a collaboration and communication platform for first detectors, extension specialists and diagnosticians to share information on plant insects and diseases. The system uses field data and digital media as tools for enhancement of diagnosis of plant diseases, insects, weeds, invasive species, plant management, physiology, and nutrient problems."

At the bottom of the page, there is a search bar with the text "Search DDIS" and a "Go" button. Below the search bar, there is a "Quick Links" section with two links: "DDIS Mobile >>" and "Meet Your Diagnosticians >>".

The Windows taskbar at the bottom shows the system clock as 6:57 PM on 7/31/2013, along with various application icons including Internet Explorer, File Explorer, HP, and Microsoft Word.

Key to Woody Plants by W.C. Muenscher



A. Plants with leaves present

B. Plants with needles

go to Key I p. 6

B. Plants with broad leaves

C. Leaves opposite or whorled

go to Key II p. 8

D. Leaves simple

go to Key III p. 12

D. Leaves compound

C. Leaves alternate

go to Key IV p. 13

E. Leaves simple

go to Key V p. 23

E. Leaves compound

A. Plants with leaves absent

F. Leaf-scars opposite or whorled

go to Key VI p. 26

F. Leaf-scars alternate

go to Key VII p. 30

Back to Plant ID: Who ya gonna call?



- The first line of assistance is your county agent.
- Other local experts are available

Activity

The background features a light green gradient with a decorative border at the top consisting of stylized grass and plant silhouettes. The main content area has a darker green background.

Things you can do to learn more about plant ID:

(1) Practice using a Plant Key for Identification and regularly use the online Plant FlorIDa Learning Module. It is a great interactive tool to learn all of your Florida plants!

And/Or

(2) Start Your own Plant ID Notebook:

- press a plant
- complete the Plant ID Note Sheet

Let's take a field trip!

Acknowledgements:

This presentation was adapted from a PowerPoint originally developed by: Dr. Elizabeth Lamb, Cornell University IPM program – formerly @ UF/IFAS IRREC

Other contributors include:

- Adrian Hunsberger, Miami Dade Extension Agent
- Kim Gabel, Hort. Agent - Monroe County (*THE KEYS*)
- Stan Rosenthal, Extension Agent – Forestry, UF/IFAS Leon County Extension
- Jim Chatfield, Extension Specialist, the Ohio State University
- Paul Baumann, Weed Specialist – TAMU
- Oregon State Univ. Master Gardener Botany page:
<http://extension.oregonstate.edu/mg/botany/index.html>