

# Botany



*Department of Environment*

The first stage

**Leaves Part I**

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# Leaves



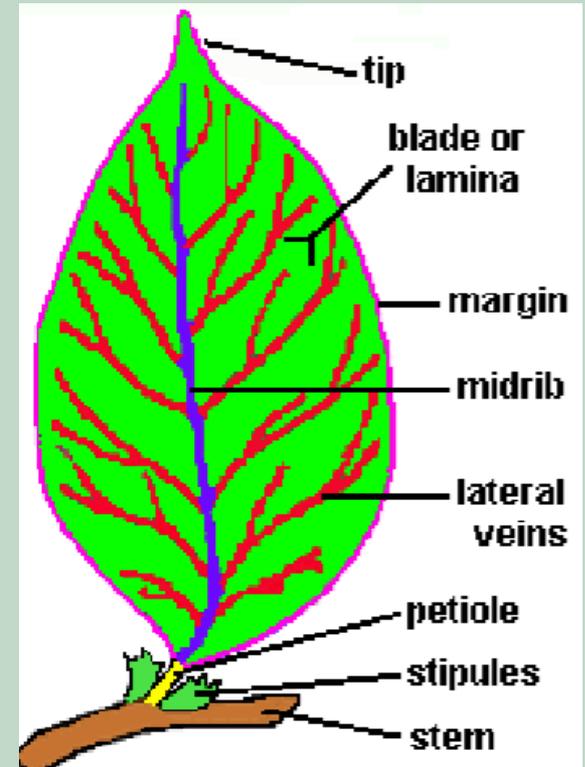
## Functions:

1. **Absorption** of sunlight
2. **Photosynthesis** (production of sugars from sunlight, carbon dioxide, and water)
3. **Gas exchange** (absorb  $\text{CO}_2$ , release  $\text{O}_2$ )
4. **Transpiration** (loss of water)
5. **Storage** of photosynthates

In some plants leaves may be modified for climbing (tendrils), for plant defense (spines), or for pollination (petal-like bracts attract pollinators)

# Leaves: Morphology

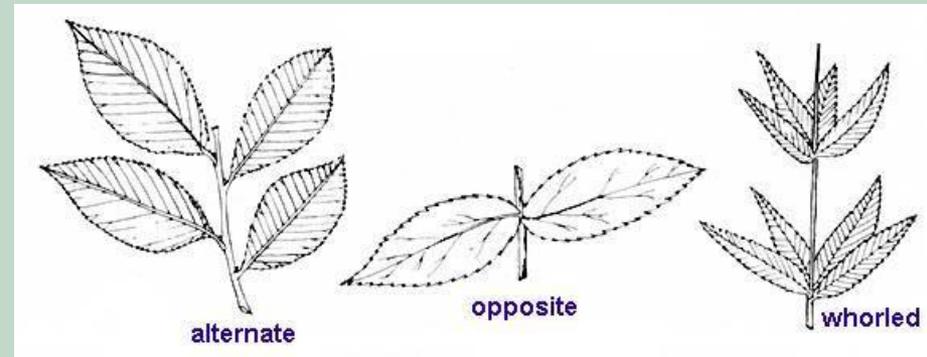
- **Blade:** flattened, expanded part
- **Petiole:** the leaf stalk
- **Stipules:** leaf-like appendages at the base of petiole
- **Base:** blade portion closest to stem
- **Tip or Apex:** blade portion furthest from stem
- **Margin:** edges of the blade
- **Midrib or Primary Vein:** the most prominent central vein
- **Secondary or Lateral Veins:** veins that branch from the midvein



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

# Phyllotaxy: Leaf Arrangement

- **Arrangement at a node**
  - **Alternate:** 1 leaf per node
  - **Opposite:** 2 leaves per node
  - **Whorled:** 3 or more leaves per node



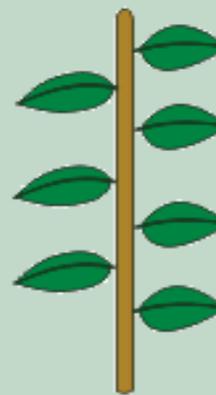
# Phyllotaxy: Leaf Arrangement

- **Arrangement on stem**

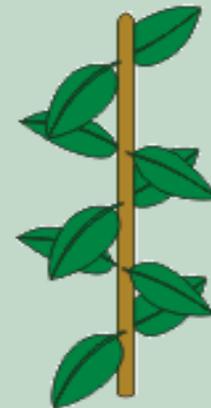
- **Spiral:** leaves at adjacent nodes evenly spaced in a spiral around the stem
- **Distichous:** leaves two-ranked (held on a single plane)
- **Decussate:** leaves at adjacent nodes rotated  $90^\circ$
- **Equitant:** two ranked, flattened leaves overlapping at the base



Alternate spiral



Alternate distichous



Opposite decussate

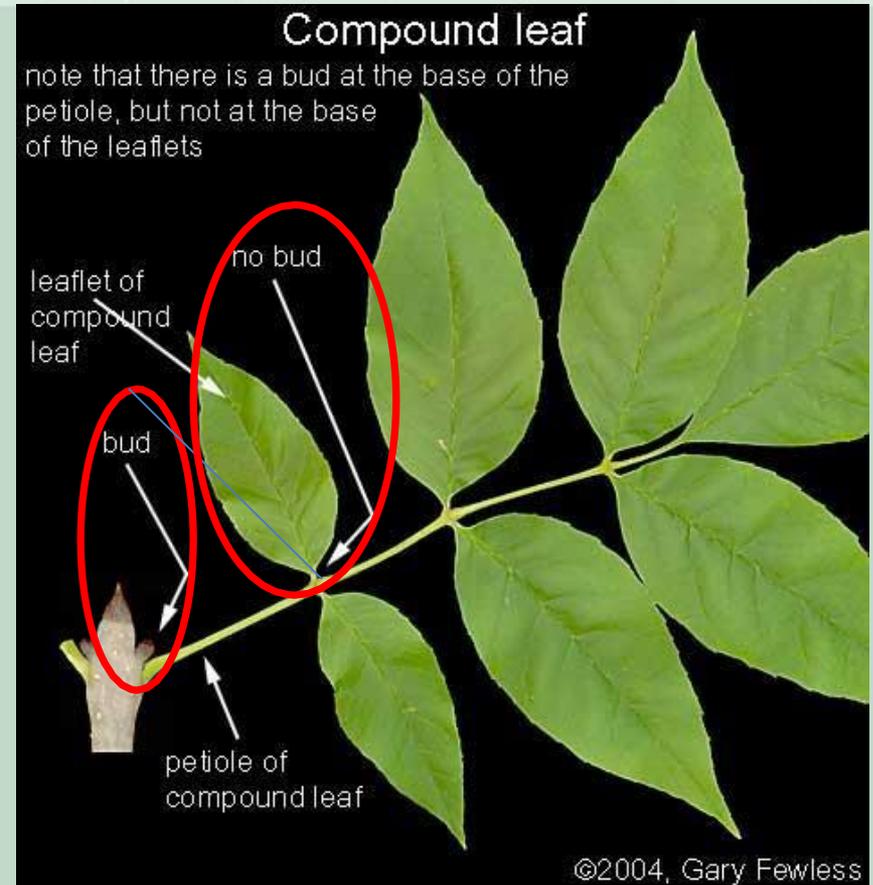
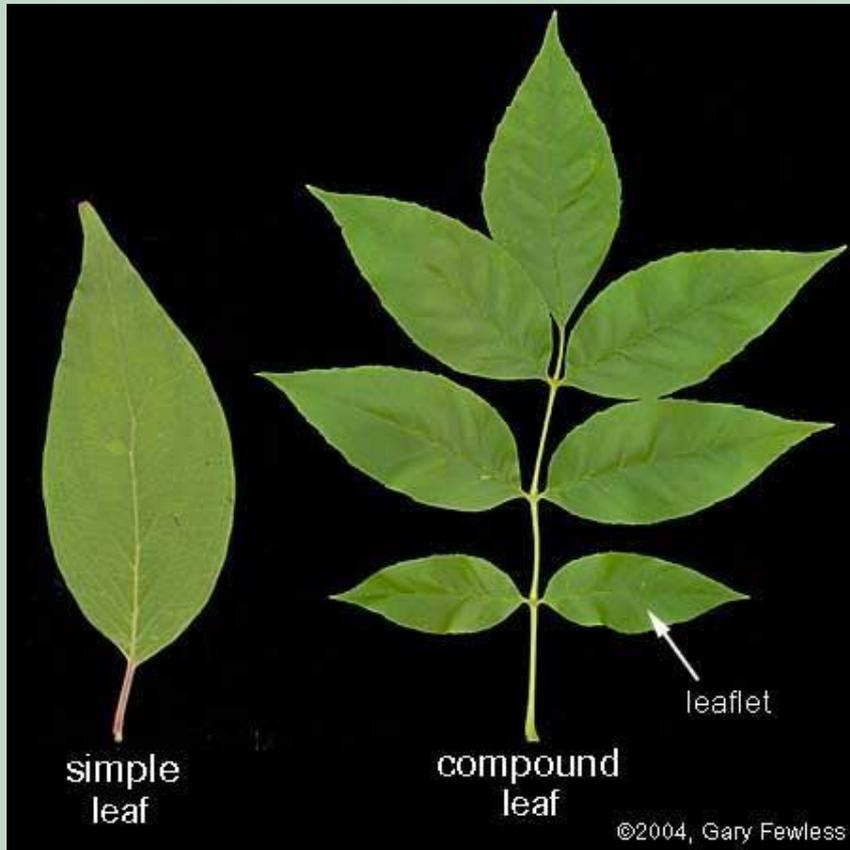


Whorled



Equitant

# Simple vs. Compound



A **simple leaf** has a single blade; a **compound leaf** has two or more blades (leaflets).

# Simple or Compound?

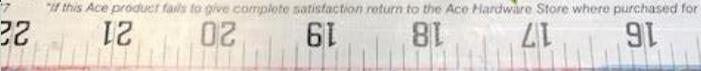
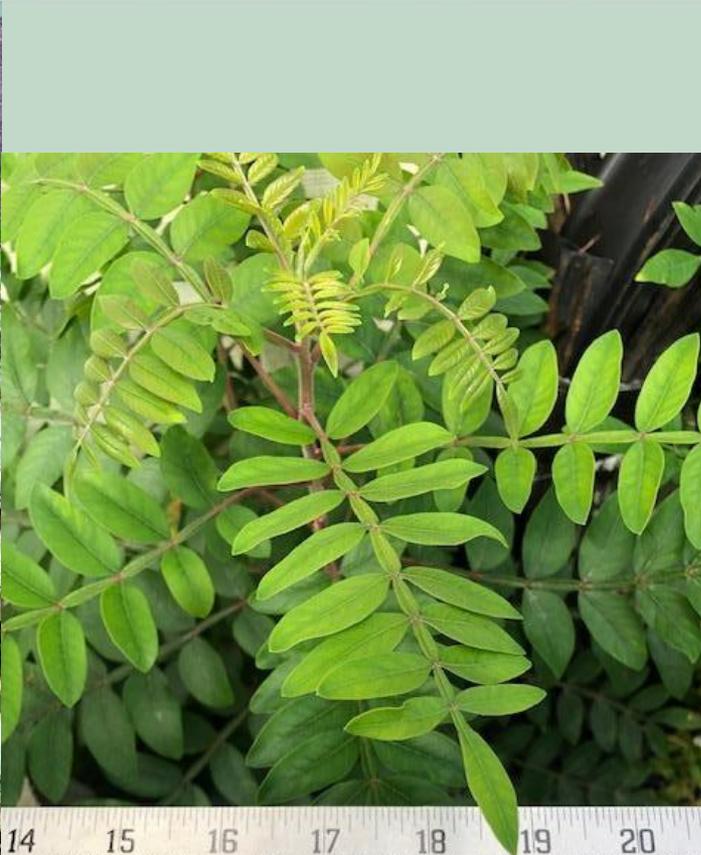


Scented Geranium

*Pelargonium citronellum* 'Mabel Gray'



# Simple or Compound?



# Simple or Compound?



# Simple or Compound?



# Simple vs Compound

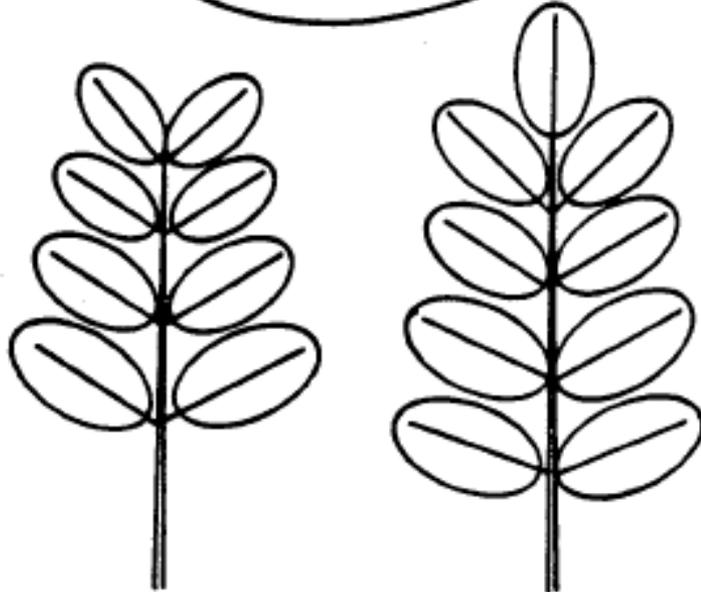
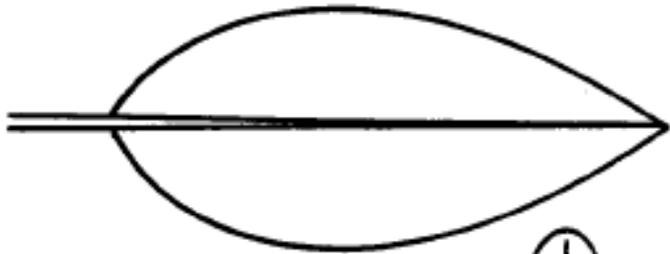


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Look for an axillary bud!

# Simple vs Compound

Simple

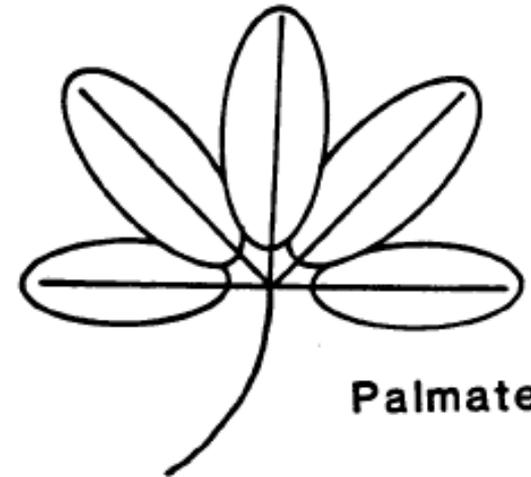
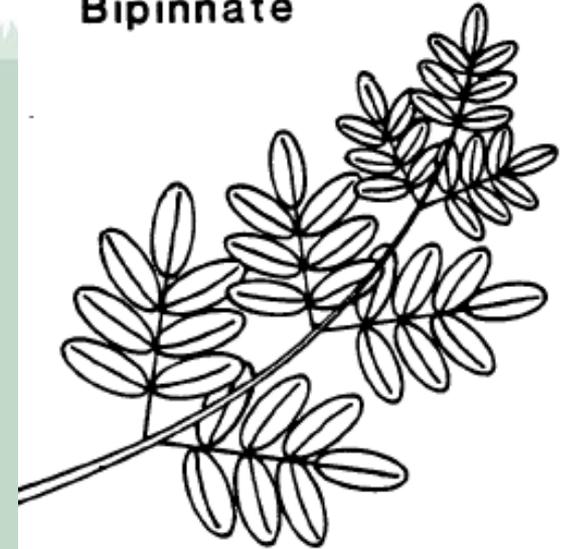


Even Pinnate

Odd Pinnate

*How many leaves are on this slide?*

Bipinnate



Palmate

# Compound Leaves: Additional Terms

- Leaflet: the units of a compound leaf
- Rachis: an extension of the petiole bearing leaflets
- Petiolule: the stalk of an individual leaflet

