Announcements

• Exam 3 next Monday, see study guide
• Field trips coming up
  – Galbreath Apr 26
  – Pepperwood May 4
• Deadlines
  – Insect collection May 14
  – Field Journal May 12

Plant Insect Interactions

• Herbivory
• Plant Reproduction
• Domatia

Evolution of Insect Herbivory

• Early hexapods contact plant parts in soil
• Vascular plants diversified 300 MYA
• Fossil traces of insect eating appear shortly thereafter
• Early herbivores often beetles

Cretaceous

• 145 – 65 mya
• Radiations
  – Angiosperms
  – Coleoptera
  – Lepidoptera
  – Hymenoptera
How Insects Feed on Plants

Challenges of Phytophagy

• Clinging to vegetation
• Subject to dessication
• Inferior diet
• Plant defenses

Diet Breadth

• Monophages
  — Feed on one plant taxa
• Oligophages
  — Feed on only a few plant taxa
• Polyphages
  — Feed on many plant taxa

How Insects Feed on Plants

• Chewing
• Mining
• Boring
• Mining and boring
• Sap sucking
• Gall induction
• Root or shoot feeding
• Flower feeding
• Seed predation
**Chewing and Rolling**

- Chewing
- Leaf rolling

**Mining**

**Boring**

- Deep tissue
- Living or dead/decaying tissue

**Sap Sucking**

- Mostly hemiptera
- Disease transmission
Gall Induction

- Kinds of galls
  - Covering galls
  - Filz galls
  - Pouch galls
  - Mark galls
  - Pit galls
  - Bud and rosette galls

Process

- Initiation
- Growth
- Insects alter plant growth patterns in some way

Other Plant Feeding

- Root and shoot feeding
- Flower feeding
- Leaf cutting bees
- Leaf cutter ants

Seed Predation

Effects on plant dramatic
- Entire individual eaten
- Types of predation
  - Development inside seed
  - Harvesting seeds
Plant Defenses

- Physical
  - Chemical
    - Secondary compounds
  - Masting

Physical Defenses

- thorns
- spines
- leaf hairs
- toughness

Chemical Defenses

- Secondary compounds
  - not necessary for metabolism
  - functions

Secondary Compounds

- Behavioral Effects
  - Repellant
  - Inhibit oviposition or feeding
- Physiological Effects: Toxicity
  - Qualitative
    - Small molecular weight, poisonous compounds
    - Usually found in ‘unapparent’ plants
    - Specialist herbivores develop detoxification
  - Quantitative
    - Large molecular weight digestibility reducers (e.g. tannins)
    - Found in large ‘apparent’ plants
    - Tend to support more generalist herbivores