Economically important Insect Orders

- Insect Feeding Guilds
- Characteristics and examples of economically important insects

Teaching Objective:
- Sight recognition of insect orders
- Laboratory exercise to follow

Insect Feeding Guilds

- What is a feeding guild?

A guild describes where an insect must go to find, eat, and process food. A guild sets the stage for understanding ecological relationships. Individual orders can have insects in one or many feeding guilds.

Insect Guild Categories

- Pest
  - Bugs that bother us
- Beneficial
  - Bugs that help us
Insect Pest Guilds

- Insects that discolor or disfigure leaves (spider mite, plant bug).
- Producers of liquid excrement (honeydew), or wax (aphid, scales)
- Gall makers - Live in specialized habitats (tumors) produced by plants.
- Defoliators – Remove leaf tissue
- Leaf miners – Live between the upper and lower surface of plants.
- Stem and trunk borers. –Live inside plant stems and trunks.
- Root feeders –feed in the soil on plant roots.
- Disease vectors– Transmit disease (Mosquitoes Malaria, elm bark beetles- Dutch Elm Disease)

Beneficial Insect Guilds

- Insects that eat pests
  - Parasites- Insects complete their life inside a pests (parasitic wasp)
  - Predators – Insects that consume other insects (lady beetles)
- Pollinators – Insects that move pollen between plants (wasps, bees and flies)
- Decomposers - Insects that feed on dead and decaying plant and animal matter. (Carpenter Ants, Termites, Bark lice, Collembola, flies).

Insect Phylogeny

Ametabolous Apterygota

Hemimetabolous Exopterygota

  - Paleoptera (ancient winged)
  - Neoptera (newer winged)
  - Orthopteroid orders -Chewers
    - Hemipteroid orders –Mostly suckers

Holometabolous Endopterygota
Ametabolous apterygota
Collembola (Springtails)

Collembola Image

Collembola Furcula
Collembola Head

Retracted chewing mouth parts

Thysanura (Silverfish/Firebrats)

Hemimetabolous Exopterygota
Paleoptera (old winged)

Adult Naiads (Aquatic juveniles)
Hemimetabolous Exopterygota
Paleoptera (old winged)
Ephemeroptera (Mayflies)

Odonata

Anisoptera (dragonflies)  Zygoptera (damselflies)

Odonata

Anisoptera (dragonflies)  Zygoptera (damselflies)
Hemimetabolous Exopterygota
Neoptera (new wing)

Aquatic ancestral group
- Plecoptera (stone flies)*
- Embioptera (web spinners)

*= commonly encountered or problematic in ornamental systems.

Plecoptera (stoneflies)

Adult
Naiad

Plecoptera (stoneflies)

Adult
Naiad
Hemimetabolous Exopterygota
Neoptera (new wing)

Orthopteroid Orders
- Dermaptera* (earwigs)
- Gryllloblatodea (rock crawlers)
- Phasmatodea* (walking sticks)
- Orthoptera* (grasshoppers, crickets and katydids)

Dictyopterous (produce eggs in cases, like mantids and cockroaches)
- Mantodea* (Mantids)
- Blattodea* (Cockroaches)
- Isoptera* (Termites)

*= commonly encountered or problematic in ornamental systems.

Dermaptera (Earwigs)

Enlarged cerci

Phasmatodea (Walking Sticks)

female

male

antennae

forelegs
Orthoptera (grasshoppers, katydids, crickets, mole crickets)

Orthopteroid Orders
Dictyopterous (produce eggs in cases),

- Mantodea* (Mantids)
- Blattodea* (Cockroaches)
- Isoptera*

Blattodea (Cockroaches)
Blattodea (Cockroaches)
common adults

Blattodea (Cockroaches)
common egg cases

Mantodea (Praying Mantids)
Isoptera (Termites)

- Soldier
- Worker
- Winged reproductives

Mud tubes