Insect Taxonomy

Good Bugs and Bad Bugs
Basic Body Plan

- Antennae
- Compound eye
- Head
- Thorax
- Abdomen
- Wings
- Spiracles
Wings
Mouthpart Modifications
Insect Development

**Exopterygota**
- Hemimetabolous
- Wings develop outside of the body
- Immatures (nymphs) resemble adults

**Endopterygota**
- Holometabolous
- Wings develop within body during pupation
- Immatures (larvae) do not resemble adults
The Etymology of Entomology

- ptera = wing
- donto = teeth/tooth
- coleo = sheath
- lepi = scale
- ortho = straight
- di = two
- hymeno = membrane
- iso = same
- derm = skin/leather
- hemi = half
Subtle Distinction

Taxonomy

*Apis mellifera*

Systematics
Classification

~ 33 orders

Grouped by morphology and development

Wings
Mouthparts
Metamorphism
  • Ametabolism
  • Hemimetabolism
  • Holometabolism
Primitive Insect

Subclass: Apterygota

Ametabolous
Collembola Springtails

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Paleoptera

Wings do not fold
Chewing mouthparts

Hemimetabolous
Ephemeroptera

Odonata
Neoptera

Wings can be folded over body at rest.
Leathery Forewing
Chewing mouthparts

Hemimetabolous
Orthoptera

Grasshopper

Katydid

Cricket
Phasmatodea

Mantodea
Isoptera

Termite Castes

- Male reproductive
- Female reproductive
- Soldier
- Worker
- Winged reproductive
Wings:
- Hemielytra
- Membranous

Piercing sucking mouthparts

Hemimetabolous
Hemiptera

Pentatomidae

Halyomorpha halys

Rhopalidae

G. Hamilton, Rutgers
“Homoptera”

Aleyrodidae

Cicadidae
Aphidoidea

Morphs on Buckthorn (Winter Host)

Morphs on Soybean (Summer Host)

SUMMER MORPH

SPRING MIGRANTS

Fundatrix (Stem Mother)

Eggs laid by buds

Oviparae

Andropara - MALE

FALL MIGRANTS (SEXUALS)

Gynoparae - FEMALE

Colonies on soybean

Apterae

Alatae

Drawings from Minks and Hansdijin 1937; Higley & Borthal 1994
Thysanoptera
Thrips

Wings: fringed Thysanos is Greek meaning fringed.

Mouthparts: Asymmetrical mandibles, right is reduced or absent, left is enlarged to form stylet.

Diet: plant foliage, pollen, prey

Vector pathogens and virus. Tomato and Impatient Wilt Virus

*Frankliniella occidentalis*
Endopterygota
“Higher Orders”

Wings: Variable
Mouthparts: Variable

Holometabolous
Coleoptera

Coccinellidae

Staphylinidae
Coleoptera

Chrysomelidae

Curculionidae
Green Lacewings (Neuroptera: Chrysopidae)

Diet:
- Aphids
- Caterpillars
- Beetle larvae

Size: 12-20 mm
Lepidoptera

Nymphalidae

Sphingidae
Diptera

Halteres
Diptera

Nematocera

Culicidae

Sciariidae
Diptera
Stratiomyidae
Brachycera
Syrphidae
Hymenoptera
Symphyta
Diprionidae
Hymenoptera

Apocrita

Braconidae

Vespidae
Hymenoptera

Apocrita

Formicidae

Apidae
Questions?

End of Insect Taxonomy