



Common Insects: The Beetles

Order: Coleoptera

- Part of the “Big 4”: Holometabolous
- Incredibly diverse: over 300,000 species
 - 1/3 are plant feeders; most are specialists
 - Predators
 - Carrion/dung feeders
 - Scavengers



Nicrophorus sayi; bugguide.net



Common Insects: The Beetles

Coleoptera: Coccinellidae

- Important predators of soft-bodied insects
- Larvae are also predaceous





Common Insects: The Beetles



C-mac ladybeetle



C-7 ladybeetle



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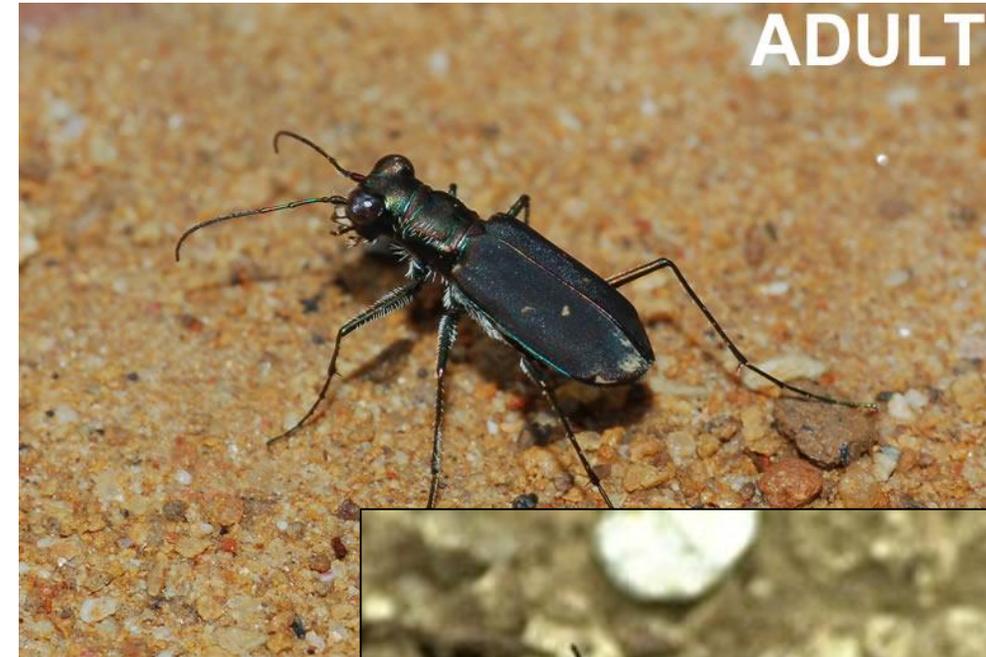
<https://go.ncsu.edu/beneficialinsects>



Common Insects: The Beetles

Coleoptera: Carabidae

- Ground beetles, tiger beetles
- Predators of weed seeds, other insects
- Effective biological controls





Common Insects: The Beetles

Coleoptera: Cantharidae

- Soldier beetles
- Late summer/early fall; feed on goldenrod
- Predators as adults and larvae
- Light-colored margins around the elytra



Elytra: modified forewings found in all beetle species



Common Insects: The Beetles

Coleoptera: Scarabidae

- ~1400 species
- Mostly dung-feeders; detritovores, plant-feeders
- Worshipped in ancient Egyptian cultures





Common Insects: The Beetles

Coleoptera: Staphylinidae

- Rove beetles; 710 spp.
- Distinguished by shortened elytra/exposed abdomen
- Active insects; fly and/or run
- Mostly predaceous





Common Insects: The Beetles

Coleoptera: Passalidae

- Bess beetles;
- Detritovores, found primarily under logs and rotting wood;
- “Hiss” in order to escape predation





Common Insects: Wasps and Bees

Hymenoptera: Vespidae

- ~325 spp.
- Predators of caterpillar and other insects;
- Long, gangly legs;
- Notched eyes;
- Usually bald or shiny in appearance







Common Insects: Wasps and Bees

Hymenoptera: Scoliidae

- Robust, hairy body;
- Bright, iridescent blue, orange abdomen;
- Wings have many 'wrinkles' at the end;
- Parasites of June beetle grubs





Common Insects: Wasps and Bees

Hymenoptera: Scelionidae

- Parasites of a large range of insect/arthropod eggs:
 - Orthoptera, Mantids, Hemiptera, Coleoptera, spiders, etc.
- Very successful as biological control agents
- Some may be considered pests

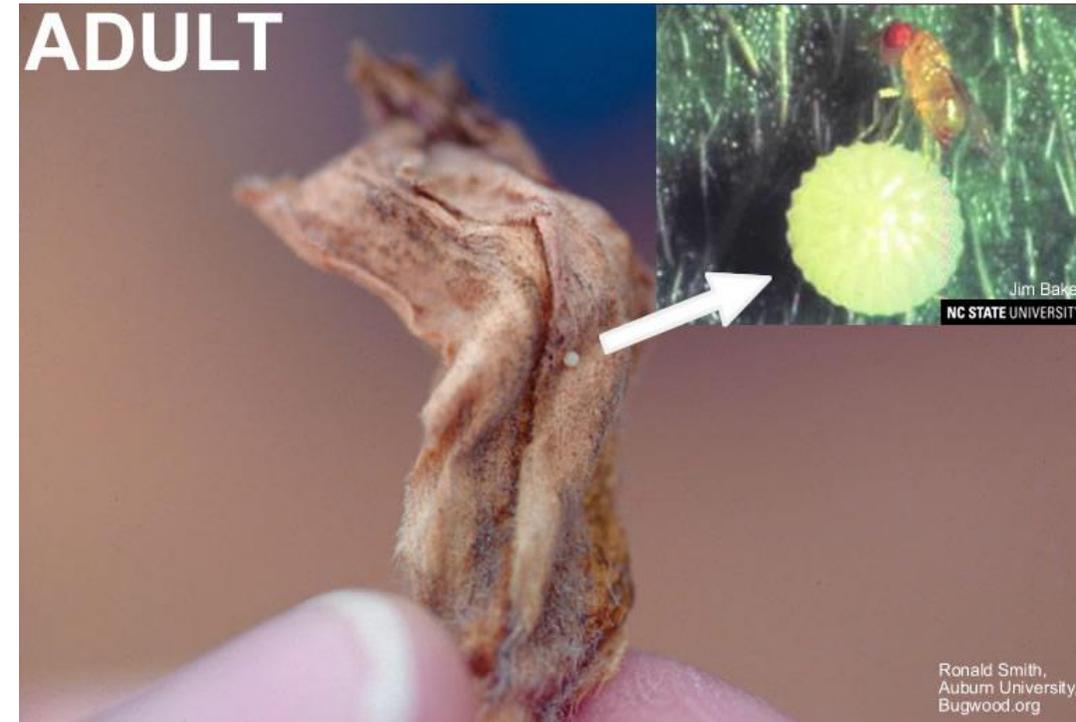




Common Insects: Wasps and Bees

Hymenoptera: Trichogrammatidae

- Egg parasitoids
- Most widely-used biological control agent: treat 10s of millions of acres/year





Common Insects: Wasps and Bees

Hymenoptera: Ichneumonidae

- Largest family in all of Insecta ~3300 species
- Host range includes: flies, beetles, wasps, bees

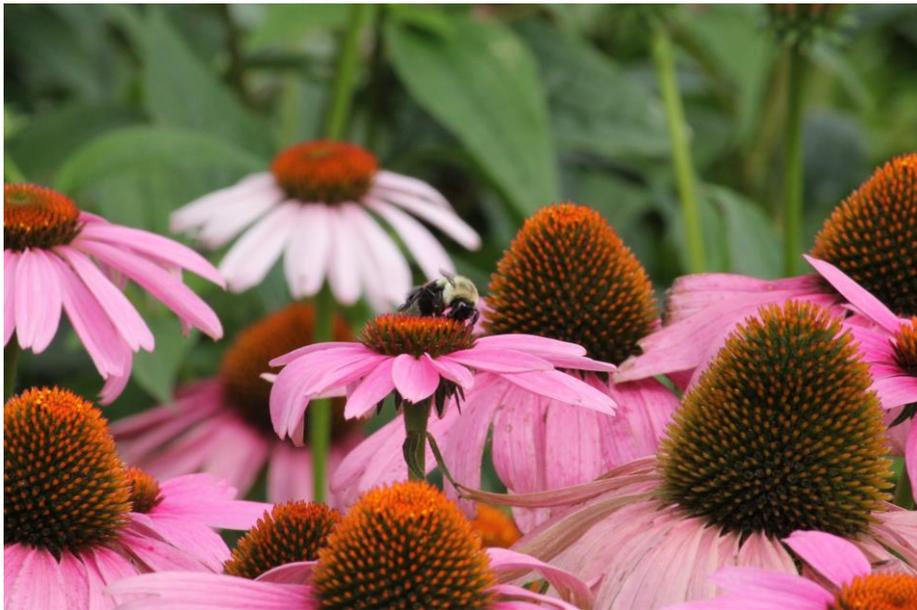




Common Insects: Wasps and Bees

Hymenoptera: Apidae

- Arguably most important in terms of angiosperm evolution and pollinator services;
- Includes carpenter bees, honeybees, bumblebees; also includes some 'kleptoparasites'





BACKYARD BEES OF NORTH AMERICA

Beyond Honeybees: Native Pollinators

4,000+ native species

Generally more efficient at pollination; generalists

May have different preferences than honeybees

NOT Aggressive



Green sweat bee: *Agapostemon*

Green sweat bee: *Augochlorella*

Mining bee: *Andrena*

Mining bee: *Calliopsis*

Mining bee: *Calliopsis*

Mining bee: *Calliopsis*

Mining bee: *Andrena*

Mining bee: *Andrena*

Green sweat bee: *Agapostemon*

Green sweat bee: *Agapostemon*

Sweat bee: *Halictus*

Sweat bee: *Halictus*

Mining bee: *Andrena*

Mining bee: *Andrena*

Mining bee: *Andrena*

Mining bee: *Andrena*

Mining bee: *Macrotera*

Mining bee: *Macrotera*

Mining bee: *Perdita*

Mining bee: *Perdita*

Alkali sweat bee: *Nomia*

Sweat bee: *Halictus*

Sweat bee: *Lasioglossum (Dialictus)*

Sweat bee: *Conanthalictus*

Mining bee: *Pseudopanurgus*

Mining bee: *Protandrena*

Mining bee: *Perdita*

Mining bee: *Perdita minima*
(smallest bee in North America)

Alkali sweat bee: *Nomia*

Sweat bee: *Lasioglossum (Lasioglossum)*

Mining bee: *Protandrena*

Mining bee: *Protandrena*

Mining bee: *Perdita*

Mining bee: *Perdita*

Mining bee: *Protandrena*



Bumble bee: *Bombus*



Squash bee: *Peponapis*



Squash bee: *Xenoglossa*



Digger bee: *Centris*



Squash bee: *Peponapis*



Carpenter bee: *Xylocopa*



Carpenter bee: *Xylocopa*
(Largest bee in North America)



Common Insects: Wasps and Bees

Hymenoptera: Colletidae

- Known as cellophane bees;
- Ground-nesters; solitary
- May resemble small wasps





Common Insects: Butterflies and Moths

Lepidoptera

- 122,000 species: 100% phytophagous
- Complete metamorphosis
- Many charismatic and 'gateway' into Entomology





Common Insects: Butterflies and Moths

Lepidoptera: Hesperiiidae

- “Skippers”, nearly 300 spp.
- Feed inside sheltered cocoons as larvae
- Many overwinter and emerge in the spring as adults





Common Insects: Butterflies and Moths

Lepidoptera: Nymphalidae

- Brush-footed butterflies
- ~210 species
- Many of the most ornamental and sought after species include:
 - Monarch
 - Great spangled fritillary
 - Red admirable
 - Zebra butterfly





Common Insects: Butterflies and Moths

Lepidoptera: Geometridae

- Over 1,000 species;
- Also known as loopers or inchworms
- Some unique species in this family





Common Insects: Flies

Diptera

- Complete metamorphosis; larvae known as maggots
- 2 wings; reduced hindwings = *halteres*
- Important as:
 - Disease vectors
 - Crop pests
 - Biological controls
 - Pollinators





Common Insects: Flies

Diptera: Dolichopodidae

- Large group, ~1300 species;
- Very long, thin legs; metallic coloring;
- General predators as adults; larvae may also be predaceous but little is known about their biology





Common Insects: Flies

Diptera: Asilidae

- Robber flies; ~1,000 species
- Very large, robust flies
- Incredibly strong and mobile fliers
- Predators of other insects



ADULT



ADULT (emerging from pupal case in soil)





Common Insects: Flies

Diptera: Tachinidae

- 2nd largest family ~1,350 species;
- Large, hairy abdomen
- Parasites of many pests
- May be confused with houseflies





Common Insects: Flies

Diptera: Phoridae

- Small group, ~370 spp.
- Mostly detritivores, some are parasites of other insects





Common Insects: Flies

Diptera: Syrphidae

- Very convincing bee/wasp mimics
- ~870 species
- Pollinators as adults
- Larvae are predators of soft-bodied insects





Further Reading

- Grimaldi, David and Michael S. Engel. 2005. *Evolution of the Insects*. Cambridge University Press., New York, NY. ISBN: 978-0-521-82149-0.
- Marshall, Stephen A. 2006. *Insects: Their Natural History and Diversity*. Firefly Books Ltd. Ontario, CA. ISBN: 978-1-55297-900-6.
- Overstreet, Leslie K. 2008. *Botanicals: Butterflies and Insects*. Assouline Publishing. New York, NY. ISBN: 978-2759402694.
- Eaton, Eric and Kenn Kaufman. 2007. *Field Guide to Insects of North America*. Houghton Mifflin Co., Boston. ISBN: 978-0-618-15310-7