

Selected Families of Hymenoptera



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Characteristics of Hymenoptera

- **Two pairs of wings.**
- **Larvae are grub-like or caterpillar-like.**
- **Occur in a wide variety of habitats and have a wide variety of lifestyles: some feed on plants, some are predacious, some are scavengers.**
- **Many are beneficial, others are pests.**
- **Apocrita (bees, wasps, and ants) have a narrow waist, Symphyta (sawflies and horntails) don't.**

Sawflies

Families
Tenthredinidae
and Diprionidae

Hosts: Many
deciduous and
coniferous plants.

Life History:

Females use their
saw-like ovipositors to insert eggs in plant
tissues. Larvae defoliate or mine leaves or
needles. One or more generations a year.



Neodiprion sertifer

Sawflies

Overwintering: Eggs, larvae, or pupae.

Physical Control: Remove groups of larvae.

Cultural Control: Minimize stress on plants.

Chemical Control: Horticultural oil or insecticides.

Biological Control:
Many parasites,
predators, and
NPV virus.



Neodiprion lecontei

Horntails

Family Siricidae

Hosts: Dead and dying beech, elm, maple, oak, and others.

Life History: Females lay eggs singly in hosts. Larvae may take two years to develop.



Tremex columba

Braconid Wasps

Family Braconidae

Hosts: Aphids, larvae of beetles, flies, sawflies, and caterpillars such as tomato hornworm, imported cabbageworm, gypsy moth.

Life History: Life cycle is 10–14 days. Larvae are internal parasitoids; many pupate outside hosts. More females than males.



John Davidson

Braconid Wasps



John Davidson

Cotesia congregata cocoons on
tomato hornworm

Aphid mummies with braconid
emergence holes

Ichneumonid Wasps

Family Ichneumonidae

Hosts: Larvae and pupae of beetles, wasps, and caterpillars, armyworms, cabbage looper, fall webworm, oakworms, tent caterpillars, tussock moths, European corn borer.

Life History: Larvae are internal or external parasitoids.



Ichneumonid Wasps



Adult Ichneumonid wasps: note the long ovipositor of the female wasp (below)



Trichogramma Wasps

Order Hymenoptera

Family

Trichogrammatidae

Hosts: Sawfly and moth eggs, cabbageworm, tomato

hornworm, corn earworm, codling moth, cutworm, armyworm, cabbage looper, European corn borer, tomato fruitworm.

Life History: Larvae are internal parasitoids of other insects.



Aphelinid Wasps

Family Aphelinidae

Hosts: Aphids, mealybugs, psyllids, scales, and whiteflies.

Life History: Solitary, lay eggs in or outside hosts. Females usually reproduce parthenogenetically, males are rare.



Encarsia formosa adult

Aphelinid Wasps



Empty pupal cases of greenhouse whiteflies and black parasitized pupae containing *Encarsia formosa*



Encarsia formosa

Encyrtid Wasps

Family Encyrtidae

Hosts: Ticks, insect eggs, larvae, and pupae; beetles, bugs, moths, mealybugs, scales.

Life History: Larvae are parasitoids; adults live 2–3 days.



Top: *Encyrtus fuscus* reared from hemispherical scale

Bottom: Parasitized hemispherical scales turned black

Chalcid Wasps

Family Chalcididae

Hosts: Moths, butterflies, beetles, flies, other wasps.

Life History: Larvae are internal parasitoids of other insects.



Gall Wasps

Family Cynipidae

Hosts: Some are hyperparasitoids on other wasps, but most induce galls on oaks or rosaceous plants.



Left: Galls on oak leaf
Above: *Callirhytis cornigera* galls on oak

Gall Wasps

Jerry A. Payne
USDA ARS
www.forestryimages.org



Life History: Females lay eggs in stems, buds, leaves, or flowers. Larval feeding causes gall formation. Some species alternate sexual and asexual generations.



Jerry A. Payne, USDA ARS
www.forestryimages.org UGA1223144

Dryocosmus kuriphilus
larvae (far left)
and adults

Scelionid Wasps

Order Hymenoptera
Family Scelionidae

Hosts: Insect and spider eggs, especially those of true bugs and moths.

Life History:

Larvae are internal parasitoids of other insects and spiders.



Sphecid Wasps

Family Sphecidae

Hosts: Other arthropods.



Cicada killer (*Sphecius speciosus*) with prey

Sphecid Wasps

Life History: Solitary; females provision nests with paralyzed caterpillars, spiders, or other prey, where larvae feed on the prey. One or more generations a year, depending on species.

Overwintering:
Larvae or pupae.

Cicada killer
Sphecius
speciosus



Sphecid Wasps

Jackman



Mud dauber
Chalybion caementarium

G. McIlveen, Jr.



Mud dauber
Chalybion californicum

Sweat Bees

Family Halictidae

Hosts: Flower nectar and pollen.

Life History: Some are solitary and others are social (live in colonies). Colonies are annual, occurring in cavities or underground burrows. Many are very colorful and metallic.



L. West
Photo Researchers, Inc.

Leafcutting Bees

Family Megachilidae

Hosts: Flower nectar and pollen; leaves are cut to make cells.

Life History: Most are solitary. Females cut leaves to make cells.

The females deposit an egg and provision each cell with pollen before sealing the cells. Larvae feed on pollen and develop in the cells.

Megachile willoughbiella



Carpenter Bees

Family Apidae

Hosts: Feed on pollen and nectar but make tunnels in redwood, cedar, cypress, and pine.



Xylocopa virginica

Carpenter Bees

Life History: In spring females make tunnels or use existing tunnels in which they lay eggs and insert pollen. Larvae develop in the tunnels. There may be several generations per year.

Overwintering:
Adults in nests.

USDA Forest Service
Wood Products Insect Lab Archives
USDA Forest Service
www.forestryimages.org



UGA0014198

Honey Bees

Apis mellifera
Family Apidae

Hosts:
Flower nectar and pollen.



Honey Bees

Life History: Honeybee colonies are perennial. New colonies form when an old queen swarms with a group of workers. The queen mates with unrelated males. Fertilized eggs become workers; males (unfertilized eggs) are produced prior to swarming.

Overwintering: Active in nests during winter.



Bumble Bees

***Bombus* spp.**
Family Apidae

Hosts: Flower nectar and pollen.



Bumble Bees

Life History: Colonies are annual. Fecundated queens emerge in spring and begin colonies in the ground. Males and new queens are produced in fall. New queens mate with unrelated males before overwintering in the ground.

Overwintering:
New queens in the ground.



Tiphia Wasp

Tiphia vernalis

Family Tephidae

Hosts: Japanese beetles.

Life History: Adults emerge in spring and females parasitize Japanese beetle larvae in the ground. Wasp larvae (one per beetle) consume grubs before making cocoons in the soil. One generation per year.

Overwintering: Pupae in cocoons.



www.oardc.ohio-state.edu/biocontrol/j_beetle.htm



Velvet Ants

Family Mutillidae

Dasymutilla occidentalis

Hosts: Larvae of wasps, bees, beetles, or flies.

Life History:

The larvae of these insects are parasites of other insect larvae.

They occur in the southern USA and have painful stings. Some are known as “cow killers.”



Drees

Vespid Wasps

Order Hymenoptera
Family Vespidae

Hosts: Caterpillars and other insects. May bother people at picnics.



Yellow jacket with caterpillar



Life History: Many have annual colonies with queens, workers, and males.

Paper wasp (*Polistes* species)

Ants

Family Formicidae

Hosts: Most feed on a variety of plant and animal material, such as other arthropods, nectar, honeydew, and human food.

Leafcutting ants cultivate and feed on a fungus.

Carpenter ants nest in wood but feed on plant and animal material.

Ants tending scales



Ants

Life History: All are eusocial. Colonies in Minnesota are annual. Fecundated queens emerge in spring and begin colonies underground or in cavities. Males are produced in the fall prior to dispersal. New queens mate with unrelated males before overwintering in the ground or crevices. Some ants tend aphids. Leafcutting ants grow a fungus in their tunnels. Carpenter ants tunnel in dead wood. Fire ants occur in the southern USA and have a painful sting. Many unusual ants (weaver ants, army ants, etc.) occur in the tropics, where colonies may live for years.

Ants

Clemson University
USDA Cooperative Extension Slide Series
www.forestryimages.org



**Carpenter ant
(*Camponotus* sp.)
adult and galleries**



R. Werner, USDA Forest Service, www.forestryimages.org

Ants



Pharoah ant

Monomorium pharaonis



***Dorymyrmex insanus* mound**

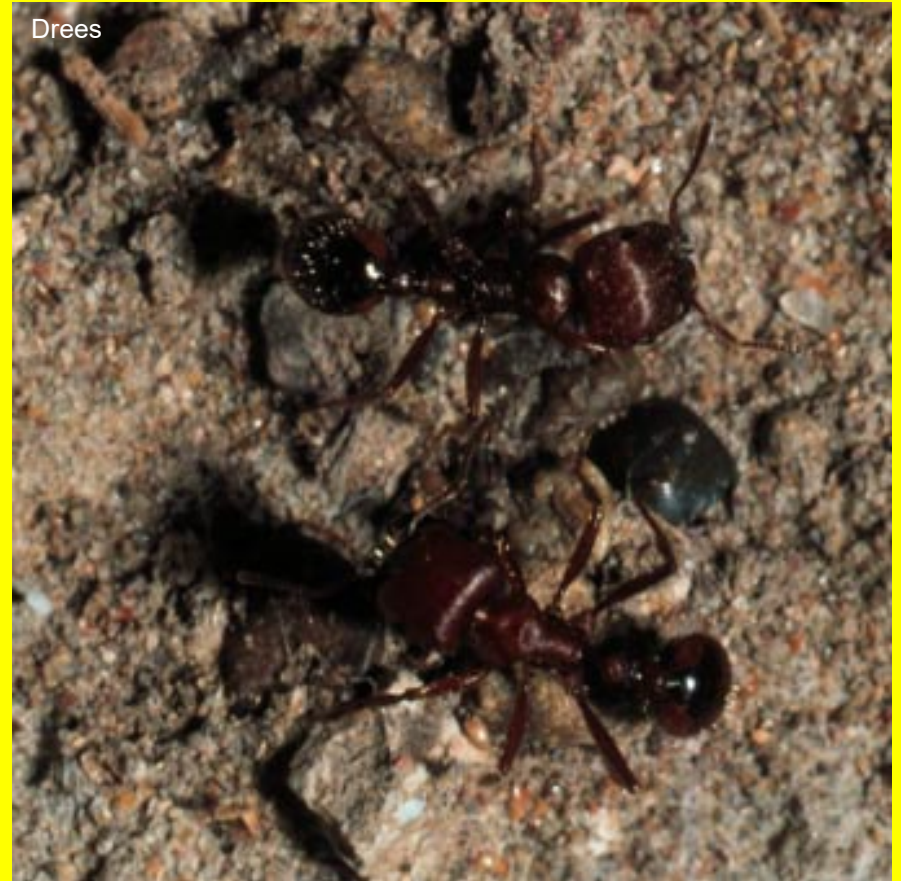
Ants

Jackman



Leafcutting ant
Atta texana

Drees



Harvester ants
Pogonomyrmex barbatus