

Classification of Insects

Insects Orders (Older Students - 7th and up)

Kingdom – Animals

Phylum – Arthropoda

Class – Insecta

Orders -

Looking at 9 Orders of Insects

- 1) Order – Coleoptera
 - Family – Beetles
- 2) Order – Dictyoptera
 - Family – Cockroaches
 - Family – Mantids
- 3) Order – Diptera
 - Family – True Flies
- 4) Order – Lepidoptera
 - Family – Butterflies
 - Family – Moths
- 5) Order – Ephemeroptera
 - Family – Mayflies
- 6) Order – Hymenoptera
 - Family – Ants
 - Family – Bees
 - Family – Wasps
- 7) Order – Odonata
 - Family – Dragonflies
 - Family – Damselflies
- 8) Order – Orthoptera
 - Family – Grasshoppers
 - Family – Katydid
- 9) Order – Phasmida
 - Family – Stick-Insects

Other Insect Orders –

Collembola - Springtails
Dermaptera - Earwigs
Diplura - Two-Pronged Bristle-tails
Embiopter - Web Spinners
Grylloblatodea
Hemiptera - True Bugs
Isoptera - Termites
Mallophaga - Biting Lice
Mecoptera - Scorpionflies
Neuropter - Lacewings
Plecoptera - Stoneflies
Protura
Psocoptera - Bark and Book Lice
Siphonaptera - Fleas
Siphunculata - Sucking Lice
Strepsiptera Stylops
Thysanoptera - Thrips
Thysanura - Silverfish
Trichoptera - Caddis Flies

An Example of Classification

Eastern Tiger Swallowtail Butterfly

Kingdom – Animal

Phylum – Arthropoda

Class – Insecta

Order – Lepidoptera

Family – Papilionidae

Genus – Papilio

Species – glaucus



1) Order – Coleoptera

Examples of Families:

- Carabidae - Ground Beetles



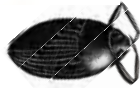
- Coccinellidae - Ladybird Beetles



- Lampyridae - Fireflies



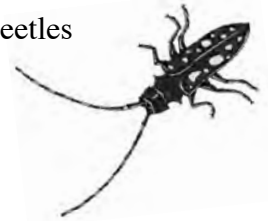
- Gyrinidae - Whirligig Beetles



- Scarabaeidae - Dung Beetles



- Cerambycidae - Long-horned Beetles



- Dytiscidae – Giant Water Bugs



The order Coleoptera includes the beetles. This is the largest order and contains the most species.

Wings: They have two pairs of wings. The outside pair (forewings) are hard and protective. They are called elytra. They split and spread when the insect needs to fly so the soft wings underneath (hind wings) can be used.

Mouth Parts: Most have chewing mouthparts. Some have piercing mouthparts.

Metamorphosis: They undergo complete (complex) metamorphosis.

Significance to Humans: They can be beneficial (i.e. ladybugs), but some families attack food crops and are considered pests.

2) Order – Dictyoptera

Examples of Families:

- Mantidae - Praying Mantises



- Hymenopodidae – Orchid Mantid



- Blattellidae – Cockroach

They have long, thin antennae with many segments.

Wings: They usually have two pairs of wings. The forewings are often adapted as tougher coverings and held flat over the back. Some lack wings.

Mouth Parts: They have biting mouthparts.

Metamorphosis: They undergo incomplete (simple) metamorphosis with the nymphs looking like small versions of the adults (with underdeveloped wings).

Significance to Humans: Though some are considered pests (cockroaches), many are beneficial (praying mantis) preying on other pest insects.

3) Order – Diptera

Examples of Families:

- Culicidae - Mosquitoes
- Tabanidae - Horse Flies



- Tephritidae - Fruit Flies
- Muscidae - House Flies



These are known as the true flies.

Wings: They have one pair of wings - the hind wings are adapted structures called halteres, which may help with flying.

Mouth Parts: They have piercing and sucking mouthparts. Some are parasites.

Metamorphosis: They undergo complete (complex) metamorphosis.

Significance to Humans: They are considered serious pests. They destroy crops and spread many diseases, including malaria.

4) Order – Lepidoptera

Examples of Families:

- Papilionidae – Swallowtail Butterflies
- Pieridae - Sulfur Butterflies
- Danaidae - Monarch Butterflies
- Lycaenidae - Coppers and Blues (Butterflies)
- Nymphalidae - Mourning Cloak, Painted Lady, Checkerspot Butterflies (brush-footed)
- Saturniidae - Luna Moths
- Sphingidae - Sphinx Moths
- Arctiidae – Isabella (wooly bears) and Tiger Moths



Swallowtail



Sulfur



Monarch



Blue

Mourning Cloak



Sphinx Moth



Isabella Moth

Luna Moth



Butterflies and moths are showy and well-known insects. Butterflies are more commonly active in the daytime as opposed to the more nocturnal moths. Moths have more feathered antennae and hairier bodies than butterflies. Both have larvae that can be destructive to trees and food crops.

Wings: As adults they have two pairs of large wings covered with protective scales.

Mouth Parts: Adults have sucking mouthparts. Larvae (young stages) have chewing mouthparts.

Metamorphosis: They undergo complete (complex) metamorphosis.

Significance to Humans: Their young form (larval caterpillars) are considered serious pests and are responsible for crop destruction. Adults, on the other hand, can be beneficial pollinators.

5) Order – Ephemeroptera

Examples of Families:

- Family – Mayflies



Adults only survive for a couple of days to mate and lay eggs. They hatch from underwater larva and fly above the water, mate, lay eggs and die. They have long thread-like legs and two long tail strands.

Wings: They have two pairs of triangle-shaped wings - the back wings are much smaller.

Mouth Parts: Adults do not eat, so have no mouthparts.

Metamorphosis: They undergo incomplete (simple) metamorphosis.

Significance to Humans: They are harmless to humans and fishing flies made to look like them have helped many fishermen catch fish!

6) Order – Hymenoptera

Examples of Families:

- Formicidae - Ants
- Vespidae - Wasps, Yellowjackets, Hornets
- Apidae - Honeybees, Bumblebees



Many have a narrow “waist” between the thorax and abdomen. Many form colonies with distinct roles.

Wings: Some have wings (two pairs) and some are wingless.

Mouth Parts: Many have chewing mouthparts (ants), though some have sucking mouthparts (honeybees).

Metamorphosis: They undergo complete (complex) metamorphosis.

Significance to Humans: Though some have painful and venomous stings (wasps), many are very important and beneficial pollinators (bumblebees).

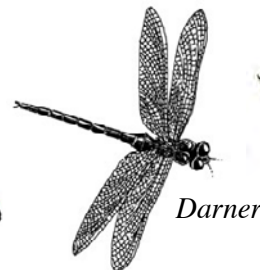
7) Order – Odonata

Examples of Families:

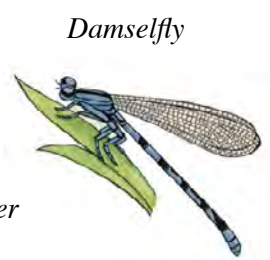
- Libellulidae - Common Skimmer Dragonflies
- Aeshnidae - Darner Dragonflies
- Coenagrionidae - Narrow-winged Damselflies



Skimmer



Darner



Damselfly

Their young (larvae) are called naiads and live in the water (aquatic), so adults are found around wet areas, where they will mate and lay eggs. They are predators with large eyes for spotting prey and strong flight for catching prey. Dragonflies hold their wings flat and out from their bodies, while damselflies hold their wings together and pulled into the body.

Wings: They have two pairs of long wings.

Mouth Parts: They have chewing mouthparts. Naiads have piercing mouthparts for catching underwater prey.

Metamorphosis: They undergo incomplete (simple) metamorphosis.

Significance to Humans: They feed on insects (especially mosquitoes), so are considered beneficial.

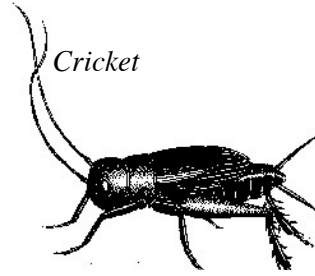
8) Order – Orthoptera

Examples of Families:

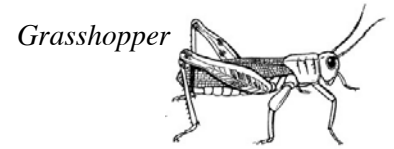
- Tettigoniidae - Katydid
- Gryllidae - Crickets
- Acrididae - Grasshoppers



Katydid



Cricket



Grasshopper

Their back legs are usually large and built for jumping.

Wings: They have two pairs of long wings, though some have no wings.

Mouth Parts: They have chewing mouthparts.

Metamorphosis: They undergo incomplete (simple) metamorphosis with the nymphs looking like small versions of the adults (with underdeveloped wings).

Significance to Humans: They can be very destructive to crops.

9) Order – Phasmida

Examples of Families

- Heteronemiidae - Common Walkingsticks



They have very long, stick-like bodies with long legs and antennae. They are so well camouflaged and move slowly on their food plants so are rarely seen by predators.

Wings: Most adults in North America are wingless (tropical forms may have wings).

Mouth Parts: They have chewing mouthparts.

Metamorphosis: They undergo incomplete (simple) metamorphosis with the young looking like small versions of the adults.

Significance to Humans: They can be destructive to some tree species.