



LEARN 10 Insect Orders of the Wenatchee Watershed

Text and photos by Susan Ballinger. Photos of
specimens from the collection of Dr. Robert
Gillespie, Wenatchee Valley College

Order Odonata – dragonflies & damselflies



Odonata means “Toothed jaws” Traits :

- extremely large eyes in proportion to the head
- long slender abdomen
- Primitive wings that can’t be folded. Each wing can be operated independently with ability to hover, fly backwards, and take off vertically (like a helicopter)
- Predacious.- eats insects Large chewing mandibles
- Eggs laid in fresh water; Aquatic larvae called “naiads” have gills and molt many times. Some remain in water for up to 2 years before becoming winged adults.

Dragonfly adult



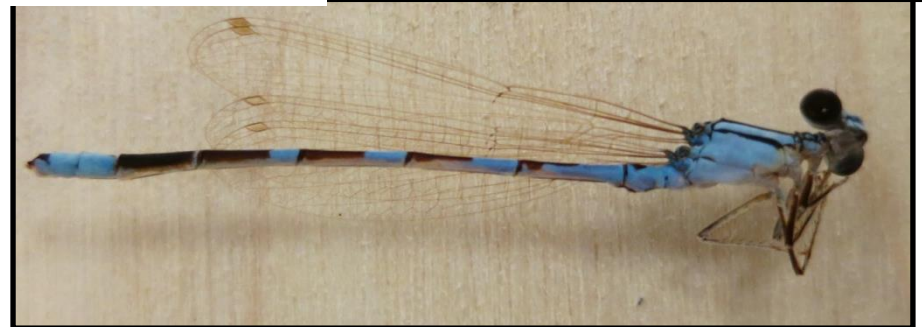
Dragonfly naiad



Damselfly naiad



Damselfly adult

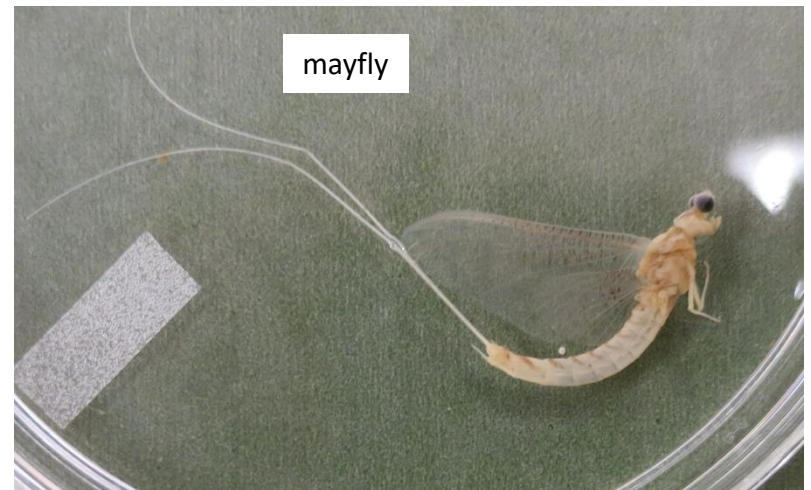


Order Ephemeroptera - mayflies



Ephemeroptera means “short-lived wing” Traits:

- Adults live on land 1-2 days, long enough to mate, often in swarming flights
- Females deposit eggs on the surface of a pond or stream, or object in water.
- Eggs hatch into nymphs that feed on algae and detritus.
- Nymphs are aquatic and live 1-2 years before emerging as winged adults.
- Habitat: fast flowing streams and shallow ponds with high levels of dissolved oxygen.



Order Coleoptera - beetles



Coleoptera means “sheath wings” Traits :

- Hardened forewings (elytra) cover the body and protect delicate hindwings
- At rest, elytra meet in a straight line down middle of the back
- Hind wings used for flight, elytra held out for balance
- Chewing mouthparts
- >350,000 species worldwide
- At least 25% of all animal species on earth
- Highly varied in size, eating habits, habitats



Darkling beetle



Long-horned beetle



June beetle



Ladybird beetle



Order Plecoptera - stoneflies



Plecoptera means “twisted wing” Traits:

- Adults: flattened soft bodies. hold wings flat over body at rest
- Adults are poor fliers and stay near the stream after emerging
- Chewing mouthparts
- Mating adults “drum” their abdomens on a surface
- Habitat: cold, fast-flowing streams.
- Food: plants and animals, dead and living
- Eggs deposited in freshwater. Nymphs live under stones for 1-3 yrs.

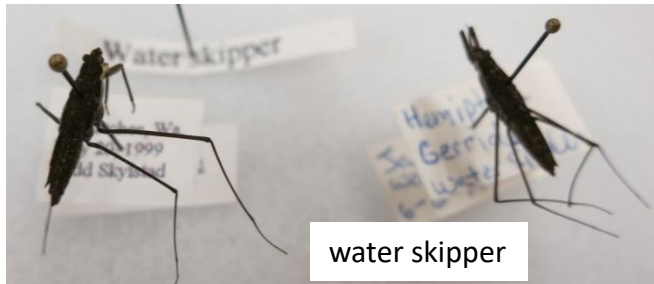


Order Hemiptera – true bugs

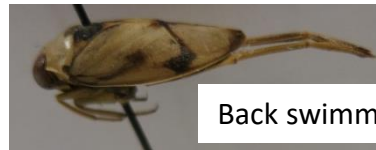


Hemiptera means “half wing” Traits:

- Named for fore wings that are hardened near the base, and membranous near the ends
- Hind wings entirely membranous (Lacking in some)
- When at rest, fold all 4 wings over each other, resulting in an “X” pattern
- Mouthparts are modified for piercing and sucking.
- Many feed on plant fluids
- Diverse order with widely varied habitats worldwide



water skipper



Back swimmer



Assassin bugs



stink bugs



GIANT WATER BUG
(TOE-BITER)

Homoptera – plant-sucking insects



Homoptera means “same wings” Traits:

- Front wings (when present) are uniform in structure (either membranous or slightly thickened. Most species have 2 pairs of wings and are held “tent like” over body.
- Includes cicadas, treehoppers, spittlebugs, aphids, leaf hoppers, & scale insects.
- Plant feeders. Have long beaks for mouth parts used to pierce plant tissue.
- Found worldwide with many species yet to be described.
- Species may be hard or soft bodied, smooth or hair-covered

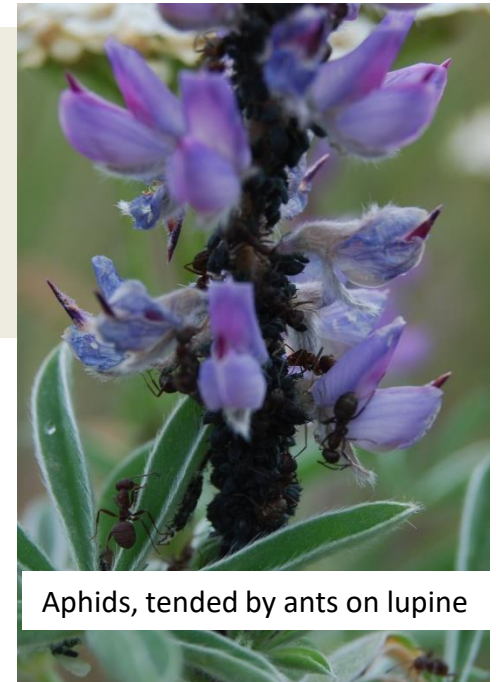


Cicadas

Homoptera must suck large amounts of plant fluids, & much can't be digested. Extra fluids are excreted as “honeydew”- collected by ants as food.



Aphid species



Aphids, tended by ants on lupine

Order Neuroptera net-winged insects



Neuroptera means “ net-wing: Traits:

- 4 membranous wings: all about the same size , usually longer than abdomen.
- Wings have many-branched longitudinal veins connected by many cross veins..
- Wings usually held rooflike over body at rest.
- Generally not stong fliers. Legs well developed
- Antennae very long, many segmented. Great variety in form.
- Chewing mouthparts.
- Predaceous (at least in larval stage)
- Most species are terrestrial, adults found near larval habitat



lacewing



snakefly



Green Lacewings (Neuroptera: Chrysomelidae)



antlion

Order Hymenoptera – wasps, bees, ants

Hymenoptera means “membrane wing” Traits:

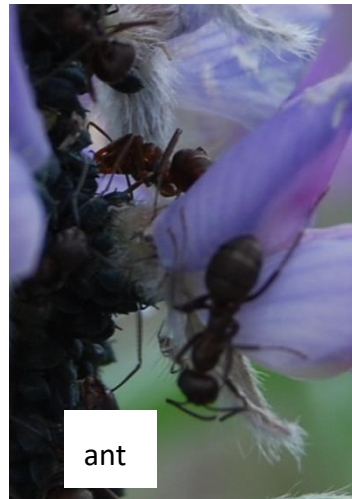
- Great diversity in habitat and behavior, includes the social insects
- Most adults winged with 2 pair of membranous wings with few veins
- Many have a constricted “waist” between thorax and abdomen.
- Most, have chewing mouthparts (some, modified to lap or suck fluids)
- In most bees, predatory wasps, and some ants, ovipositor modified to a stinger.
- Social behavior ranges from solitary to a complex class-based organization.
- In many species- adults feed on pollen and nectar; others prey on other insects for the purpose of providing food for developing larvae.
- Many species have larvae that are internal or external parasites on other insects.
- Many are important pollinators, and maintain plant diversity and crop production.



honey bee



paper wasp



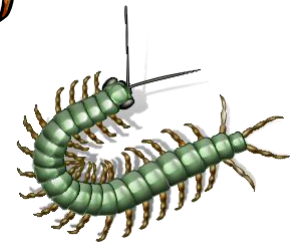
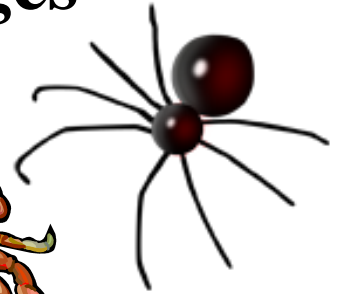
ant



carpenter ant

What is an Insect?

- **Phylum Arthropoda** – invertebrate animals
- Have **exoskeletons** –supportive outer covering
- Have **segmented** bodies
- Have at least 3 pairs of **jointed appendages** (legs)
- **CLASSES** include:
 - Arachnida (spiders)
 - Crustacea (crabs)
 - Myriopoda (millipedes & centipedes)
 - Insecta (insects)



What is an Insect?

Phylum Arthropoda Class Insecta

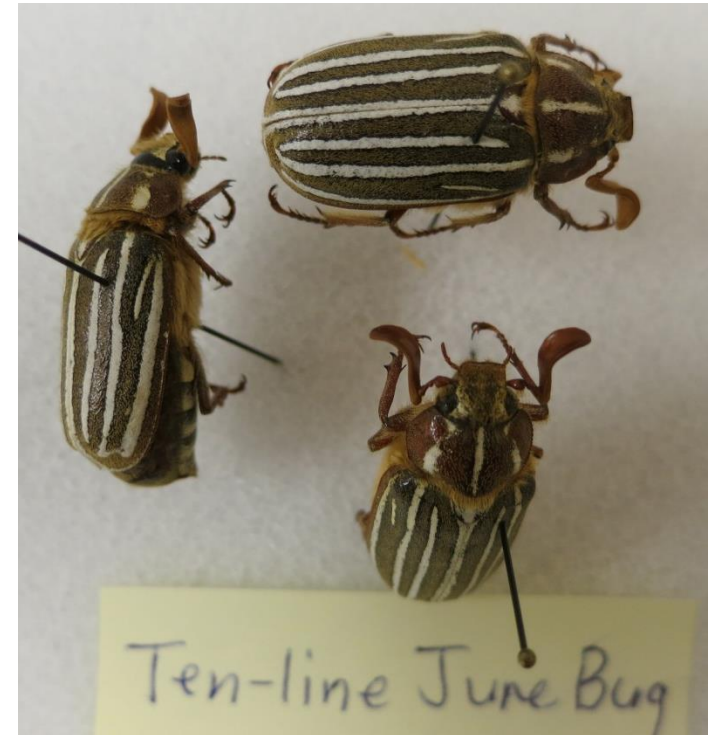
All insects have:

Have 3 distinct body regions –
head, thorax, abdomen

No more than 3 pairs of legs

1 pair of antennae

Class Insecta is divided
into 29 Orders based
on physical traits



What is an Insect?

HEAD has

Antennae: used for touch, smell, and/or hearing (in some)

Eyes: most have 2 types of eyes- compound & simple

Mouthparts: 1 pair of jaws (mandibles) for biting & chewing, or modified into a proboscis or beak for lapping, piercing, or sucking in some insect orders



What is an Insect?

THORAX: has
Legs: divided into
3 main segments

Wings (when
present) Most
adults have 2 pairs
& at least one pair
is membranous
with a series of
thicken ridges
(veins)



What is an Insect?

ABDOMEN Has

Usually have 11 segments

Terrestrial: Pairs of breathing holes (spiracles) line the sides

Aquatic: Immatures of insects (naiads) have gills on abdomen

In many species, females have an ovipositor (to lay eggs)



What is an Insect?

Growth and Development-

- Different growth forms from egg to immature to adult insect
- Usually eat different foods & live in different habitats



Most species undergo COMPLETE METAMORPHIS (4 stages)

Egg

Larva- main feeding stage

Pupa- resting stage; body reorganizes into adult form

Adult

Some species undergo INCOMPLETE METAMORPHIS (3 stages)

Egg

nymph – major feeding stage. Lack functional wings

adult

Order Lepidoptera – butterflies & moths

Lepidoptera means “scale wing” Traits:

- Overlapping scales cover their two pairs of large membranous wings, body & legs.
- Forewings usually larger than hind wings. Scales give color and texture.
- Adults of most species have sucking mouthparts, modified to form a long coiled tube, or proboscis, kept tucked under head when not in use.
- Larvae have chewing mouthparts and eat plants.

Moths:

- At rest, **hold wings** either rooflike over the body, curled around body, or flat against the resting surface.
- **Antennae** are serrate or feathery and taper to a point.
- Most fly during night and have subdued colors.

Butterflies:

- At rest, **hold wings** together vertically over the body.
- Slender **antennae** with enlarged club at the tip.
- Fly during daytime



Order Diptera – 2 winged true flies

Diptera means “two wing” Traits:

- Have only 1 pair of wings (forewings)
- The 2nd pair of wings is absent, or reduced to small knobbed balancing organ.
- Membranous forewings usually translucent with relatively few veins.
- Prevalent in most habitats and are often the first flying insects to emerge in spring
- Usually day active; feed on a wide variety of plants and animal fluids
- Mouthparts modified for feeding on liquids by piercing, sucking, lapping, or sponging.

