

INSECTS AND BUTTERFLIES

Introduction to the Natural World
June 2018

INSECTS

- Some characteristics of insects:
 - Chitinous exoskeleton. No bones; a hard outer covering supports muscles.
 - 3-part body: head, thorax, abdomen
 - 6 legs connected to thorax; legs are jointed
 - Most also have wings (connected to thorax) & 2 antennae on the head

NOT INSECTS

- Spiders
- Ticks & mites
- Scorpions
- Crabs



ABUNDANT!

- More than half the species of living organisms on earth are insects...
 - "Though the true dimensions of species diversity remain uncertain, estimates range from 2.6–7.8 million species with a mean of 5.5 million." *Wikipedia*
 - 29-32 orders of insects, including lepidoptera (BF & moths)
- Adaptable and variable

Head

- One pair of antennae.
 - The antennae are usually used as tactile organs or as olfactory organs.
- Eyes.
 - Most insects possess one pair of compound eyes; some have simple eyes called "ocelli".
- Mouthparts.
 - There is a big variety in types of mouthparts; biting, sucking, stinging, licking, etc. Mouthparts can help with ID.



Thorax

- Three segments: pro-thorax, meso-thorax and meta-thorax.
 - Each segment has one pair of legs.
 - Some insects are legless, or have fewer than 6 legs. Some larvae have leg-like appendages on the abdomen.
- Often one or two pairs of wings.
 - The wings are on the second and/or third segments of the thorax.
 - Some insects are wingless; immature stages are often wingless.



Abdomen

- The gonopore (genital opening) is at the posterior end of the abdomen.
- No appendages used for moving on the abdomen of adults (except in a few primitive insects).
- Sometimes there are some appendages at the end of the abdomen.



Metamorphosis

- Adaptation that allows insects to exploit available food sources.
- Can be 3 stage (incomplete) or 4 stage (complete)
 - Simple/incomplete = adult, egg, nymph (e.g. grasshoppers)
 - Complex/complete = adult, egg, larva, pupa (e.g. butterflies)
- Egg, larva, pupa, adult. Incomplete doesn't include pupa.



A Few Resources

- Scarabs: The Bug Society. Local organization of people interested in insects and/or spiders <https://crawford.tardigrade.net/Scarabs.html> (also on MeetUp)
- Bug Guide <https://bugguide.net/node/view/15740>
- A Peterson Field Guide to Insects: America North of Mexico
- Kaufman Field Guide to Insects of North America
- Dragonflies and Damselflies of the West, Dennis Paulson
- Key to Washington dragonflies <https://www.pugetsound.edu/academics/academic-resources/alter-museum/biodiversity-resources/dragonfly-field-key-to-adult-washington/>
- Common Bugs and Insects Found in Washington <https://www.insectidentification.org/insects-by-state.asp?thisState=Washington>
- Many more books about specific types of insects
- Bioquip Products <https://www.bioquip.com/>

Butterflies Order Lepidoptera



Butterfly Life Cycle – complete metamorphosis



- Eggs laid on larval host plant
- Many different egg-laying patterns; forms of egg



Butterfly Life Cycle - Larva

- Larva's skin has limited elasticity.
- As larva grows, it has to shed the skin.
- Each molting stage is called an "instar"
- Most Washington butterflies have 5 instars.



Butterfly Life Cycle - Pupa



- The final instar transforms into a pupa (chrysalis)
- Covering is made of hardened protein
- Pupae often look like a twig or leaf, or hidden in duff
- Moths make cocoon spun from silk

Butterfly Life Cycle - Emergence



Emerging butterfly pumps fluid from abdomen into wings.

Fluid flows thru veins to shape the wings

Butterflies & Plants

- Butterflies depend on
- Host plants—for larvae
 - Nectar plants—for adult

Adult lays eggs on/near larval host plants



Some species rely on one species of plant for food, are vulnerable to habitat loss.
Others are generalists that will feed on variety of plants.

Butterfly or Moth?

- Time of day is a clue
 - But many moths fly during the day (diurnal)
 - Moths can be colorful



Butterflies

- Butterflies rest with wings up or in "jet fighter" position



- Butterflies bask with wings spread



Moths

Moths often rest with wings against the body or in "V"



Butterfly or Moth?

- **Butterfly:** Slender antennae with clubbed end
- **Moth:** Feathery or pointed end



Butterfly or Moth?

- Watch where they go when disturbed
 - Butterflies fly upward
 - Moths fly downward and often disappear



Washington Butterfly Species

- Objectives:
 - Learn names of common, easy to identify species
 - Help you get to right section of field guide for other species
 - See more butterflies; be aware of them when they're around you

Main groups found in WA:

Skippers

- Spreadwing skippers
- Grass skippers

"True Butterflies"

- Swallowtails and parnassians
- Pierids—Whites and sulphurs
- Lycaenids—Coppers, hairstreaks, blues
- Nymphalids—Fritillaries, admirals, checkerspot, monarch, mourning cloak, wood nymphs, ringlet

Spreadwing skippers



- 1.5-2" wingspan
- Dark gray or brown
- Stay close to the ground

Grass skippers

Small and brown/tawny
Larvae eat grasses



- >1" wingspan
- July & August
- Common in yards, parks in town and in grassy areas elsewhere

Woodland skipper



Swallowtails



Western Tiger Swallowtail

Parnassians



- Semi-transparent white
- Large red spots
- Found in countryside and mountain areas
- 2 similar species, found at different elevations

Whites & Sulphurs: Pierids



Cabbage White

- White upperside with black tips
- Two spots (female) or one spot (male)
- Very common butterfly in town

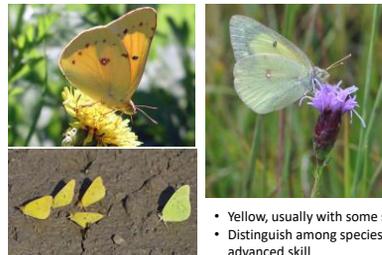


Julia's Orange Tip

- Orange wing tips
- White or yellow wings
- Males are white; females yellow
- FKA Sara's Orange Tip

Photo by Dave Nunns/Alto

Sulphurs



- Yellow, usually with some spots
- Distinguish among species is advanced skill

Coppers, Blues, Hairstreaks: Lycaenids



Blues

- Males are blue on the upperside; females brownish
- Underside usually grayish with pattern of white, black, and sometimes orange spots

Coppers

- 1.25" – 1.5" wingspan
- Males and females look different in some species
- Most have orange zigzag on upper hindwing



Hairstreaks

- "Hair" refers to tails
- Some more noticeable than others
- May be broken off or absent
- 1" – 1.5" wingspan



Brush-foot butterflies: Nymphalids



Lorquin's Admiral

- 3" wingspan
- Black on dorsal (upper) side
- Band of white rectangular spots
- Orange-brown wing tips

Mourning Cloak



- 3" wingspan
- Winters in adult stage so seen in winter on warm days, early spring, late fall

"Greater" and "Lesser" Fritillaries



Coronis fritillary ("greater fritillary")
3" wingspan
Large spots on ventral (underneath) side of wings
Spots may be silvered or opalescent

Western meadow fritillary ("lesser fritillary")
1.75" wingspan
Ventral pattern of mottled lavender and russet

Checkerspots



Photo by David Sherry

- 1.75" – 2.25" wingspan
- White spots on black or orange
- Yellow or red antennae
- Several very similar species

Painted Lady



Photo by Dave Neumann

- 3" wingspan
- Orange center, black wing tips and edges.
- Trailing end black spots
- Occasional population explosions in Mexico cause massive northward migrations

Satyr anglewing



- Also called satyr comma because of comma-shaped mark on hindwing
- Irregular wing shape
- Ventral wings have cryptic color pattern
- Several similar species

Ochre Ringlet



- 1.5" wingspan
- Flies in spring-early summer

Common Wood Nymph



- 2" wingspan
- Brown with 2 eye spots on forewing
- Dark wood nymph similar but spots are unequal size

Stay involved

Washington Butterfly Association

Field trips and presentations
 Novices welcome
 Beginner-oriented group
<http://wabutterflyassoc.org>

Stay involved

1. Cascade Butterfly Project needs volunteers, no experience necessary. Help NPS monitor butterflies and hike beautiful trails. Weekdays.
2. Upload your photos of butterflies to *Butterflies and Moths of North America*. Experts will ID the bugs. www.butterfliesandmoths.org

RESOURCES

- Butterflies of America—identification and photos <https://www.butterfliesofamerica.com/L/Neotropical.htm>
- Butterflies and Moths of North America—identification and photos <http://www.butterfliesandmoths.org>
- N. American Butterfly Ass'n <http://www.naba.org>
- Pacific NW Moths—identification tool <http://pnwmoths.biol.wvu.edu>

BOOKS

- *Butterflies of the Pacific Northwest*, Robert Michael Pyle and Caitlin LaBar
- *Life Histories of Cascadia Butterflies*, David James and David Nunnallee. Magnificent, awesome book with fantastic photos of every life stage of every butterfly found in Washington and Oregon; informative section about butterfly life history
- *Butterflies of Cascadia*, Robert Michael Pyle slightly outdated but very interesting and informative guide to butterflies of Washington and Oregon
- *Butterflies of North America*, Jim Brock and Kenn Kaufman
- *Butterflies Through Binoculars*, Jeffrey Glassberg

Introduction to the Natural World

**Butterfly ID
Practice****Butterfly 1**

Western Tiger Swallowtail

**Butterfly 2**

Cabbage White



Butterfly 3

Blue



Butterfly 4

Cinnabar moth



Butterfly 5

Lesser Fritillary



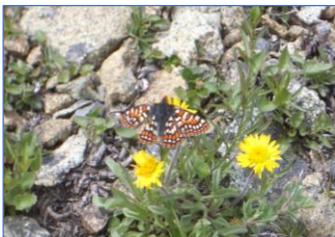
Butterfly 6

Greater Fritillary



Butterfly 7

Checkerspot



Butterfly 8

Woodland skipper



Butterfly 9

Lorquin's Admiral



Butterfly 10

Mourning Cloak



Butterfly 11

Painted Lady



Questions?

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