Biodiversity for Sustainable Futures

Insects of Alberta:
Visual Guide to Terrestrial Orders (Adults)

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Gee, G., Summers, M. (2024). Insects of Alberta - Visual Guide to Terrestrial Orders Adults. QUBES Educational Resources.

Most Common Orders

Legend

- Common Names
- Habitat
- Body Size
- Mouthpart Type
- Wing Number
- Notable Features

Hymenoptera

0.2 - 115 mm | 0/2 pairs | Chewing /Lapping

Terrestrial and subterranean, flowers

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- Thorax and abdomen are connected by a thread thin waist
- Females have an ovipositor modified into a stinger
- Forewings are typically larger than hind wings, both have sparse venation that angle to form closed cells
- 3-60 segmented geniculate (elbowed) antennae, most having 10+ segments
- Commonly have three ocelli

Bees, Wasps, Ants, & Sawflies

Hemiptera

1 – 100+ mm | 2 pairs | Piercing/ Sucking

Many terrestrial and freshwater environments

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- Rostrum (beak-like mouthparts with accompanying piercing structures)
- Wings either cross at distal end of abdomen or are held above body in a tent-like manner
- Forewings may be entirely leathery or hemelytra (wings that are leathery/hardened at the front and membranous/thin in the back
- May have prominent scutellum (triangular back plate)
- 3-13 antennal segments
- Minimal morphological differences among legs, mostly gressorial (walking/running), occasionally saltatorial (adapted for jumping)

True Bugs, Cicadas, Hoppers, & Aphids

Diptera

0.5 - 40 mm | 1 pair | Sucking

Virtually all environments

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- The forewings are membranous with moderate venation
- Hindwings are reduced to halteres (small, club-shaped wing remnants) which serve to help balance during flight
- Large compound eyes, no ocelli
- Females lack a proper ovipositor
- Antennae are filiform (thread-like), aristate (thin and connected to a platform), or stylate (similar to filiform but shorter and thicker)

Flies & Mosquitoes

Coleoptera

0.3 - 200 mm | 2 pairs | Chewing

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Majority of terrestrial and freshwater environments

- Elytra (hardened forewings which typically cover entirety of membranous hindwings when at rest)
- Wide variation in morphology of antennae, <11 segments
- Commonly lack ocelli
- Wide variation in leg morphology

Beetles

Odonata

2 - 15 cm | 2 pairs | Chewing

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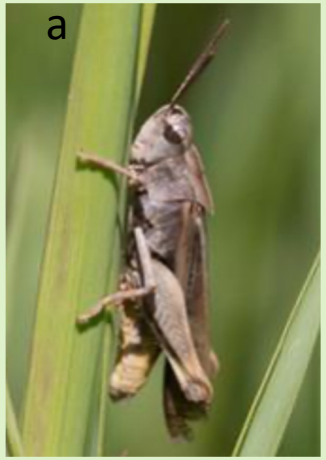
Largely terrestrial, common on and around freshwater

- Large compound eyes with 3 ocelli
- Short, bristle antennae
- Long, intricately veined fore and hindwings
- Clasping sex organs at the apex (tip/end) of male abdomens
- Forelegs adapted for grabbing and clasping during flight

Dragonflies & Damselflies

Orthoptera

< 12 cm | 2 pairs | Chewing



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Terrestrial

- Large compound eyes, some have ocelli
- Tegmina (hardened forewings) cover membranous hindwings at rest
- Hindwings are membranous and fan-shaped with many veins and fold like accordions under tegmen
- Hind legs are saltatorial (adapted for jumping)
- Females in some groups have cerci and/or an ovipositor

Grasshoppers/Locusts, Katydids, & Crickets

Lepidoptera

2 - 250+ mm | 2 pairs | Siphoning

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Terrestrial

- Coiled proboscis (straw-like mouthparts)
- Forewings are typically larger than the hindwings, both are covered in fine scales
- Ocelli and/or other sensory organs are common
- Multisegmented antennae, with variation in morphology used for identification

Butterflies & Moths

Common Orders

Legend

Common Names

Habitat

Body Size

Mouthpart Type

Wing Number

Notable Features

Archaeognatha

6 - 25 mm

0 pairs

Reduced

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Leaf litter, under tree bark

- Large compound eyes that connect dorsally (further back on the head) and 3 ocelli
- Long medial caudal filament (thread-like appendage sitting in the middle of the tail end) with two shorter cerci on either side
- Humped thorax tapers down through to 11 abdominal segments
- Multisegmented antennae

Bristletails

Dermaptera

6 - 35 mm

0/4 pairs

Chewing

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Cool & dark places during the day, under leaves, rocks, and bark

- Large cerci
- Dorsoventrally (back to underside) flattened
- Some are apterous (wingless), but those with wings have tegmina (leathery/hardened forewings) and membranous fan shaped hindwings with fine venation
- Eyes range from large to absent, ocelli absent
- Filiform (thread-like) antennae

Earwigs

Ephemeroptera

1 - 30 mm

1/2 pairs

Reduced

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Vegetation on and around freshwater

- 3 ocelli
- Short, filiform (thread-like) antennae
- Long medial caudal filament (thread-like appendage sitting in the middle of the tail end) with two equal length cerci on either side
- Fore legs are often raised in front of the body when at rest
- Triangular wing pairs with larger forewings and hindwings reduced or absent in males

Mayflies

Neuroptera

3 - 80 mm | 2 pairs | Piercing & Sucking

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Terrestrial, soil, vegetation environments

- Multisegmented antennae with morphological variations
- Fore and hindwings are similar in size, intricate venation, and membranous
- No cerci
- Ocelli present in some groups

Antlions, Owlflies, Lacewings, & Mantidflies

Plecoptera

4 - 60 mm | 2 pairs | Chewing

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On and around freshwater environments

- Fore and hind wings are similar in shape with the hind slightly larger at the base
- Long multisegmented antennae
- Prothorax (first thoracic segment) is not elongated
- Ocelli are present in some groups

Stoneflies

Psocodea

1 - 10 mm | 0/2 pairs | Chewing

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Leaf litter, under rocks, under bark, in human dwellings

- Large compound eyes and 3 ocelli among winged groups, but no ocelli if apterous (wingless)
- 13 segmented filiform (thread-like) antennae
- Asymmetrical mouthparts
- Reduced wings with sparse venation are coupled together and sit tent-like when at rest

Bark Lice, Book Lice, & Parasitic Lice

Siphonaptera

1 - 10 mm | 0 pairs | Piercing

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On specific hosts or in the nest/bedding of these hosts

- Body is laterally flattened
- Saltatorial (adapted for jumping) hind legs
- Large combs on head or thorax
- No compound eyes, instead well-formed ocelli or no visual sensory organs
- Antennae sit in deep grooves

Fleas

Thysanoptera

0.5 - 14 mm | 0/4 pairs | Piercing/ Sucking

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Living plants, some living in leaf litter or on dead branches

- When wings are present, they are narrow little/no veins, and have long fringe
- Antennae are short and have only 4-9 segments
- Groups with wings also have three ocelli
- The forelegs may be raptorial (adapted for grasping) and the hindlegs may be saltatorial (adapted for jumping)

Thrips

Trichoptera

1.5 - 40 mm | 2 pairs | Chewing

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Well-aerated streams, marshes, ponds, lakes, and the surrounding vegetation

- Forewings are typically dark, sturdy and held tightly above the body while the hind wings are delicate and membranous
- Prominent palpi (mouth appendages)
- Some groups have ocelli
- Long setaceous (thread-like with successively smaller segments), multisegmented antennae

Caddisflies

Zygentoma

8 - 10 mm | 0 pairs | Chewing

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Damp/warm indoor environments, outdoors in leaf litter, ant nests, under bark, in caves

- 1 long medial caudal filament (thread-like appendage sitting in the middle of the tail end) with two equal length 2 cerci on either side
- Eyes are either absent or greatly reduced to ommatidium (single visual-sensory unit)
- Thorax tapers from humps into 11 segmented abdomen
- Multisegmented antennae

Silverfish & Firebrats

Uncommon Orders

Legend

Common Names

Habitat

Body Size

Mouthpart Type

Wing Number

Notable Features

Megaloptera

10 - 75 mm | 2 pairs | Chewing

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On and around freshwater environments

- May have large mandibles
- Variable multisegmented antennae
- Large pleated anal field on wings
- Intricate wing venation

Alderflies, Dobsonflies

Raphidioptera

? mm | 2 pairs | Chewing

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Coniferous temperate forests, west of Rocky Mountains only

- Fore and hindwings are similarly shaped with intricate venation and eye spot
- Females have a long, flexible ovipositor which resembles a snake's tail
- Elongated prothorax (first thoracic segment)

Snakeflies

Blattodea

8 – 60+ mm | 0/4 pairs | Chewing

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Woodlands or human dwellings

- Moderately large to small eyes with two ocelli
- Dorsoventrally flattened
- Long multisegmented antennae
- Tegmina (hardened forewings) may be present, both pairs may be membranous, or apterous (wingless)

Cockroaches & Termites

Rare Orders

Legend

- Common Names
- Habitat
- Body Size
- Mouthpart Type
- Wing Number
- Notable Features

Strepsiptera

0.5 - 4 mm | 1 pairs | Reduced Chewing

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Females spend entire life in host

- Reduced forewings and fan shaped hindwings
- Branched antennae with 4-7 segments
- Raspberry-like eyes and no ocelli

Twisted-wing Parasites/ Stylopids/ Strepsipterans

Mecoptera

3 - 30 mm | 2 pairs | Chewing

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Moist forest environments

- Extended anteater-like snout
- Some groups have males with large reproductive organs that fold over the top of the abdomen and look like a scorpion's stinger
- Both wing pairs are similar in size and patterning
- Filiform (thread-like) antennae with 14+ segments

Scorpionflies & Hangingflies

Grylloblattodea

15 - 30 mm | 0 pairs | Chewing

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High elevations, under rocks, at the edge of snow fields, in ice caves or on moss

- Antennae are long and filiform (thread-like) with 28-50 segments
- Cerci with 8 segments
- Females have a long sword-shaped ovipositor
- Have both cricket and cockroach-like characteristics

Rock Crawlers/ Ice Crawlers

Orders Not Recorded Wild In Alberta

Legend

- Common Names
- Body Size
- Wing Number
- Habitat
- Mouthpart Type
- Notable Features

Phasmatodea

<30 cm | 0/2 pairs | Chewing

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Trees/shrubs, areas that are warm and moist

- Except for one, North American species are wingless
- Resemble sticks or leaves
- Small compound eyes with ocelli present on winged males only
- Single segmented cerci
- Tegmina (leathery fore wings) protect membranous hindwings which have a hardened anterior (front) border
- 8-100 segmented antennae

Walkingsticks, Stick Insects, Leaf Insects, & Phasmids

Mantodea

1 - 15 cm | 2 pairs | Chewing

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Tropical and Subtropical

- Filiform (thread-like) antennae
- Triangular head
- Fore legs are raptorial (adapted for grasping), mid and hindlegs are gressorial (walking/running)
- Forewings are thickened and more narrow than membranous hindwings
- Short, multisegmented cerci

Mantids/ Praying Mantids

Embioptera

4 - 20+ mm | 0/2 pairs | Chewing

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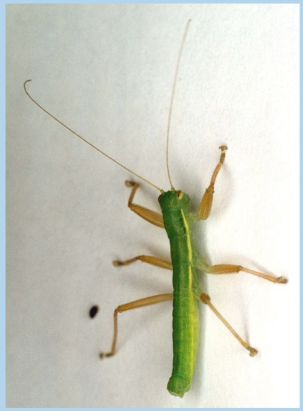
Complex tunnels under leaf litter, bark, rocks, and soil

- Enlarged apical (tip/end) tarsal segment has glands which produce silk
- Enlarged hind femur for backwards running
- 1-2 segmented cerci, asymmetrical on males
- Wings only occasionally present on males
- Reniform (kidney-shaped) eyes without ocelli
- Filiform (thread-like) antennae

Embiidna/ Emboidea/ Embiopterans/ Webspinners

Mantophasmatodea

<2.5 cm | 0 pairs | Chewing



"Mantophasma zephyra Zompro et al" by P.E. Bragg is licensed under CC-BY-SA 3.0

Rock Crevices in southern Africa

- Long antenna with 26-32 segments
- Distal tarsal segment is held off the ground, called "heelwalkers"
- Large clasping cerci on males, simple single segmented cerci on females

Heelwalkers

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