Biodiversity for Sustainable Futures

Insects of Alberta - Interactive Identification Guide To Common Orders

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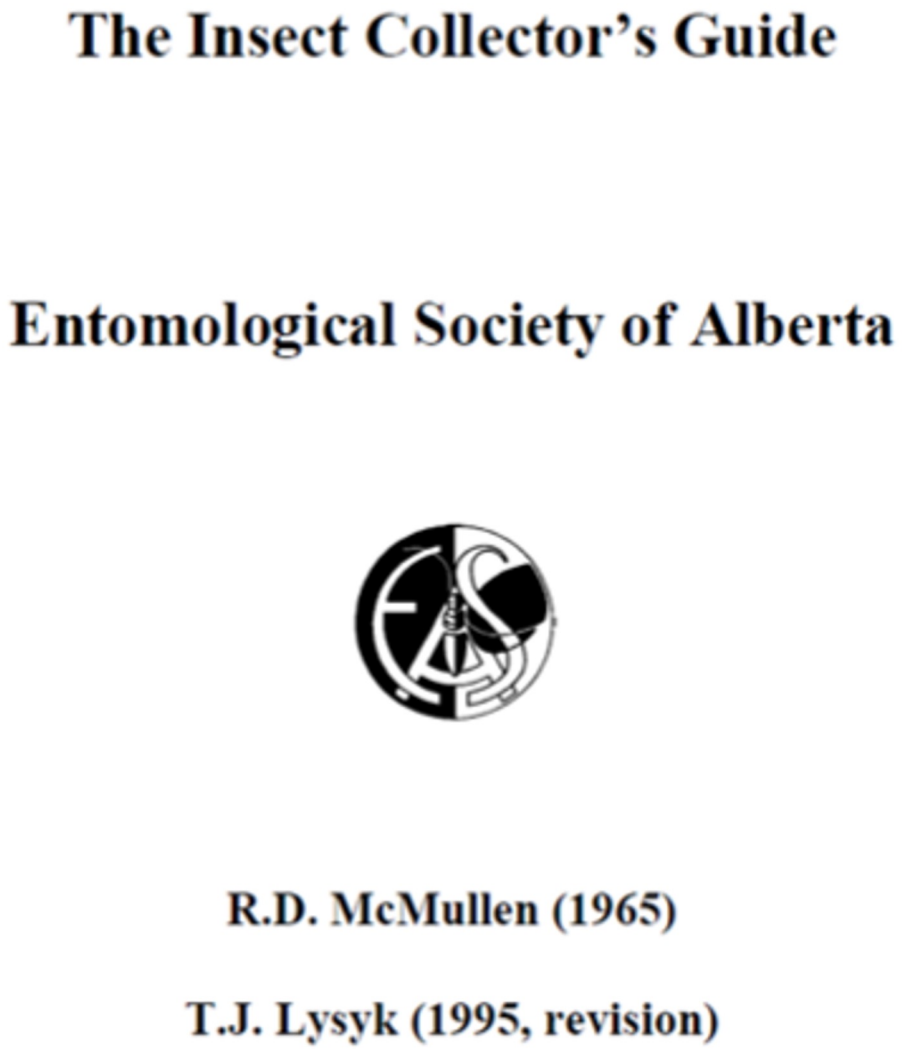
Seal, M., Duclos, K., Summers, M., Carson, A. (2024). Insects of Alberta - Interactive Identification Guide To Common Orders. QUBES Educational Resources.

- This interactive identification key is based on, and modified from, the dichotomous key
  “The Insect Collector’s Guide” by R.D. McMullen (1965), revised by T.J. Lysyk (1995) for the Entomological Society of Alberta
  which can be accessed and found at this link:
  https://www.entsocalberta.ca/guide.pdf



How to use this interactive dichotomous key

- This guide provides visual examples and links to 2D and 3D examples of morphological characters used to identify insects belonging to common orders found in Alberta. This guide also provides examples of insects belonging to these orders.

- This guide takes the form of an **interactive dichotomous key**. Each page involves two statements describing morphological features. You, the observer, will select which statement best describes the insect you are trying to identify and click on the page number that follows the statement. Each statement will lead you to a subsequent choice until you arrive at an order level identification for your specimen.
    - Example videos of using a dichotomous keys: https://www.youtube.com/watch?v=M51AKJqx-7s

      https://www.youtube.com/watch?v=NbAjI_4Lleo

- You can use this guide alongside the **Insects of Alberta: Visual Guide to Terrestrial Orders (Adults)** and **Visual Glossary of Insect Morphology**.

- We recommend that you keep notes of which steps you complete, so that you can easily review previous steps.

- Note: you may need a 10X hand lens or a stereomicroscope to see some of the features on the insects.

1.

- **Wings present**, the front wings often in the form of hard, leathery or horny wing covers 2

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- **Wings absent** or represented only by minute pads or buds 19

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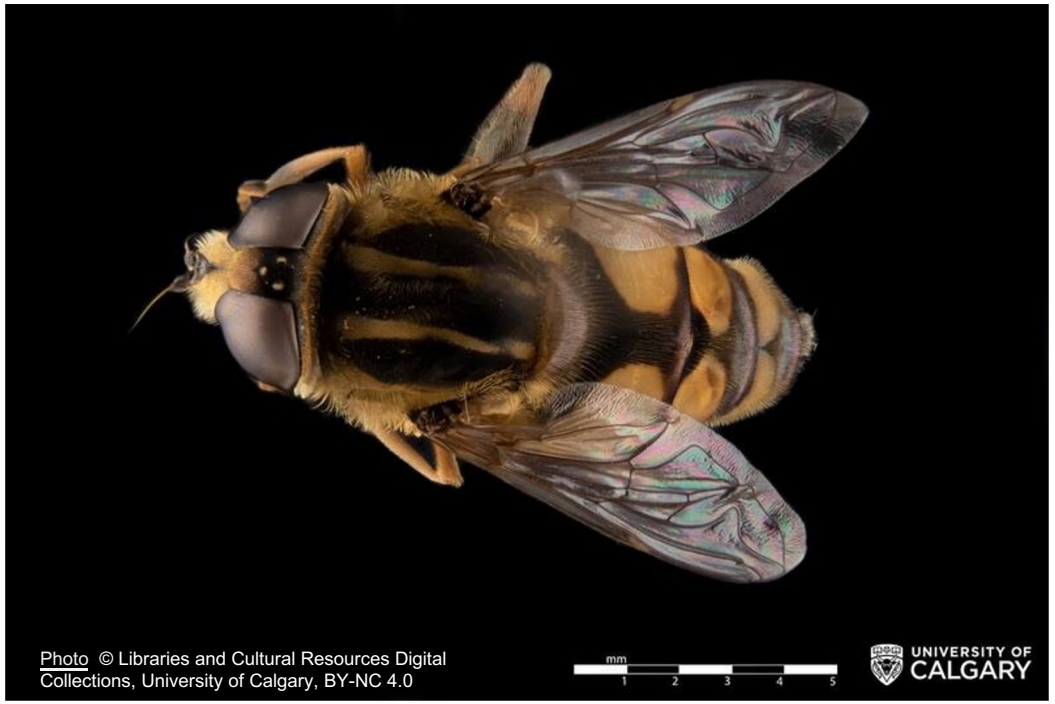
2.

- With **only one pair of wings**, these always membranous 3



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- With **two pairs of wings**, the front pair often represented by hard wing covers beneath which the hind wings are concealed in repose 5

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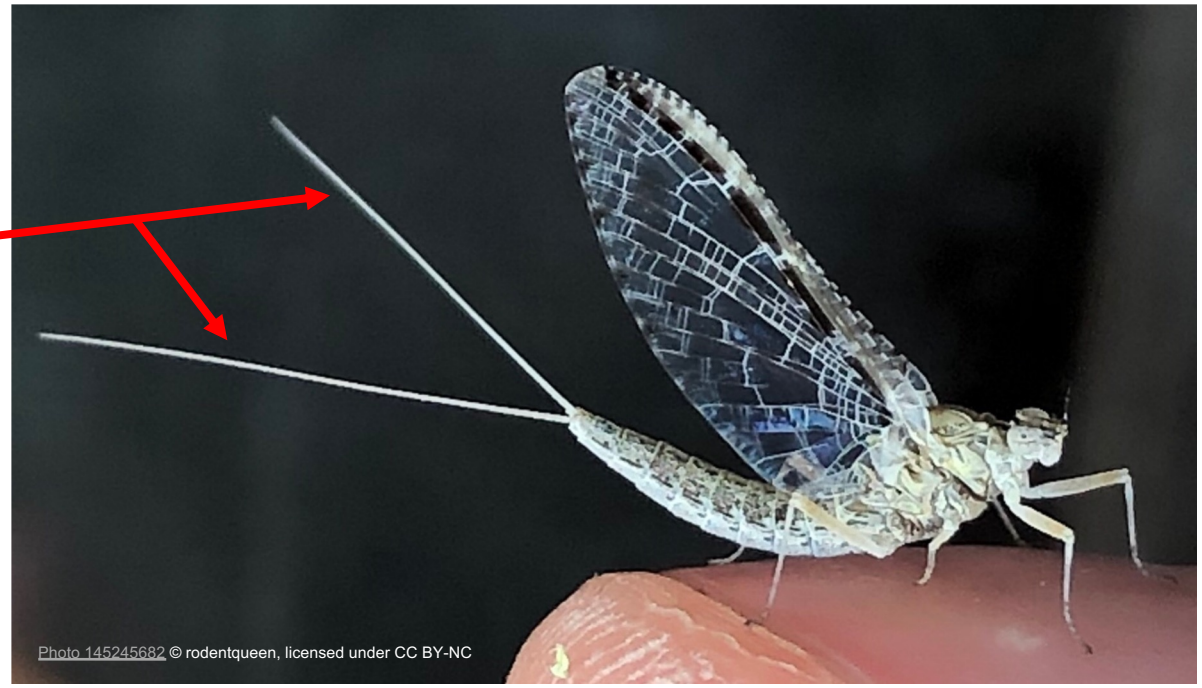
3.

- End of abdomen with two or three slender but conspicuous, long projecting filaments 4

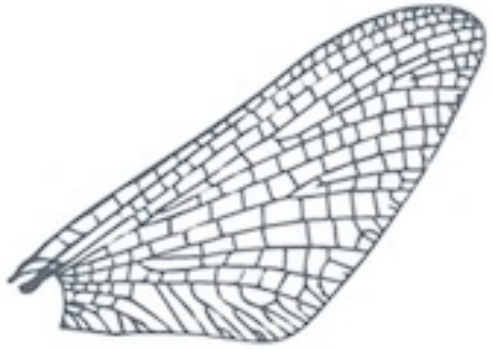


- End of abdomen without such filaments ..... **Order Diptera** (mosquitoes, midges, flies)

Examples:
3D: House fly, Hover fly
2D: Diptera, Hover fly

4.

- Wings with a network of veins, including many cross veins ..... **Order Ephemeroptera** (mayflies), in part.



Examples:
2D: Mayfly; Mayfly; Mayfly; Mayfly (Speckled duns)

- Wings with very few longitudinal veins and no cross veins ..... **Order Hemiptera**, in part (males of scale insects or Coccidae)

Examples:
3D: Stink bug
2D: Hemiptera; Big-eyed bug; Broad-headed bug; Water boatmen; Treehopper

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5.

- Front wings horny, rigid, opaque, without veins, meeting in a line over middle of body and concealing the membranous hind wings 6

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Examples:

3D: Dermaptera (Earwig);
Beetle;
Longhorn Beetle

2D: Jewel beetle;
Carrion beetle;
Longhorn beetle;
Rhinoceros beetle

- Front wings usually membranous although often covered with scales or hairs; if leathery, with the veins distinct, and not meeting along a line over middle of body 7

6.

- Tip of abdomen with a pair of prominent forceps-like appendages; front wings (wing covers) very short ..... **Order Dermaptera** (earwigs)

Examples:
3D: Dermaptera
2D: Dermaptera

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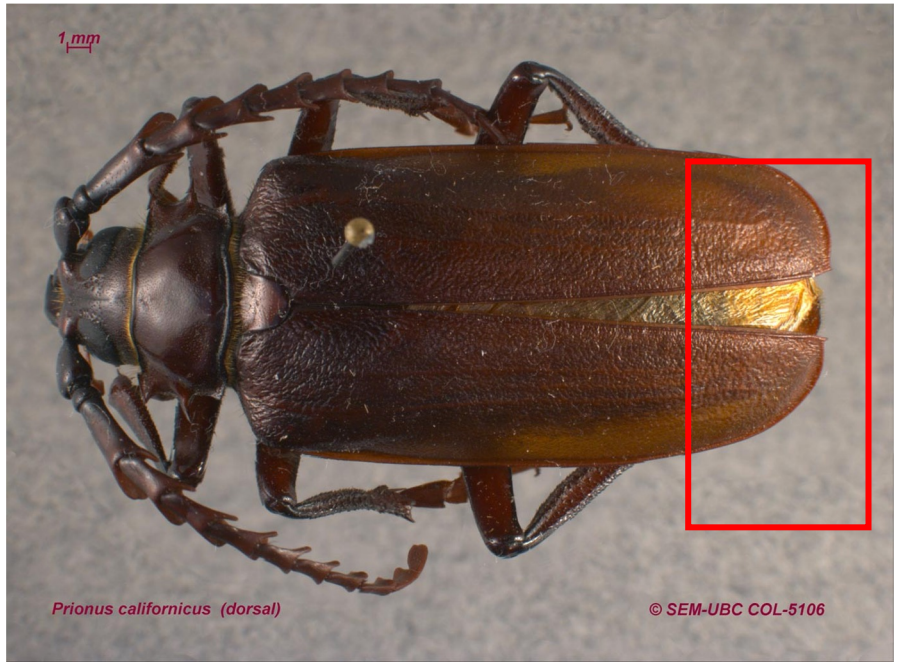
- Tip of abdomen without such appendages;. front wings (wing covers) usually covering most or all of abdomen although sometimes short ..... **Order Coleoptera** (beetles)

Examples:
3D: Polyphylla fullo
2D: Jewel beetle; Carrion beetle; Longhorn beetle; Rhinoceros beetle



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7.

- Front wings more or less leathery or parchment-like 8

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- Front wings membranous (N.B. wings covered with scales are usually membranous under the scales) 9

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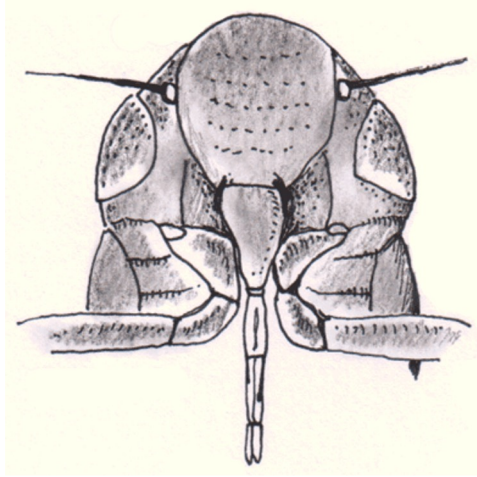
8.

- Mouth parts in the form of a piercing and sucking beak ..... **Order Hemiptera,** in part

Piercing and sucking mouth parts:
Beak-like mouth parts with accompanying piercing mouth parts for piercing plants and sucking plant juice

Examples:
3D: Hemiptera (Stink bug)
2D: Hemiptera (Plant bug); Hemiptera (Stink bug); Hemiptera (Pirate bug); Hemiptera (Stink bug)



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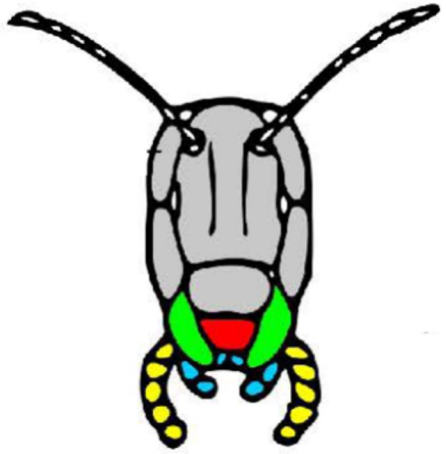
- Mouth parts fitted for chewing ..... Order **Orthoptera**

Chewing mouth parts:
Basic form of mouth parts for chewing solid food

Examples:
3D:Orthoptera (Grasshopper)
2D: Orthoptera (Grasshopper)



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9.

- Wings covered with overlapping scales, often in beautiful color patterns .....
  Order Lepidoptera (moths and butterflies)

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Examples:
3D: Tiger Swallowtail, Moth

2D: Lepidoptera Library

- Wings not covered with scales 10

10.

- Wings very narrow, bladelike and fringed with long bristles; tarsus ending in a large bladderlike structure ..... **Order Thysanoptera** (thrips)

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Examples:
2D: Thysanoptera,
Thysanoptera

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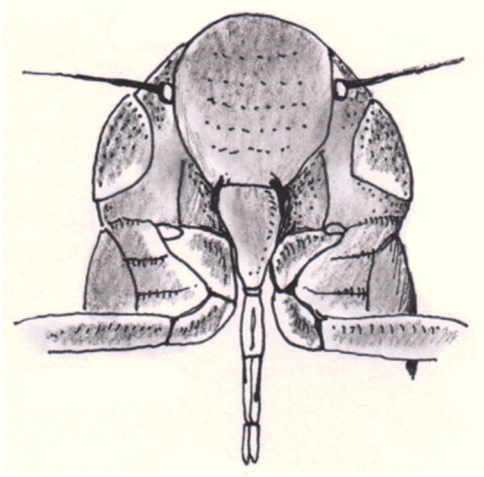
- Wings not bladelike; tarsus without such a bladderlike structure 11

11.

- Mouth parts in the form of a beak fitted for piercing and sucking ..... **Order Hemiptera,** in part

Piercing and sucking mouth parts:
Beak-like mouth parts with accompanying piercing mouth parts for piercing plants and sucking plant juice

Examples:
3D: Hemiptera (Stink bug)
2D: Hemiptera (Plant bug); Hemiptera (Stink bug); Hemiptera (Pirate bug); Hemiptera (Stink bug)



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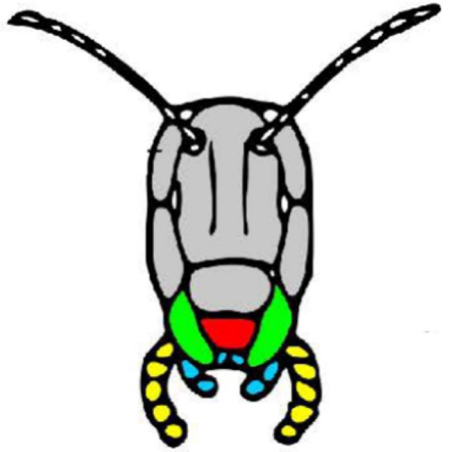
- Mouth parts fitted for chewing 12

Chewing mouth parts:
Basic form of mouth parts for chewing solid food

Examples:
3D: Hymenoptera (Ant head); Coleoptera

2D: Coleoptera (Lady beetle); Coleoptera (Diving beetle); Coleoptera (Ground beetle); Hymenoptera (Ant)



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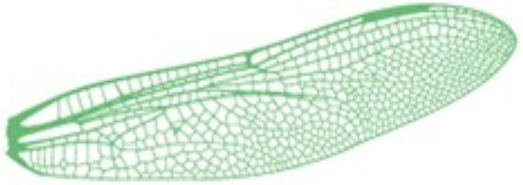
12.

- Wings with numerous longitudinal veins and many cross veins forming a network 13

Examples:
3D: *Odonata*

2D: Dragonfly; Damselfly



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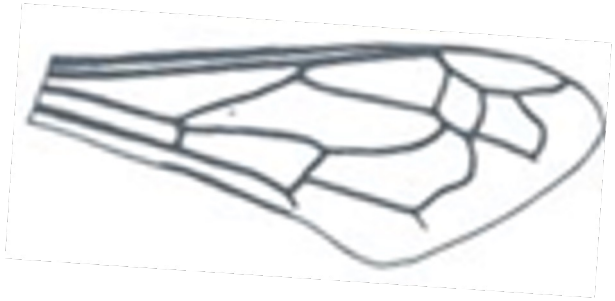
- Wings with few cross veins and usually with few longitudinal veins, not net-veined 17

Examples:
3D: Hymenoptera

2D: Bumble bee;
Wasp; Honey bee



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13.

- Antennae very short and inconspicuous, composed of few segments 14

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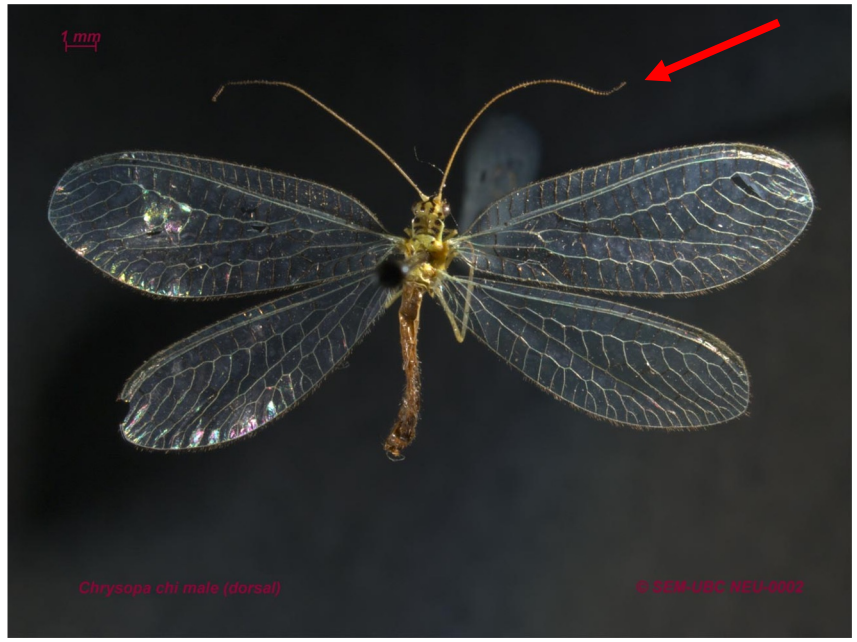
- Antennae conspicuous, composed of many segments 15



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14.

- Hind wings very small, tip of abdomen with two or three long thin filaments ..... **Order Ephemeroptera**, in part (mayflies)

Examples:
2D: Mayfly; Mayfly; Mayfly; Mayfly (Speckled duns)

- Front and hind wings of about equal size; abdomen without terminal filaments ..... **Order Odonata**

Examples:
3D: *Odonata*

2D: Dragonfly; Damselfly

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15.

- Wing veins mostly membranous and faint, front and hind wings of same size and shape, tarsi four-segmented .....
  Isoptera **(termites) (within Order Blattodea)**

Examples:
2D: Termite; Termite

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- Wing veins strongly developed 16

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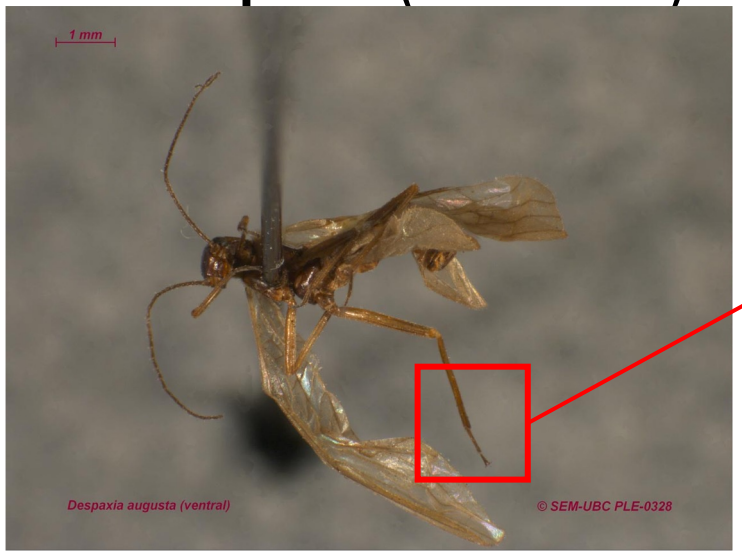
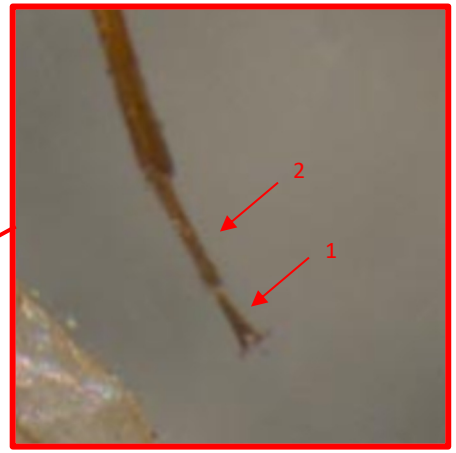
16.

- Tarsi two-or three-segmented ..... **Order Plecoptera** (stoneflies)





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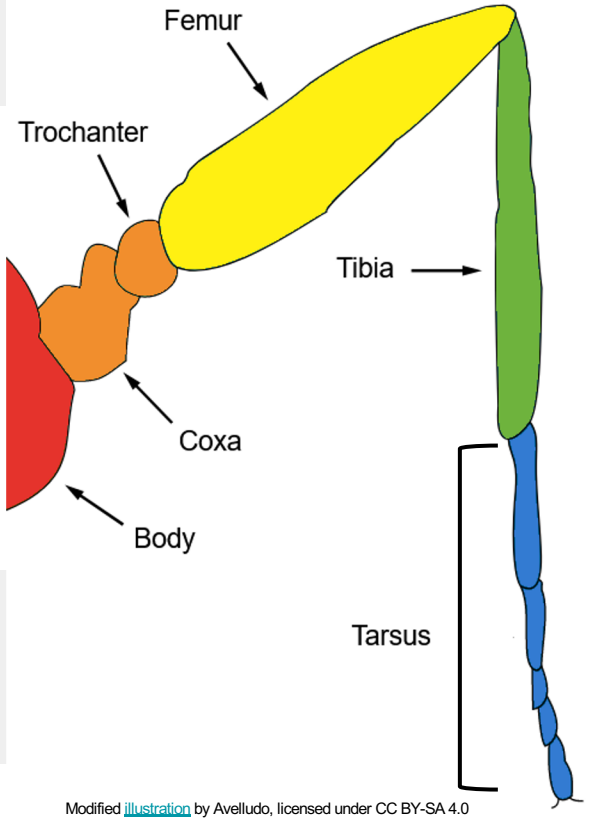
Examples:
2D: Stonefly; Stonefly



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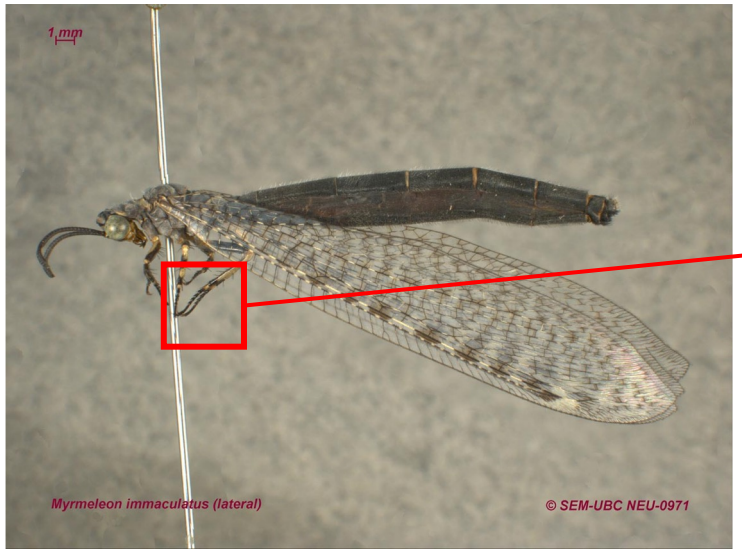
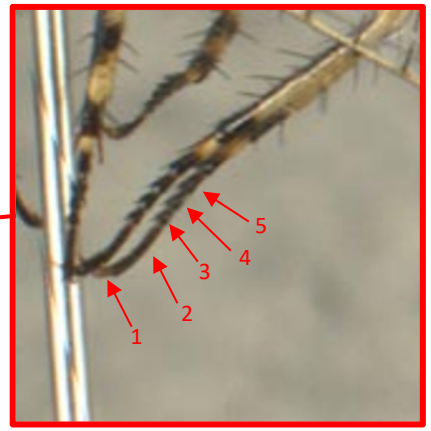
- Tarsi five-segmented..... **Order Neuroptera** (lacewings and dobsonflies)





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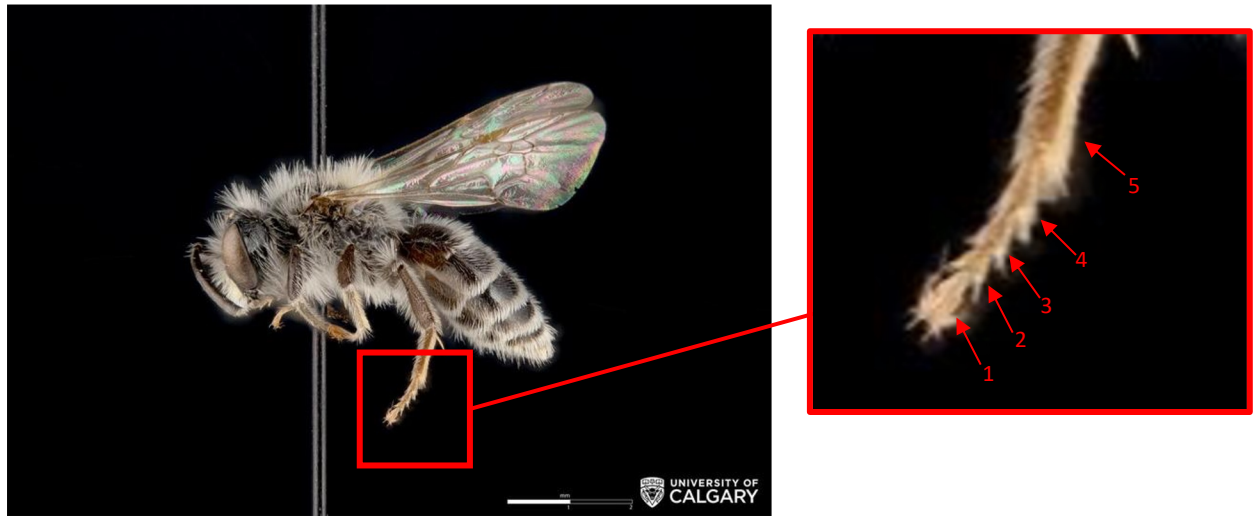
Examples:
2D: Lacewing; Lacewing

17.

- Tarsi five-segmented 18



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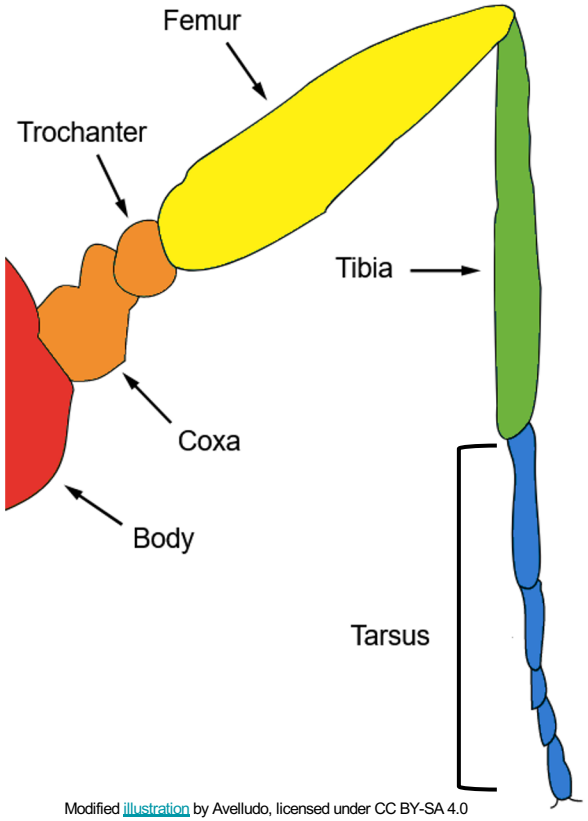
Examples:
3D: Bee

2D: Bee; Ant



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- Tarsi two- or three-segmented .....

  Order Psocodea (formerly Psocoptera, book lice)

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Examples:
2D: Book lice;
Bark lice

18.

- Wings covered with fine long hair and held rooflike over abdomen, in repose ..... **Order Trichoptera** (caddisflies)

Examples:

2D: Caddisfly

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- Wings membranous and transparent, not covered with long hairs, not held rooflike over abdomen in repose ..... **Order Hymenoptera**

Examples:
3D: Hymenoptera

2D: Bumble bee;
Wasp; Honey bee

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19.

- Tip of abdomen with two or three long appendages directed backward …… 20

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- Tip of abdomen without such appendages 21

20.

- Abdominal appendages thick, rigid, in the form of forceps ..... **Order Dermaptera**, in part (earwigs)

Examples:
2D: Earwig;
Earwig

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- Abdominal appendages delicate flexible, antenna-like ..... **Order Thysanura** (silverfish, etc.)

Examples:
2D: Bristletail;
Bristletail

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21.

- Tarsi one- to three-segmented 22

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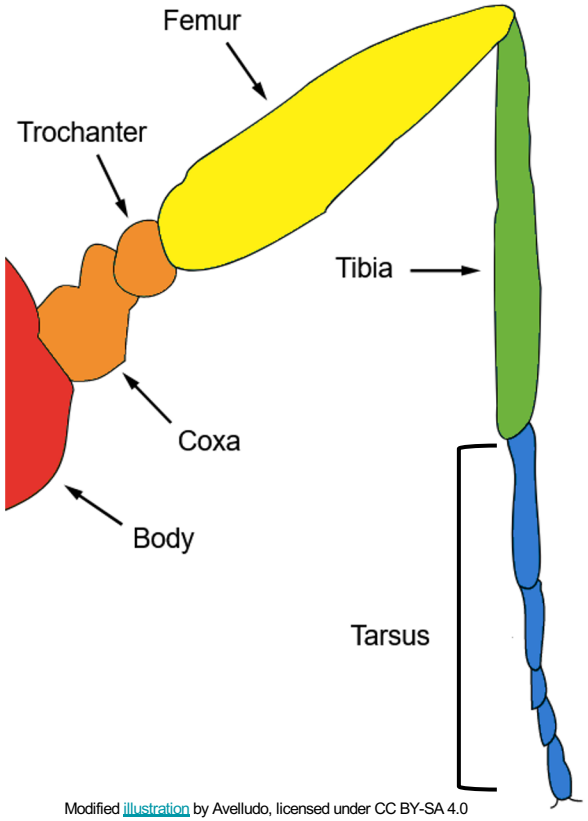
Examples:
2D: Hemiptera (Bed bug)



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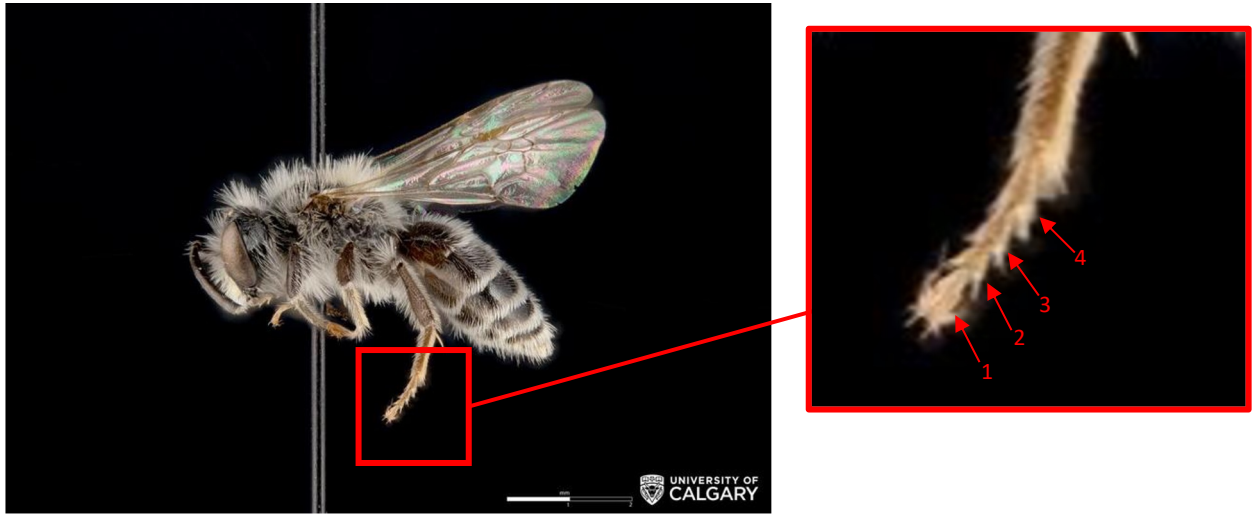
- Tarsi four- to five-segmented 5 25



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Examples:
3D: Bee

2D: Bee; Ant

22.

- Antennae conspicuous, projecting in front of head 23

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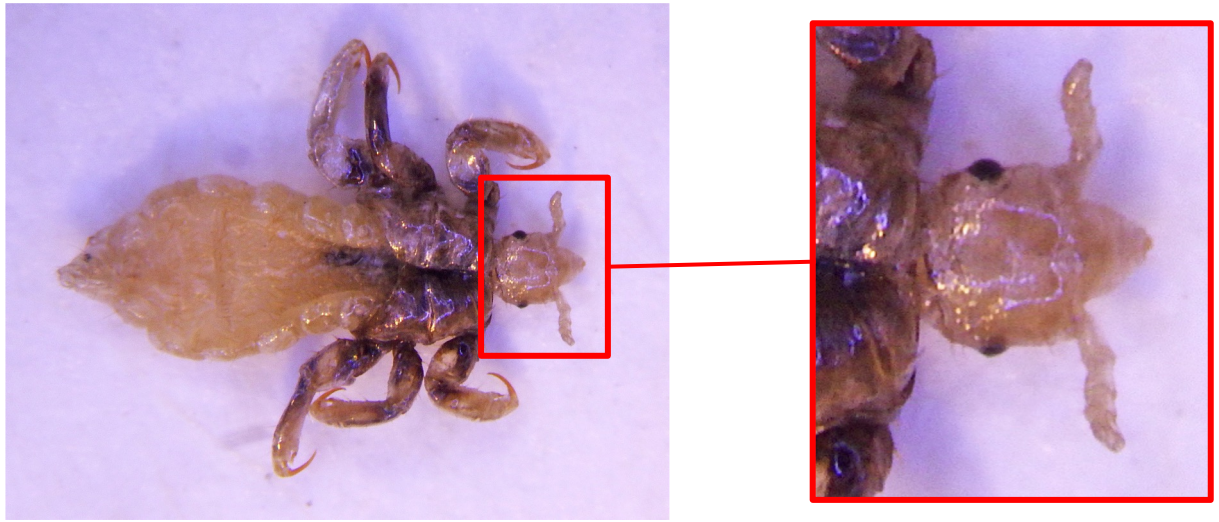
- Antennae very short, inconspicuous not projecting in front of head ..... Phthiraptera **(louse/lice) (within Order Psocodea)**



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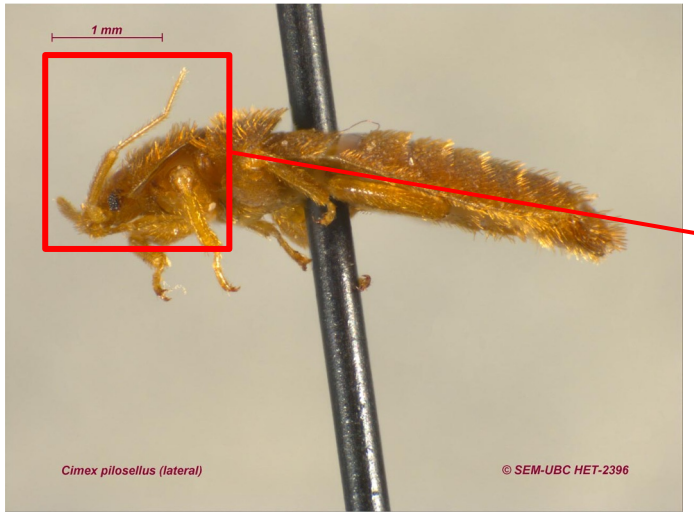
23.

- Antennae composed of three to six segments 24



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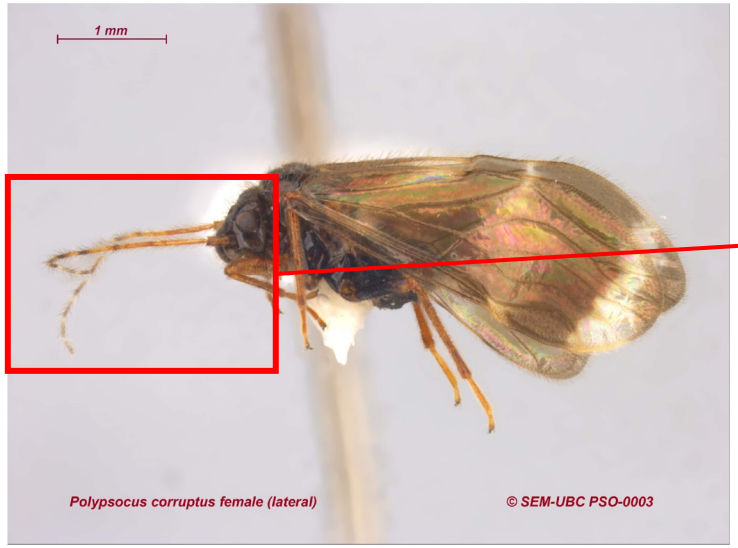
Examples:
2D: Bed bug;
Bed bug

- Antennae with more than six segments; very tiny insects that sometimes occur by the thousands in damp houses ..... **Order Psocodea (formerly Psocoptera**, book lice)



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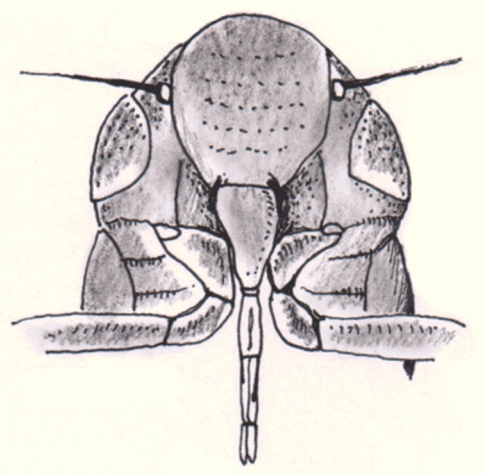
Examples:
2D: Book lice;
Bark lice

24.

- Mouth parts in the form of a distinct beak; body greatly flattened ..... **Order Hemiptera, Family Cimicidae** (bed bugs)

Piercing and sucking mouth parts:
Beak-like mouth parts with accompanying piercing mouth parts for piercing plants and sucking plant juice

Examples:
2D: Bed bug; Bed bug; Bed bug



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- Mouth parts not in the form of a beak; body not flattened ..... Collembola (springtails and snowfleas) (not within Insecta, Collembola is a Class within Hexapoda)

Examples:
2D: Springtail; Springtail; Snow flea

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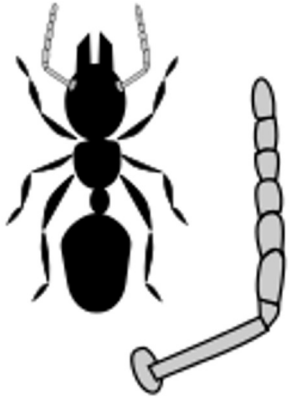
25.

- Antennae prominent 26

Examples:
3D: Ant

2D: Ant;
Ant



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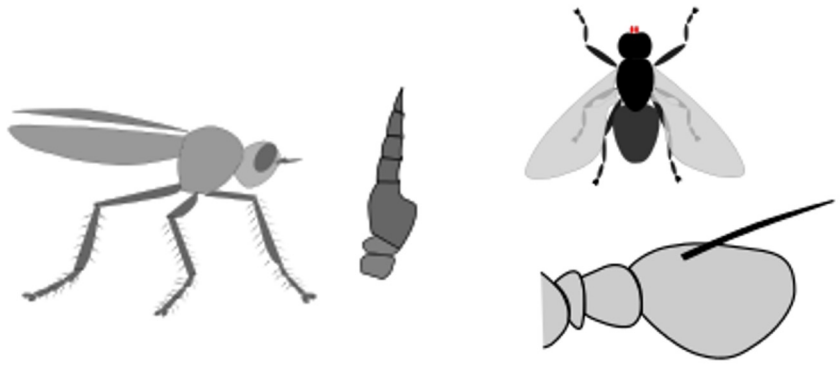
- Antennae inconspicuous, not projecting 27

Examples:
3D: Diptera (Hover fly);
Diptera (Fruit fly)
2D: Diptera (Thick headed fly);
Diptera (Blow fly);
Diptera (Thick headed fly);
Diptera (Bee fly)



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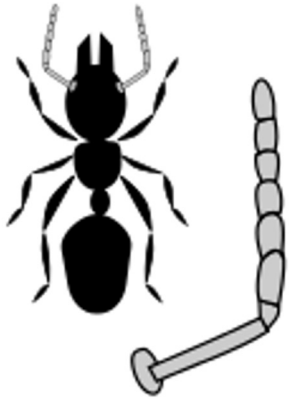
26.

- Body noticeably constricted at base of abdomen, antennae elbowed, the basal segment very long, tarsus five-segmented ..... **Order Hymenoptera, Family Formicidae** (ants)

Examples:
3D: Ant

2D: Ant;
Ant



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- Body not constricted at base of abdomen; antennae not elbowed, basal segment short, tarsus four-segmented ..... Isoptera (termites) **(within Order Blattodea)**

Examples:
2D: Termite; Termite;
Termite

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27.

- Body strongly compressed from the sides; abdomen distinctly segmented; coxae very large and strongly flattened; legs fitted for jumping .....

Order Siphonaptera (fleas)

Examples:
2D: Fleas;
Flea

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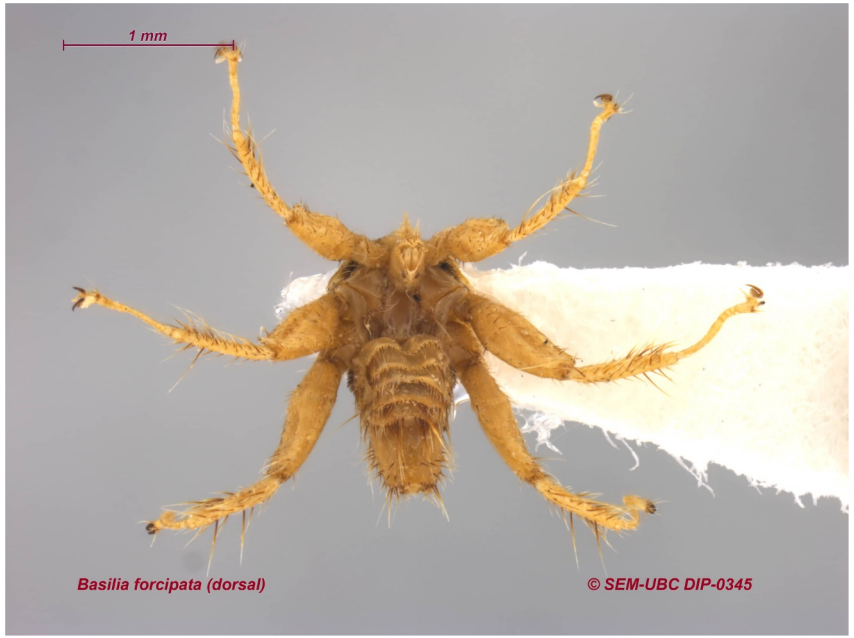
- Body flattened top to bottom; abdomen not distinctly segmented; legs not fitted for jumping .....

Order Diptera, in part, wingless forms (sheep ked and its relatives)

Examples:
2D: Bat Flies;
Bat fly



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