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A key to common adult insect taxa

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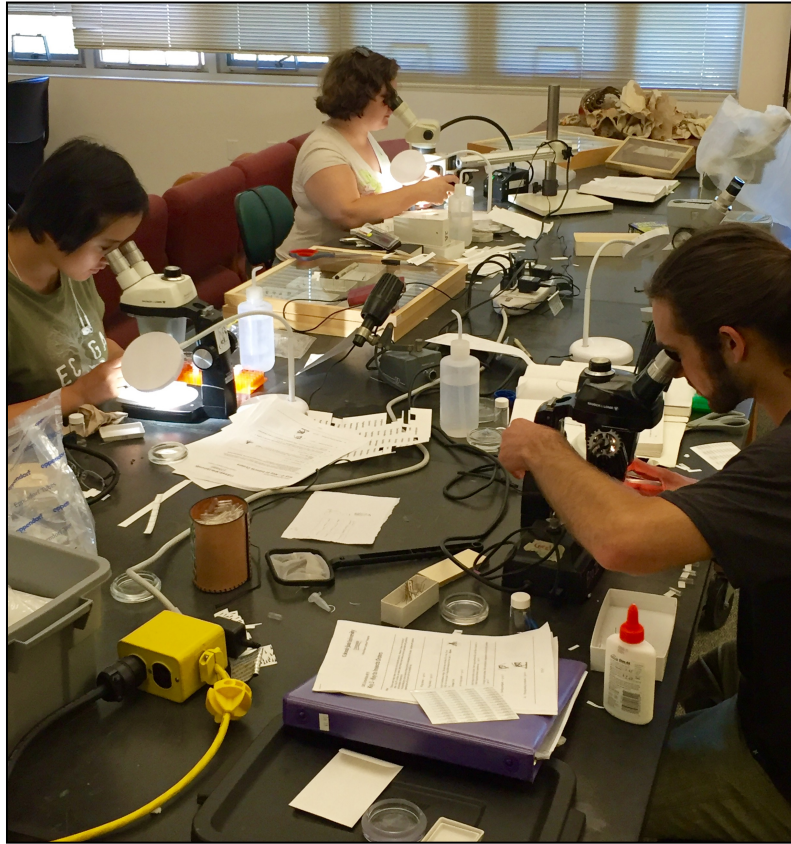
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A KEY TO COMMON ADULT INSECT TAXA

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INTRODUCTION

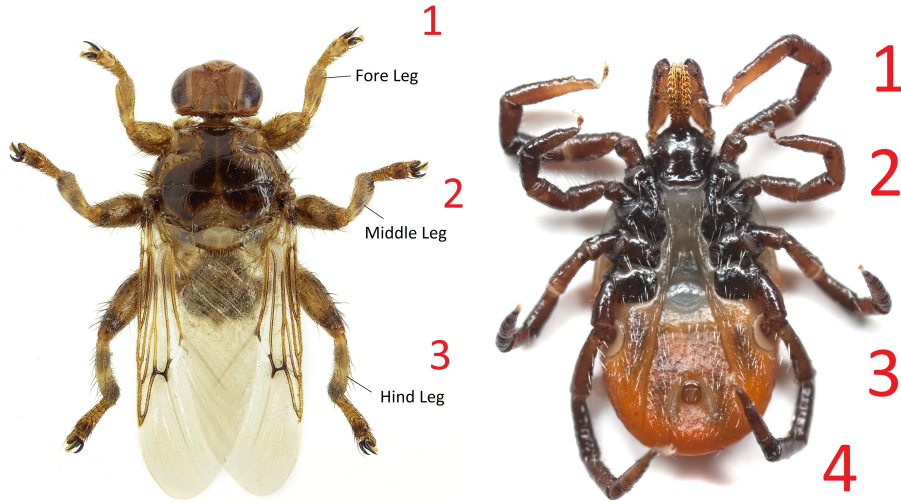
This guide was developed at UC Santa Barbara as a general guide for how to identify common insects to order. It was developed as a training guide for students that are unfamiliar with entomology or technical terminology, and is based on insects and other arthropods found near UC Santa Barbara in California. This key was developed as part of the Institute of Museum Library Services Grant (award #MA-30-16-0387-16) to curate and digitize the Adrian Wenner Historic Insect Collection at University of California, Santa Barbara.



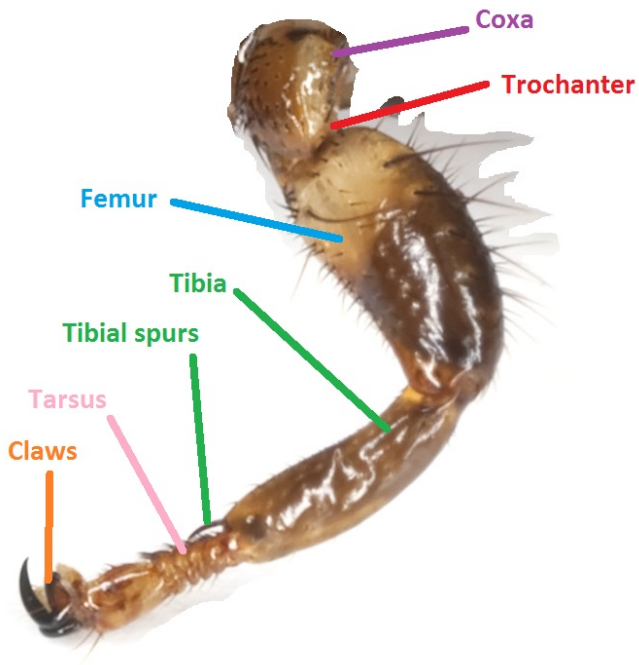
KEY TO COMMON ADULT INSECTS

1a 3 pairs of legs presentgo to 2

1b More than 3 pairs of legs present...**NOT AN INSECT!**



Pairs of legs = 1 leg on each side= 2 legs
For example, 3 pairs of legs = 6 legs total

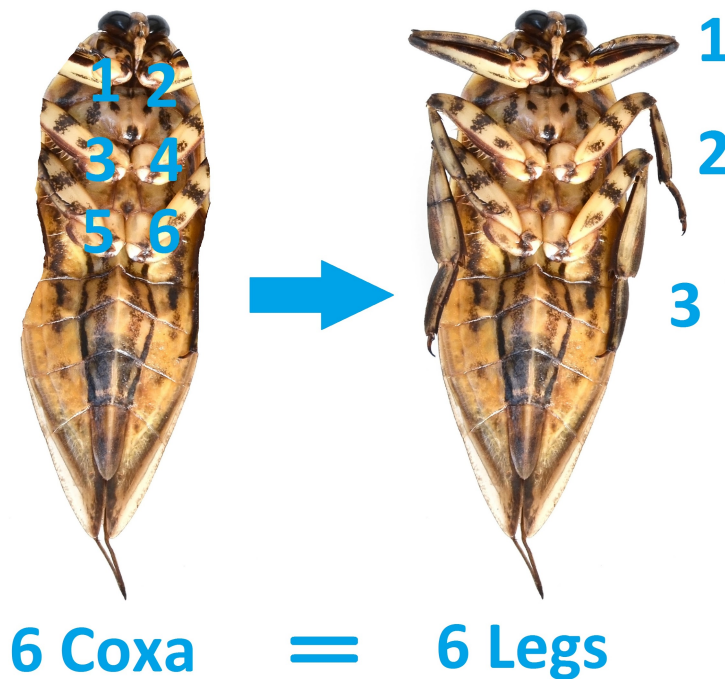


When legs are missing you will still be able to see how many should be there by looking at the **coxae**.

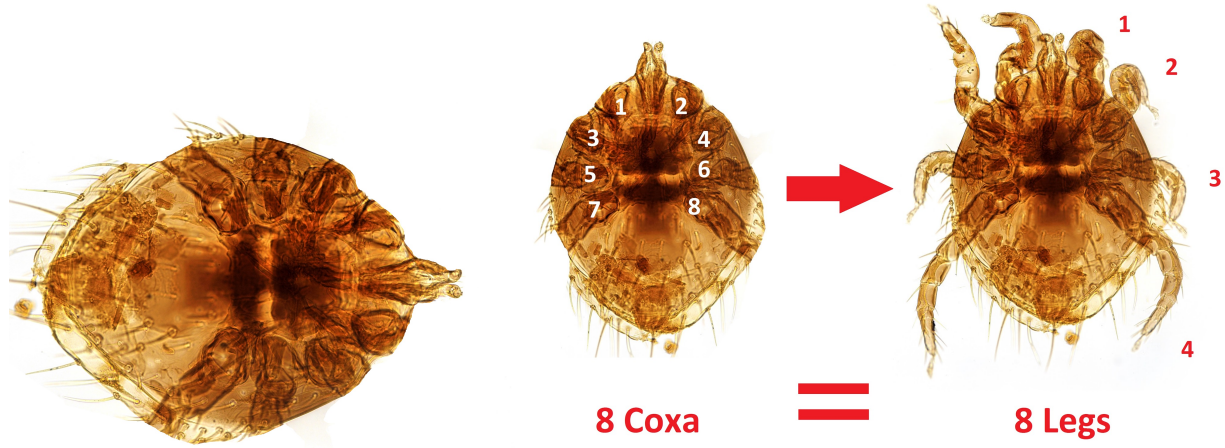
The coxae are the part of the leg that connects to the body. Just like how humans can't have an arm without a shoulder, an insect cannot have a leg without a coxa.

When an insect leg gets ripped off, the coxae usually remains on the body. By counting the coxae you can determine how many legs should be there.

Based on coxae, how many legs should this specimen have?



How about this next one?



(2) 2a 1 pair of wings...go to 3



2b 2 pairs of wings...go to 4



2c no wings...go to 9

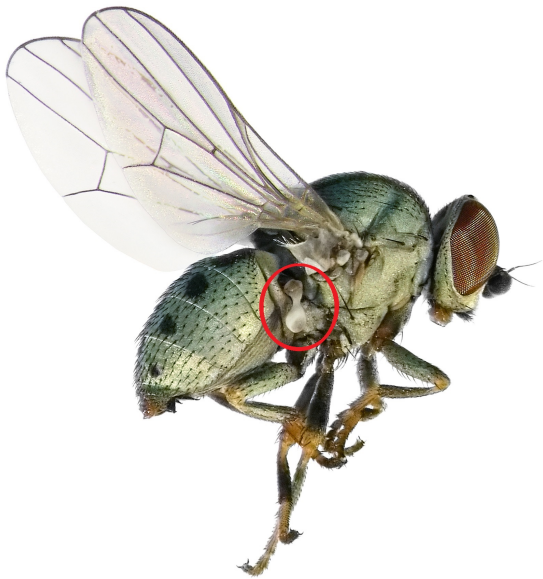


(3) 3a one pair of wings present with *halteres*

ORDER DIPTERA (FLIES):

will only have **1 set of wings** (2 wings total) and halteres

One of the most common orders and with a huge variety of shapes and sizes!!!



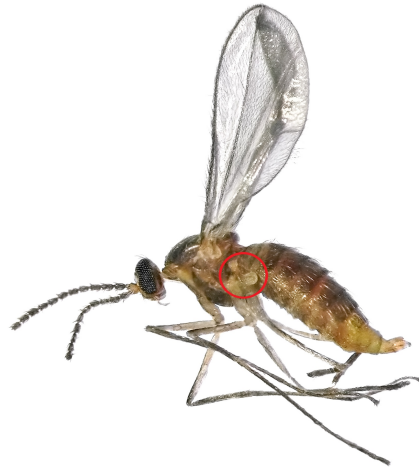
Circled in **red** is the **haltere**.

This is the **main way** you will be able to distinguish Hymenoptera from Diptera.

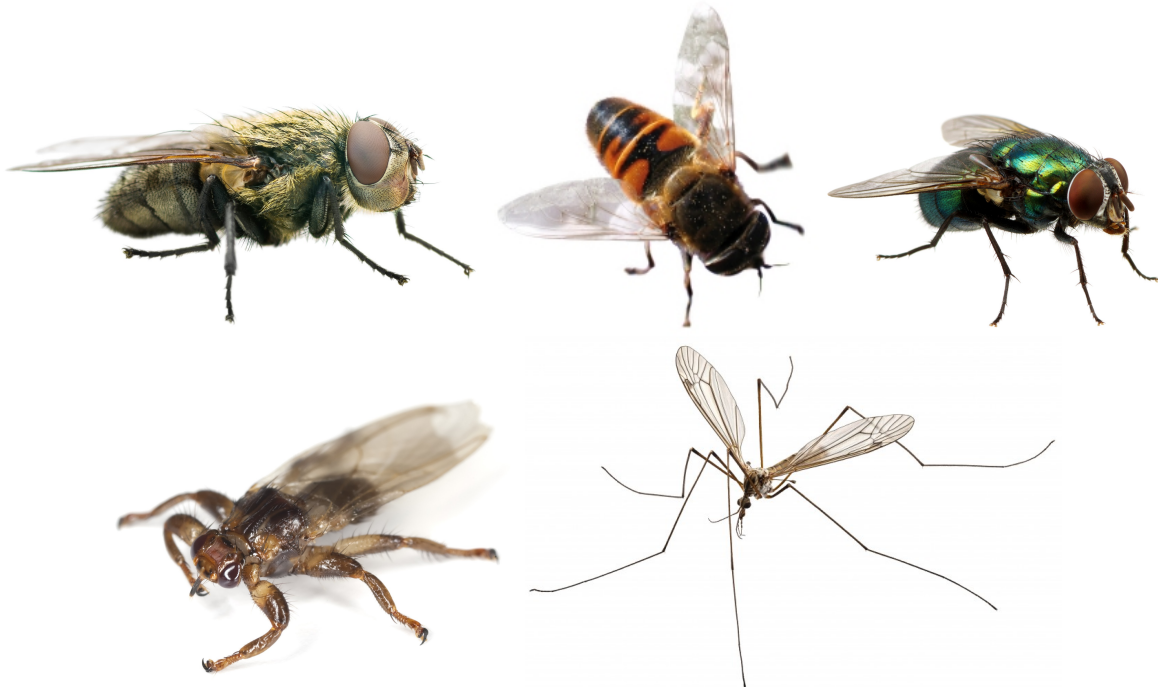
If you see a haltere you *know* it is Diptera, as Strepsiptera are extremely rare.

Look carefully, they can be covered by the wings and are variable in size, proportions, and color.

Two more examples of easily visible halteres:



****The halteres of the below Diptera are obscured. You will commonly have to examine your specimen more closely or at a different angle to get a better view. ****



3b 1 pair of wings and tail filaments no halteres

ORDER HEMIPTERA SUPERFAMILY COCCOIDEA (SCALE INSECT MALES):

Males of scale insects will look like aphids but with one pair of wings and tails, **don't have halteres**

They are *rare* to find in this area, as they do not eat and die quickly after reaching maturity.

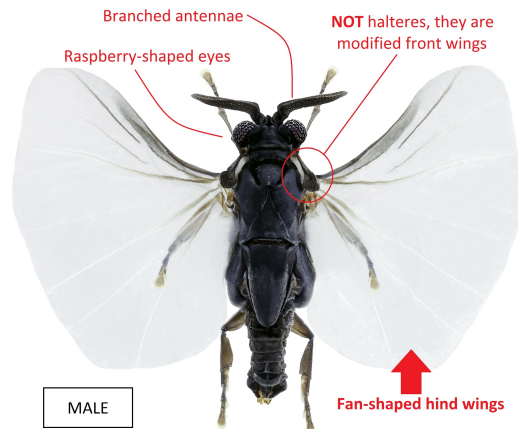


Note the one pair of wings, no halteres, and presence of tail filaments.

3c Front wings reduced and fan-like hind wings

ORDER STREPSIPTERA (MALES):

branched antennae, fan-like hind wings, and reduced front wings that look similar to a haltere

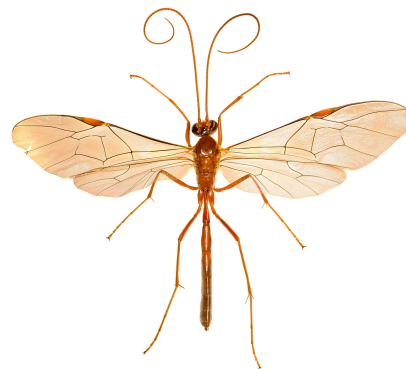


THESE ARE VERY RARE= You will probably not see these

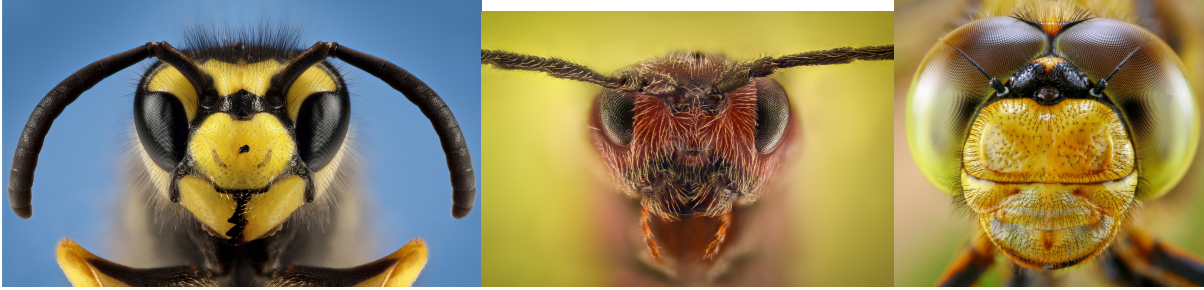
(4) 4a Front and hind wings not both membranous....go to 5



4b Front and hind wings are both membranous or they are covered in hair/scalesgo to 7



(5) 5a Chewing mouthparts...go to 6



5b Piercing-sucking mouthparts

ORDER HEMIPTERA (TRUE BUGS):

LOOK for **beak** mouth (sharp straw), they do not have mandibles (chewing mouthparts) like many other bugs! Also have 4 wings (2 sets) which are usually folded over each other

One of the *most common* and visually diverse group you will see around here.



Very diverse body form among families= look for the beak

Sometimes the beak may be hiding/folded underneath the body or hard to see



Some examples of beak placement in Hemiptera

(6) 6a Front wings leathery or hard with no veins that meet in a straight line....

ORDER COLEOPTERA:

4 wings but the front wings form a *hardened covering* and hind wings are membranous, the hardened covering forms a straight line down the back which is a great way to tell if you are looking at a beetle because for bugs like Hemipterans, the wings crossover

Another *very common* group you will collect.



Two very differently looking beetles, note that they both have the straight line down their back formed by the elytra



There is a lot of diversity in size and shape; Coleoptera can range incredibly in size. If you see something that looks like a really tiny beetle under a microscope, it probably is.

6b Overlapping wings that are more or less parchment-like with a network of veins

ORDER BLATTODEA (COCKROACHES):

Flattened oval bodies and long swept-back antennae. When wings are present (4 wings), they are held flat over the back, overlapping one another

Not common in the wild but will often be found within buildings/homes/trash.

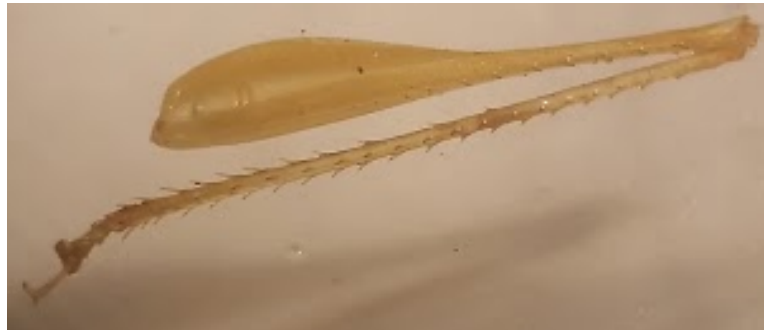


6c enlarged hind legs for jumping

ORTHOPTERA (GRASSHOPPERS/KATYDIDS/CRICKETS):

Hind legs long and enlarged for jumping, larger (5mm-12cm), front wings parchment-like and hind wings membranous

May be *common* though they can be difficult to catch.



A close-up of the enlarged hind leg of a katydid

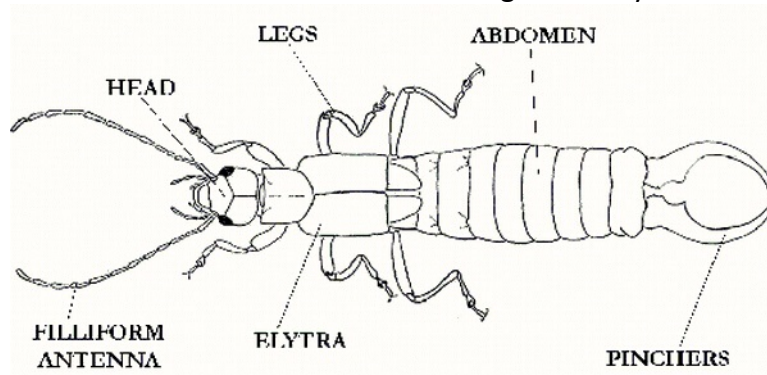


6d Very short front wings and pincers on the tip of the abdomen....

ORDER DERMAPTERA (PINCHER BUG/EARWIG):

Pincers on back, size of 6-35 mm (not counting cerci)

Common in these areas though not very diverse.



6e Front



wings more or less parchment like with a network of veins. Front legs modified to catch and hold prey.

Order Mantodea (mantis): characteristic mantis body, triangular head, raptor front legs for prey capture, (1.2 to 15 cm) long. *Rare* to find these in our area as they are quite seasonal.



(7) 7a All four wings membranous....go to 8



7b Wings completely or partially covered in powdery scales with coiled proboscis

ORDER LEPIDOPTERA (MOTHS AND BUTTERFLIES):

4 **scaly** wings, long proboscis (long, curly straw mouth)

lepidopteran mouths look and act like curly straws and are called a proboscis





7c Wings completely or partially covered in hair and WITHOUT coiled proboscis

ORDER TRICHOPTERA (CADDISFLIES):

4 hairy wings, no proboscis, wings held like a tent over the body





7d Wings with setae or fringes, sucking mouth parts, usually very small

ORDER THYSANOPTERA (THRIPS):

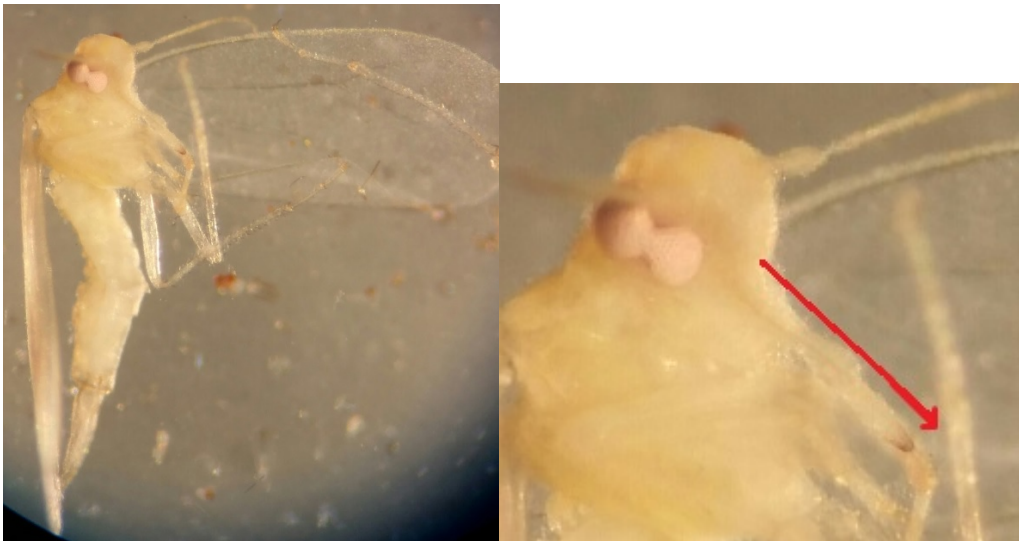
Sausage shaped (elongate), short antennae, hairy wings



(8) 8a Mouthparts are almost always elongated into a slender **beak**
Order Hemiptera (true bugs): LOOK for **beak** mouth (sharp straw), they do not have mandibles (chewing mouthparts) like many other bugs! Also have 4 wings (2 sets)

Another *common* Hemiptera group.

Examples of beak placement in Hemiptera



Can you spot the difficult-to-see beak on this Hemiptera?

Some beaks are difficult to spot, and you have to know what you're looking for.



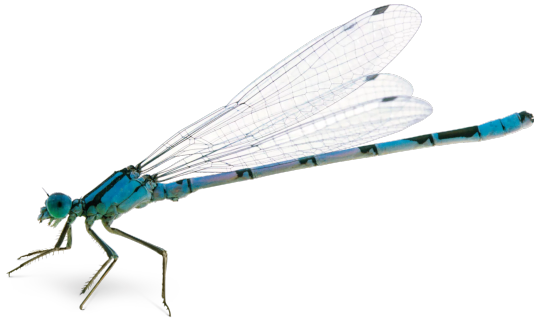
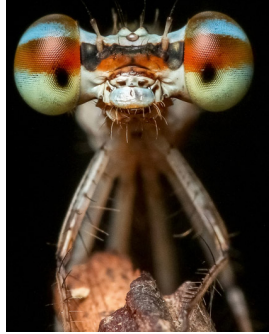
8b elongated, highly veined wings

ORDER ODONATA (DRAGONFLIES/DAMSELFLIES):

characteristic dragonfly body, large head with big eyes, elongate body with 4 membranous wings, and chewing mouthparts

Uncommon and difficult to catch, they are really smart and great at flying.





8c Front wings usually longer than hind wings

ORDER HYMENOPTERA (WASPS, ANTS, AND BEES):

May look fly-like but have 2 sets of wings (4 wings)

One of the most common groups you will find. Be sure not to get them confused with Diptera.

There is also an incredible size range in Hymenoptera (about 0.21 mm (about 0.008 inch) in length to the largest which may exceed 5 cm (about 2 inches) in length). Most of the really tiny fly-looking things you collect will be tiny hymenopterans



8d wings are held roof like over body and have prominent (dark and easy-to-see) veins

ORDER PSOCODEA:

Round head with bulbous face, hair-like antenna as long as or longer than body



They are quite diverse in appearance but clearly have the bulbous head and elongate antenna

8e long wings that are of equal length

ORDER BLATTODEA/ISOPTERA (EPIFAMILY TERMITOIDAE (TERMITES)):

Look like ants but lack the unique characters to be a Hymenopteran (wings are same length if has wings and no pinched waist) (3-20mm)



8f 4 veiny wings with chewing mouthparts

ORDER NEUROPTERA (LACEWINGS/ANTLIONS/ETC):

4 membranous wings with usually many veins, chewing mouthparts

Commonly collected in these areas.



The wings are large in comparison to the body and are also held roof-like over the body

8g 4 veiny wings and raptorial front legs

ORDER NEUROPTERA FAMILY MANTISPIDAE:

May look similar to mantises (Mantodea) but have long veiny wings characteristic of Neuroptera and can't use the raptorial front legs for walking

Very rare in these areas, you will probably not find these.



8h triangular wings, long tails

ORDER EPHEMEROPTERA (MAYFLIES):

Triangular wings held vertically over the body, long tails

Extremely seasonal and rare to find as adults.



8i elongated neck

Order Raphidioptera (snakeflies): long “necks”, neuropteran-like wings, very recognizable

Uncommon to find in these areas.



8j pleated wing patterns on top

ORDER MEGALOPTERA (ALDERFLIES/DOBSONFLIES):

Also neuropteran-like but have wings with pleated (diff pattern) sections and hind wings that are larger than the front wings

Extremely seasonal and *rare* to find as adults.

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8k two long tails and flat wings

ORDER PLECOPTERA (STONEFLIES):

Have two long tails, chewing mouthparts, the forewings are held flat to the abdomen. Extremely seasonal and *rare* to find as adults.



8l long face

ORDER MECOPTERA (SCORPIONFLIES/HANGINGFLIES,ETC):

Horse (long) **face**, thread-like antennae, chewing mouthparts. *Very rare*, you will probably not find these.



some males have what looks like a scorpion stinger but it is just male genitalia

8m enlarged hind legs for jumping

ORTHOPTERA (GRASSHOPPERS/KATYDIDS/CRICKETS):

Hind **legs** long and enlarged for jumping, larger (5mm-12cm), front wings parchment-like and hind wings membranous

May be *common* though they can be difficult to catch.



A close-up of the enlarged hind leg of a katydid



8n 2 small tails, fat feet in front

ORDER EMBIIDINA (WEBSPINNERS):

Cylindrical body, fat front feet used to make webs



(9) 9a Piercing-sucking mouthparts...go to **10**

Mouthparts will not always be easy to see. If you cannot see them look at all remaining couplets



9b Chewing mouthparts...go to **11**



9c Wings with setae or fringes, asymmetrical mouthparts for rasping, usually very small

ORDER THYSANOPTERA (THRIPS):

Sausage shaped (elongate), short antennae, hairy wings



(10) 10a Head and body distinctly separate

ORDER HEMIPTERA (TRUE BUGS):

LOOK for **beak** mouth (sharp straw), they do not have mandibles (chewing mouthparts) like many other bugs!



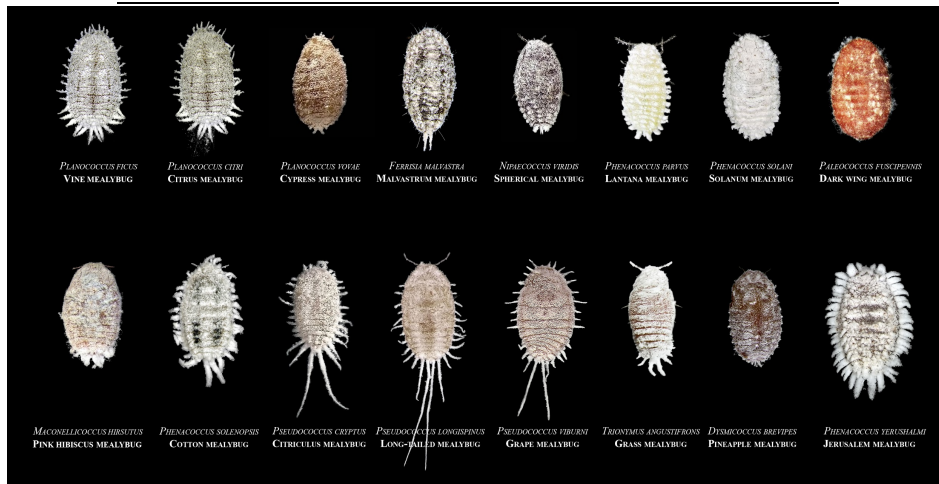


10b Head and body hard to tell apart

ORDER HEMIPTERA SUPERFAMILY COCCOIDEA (SCALE INSECTS):

Covered with a soft or hard waxy coating and attached to plants females are immobile and look like warts on a plant but they are actually Hemipterans

Common and in very large groups on plants



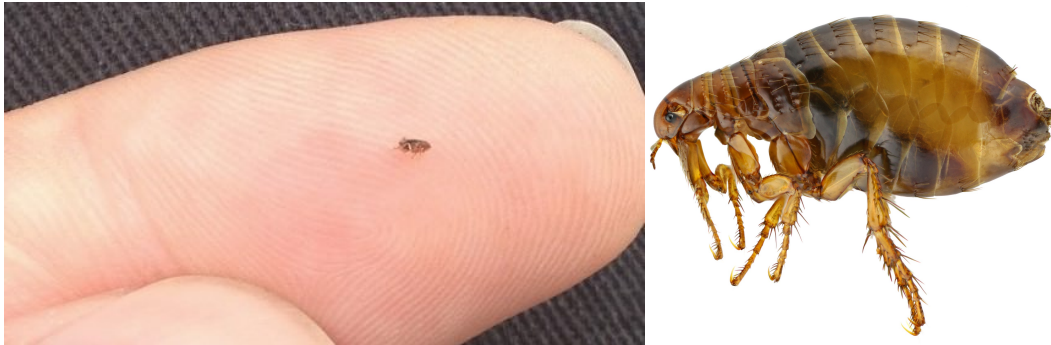
If you flip over the scale insect, you should be able to see all of the normal hemipteran characteristics (6 legs & beak)

10c flattened side-to-side, large hind legs

ORDER SIPHONOPTERA (FLEAS):

Tiny, hard-bodies, flattened sideways (hot-dog style), large hind legs for jumping and quick movements, sucking mouthparts

Common on domestic animals/pets



10d small, flattened parasites

ORDER PSOCODEA TAXON "ANOPLURA" (SUCKING LICE):

Head narrow and distinct claws

Can be found on humans. Head lice, pubic lice, body lice are in this group.



(11) 11a Ant-like...go to **12**

11b Not ant-like, with abdomen features...go to **13**

11c Not ant-like, without abdomen tail features...go to **14**

(12) 12a elbowed antenna, constricted waist, abdominal node

ORDER HYMENOPTERA FAMILY FORMICIDAE (ANTS):

Can be easily identified due to a distinct node (bump/ball) separating the abdomen from the thorax, they also have elbowed antennae (bent), these characters can help separate them from other wingless hymenopterans. Very common to collect, though native ants are hard to find so not very diverse.



A close-up of an ant, notice how the antennae are elbowed.

12b Antennae not elbowed, no abdominal node

ORDER HYMENOPTERA (WINGLESS WASPS):

Many groups have wingless varieties, they can look very similar to ants since they also have the constricted waist but they do not have an abdominal node or elbowed antennae



12c doesn't have a pinched waist, usually cream colored

EPIFAMILY TERMITOIDAE (TERMITES):

Can look ant-like but lack the unique characters to be a Hymenopteran

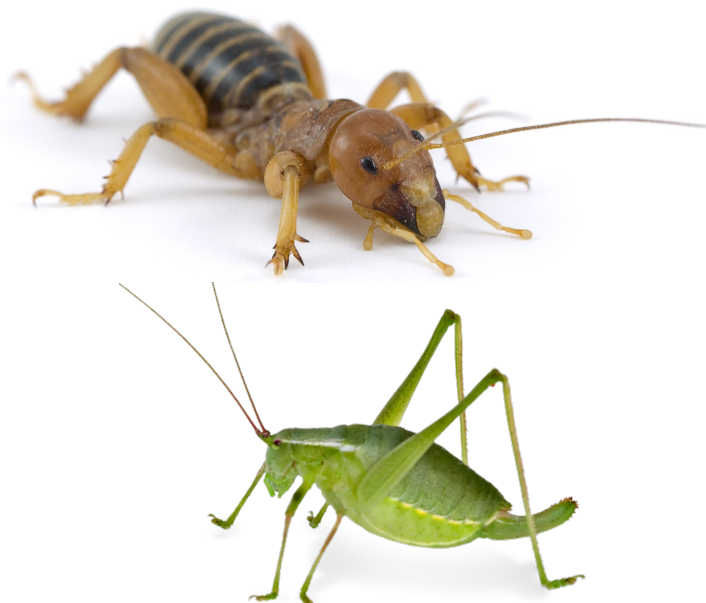
Common in this area both within homes/buildings and also in the wild under logs.

(13)

13a enlarged hind legs for jumping

ORDER ORTHOPTERA (GRASSHOPPERS/KATYDIDS/CRICKETS):

Hind **legs** long and enlarged for jumping, larger (5mm-12cm), thread-like antennae, 1 pair of tail-like cerci on most adults



13b elongated body

ORDER PHASMIDA (STICK INSECT):

Elongated body, legs very long and slender, chewing mouthparts, no enlarged hind legs



13c

ORDER ZYGENTOMA (SILVERFISH):

No wings, flat body, 3 “tails” of near equal length, long thread-like antennae, can’t jump



13d 3 tails with the middle tail much longer than the other 2

ORDER ARCHAEOGNATHA (JUMPING BRISTLETAILS):

Wingless, cylindrical body, also 3 “tails” with 1 longer than **the** other 2, large eyes that meet in the middle, can jump

Commonly collected in this area while jumping around.



13e 2 small tails, fat feet in front

ORDER EMBIIDINA (WEBSPINNERS):

Wingless, cylindrical body, fat front feet used to make webs



(14) 14a
ORDER PSOCODEA(BOOK/BARK LICE):

Very tiny (1-10mm), whitish body, look for characteristic rounded head and bulbous face

While they may all look quite different they still have the round, bulbous head and elongate antennae.



14b small, flattened parasites

**ORDER PSOCODEA -
“MALLOPHAGA” (CHEWING
LICE):**

wide heads, on birds



14c doesn't have a pinched waist, usually cream colored

EPIFAMILY TERMITOIDAE (TERMITES):

Can look ant-like but lack the unique characters to be a Hymenopteran. *Common* in this area both within homes/buildings and also in the wild under logs.

