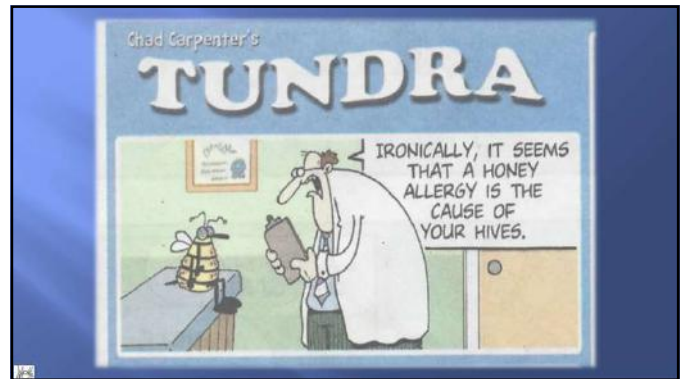


OSU EXTENSION SERVICE MASTER GARDENER™ PROGRAM

BASIC ENTOMOLOGY

Rich Little
OSU Extension Master Gardener Volunteer
Linn/Benton County

**Do not worry you
will not
remember it all, so
be sure to have fun !**

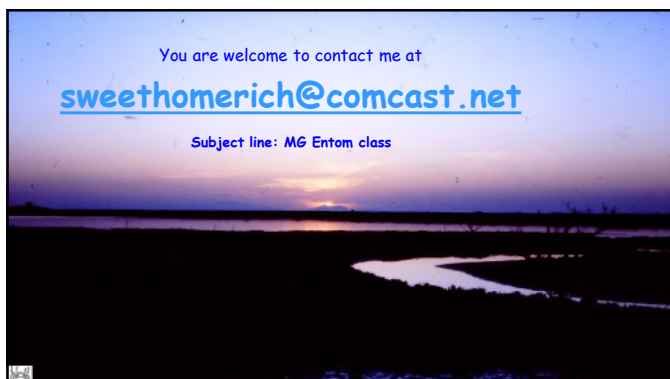
GOALS FOR TODAY

To have a basic understanding of and know how to identify some insects of concern, you may encounter some as a Master Gardener.

Know where to find and how to use the resources and references to further enhance your identification skills.

Who you can go to if you have 'bug' question later.

You are welcome to contact me at
sweethomerich@comcast.net
Subject line: MG Entom class



Three body sections, Wings, 3 Pairs of legs, 1 pair of antennae

Insects are the only invertebrates with wings.

Insects are the only adult invertebrates with 3 pairs of legs

1 pair of antennae, may be very small.



These are important parts to know about as they will help you identify the insect.

Mouthpart types
 Wing types
 Antennae types
 Legs

True Bugs: Hemiptera/Heteroptera
 (different wings)

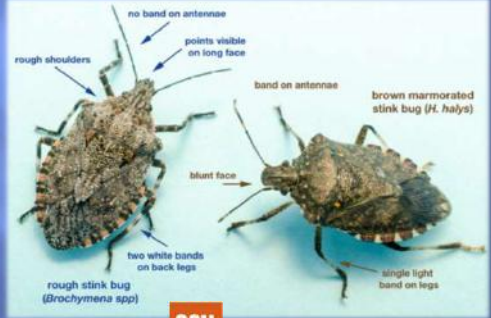
One of the most distinctive features of the Hemiptera, is the structure of the front wings. **hemi** = half, **ptera** = wings. The front half is thickened and leathery and the hind portion is membranous.




The BMSB is the only Oregon stink bug with distinct white bands on its antennae. Other OR stink bugs have dark antennae with at most less distinct pale markings.



Steve Valley, ODA



no band on antennae
points visible on long face
rough shoulders
band on antennae
blunt face
two white bands on back legs
rough stink bug (*Brochymena* spp.)
brown marmorated stink bug (*H. halys*)
single light band on legs

OSU Oregon State University
Department of Horticulture Web page
College of Agricultural Sciences on Brown Marmorated Stink Bug in Oregon

The BMSB has a 'smooth' shoulder. While the rough stink bug has a rough scalloped shoulder..



Steve Valley, ODA



Ants, Wasps & Bees:
Hymenoptera (membrane-wings)



When wings are present there are always 2 Pairs of wings (4 wings total).
Wings are membranous and clear and stiff with relatively few veins. Fore wings are about 1.5 to 2 times as long as hind wings.
Hymenoptera have unique hook-like setae (bristle) to hold the fore and hind wings together so they act as one wing.



Ants, Wasps & Bees: Hymenoptera

Antennae are usually filiform [thread like] or moniliform [beaded like a necklace].
Chewing mouth parts.
Have large compound eyes.




Ants, Wasps & Bees: Hymenoptera
Most Hymenoptera have a narrow waist (petiole).
An ovipositor is always present in females in one form or other, often adapted for sawing and or piercing and stinging.

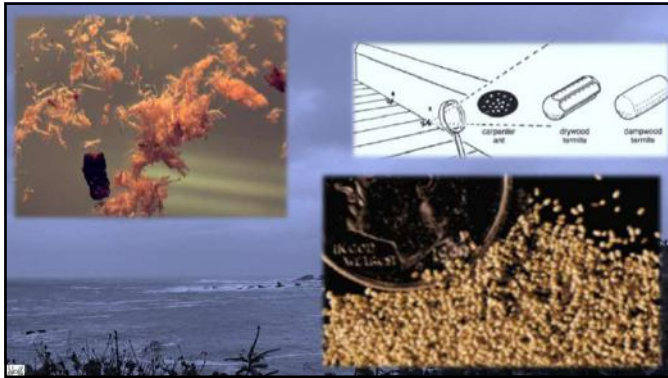
CARPENTER ANTS & TERMITES

Carpenter Ant **Termite**

Smooth thorax **One node**

Winged Carpenter Ant have two wings, different in size and shape.

Termites swarmer's have two wings that are similar in size and shape.



Asian giant hornet

Vespa mandarinia

Although it is not typically aggressive toward humans, this new unwelcome pest can inflict a powerful sting and also represents a threat to honeybees, for which they have a voracious appetite



This invasive hornet is typically almost an inch and a half long and are distinguished by their large yellow heads.

Asian giant hornets' nest in the ground. Though they are typically not interested in humans, pets or large animals, they can inflict a nasty sting if threatened or their nest is disturbed.



True Flies: Diptera

(Two-wings)

The unique differences that separate Dipterans from all other insects is the number of wings. Dipterans only have one Pair of wings (2 wings total).



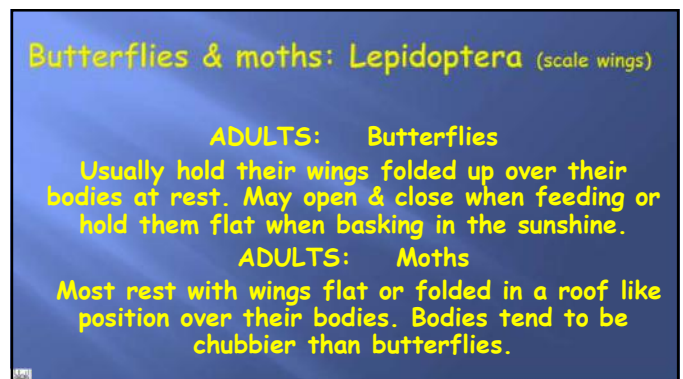
True Flies: Diptera

(Two-wings)

Wings with few or numerous longitudinal veins, few closed cells.

Dipterans wings have evolve with a high degree of adaptation for rapid, efficient flight.

Usually large compound eyes.



Butterflies & moths: Lepidoptera

(scale wings)

ADULTS: Butterflies

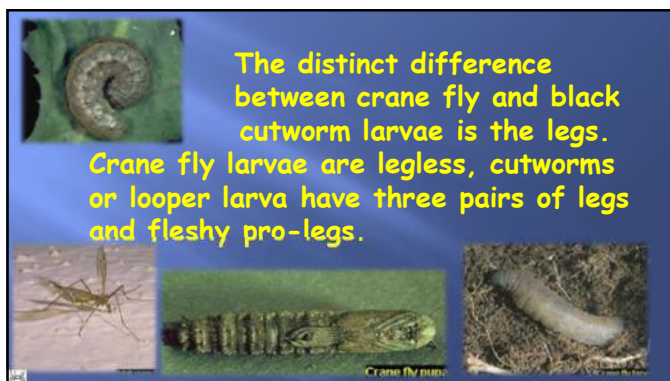
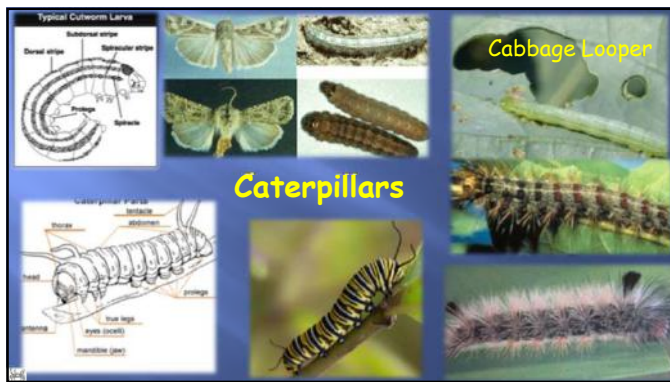
Usually hold their wings folded up over their bodies at rest. May open & close when feeding or hold them flat when basking in the sunshine.

ADULTS: Moths

Most rest with wings flat or folded in a roof like position over their bodies. Bodies tend to be chubbier than butterflies.



Butterfly & moth larva have chewing mouthparts. True legs are on the thorax, pro-legs found on the abdomen. Pro-legs are not true legs.
 Larva of butterflies are not fuzzy or hairy but may have spikes or spines.
 Larva of moths are usually fuzzy or hairy caterpillars.



Butterflies & moths: Lepidoptera


Chrysalis or Pupa: Butterflies
 Has smooth skin & hangs from a patch of silk usually on a plant part but not found in soil.

Cocoons or Pupa : Moths
 Plastered with silk threads. Cocoons found in the soil/dirt are moths.

If larva has many legs (real legs & pro-legs) its Lepidoptera

Beetles: Coleoptera


(sheath-wing)



When wings are present there are 2 Pairs. The most distinctive character of the Coleoptera is the front wings. The front wings [Elytra] are thickened, hard brittle or leathery. The hind wings of beetles fold under the elytra. This is accomplished by a complex series of folding creases and hinges.

Coleoptera: Beetles and weevils

Noticeable antennae almost always with 11 or fewer segments.
 Well-developed chewing month parts.
 Larvae: Head capsule, 3 pairs of legs on the thorax no legs on the abdomen (Weevil larvae lack legs on the thorax)
 Often antennae and legs fit into grooves or depressions on the body as further protection



Beetles



Adults are 1 to 1 1/2 inches long.

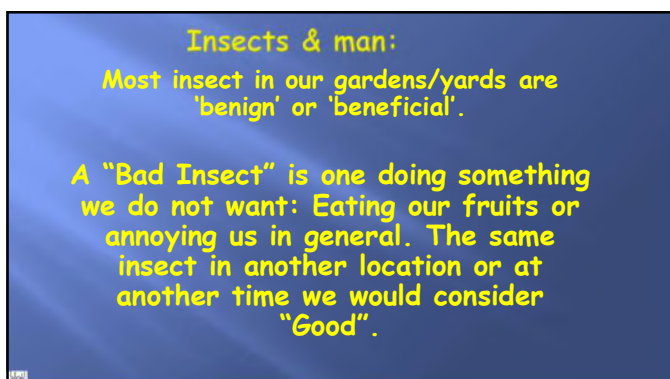
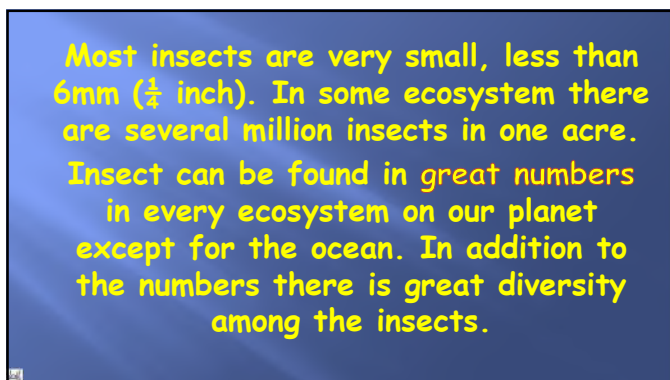


Who made that hole?

Beetles




Strawberry root weevil. (Photo: Ken Gray collection.)
 Black vine weevil. (Photo by John Copinera.)



Identification of insects is a visual process as you can hold the insect in your hand. (like you would a flower)

A good 10X hand lens will be one of your most useful piece of equipment.

Metamorphosis: (change in shape)

Is the term used to describe the different life stage changes in an insect.

No Metamorphosis:
No change in shape

Gradual or simple Metamorphosis:
Minor change in shape

Complete Metamorphosis:
Major changes in shape/form & biology

Gradual or simple Metamorphosis:

Egg-
Nymph-
Adult-

All life stages look similar. behave similar
Whole family can live and feed together.

ORDERS WITH GRADUAL METAMORPHOSIS		
Order/Common Name	Mouthparts	Wings
Orthoptera Grasshopper's Crickets	chewing	2 pair 1 st leathery
Hemiptera True bugs	piercing-sucking	2 pair 1 st halfwing
Homoptera Aphids, scales weevilsbugs	piercing-sucking both membranous	2 pair (some without)
Thysanoptera Thrips	rasping-sucking	2 pair fringed leathery
Dermaptera Earwigs	chewing	2 pair 1 st short wing cover

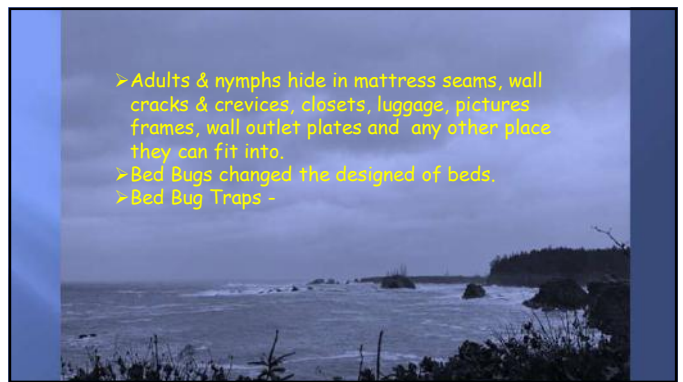
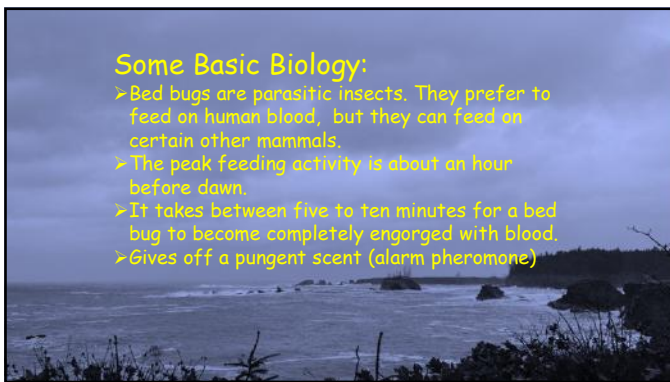
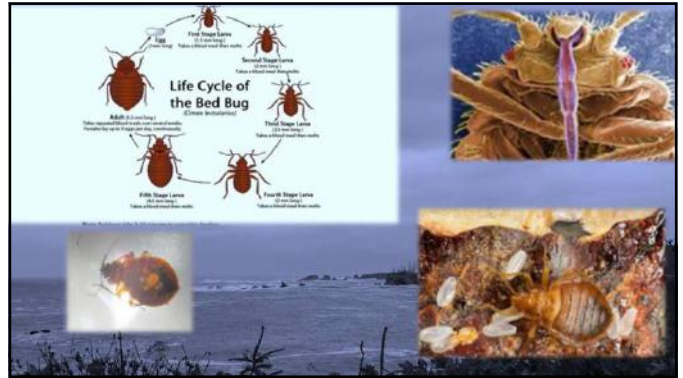
Complete Metamorphosis:

Egg-
larvae-
pupa-
Adult-

Larvae does not look like
Adult- are wormlike
Can live in different
environment
Eat different food

ORDERS WITH COMPLETE METAMORPHOSIS		
Order/Common Name	Mouthparts	Wings
Coleoptera beetles	adult: chewing larva: grub chewing	2 pair 1 st hardened wingcover (elytra)
Diptera flies	adult: sucking, sponging, etc. larva (maggot): chewing	1 pair
Lepidoptera butterflies moths	adult: siphoning larva (caterpillar): chewing	2 pair scales on wings
Neuroptera lacewings dobson	adult: chewing larva: chewing	2 pair not like veins
Hymenoptera bees, ants wasps	adult: chewing larva (grub): chewing	2 pair both membranous







Flies

Notes of interest
 "Fly" in name true fly (House Fly vs. Butterfly)

ADULTS:
 Short stubby antennae. Only one pair of wings

Larva: Have no legs (Crane Flies & Cutworms)

Flies

SPOTTED WING DROSOPHILA (SWD)

Drosophila suzukii

Adult SWD flies resemble the common vinegar flies, frequently seen in your kitchen. At 2-3 mm in length, SWD have red eyes and a yellowish-brown-colored body and striped abdomen

(photo courtesy of John Davis, <http://bugguide.net/user/view/4793>)

SWD Identification – key characters

Male	Female
<p>Black spots on wings</p> <p>2 black combs on front legs</p>	<p>Female ovipositor (saw-like) inserts into only fully ripened eggs. The ovipositor looks under all seeds</p>

Male: black spots near the tip of each wing and 2 black combs on each front leg (foot). **Females:** have a saw-like ovipositor that they use to insert their eggs into ripe fruit

Larvae in Raspberry
(Photo by Ed Show)

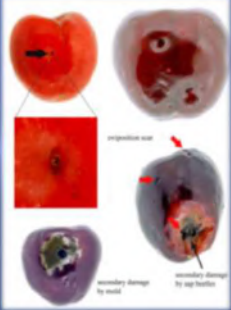


SWD Male on Raspberry to give a sense of size
(Photo by Ed Show)



(T. Hueppelshouser, British Columbia Ministry of Agriculture and Lands)
http://cifr.ucr.edu/spotted_wing_drosophila_cherry_vinegar_fly.html

In Asia, SWD has been reported damaging primarily cherries, but has been recorded infesting other thin skinned fruits, namely apple, blueberry, grape, peach, persimmon, and plum. Numerous generations per season will result in heavy losses for cherries and other fruit.



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