

# Bedbug Feeding



# Aphids

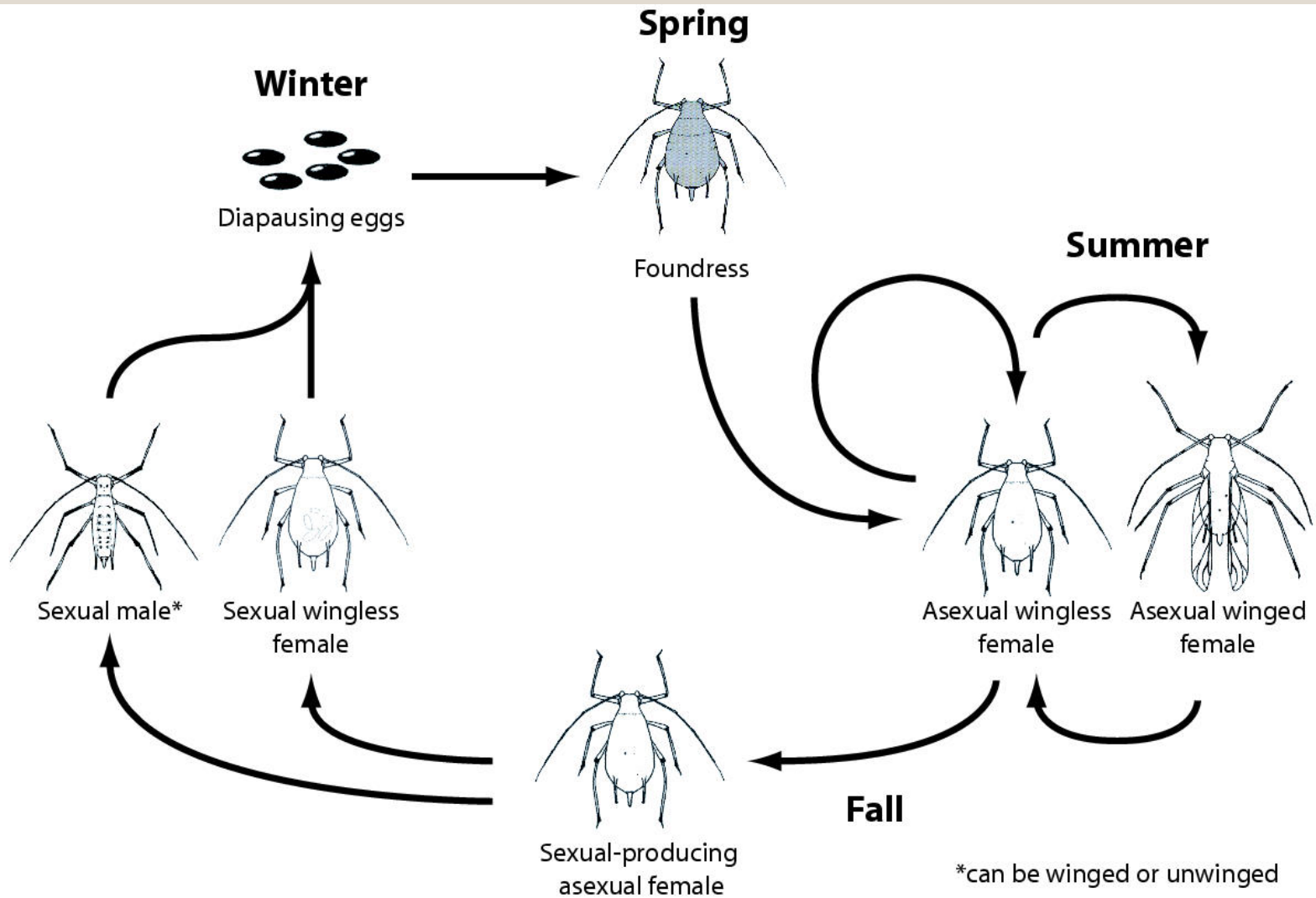
- Small soft bodied (2-6 mm).
- Globular in shape.
- Cornicles nearly always present near posterior end of the abdomen.
- Winged or Wingless.
- Piercing sucking mouthparts (honeydew).



# Aphids



# Aphid Lifecycle





# Aphid Lifecycle



# Aphid Infestations



WASH



Brian McCornack, University of Minnesota.



# Aphid feeding



# Some Major Aphid Pests of Washington

Aphid	Key Plant Host	Winter Stage/Site
Maple aphid	Acer sp.	Main species as egg*/bark
Conifer aphids (Cinara sp.)	Conifers	Egg*/needles and bark
Cherry aphid	Prunus sp.	Egg*/bark
Apple aphid	Malus, Pyrus, Crataegus sp.	Egg*/bark
Rosy apple aphid	Malus sp.	Egg*/bark
Woolly apple aphid	Malus sp.	Mobile immatures/bark & roots
Rhododendron aphid	Rhododendron sp.	Unknown
Birch aphid	Betula sp.	Probably egg*/bark
Willow aphid	Salix, Pyrus, Populus sp.	Probably egg*/bark
Spruce aphid	Picea sp.	Adults, immatures/needles
Leafcurl plum aphid	Prunus sp.	Egg*/bark
Green peach aphid	Many, especially Prunus sp.	Primarily Egg*/bark or buds
Poplar gall aphid	Populus sp.	Egg*/bark



# Aphid Control



# Aphid Control



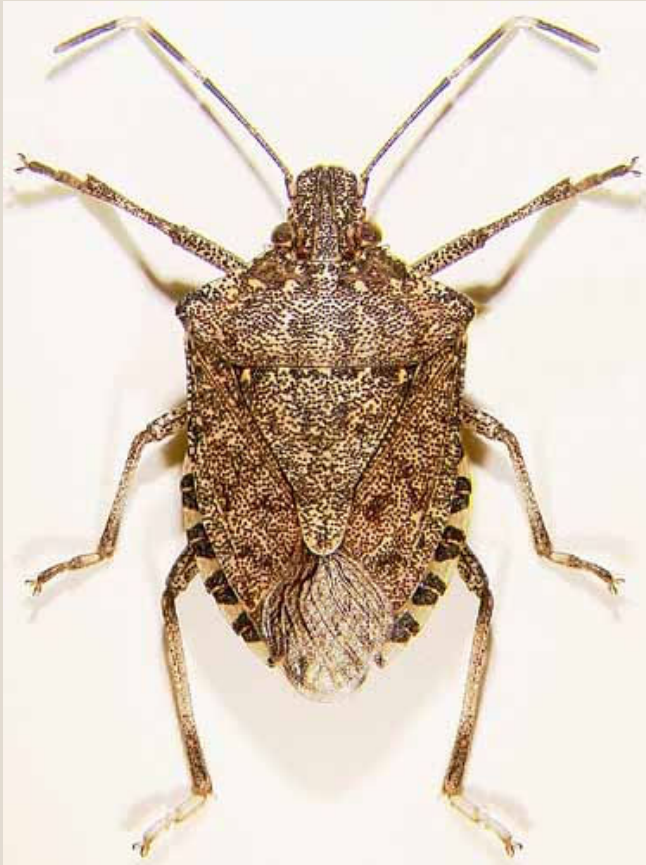
# Aphids





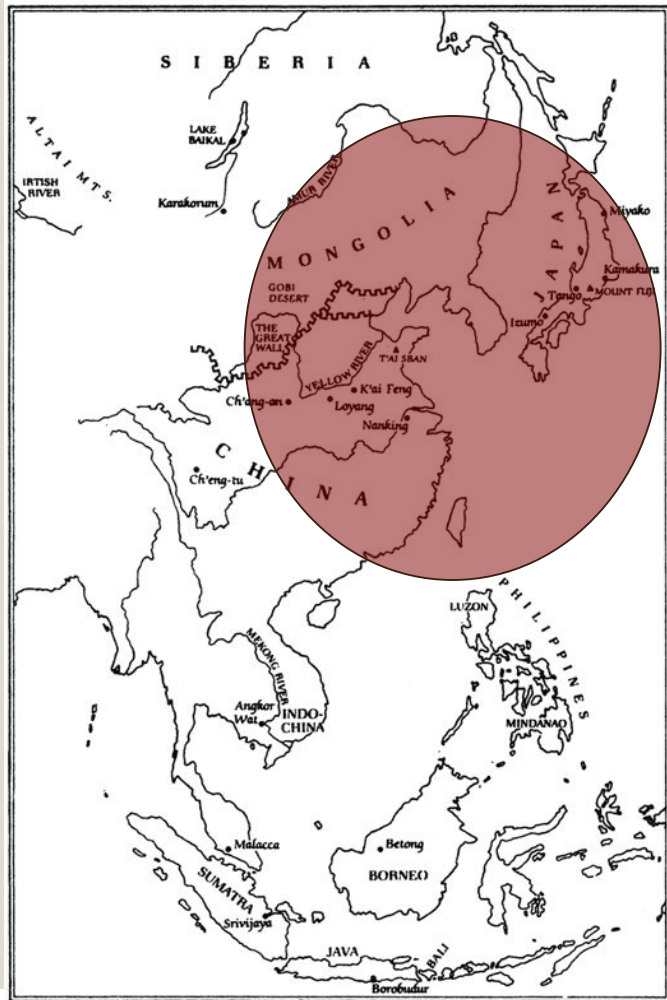
# Brown Marmorated Stink Bug

- *Halyomorpha halys* (Hemiptera: Pentatomidae)





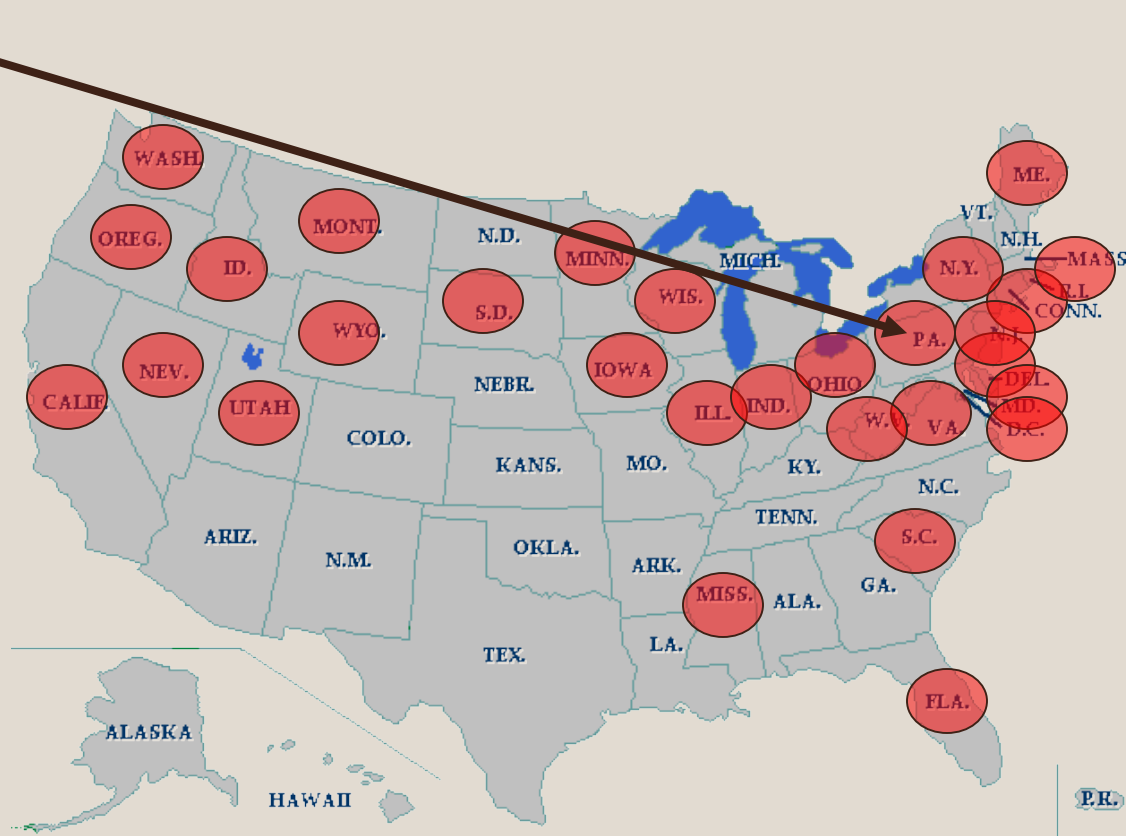
# Brown Marmorated Stink Bug – Native Range



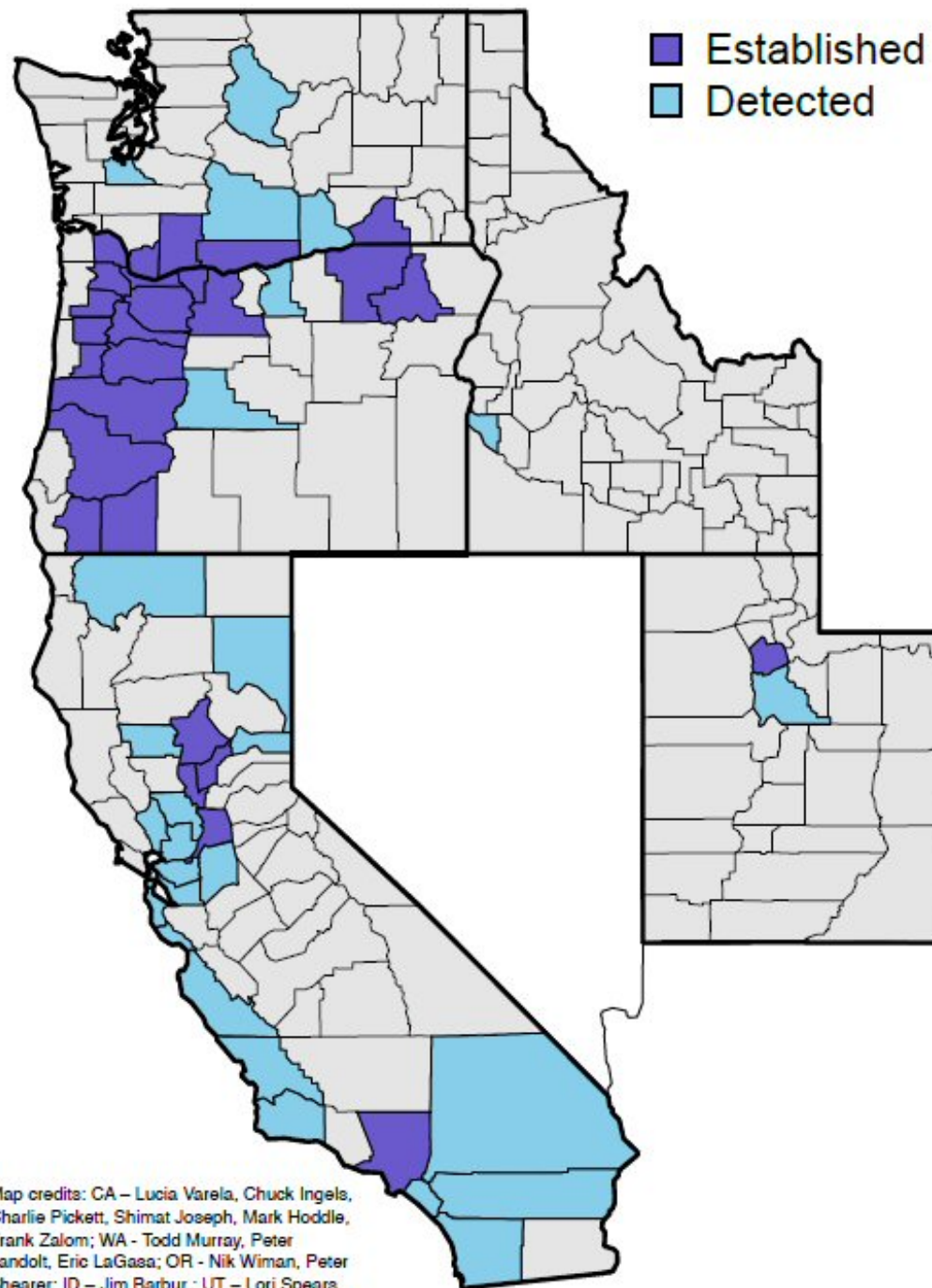
- Japan, Korea, Taiwan and China

# Brown Marmorated Stink Bug – North America

2001, Allentown PA



# The Spread



# Brown Marmorated Stink Bug - Life Cycle

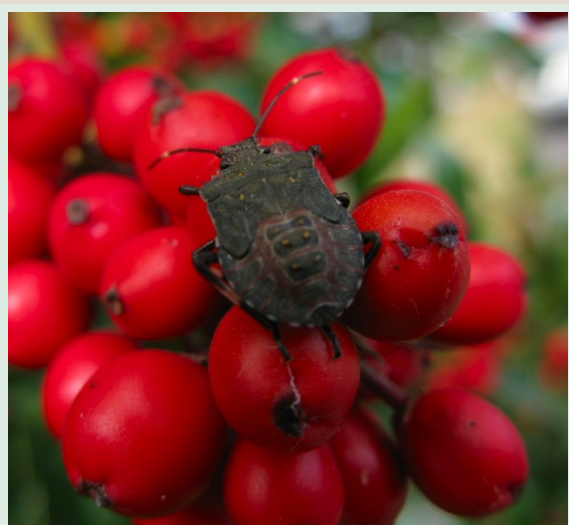
- 200-500 egg/female.
- Eggs laid in clusters of 25-30.
- Eggs begin hatching in May/June.





# Brown Marmorated Stink Bug - Life Cycle

- Five growth immature stages (instars).



# Brown Marmorated Stink Bug - Life Cycle



- Overwintering adults emerge in early spring.

# Brown Marmorated Stink Bug - Life Cycle

- Winter aggregations.





# Brown Marmorated Stink Bug – Hosts

*Paulownia  
tomentosa*  
Royal Princess  
or Empress  
Tree



*Tree of Heaven*  
*Ailanthus  
altissima*





# Brown Marmorated Stink Bug – Hosts



- Within Asia, 300 host plant recorded. US surveys identified over 60 hosts including:
- apple, plum, peach, pear, cherry, raspberry, blueberry, grape, pecan, bell pepper, tomato, pole/bush beans, cucumber, sweet/field corn, soybean ornamental trees and shrubs (maple, holly, dogwood, crabapple, hawthorn, elm, sycamore and serviceberry).

# Brown Marmorated Stink Bug – Agriculture Pest Status



- Severe damage in Mid-Atlantic states in 2009-2010. \$37 million in damages to apple growers in MD PA and WV.
- 20%-100% crop loss.

# Brown Marmorated Stink Bug – Ecological Impacts



- Feeds on unknown number of native hosts.
  - Oregon grape
- Overwinters underneath tree bark.



# Order Mantodea: Preying Mantis







# Order Mantodea: Preying Mantis



**Snake anyone?**





# Order Mantodea: Preying Mantis



**So why does she  
eat the male?**





**Egg case =  
ootheca**



# Will my Praying Mantis make a Good Beneficial Insect?



**YUM, Honey Bee**

# Thrips

## Order Thysanoptera

- Small linear insects with piercing-rasping mouthparts.
- Scarring, blemishes and/or spots may be produced around egg laying puncture wounds.
- Known to vector several viruses.

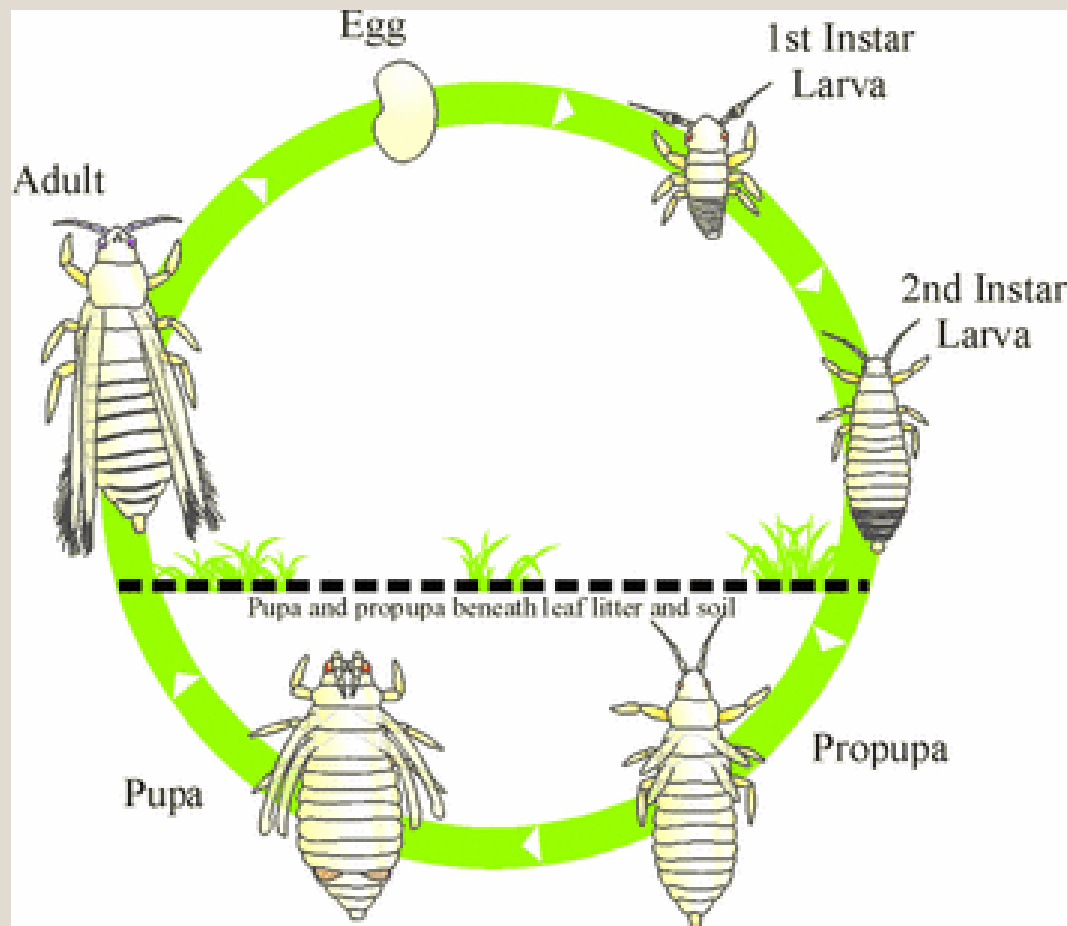




# Thrips



# Thrips Lifecycle



# Thrips





# Thrips

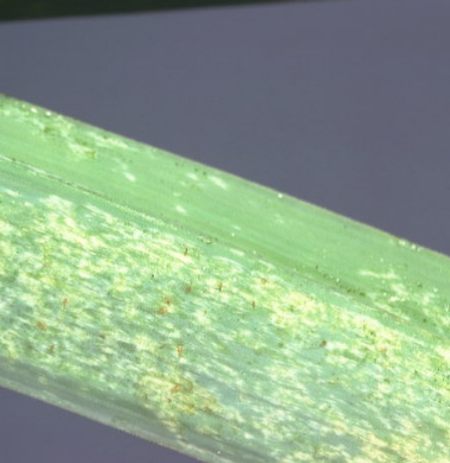


# Thrips





# Thrips Damage



T. Smith, UMass



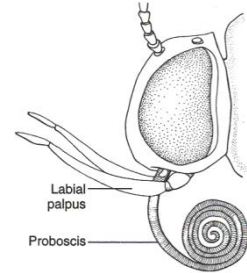


# Order Lepidoptera

*lepto* = scale, *ptera* = wing

## Common Lepidopteran Traits:

- Complete Metamorphosis.
- Wings almost always covered with scales.
- Wings relatively large compared to body.
- Front wings larger than hind wings.
- Mouthparts sucking; proboscis almost always forming a coiled tube (in adults).
- Major pollinators.
- Larvae (Caterpillars) have chewing mouthparts
  - Voracious feeders
  - Can be plant pests



(a)



© Bryan F. Reynolds

# Butterflies – Most Recognized Insect Group

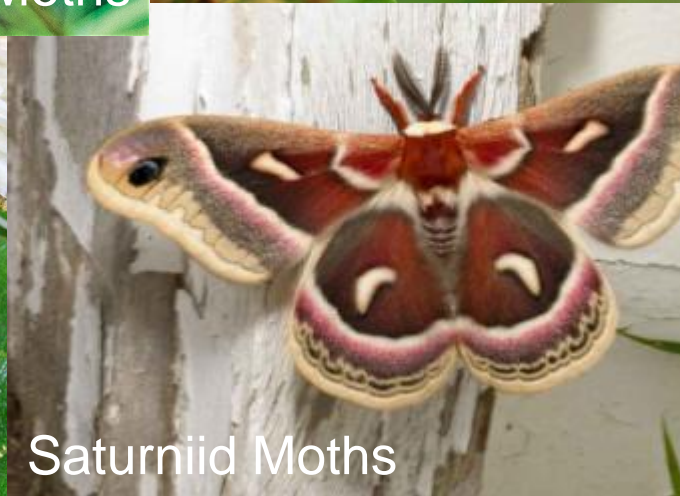




# Moths

## Moths

(2-3 mm up to 9.8 inches)



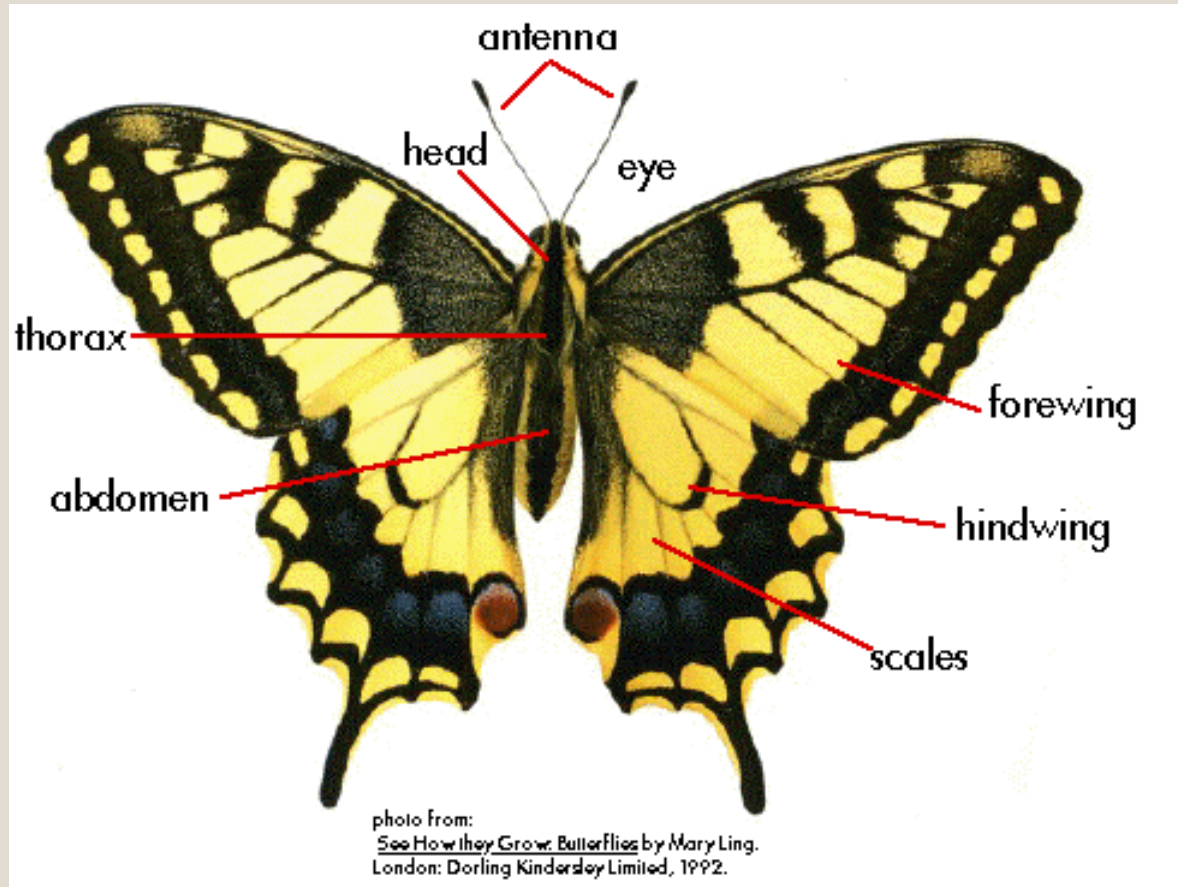


# Difference Between Butterflies and Moths

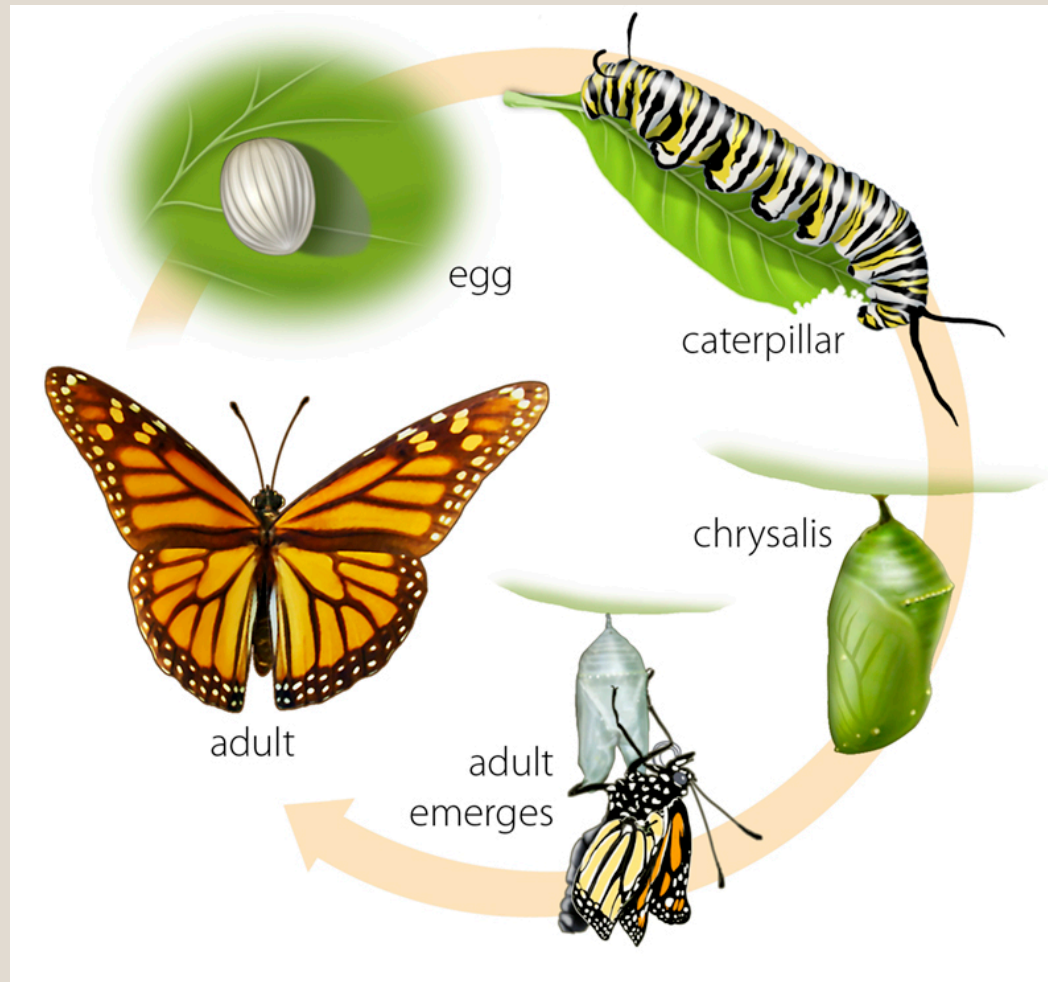
## Comparison chart

	Butterfly	Moth
Number	825 species	About 12,000
Activity period	Active mostly during the day	Active mostly at night
Antennae	Long and thin, swell at end	Short and feathery
Resting posture	Usually with wings closed	Wings usually open
Mating Selection	Use sight to select mates	Use scent to select mates
Size	Small to Large	Smaller (Micro) / Larger
Body Temperature Regulation	Uses the sun to warm up.	Moves wings to warm up
Pupa	Makes a chrysalis hanging from a branch or other support	Makes a cocoon underground or on the ground
Color	Usually bright	Usually less bright than butterflies

# Parts to a Butterfly



# Butterfly – Life Cycle





# Butterfly Caterpillars



# Butterfly - Pupa

- The larva transforms into a pupa (or chrysalis) by anchoring itself to a substrate and molting for the last time.





# Swallowtail



# Monarch





# Tomato Hornworm



Egg



Larva

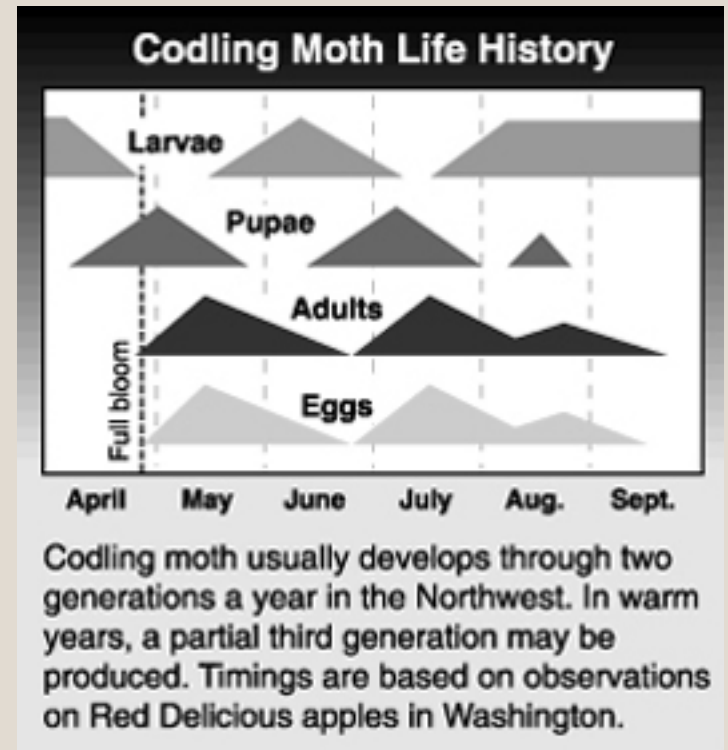


Pupa



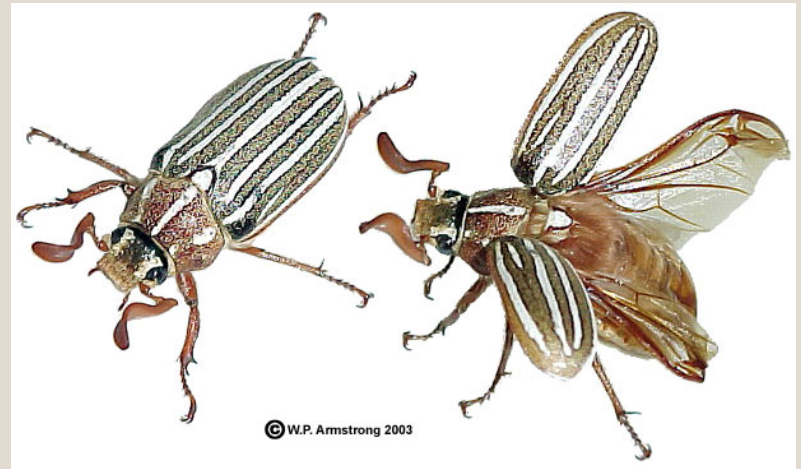
Adult tomato hornworm

# Codling Moth



# Order Coleoptera – “sheathed wing” Beetles, Weevils

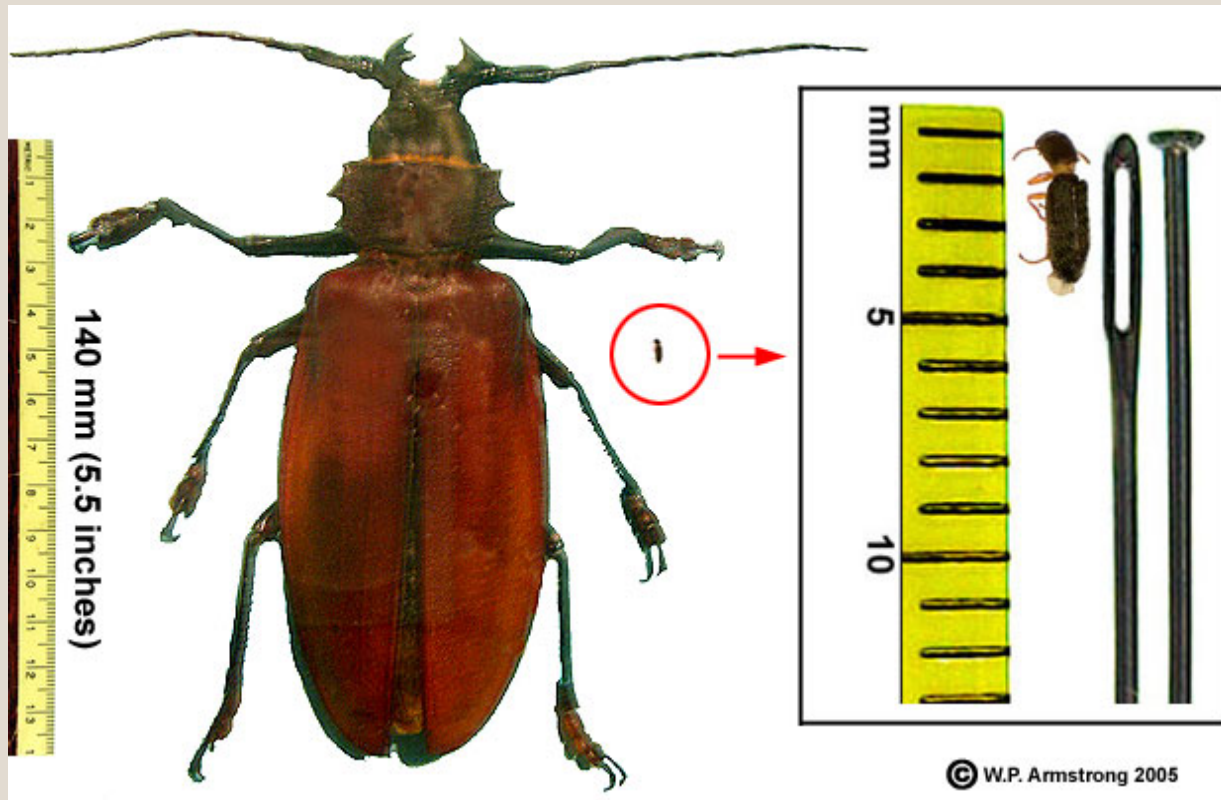
- Complex metamorphosis.
- Chewing mouthparts - larvae and adults.
  - Feed on leaves, stems, roots, buds, flowers, fruits, seeds, or woody tissue.
- Adults winged.
  - outside wing hardened.
- Some predators (beneficial).
- Some pollinators (beneficial).
- Some plant feeders (pest).
- Most abundant animal on earth.





## Gee Wiz Facts About Insects # 3.

### *Largest Insect?*



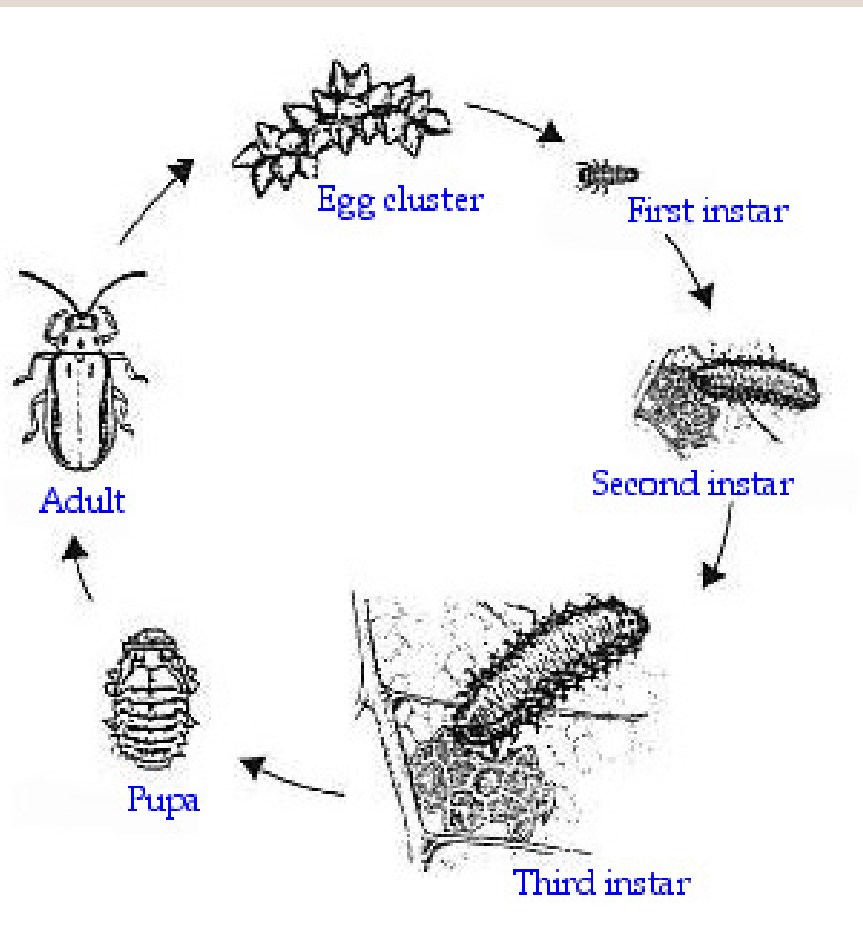
***Titanus giganteus*; up to 17 cm (=6.69 inches)  
and can weigh 88 grams (453 g = 1lb)**

# Elm leaf beetles (chrysomelidae)



- Leaf beetles are one of the largest families in the Order Coleoptera.
- All species feed on plants in both adult and larval stages.
- Many are brightly colored or have stripes on their elytra.

# Elm leaf beetle Life Cycle



LIFE-CYCLE STAGES OF ELM LEAF BEETLE INDICATING SUITABLE TIMES TO TARGET CONTROL MEASURES

MONTH	EVENT	ACTION
Aug/Sept	Hibernation	Soil injection
October	Beetle emerges	Foliage sprays
November	Eggs laid	Foliage sprays
December	Larvae	Foliage sprays Trunk banding
January	Pupae	Trunk banding
February	New adults	
March/April	Hibernation	



# Elm leaf beetle Damage

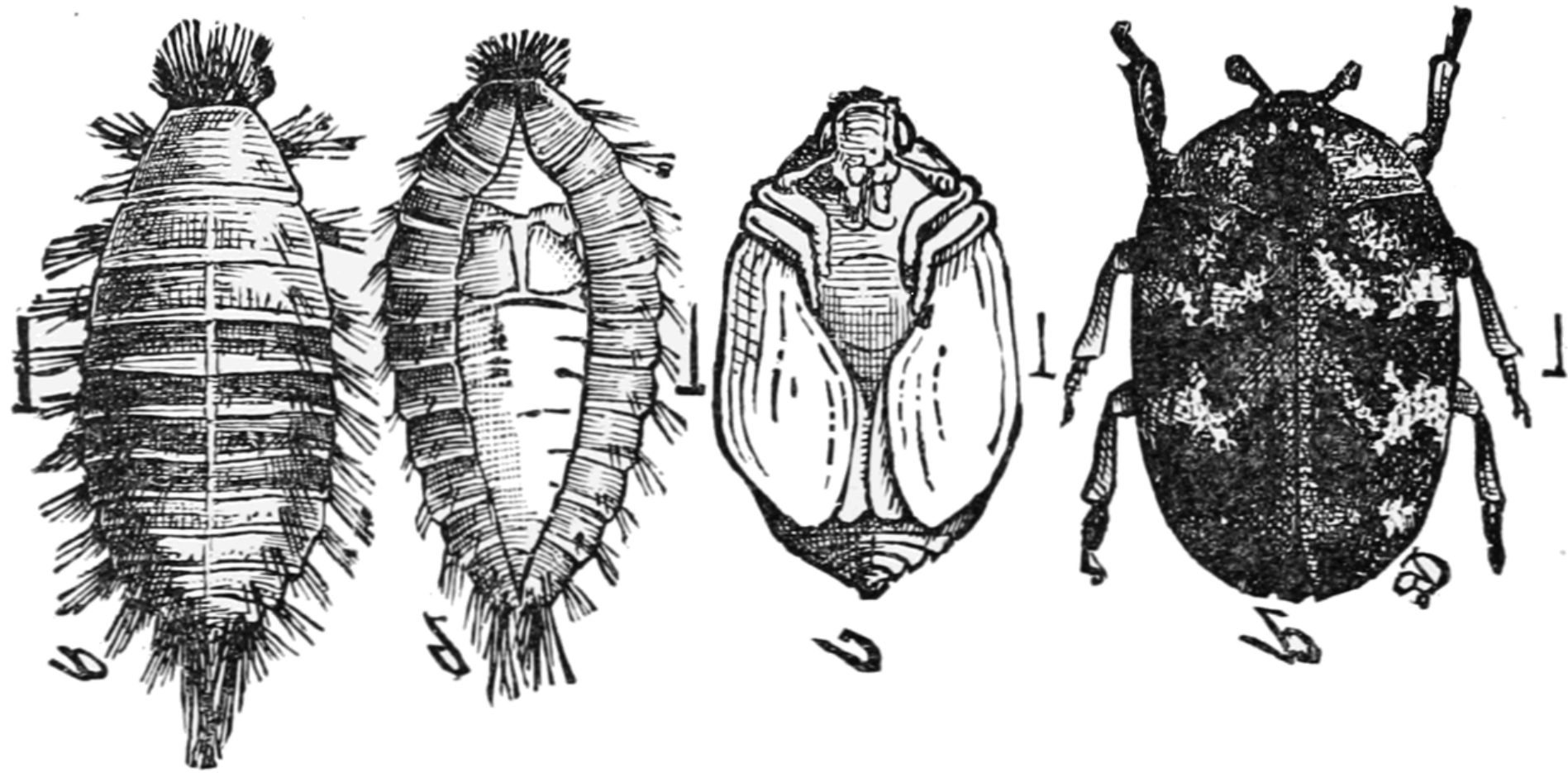


# Dermestid Beetles





# Dermestid Beetle Life cycle





# Dermestid Beetle Larva



# Dermestid Beetle Damage



# Dermestid Beetle Damage





# Dermestid Beetle Damage

