

Module 9 – Insects & Other Garden Pests

LSU AgCenter Home Gardening Certificate Course

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Entomology

1. Entomology is the scientific study of insects.
2. More than one million different insect species have been described.
3. They are the most abundant group of animals in the world and live in almost every habitat (not so much in oceans).
4. Less than 1% of insect species are pests and only a few hundred are consistently a problem.

Basic Insect Classification

Kingdom: Animalia (all animals)

Phylum: Arthropoda (all arthropods)

- 1.Exoskeletons made of chitin
- 2.Highly developed sense organs
- 3.Jointed limbs
- 4.Segmented bodies
- 5.Ventral nervous system. Arthropods' nervous systems run along the front of their bodies.
- 6.Bilateral symmetry. This means that the left and right sides of an arthropod are the same.

Basic Insect Classification

Class: Insecta (only the insects)

1. Three pairs of legs
2. Three body parts: head, thorax, and abdomen
3. Typically two pair of wings; some groups have one pair or none
4. One pair of antennae
5. Usually one pair of compound eyes; simple eyes (ocelli) present in many groups

Basic Insect Classification

In U.S. and Canada

Order: 28 Orders

Family: Over 600 Families

Genus: Over 12,500 Genera

Species: Over 86,000 species



Most of the insects important to gardeners are in 9 orders:

1. Coleoptera – Beetles
2. Dermaptera – Earwigs
3. Diptera – Flies, Mosquitos, Midges, Gnats
4. Hemiptera – Stink Bugs, Leaf-footed Bugs, Aphids, Whitefly,
5. Hymenoptera – Ants, Bees, Wasps,
6. Lepidoptera – Butterflies, Moths
7. Neuroptera – Lacewings
8. Orthoptera – Grasshoppers
9. Thysanoptera - Thrips

Coleoptera – Beetles

1. Four wings; the first pair thickened or hardened.
2. First pair of wings usually as long as abdomen protecting second pair of wings that are membranous.
3. Pair of hardened wings meet a straight line down the back
4. Chewing mouthparts



Dermaptera – Earwigs

1. Four wings; the first pair thickened or hardened
2. Short wing covers and with abdominal forceps
3. Chewing mouthparts



Diptera – Flies, Mosquitos, Midges, Gnats

1. One pair of wings; second pair is reduced in size and often not seen
2. Wings membranous, with conspicuous veins.
3. Piercing, sucking or lapping mouthparts



Hemiptera – Stink Bugs, Leaf-footed Bugs, Aphids, Whitefly

1. Four membranous wings, front wings larger than hind ones.
2. The front wings somewhat translucent or thinner and with veins.
3. Wings held rooflike over abdomen - hoppers.
4. Triangle on back behind the head formed by the wings – true bugs
5. Piercing-Sucking mouthparts



Hymenoptera – Ants, Bees, Wasps

1. Four membranous wings, front wings larger than hind ones.
2. Hind wings smaller than front wings with few cross veins.
3. Head joined loosely to thorax
4. Chewing mouthparts



Lepidoptera – Butterflies, Moths

1. Four large wings, covered by scales
2. Siphoning or vestigial mouthparts



Neuroptera – Lacewings

1. Four membranous wings, front wings larger than hind ones.
2. Their wings are folded flat over the abdomen, or held tent-like over the body
3. Chewing mouthparts



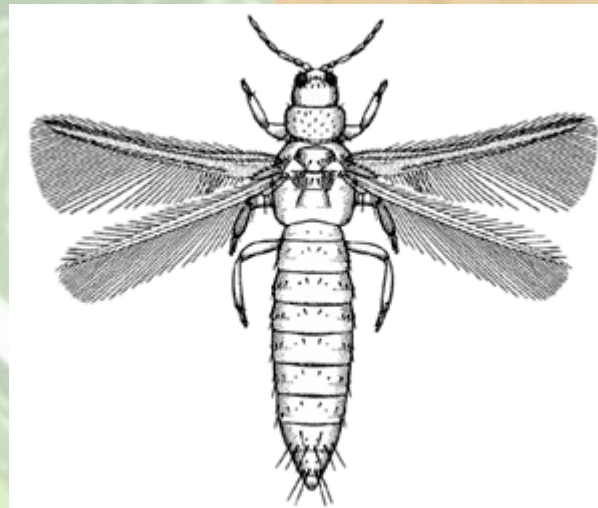
Orthoptera – Grasshoppers

1. Four wings, front ones somewhat thickened.
2. Jumping hind legs.
3. Hind wings, when open, spread like fans
4. Chewing mouthparts

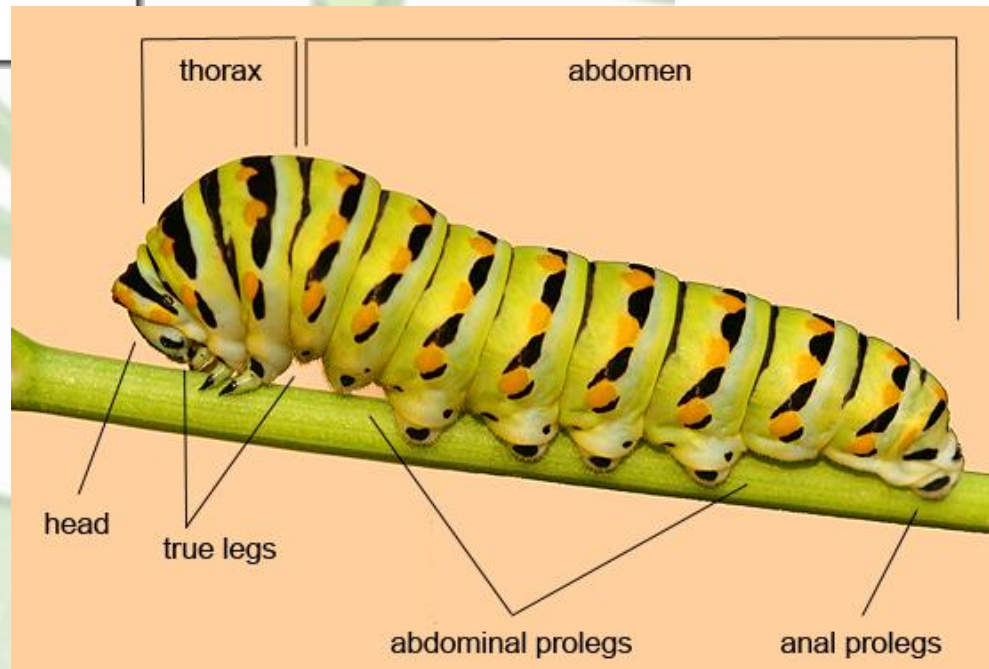
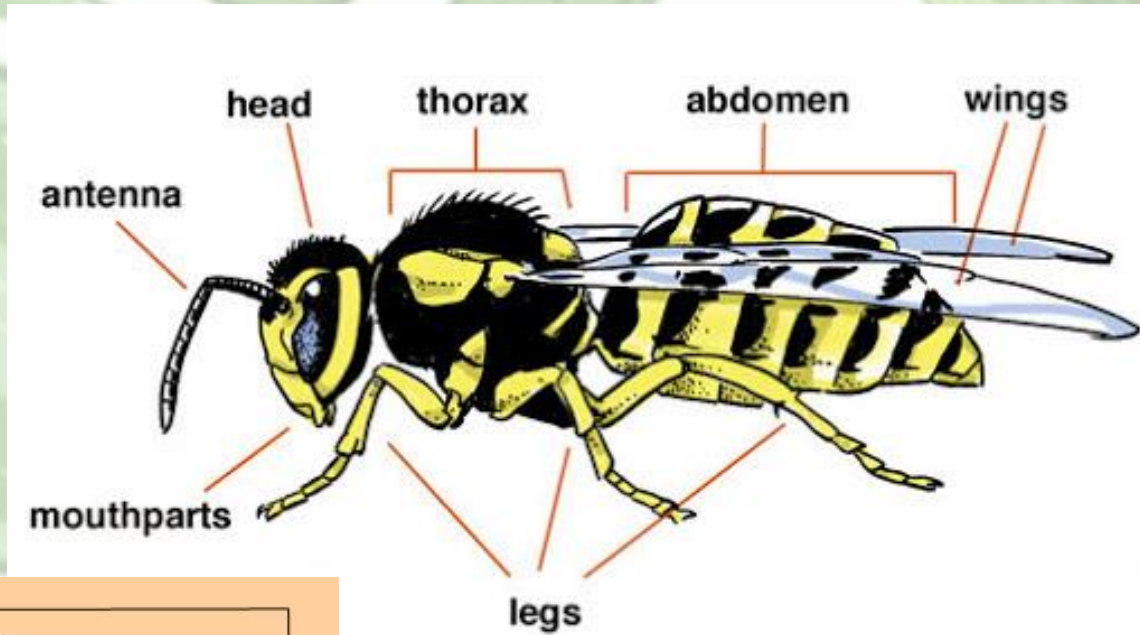
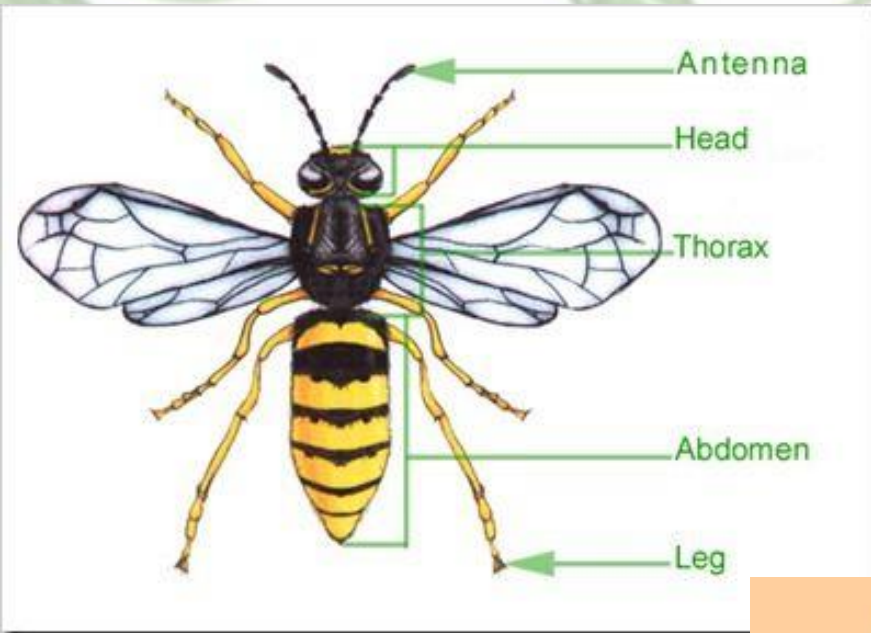


Thysanoptera - Thrips

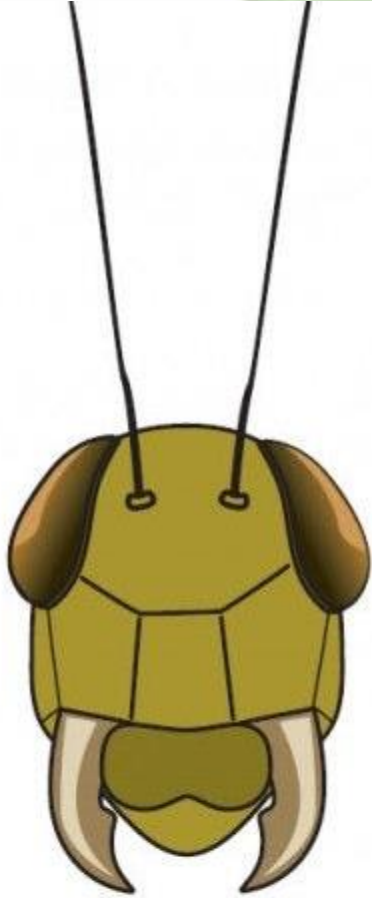
1. Wings with setae or fringes,
2. Sucking mouth parts, usually very small.
3. Some specimens wingless
4. Rasping sucking mouthparts



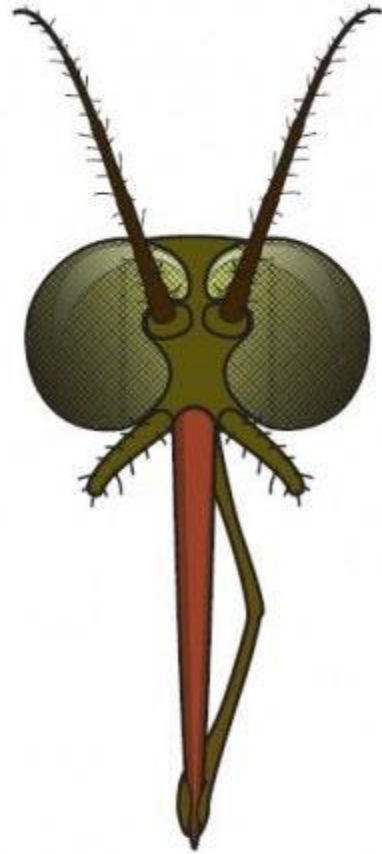
Insect Anatomy



Insect Mouthparts and Feeding Styles



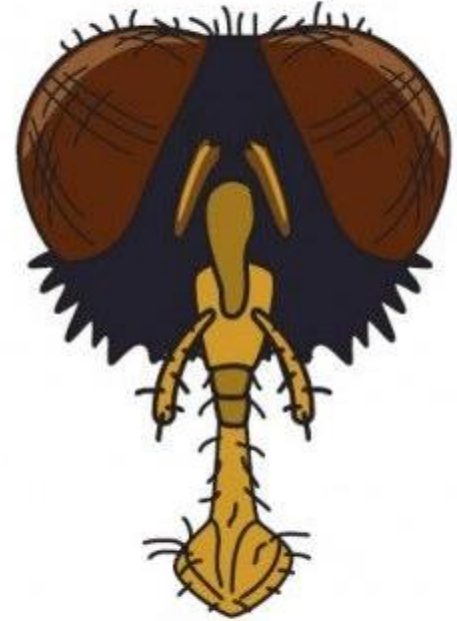
Chewing



Piercing-sucking

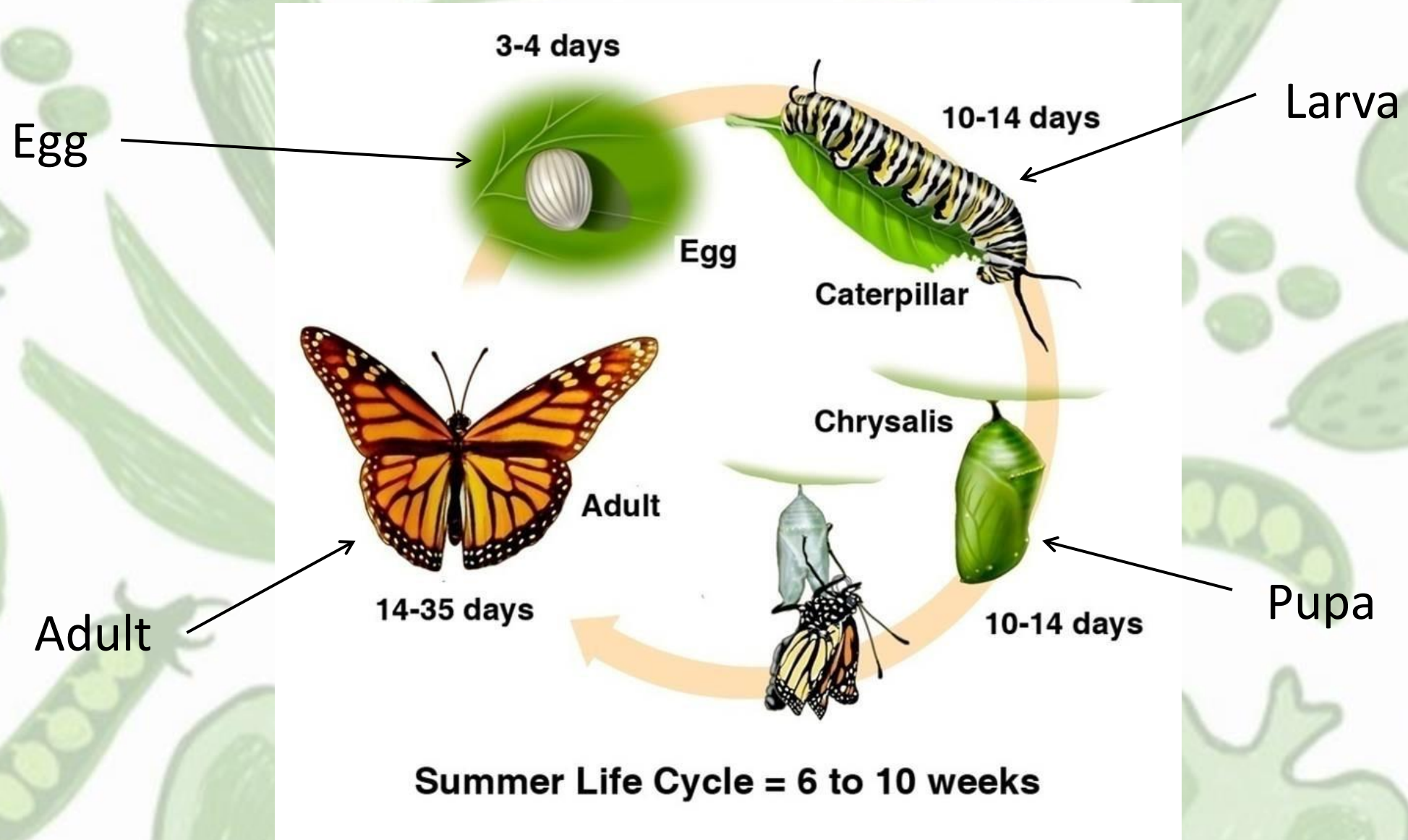


Siphoning

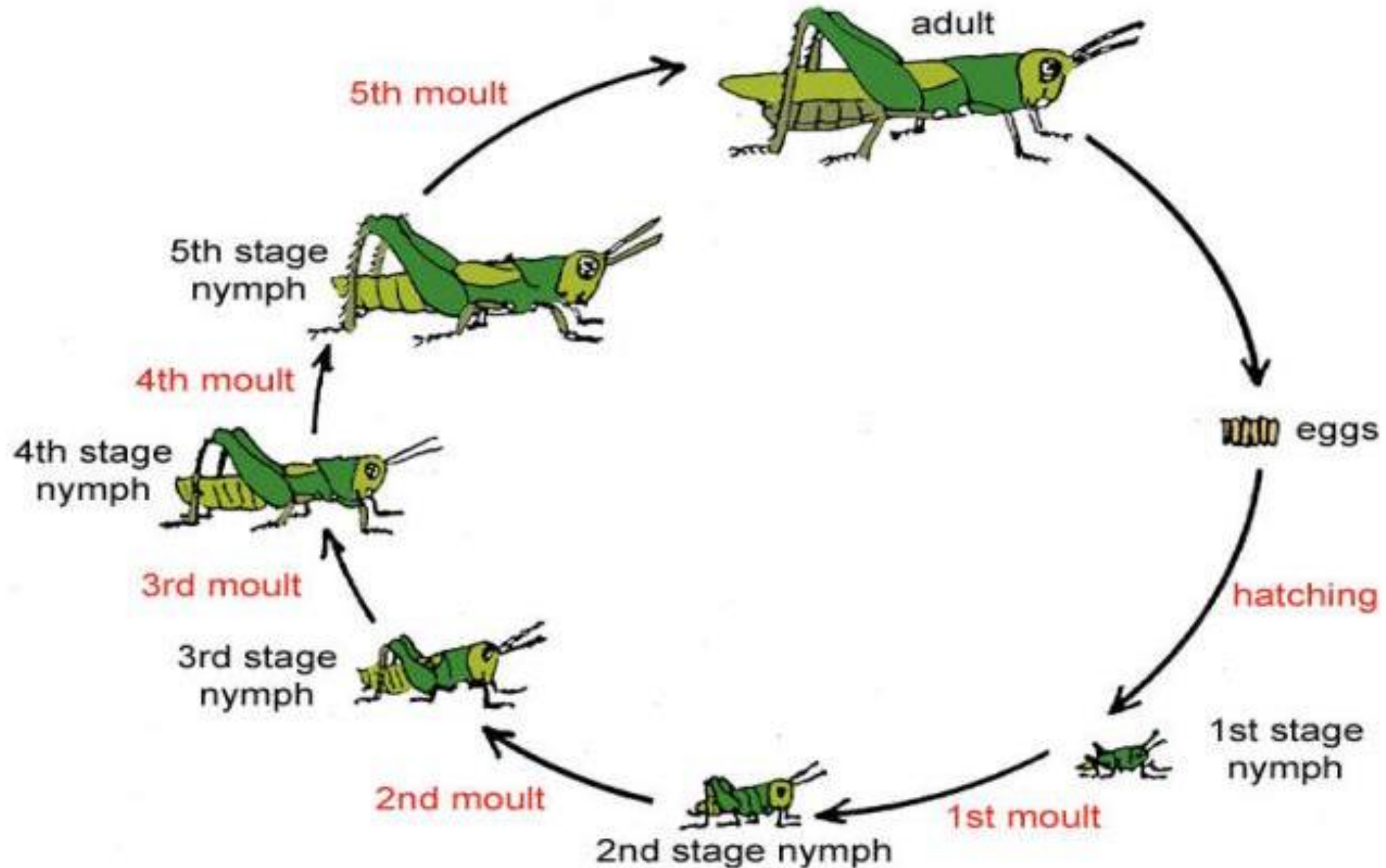


Sponging

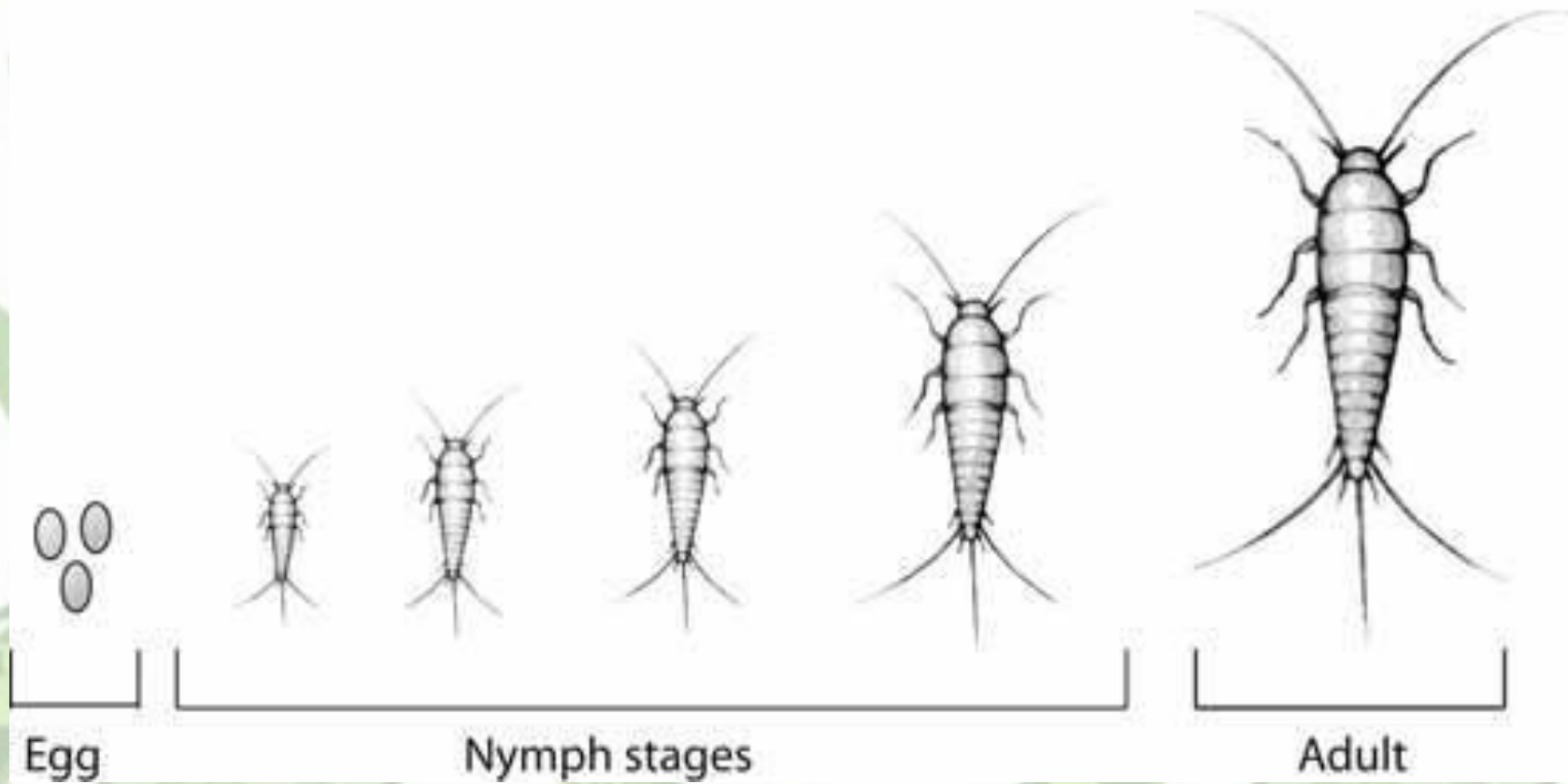
Insect Life Cycle – Complete Metamorphosis



Insect Life Cycle – Incomplete Metamorphosis



Insect Life Cycle – No Metamorphosis



Insect Feeding Damage



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Some Commonly Encountered Coleopteran Garden Insect Pests



Colorado Potato Beetle



Mexican Bean Beetle



Striped Cucumber Beetle



Vegetable Weevil



Flea Beetles



Pepper Weevil

Some Commonly Encountered Lepidopteran Garden Insect Pests



Armyworm



Bean Leaf Roller



Tomato Fruitworm



Tomato Hornworm



Corn Earworm



Squash Vine Borer



Cabbage Looper

Some Commonly Encountered Hemipteran Garden Insect Pests



Green Peach Aphid



Leaf-footed Bug



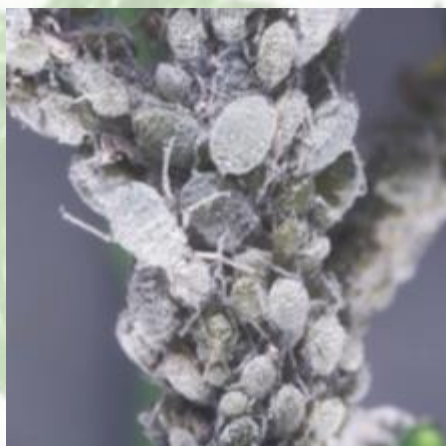
Whitefly



Squash Bug



Tarnished Plant Bug



Cabbage Aphid



Green Stink Bug

Some Commonly Encountered Dipteran & Thysanopter Garden Insect Pests



Onion Thrips -
Thysanoptera



Vegetable Leafminer - Diptera



Western Flower Thrips
- Thysanoptera

Other Garden Pests – Snails & Slugs

Kingdom: Animalia

Phylum: Mollusca

Class: Gastropoda



Other Garden Pests - Mites

Kingdom: Animalia

Phylum: Arthropoda

Class: Arachnida

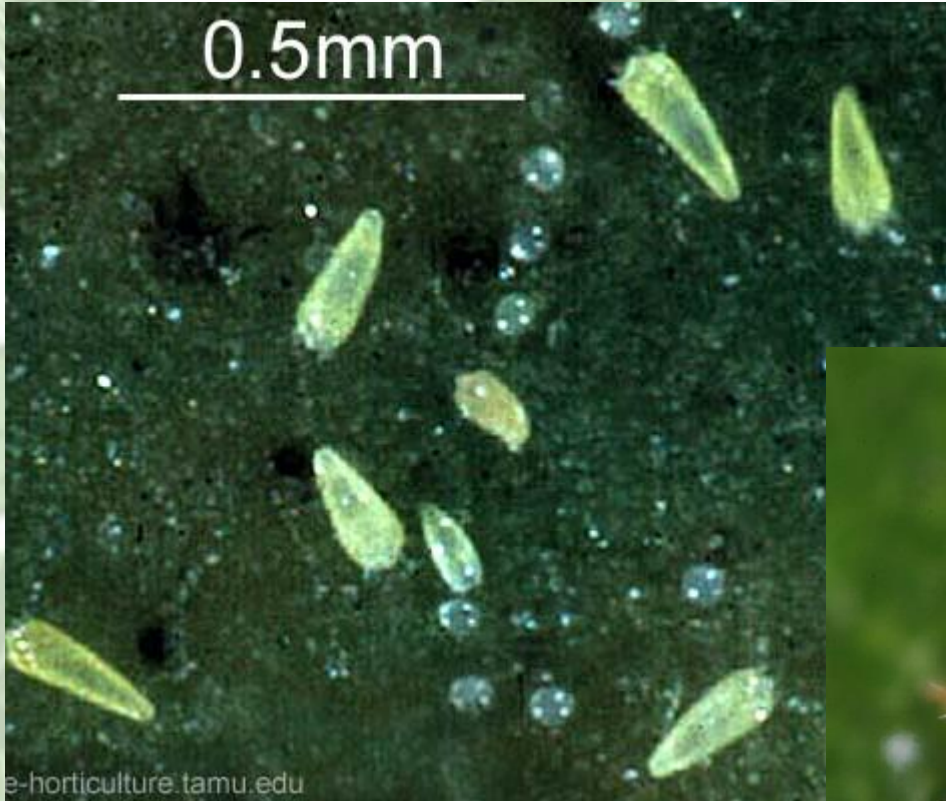
Subclass: Acari

1. Mostly mites have oval-shaped bodies with two body regions that may appear fused together.
2. Mostly mites have piercing sucking mouthparts such as Phytophagous and Predatory mites.
3. Some mites have chewing mouthparts such as Stored grain mites.
4. Mites have 8 legs (4 pairs)

Other Garden Pests - Mites

1. Worldwide – over 7500 species of plant-feeding mites (Phytophagous)
2. They feed on the leaves, inflorescence and developing plant tissue with piercing-sucking mouthparts
3. Their feeding results in leaf stippling, blotching, curling and twisting
4. They may also induce plant gall formation
5. All stages of mites except eggs can transmit virus and cause diseases (e.g. wheat streak mosaic, fig mosaic, tobacco mosaic)
6. Certain soil inhabiting mites carry fungal spores causing diseases like fungal rot of garlic and onion

Other Garden Pests - Mites



Citrus Rust Mite



Red Spider Mite



Two-Spotted Spider Mite

Other Garden Pests - Mites



Other Garden Pests - Nematodes

1. Nematodes are thread-like roundworms that live in a wide range of environments including soil and fresh and salt water.
2. There are species of nematodes that feed on fungi, bacteria, protozoans, other nematodes, and plants.
3. They can also parasitize insects, humans, and animals.
4. Nematodes that feed on plant parts are called plant parasitic nematodes and are ubiquitous in agricultural soils.

Other Garden Pests - Nematodes

Root-Knot Nematode

Kingdom: Animalia

Phylum: Nematoda

Class: Secernentea

Order: Tylenchida

Family: Meloidogynidae



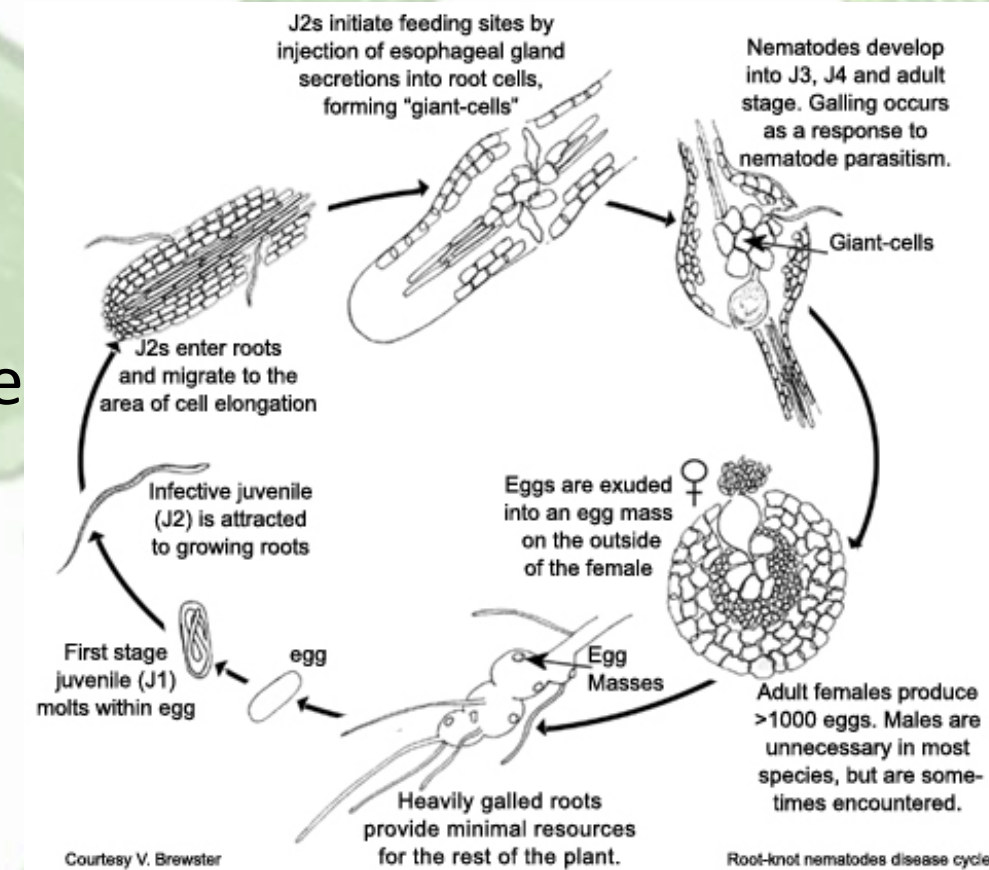
Okra



Tomato



Lettuce





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