Overview of Common Orchard Insects of Western Colorado

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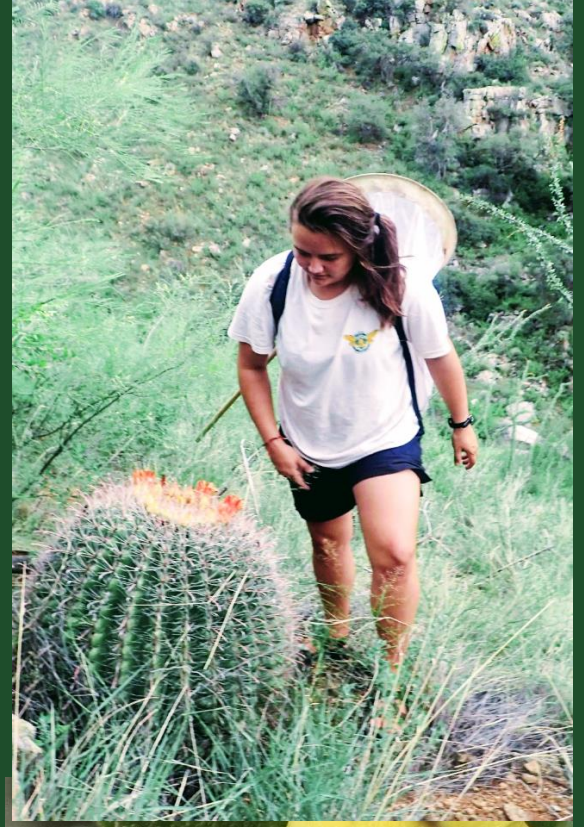

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Celebrating my 12th Year as a CSU Aggie!

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- Apiculture
- Urban Forestry
- Horticulture
- Natural Resources
- Residential Homes
- Commercial Businesses
- Public Health
- Invasive Species

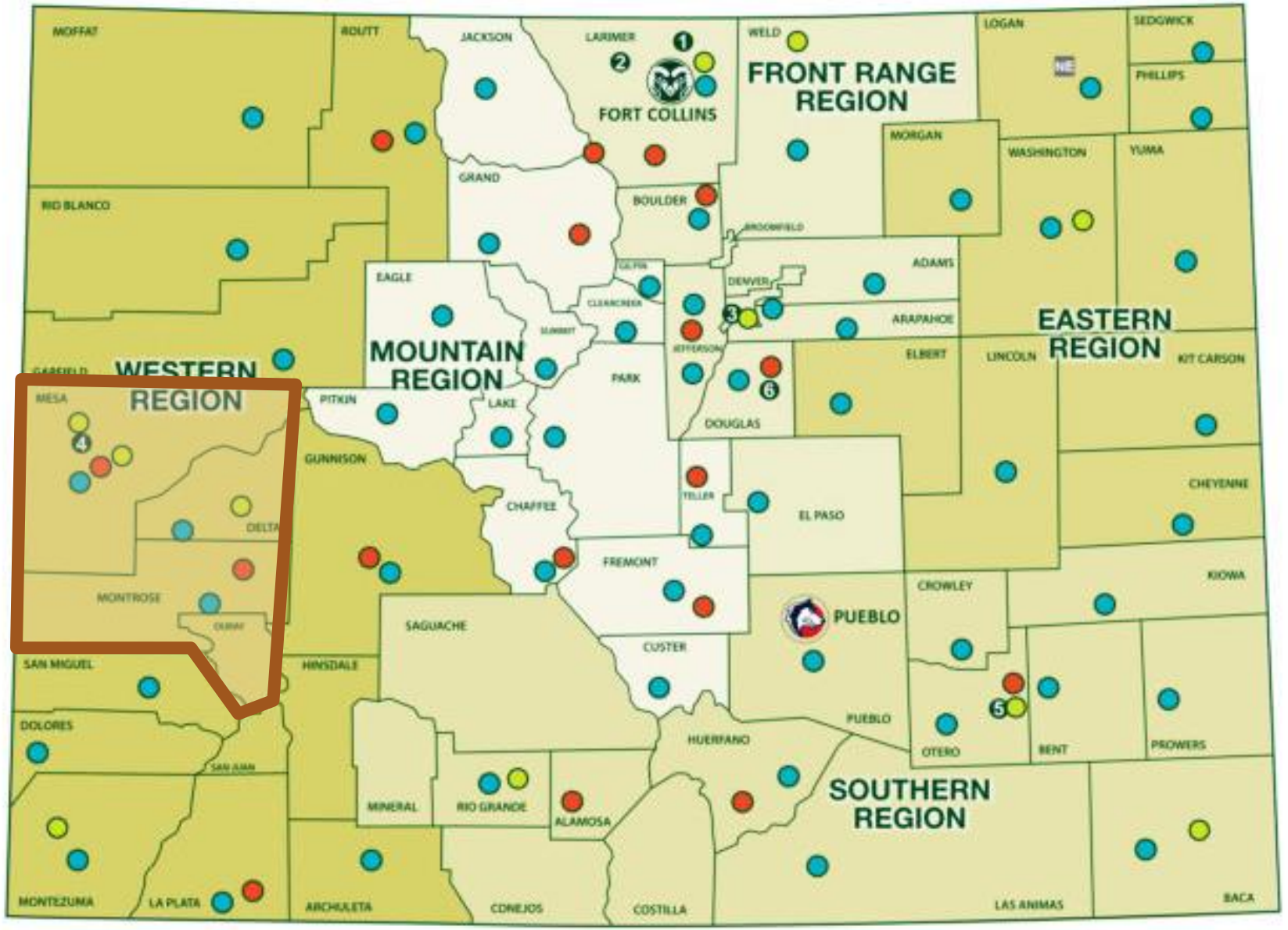
Crops grown in western Colorado

Field corn, sweet corn, alfalfa, seed alfalfa, stone fruits, grapes, beans, onions, mixed vegetables

CSU Extension

around the State of Colorado

I cover the Tri-River Area, stationed in Grand Junction in one of the busiest offices in the state, within Mesa County.



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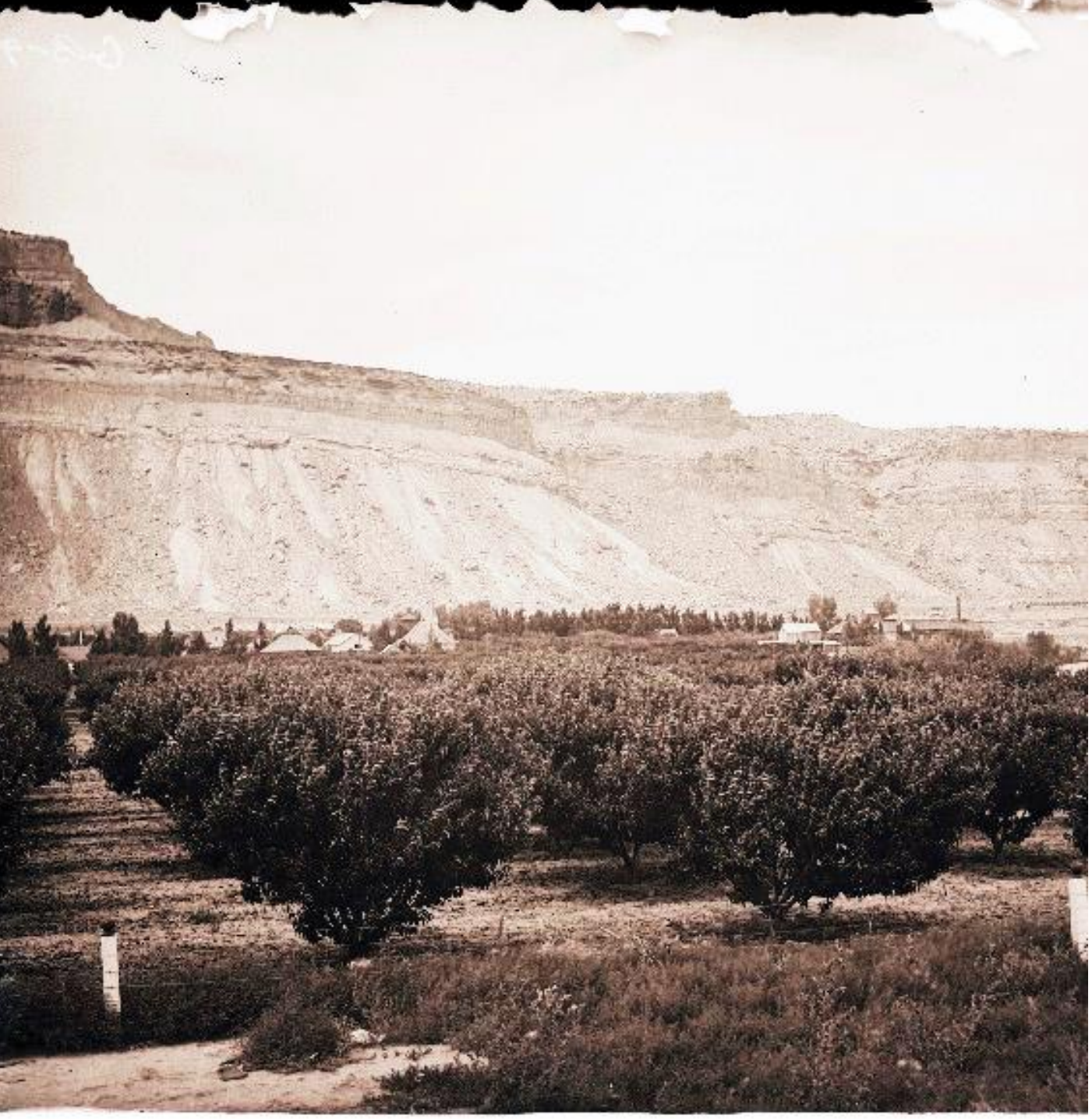
The Tri-River Area of western Colorado obtains a unique set of growing areas tucked in against desert and mountains

Historical Fruit Production: Western Colorado



Canneries and countless acres of tree fruit were grown in the Grand Valley around the turn of the 19th century.

Palisade Insectary opens in 1945

Pest Control District- established in 1960s

We have been controlling pest insects in orchards since the beginning.

One man is on the ground and holds a sprayer; the other man is standing in a horse drawn wagon and appears to be operating a pump for the sprayer to treat for green peach aphids and peach twig borers. Clifton, Colorado. March 28, 1910.

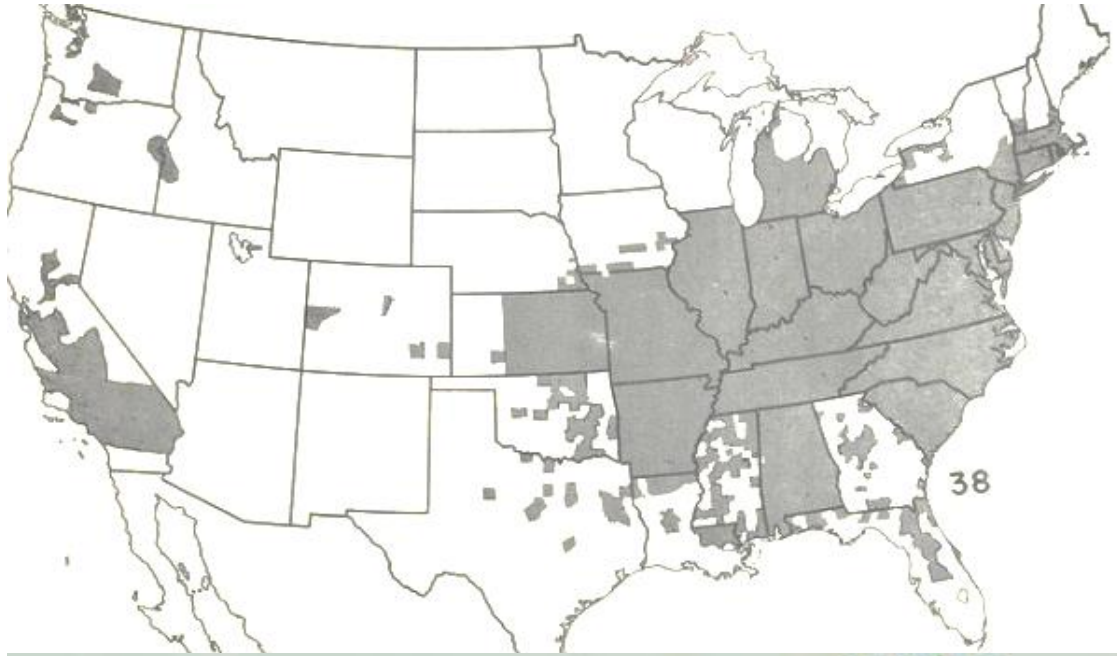
Oriental Fruit Moth
Grapholita molesta

Larvae of the oriental fruit moth consumes a maturing peach from the inside out

Adult oriental fruit moth

Photos both sourced from Palisade Insectary

The oriental fruit moth originated in China. It was introduced in the United States from Japan on flowering cherry about 1913.



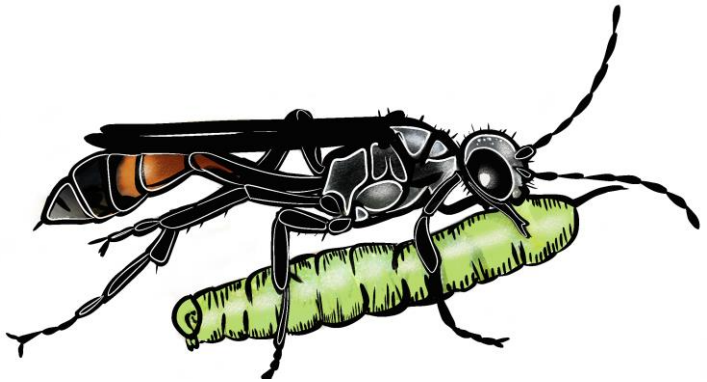
Its introduction threatened the entire orchard industry as its larval would eat their way through apples, pears and peaches, ruining the fruit.

In 1944 this voracious moth was accidentally introduced into the Grand Valley of Colorado by way moving plant material or produce on railroad cars.

***Macrocentrus ancylivorus* was introduced to combat this moth pest and is still reared today by the Palisade Insectary.**

Pests

Type: aphids, wood borers, fruit flies
Behavior: Time of year, part of the plant they cause damage, generations per year, life cycle
Mouthpart: fluid feeding on plants vs. mandibles to consume plant food.



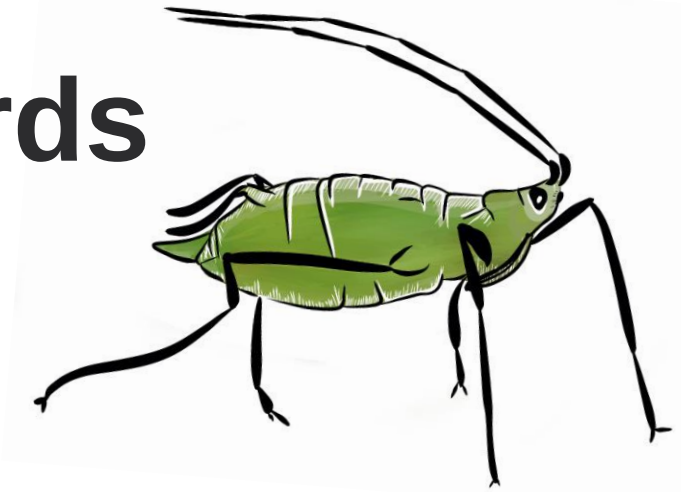
Predators

Type: spider, tachinid flies, solitary wasps, dragonfly
Behavior: ambush predators vs. active hunting predators. Specialist feeders or generalist feeders
Mouthpart: fluid feeding vs. mandibles
Parasites and Parasitoids Eggs or larvae eat their host

Pollinators

Type: European honeybee, solitary bees, bumble bees, butterflies, true flies, beetles, ants
Behavior: Blooms appear in the spring and bees forage for floral rewards like nectar for carbohydrates and pollen for protein. Social structure (hive) or solitary (individuals live alone)

Pest Arthropod Guilds in Orchards



Herbivores- feed on plant material

- **Defoliators** – Remove leaf tissue
- **Stem, fruit, and trunk borers**. –Live inside plant material from inside
- **Insects that discolor or disfigure leaves/fruit** (spider mite, bugs).
- **Producers of liquid excrement (honeydew), or wax** (aphids)
- **Root feeders** –feed in the soil on plant roots (wooly aphids).

Pests either damage the perennial crop, like the tree itself. Or a pest may cause cosmetic damage to the point where the crop is not going to meet market grade.

Beneficial Arthropod Guilds in Orchards

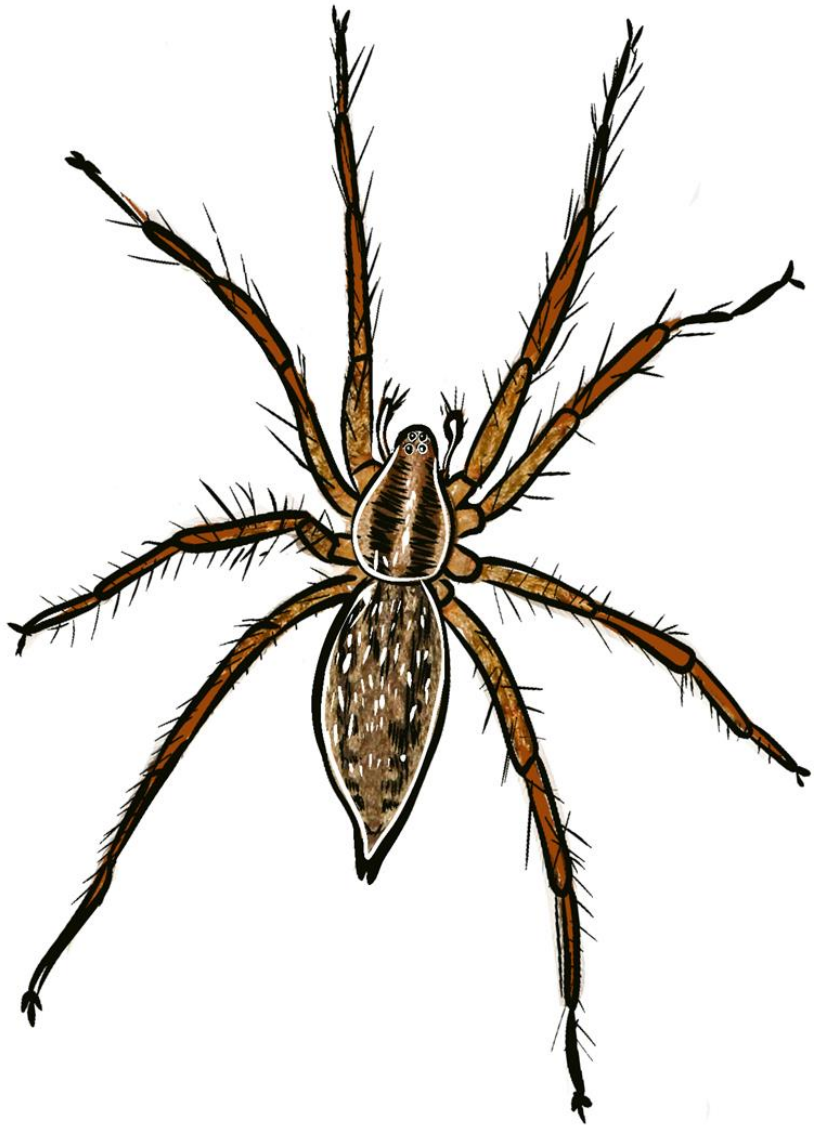
They eat or parasitize pests

Parasites- Insects complete their life inside a pest (parasitic wasps, flies)

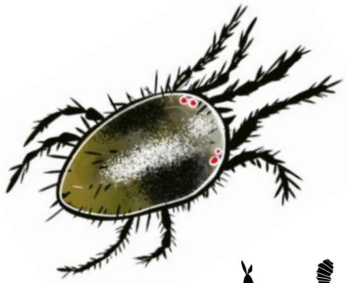
Predators – Insects that consume other insects (lady beetles)

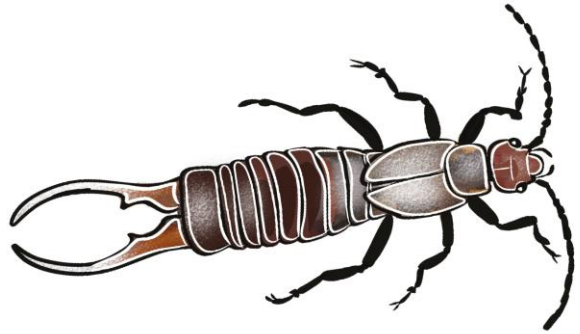
Pollinators – Insects that move pollen between plants when they gather nectar (wasps, beetles, flies, moths, butterflies, bees and flies)

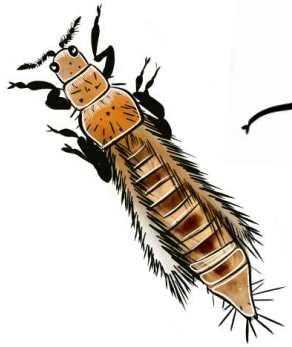
Decomposers - Insects that feed on dead and decaying plant and animal matter. (Carpenter Ants, Termites, Bark lice,wood borers, many wasps, flies).

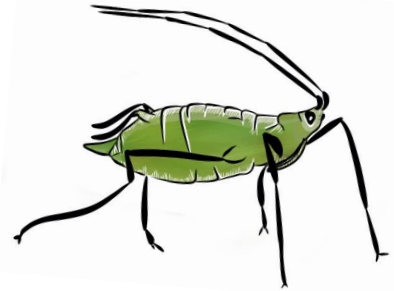


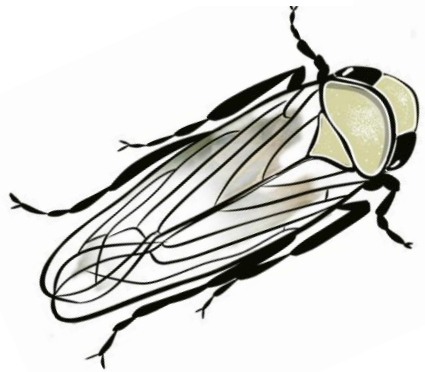
Arthropod Pests in Orchards

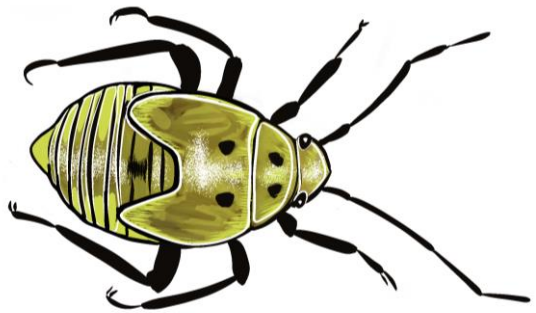


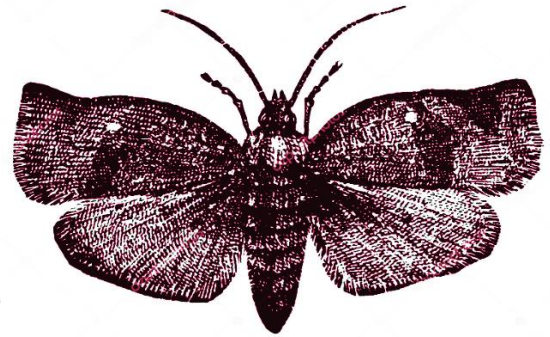




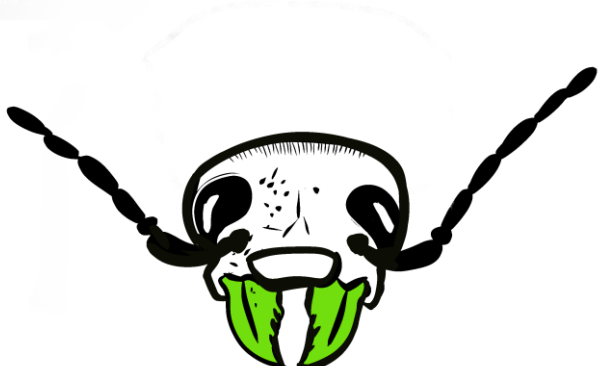


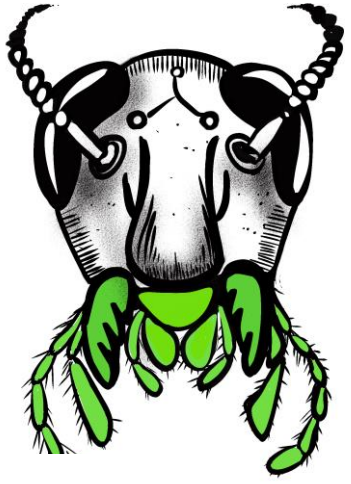


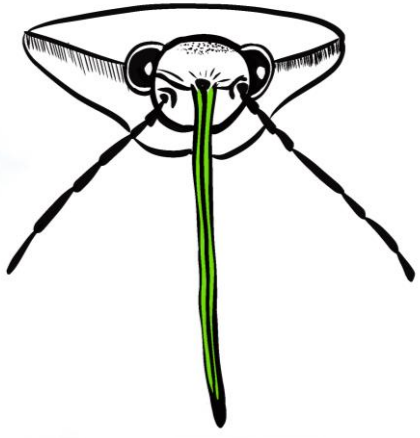


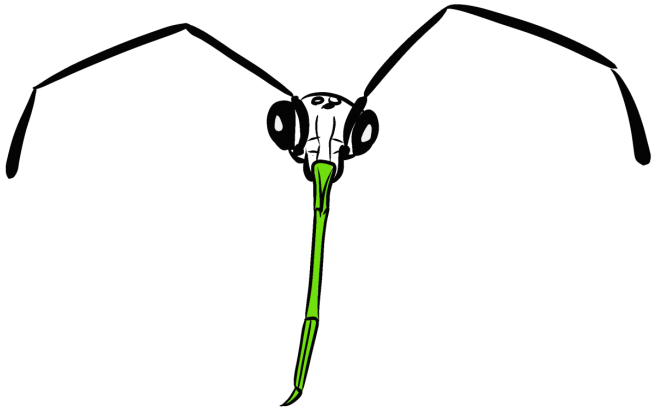


- **Insect have different types of mouthparts to consume their diverse prey items**

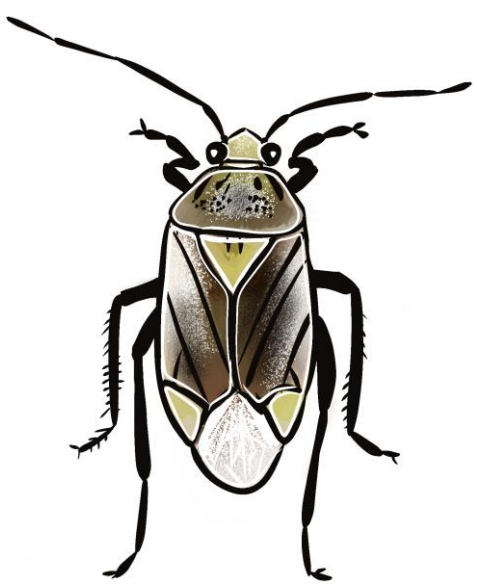


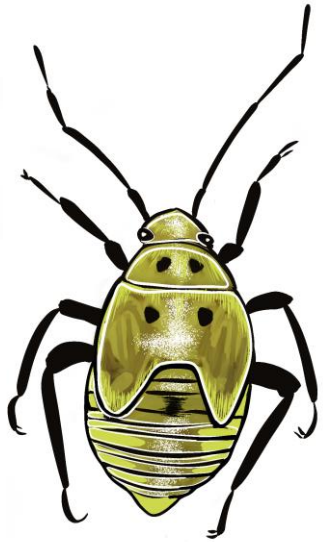


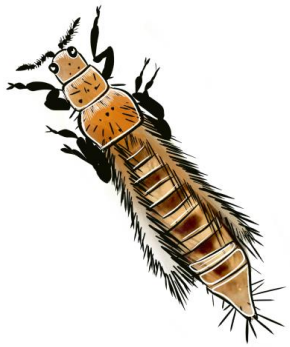


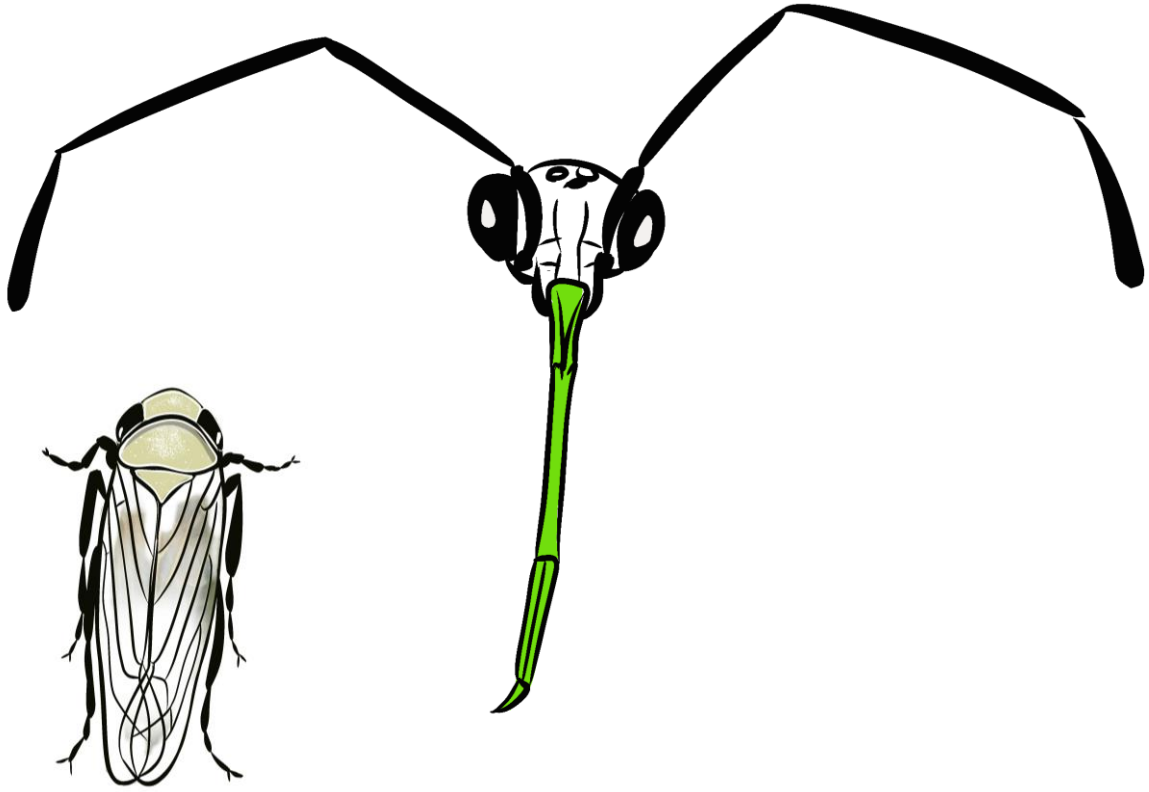


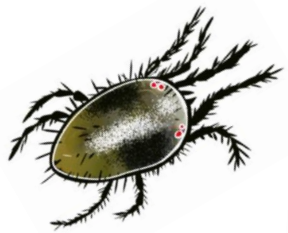
Pests like aphids, spider mites, and scale are fluid feeding

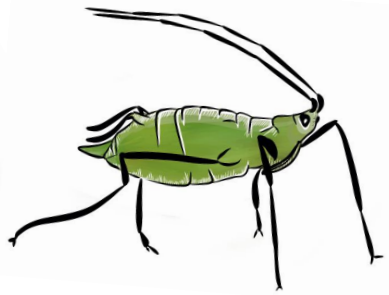






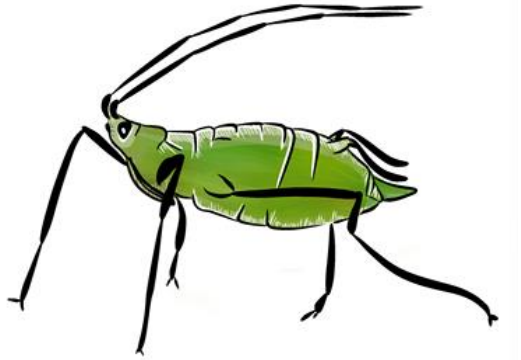






Mouthparts are fluid feeding and are used to pierce and suck fluids of either insects or plants

Aphids



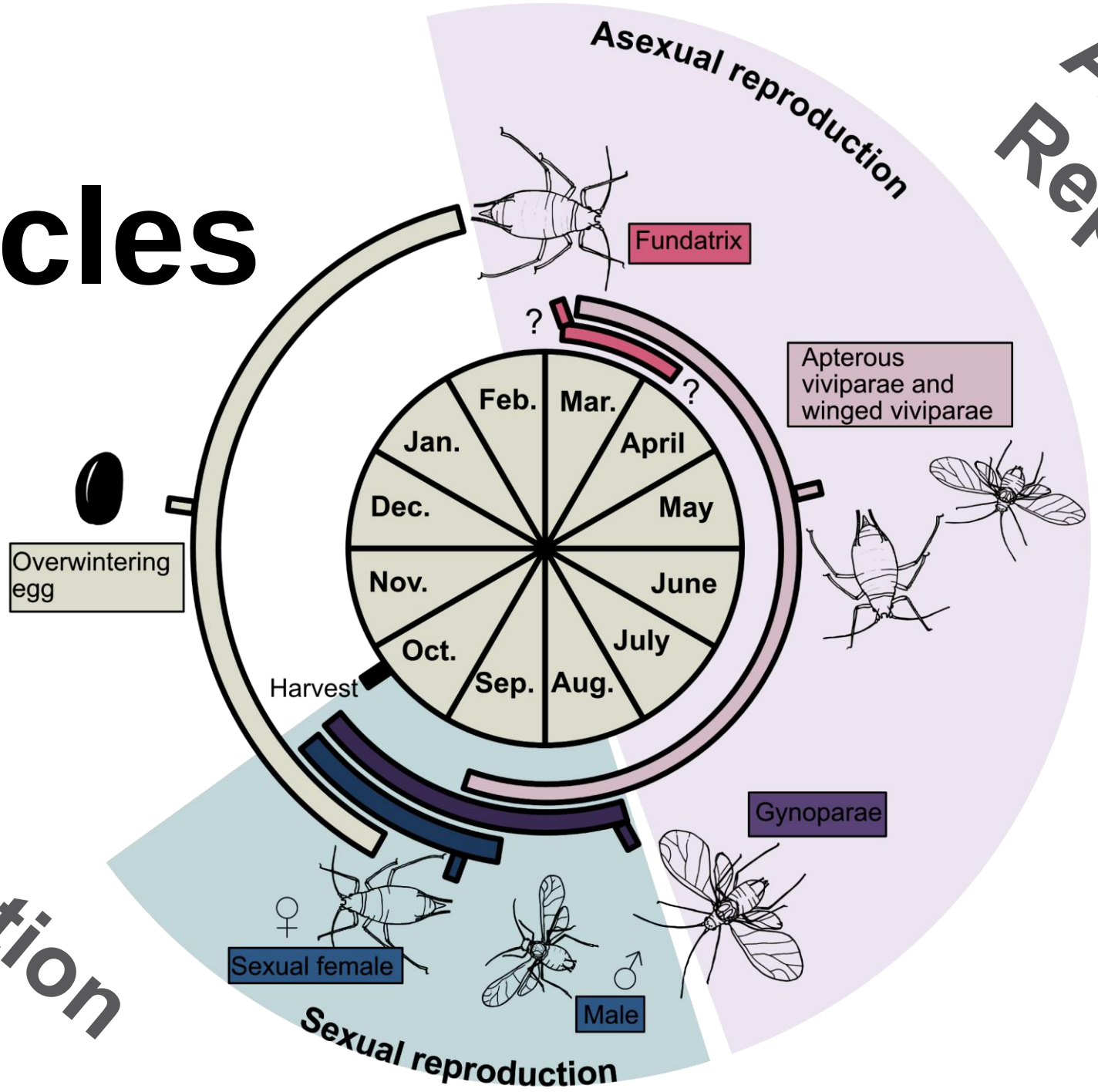
Aphids feed on the phloem tissues with piercing sucking mouthparts

Green peach aphids, rosy apple aphids, black cherry aphids, are small/soft-bodied true bugs that suck sap from many types fruit trees in western CO.

Insecticides- Many neonics, hort oils, neem, and soaps are labeled.

Some overwinter as eggs on peach, nectarine, apricot, or plum trees as well as other hosts.

Aphid Lifecycles



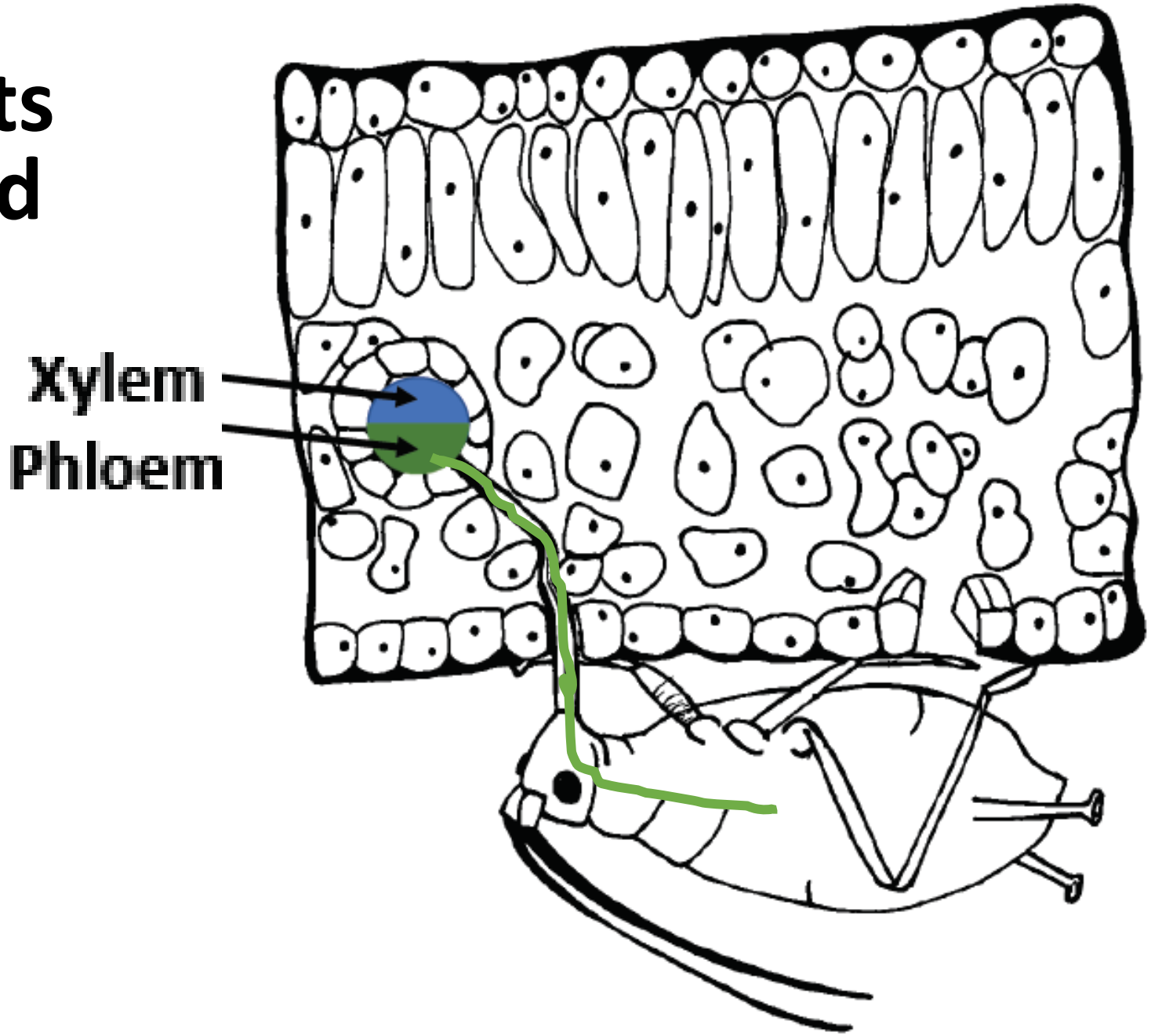
Asexual-Reproduction

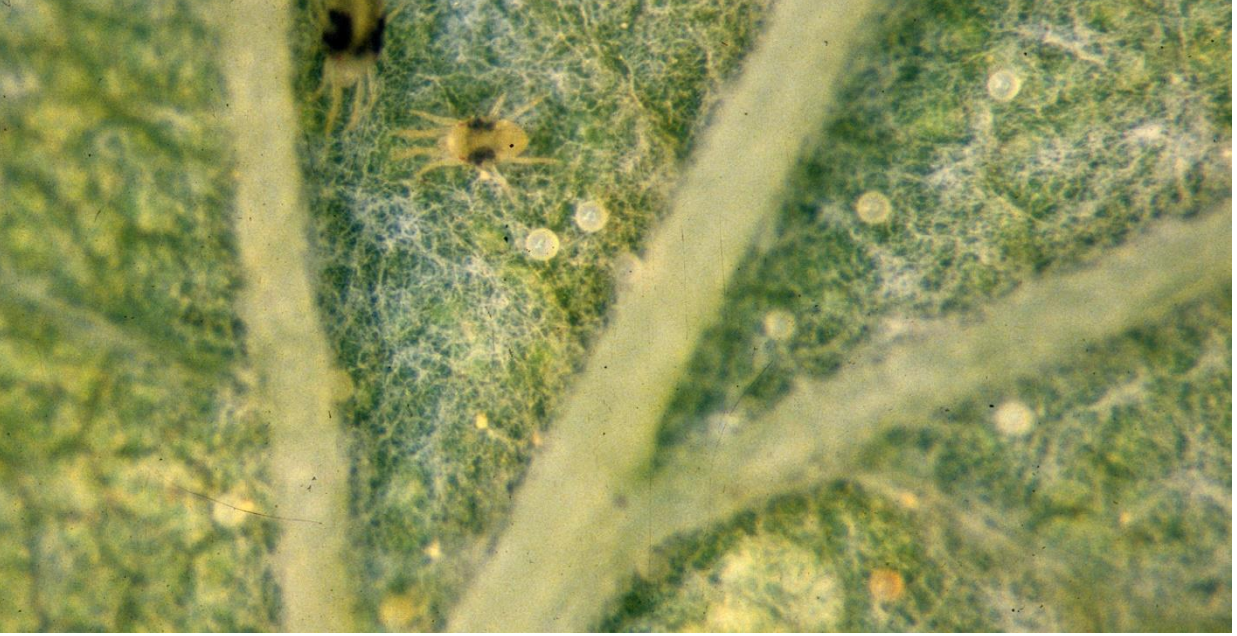
Sexual-Reproduction

Figure: Dr. Erika Peirce and Melissa Schreiner

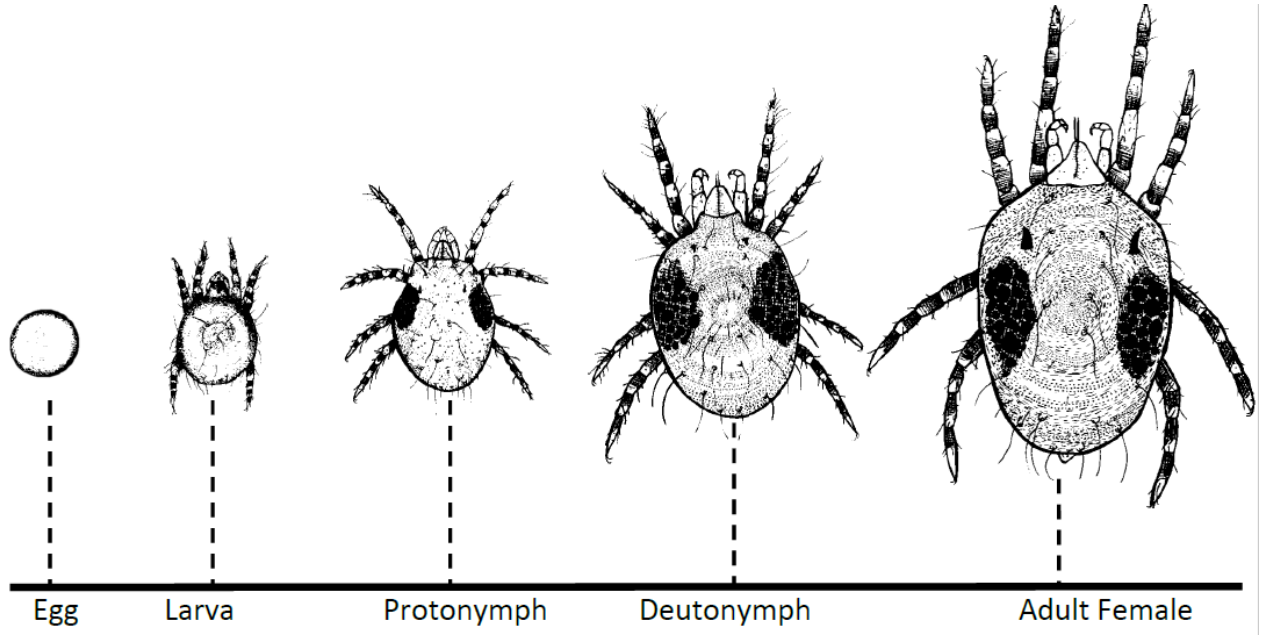
Aphid mouthparts probe around and find the vascular tissues.

Aphids feed on photosynthates directly from phloem cells





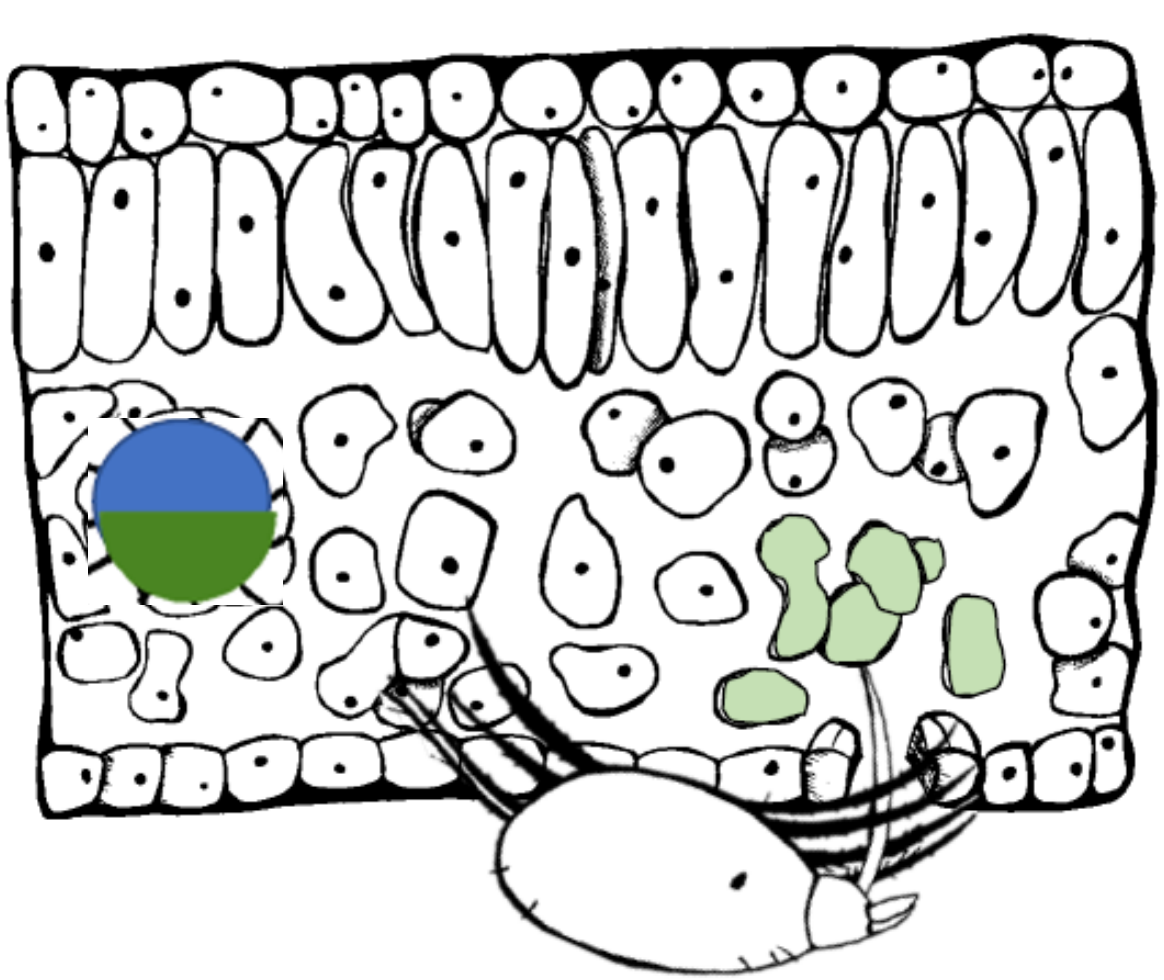
Twospotted spider mite, *Tetranychus urticae*

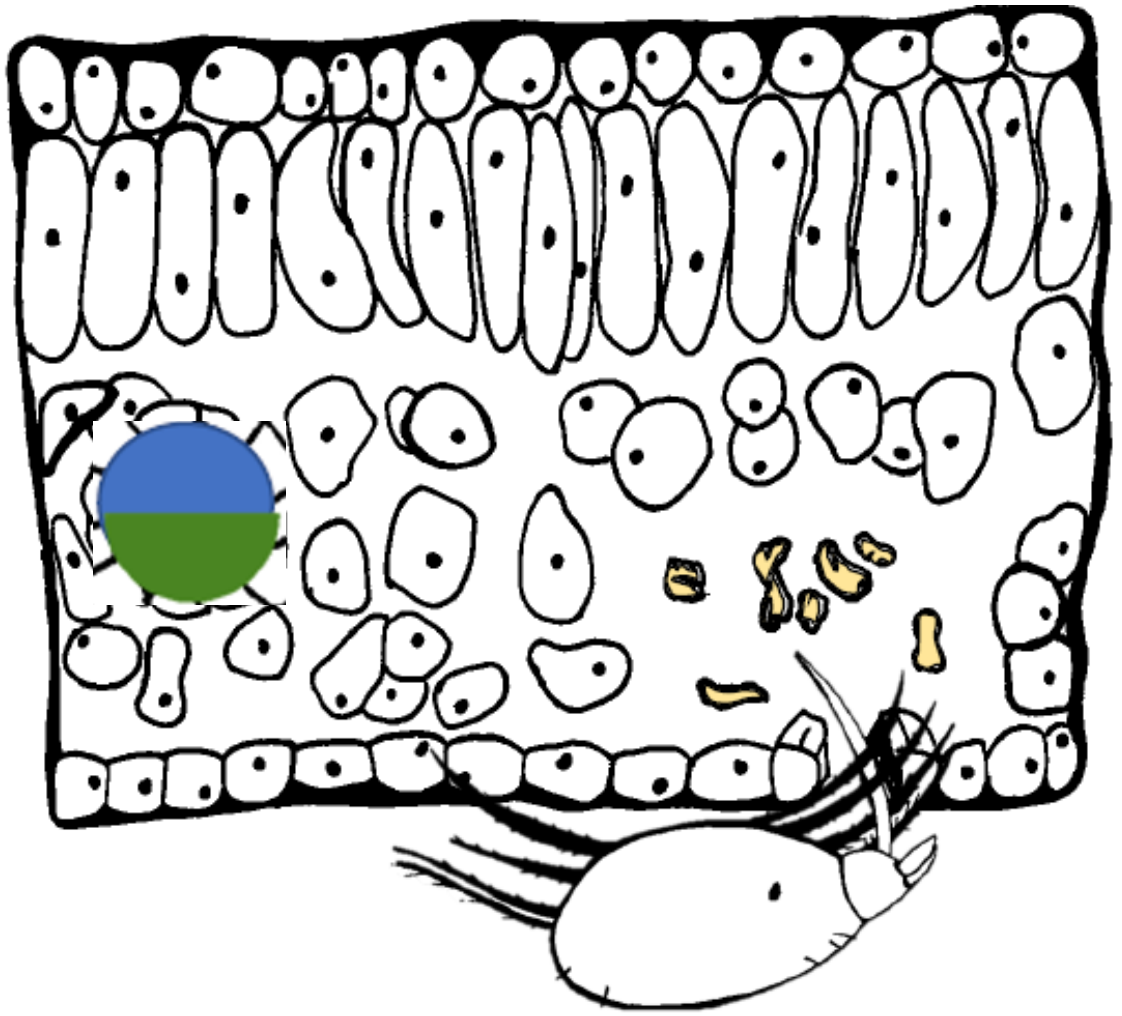


Spider Mite Management

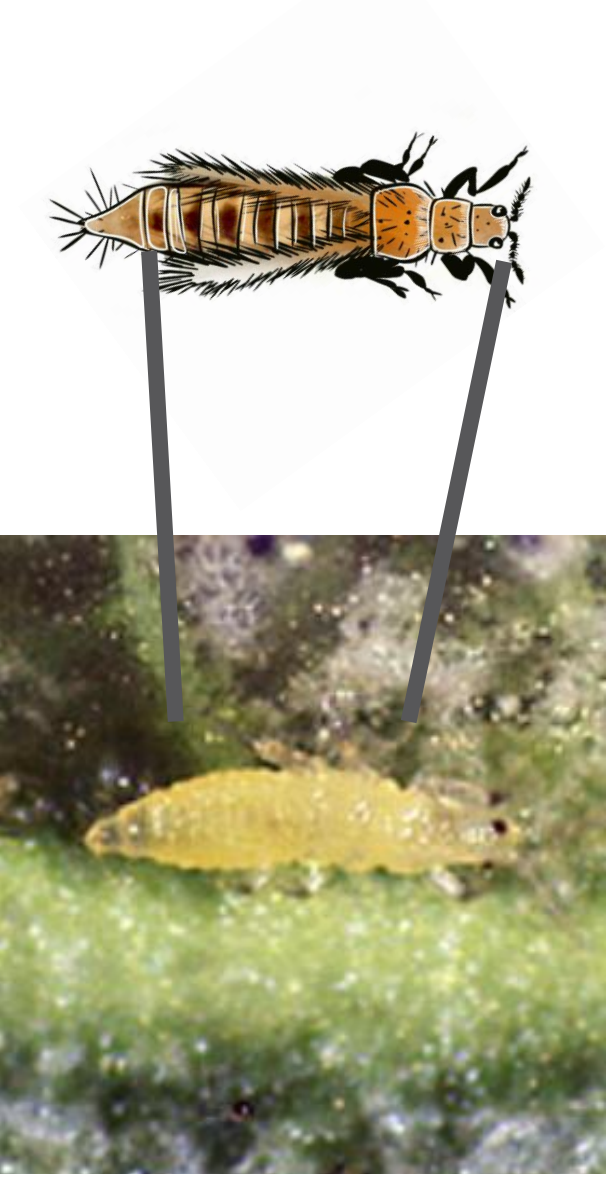
- Monitor high risk plants
- Minimize drought stress
- Increase humidity
- Take particular care with pesticide use on mite sensitive plants

Spider mite mouthparts remove contents from and damage mesophyll cells





Western Flower Thrips

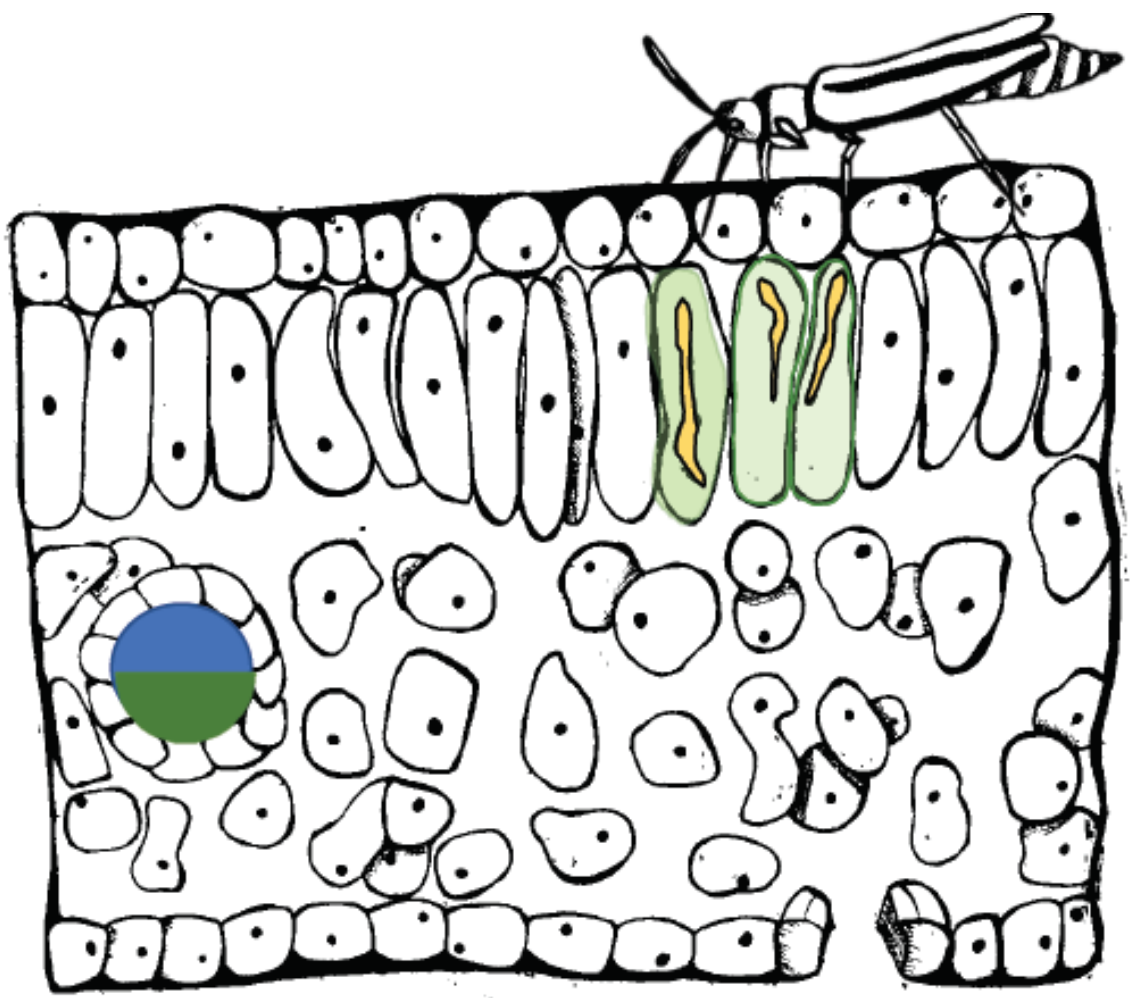


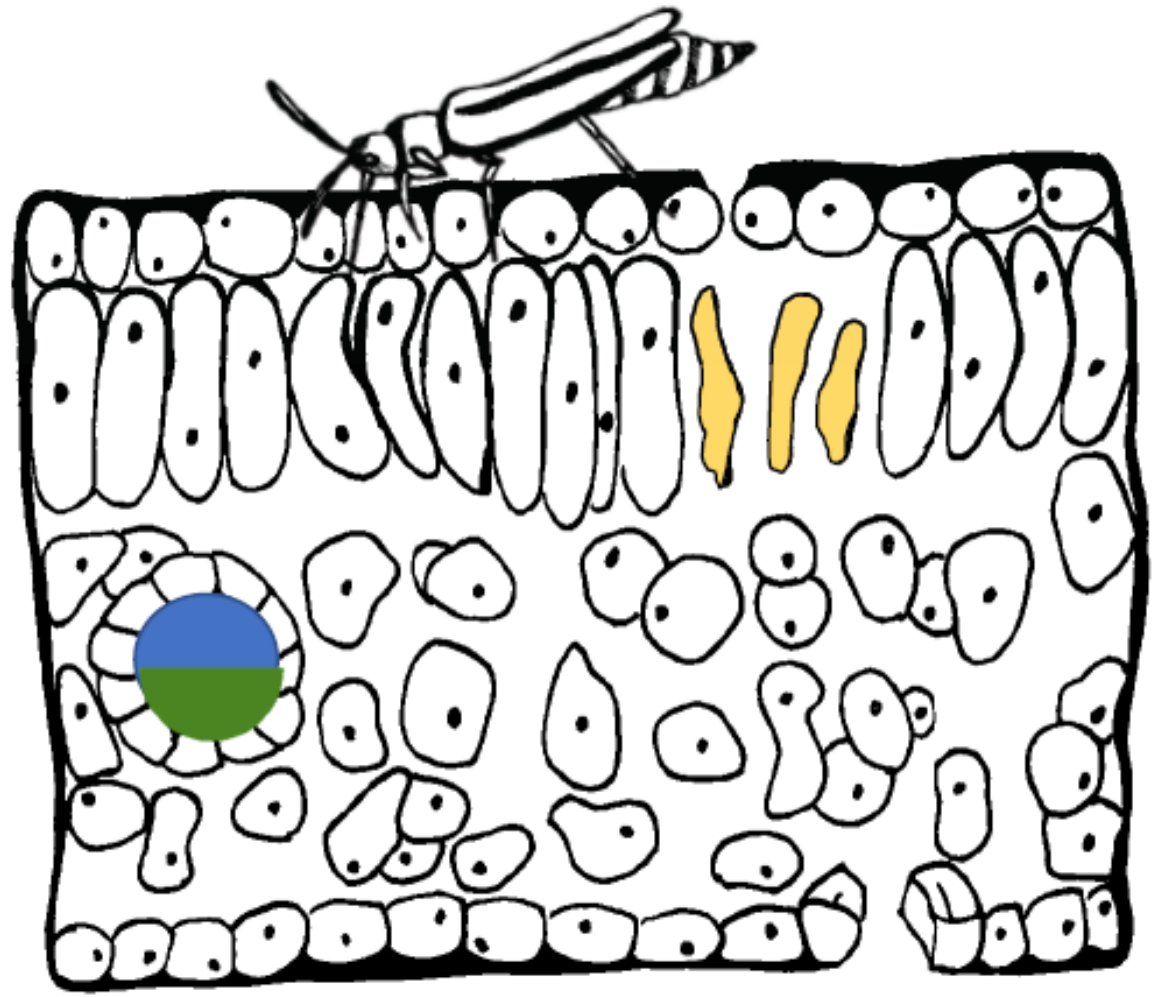
(Utah State University Extension)

Thrips have many host plants hatch and nymphs feed in numbers on flowers and developing small fruit. Thrips feed on many plants- rosaceous crops, strawberry, Solanaceous crops, Legume crops, Cucurbit crops, etc.

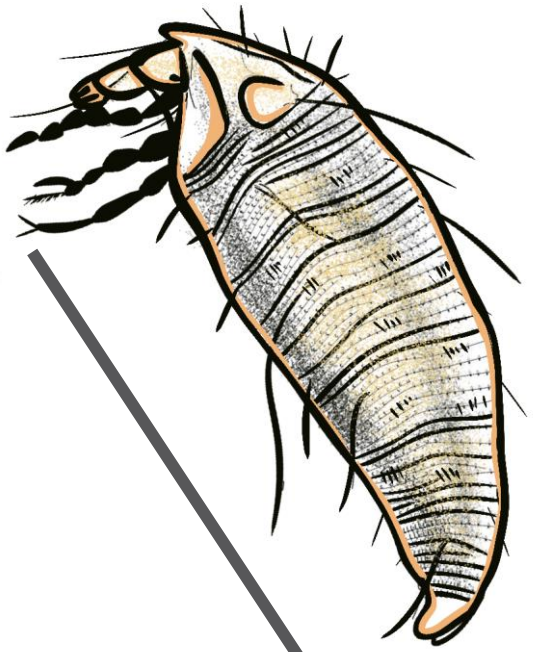
Their small mouthparts are jabbed inside the plant tissue and their feeding scars the epidermis of the fruit leading to cosmetic damage. As the fruit grows, the scars become visible!

Thrips feed on and damage cells





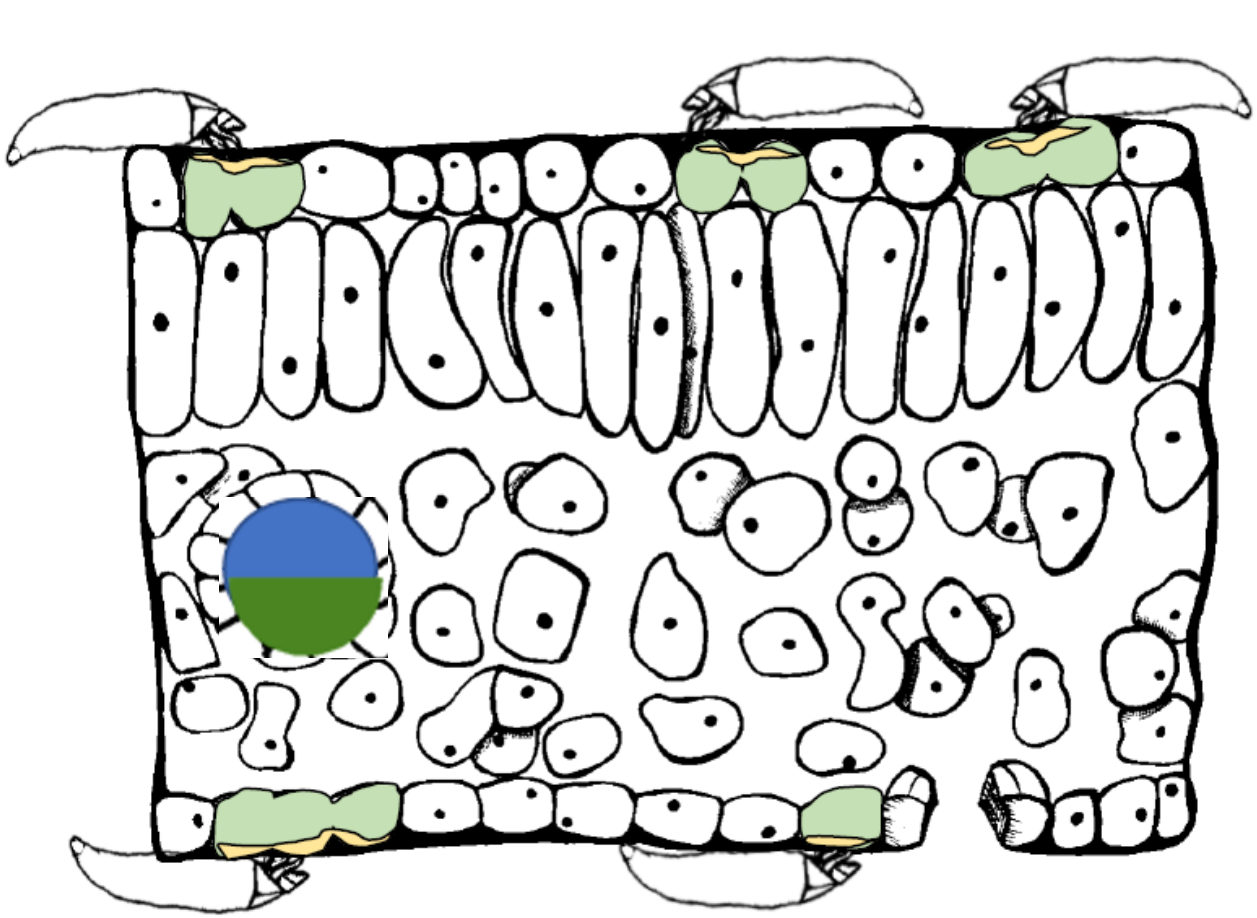
Eriophyid or Rust Mites

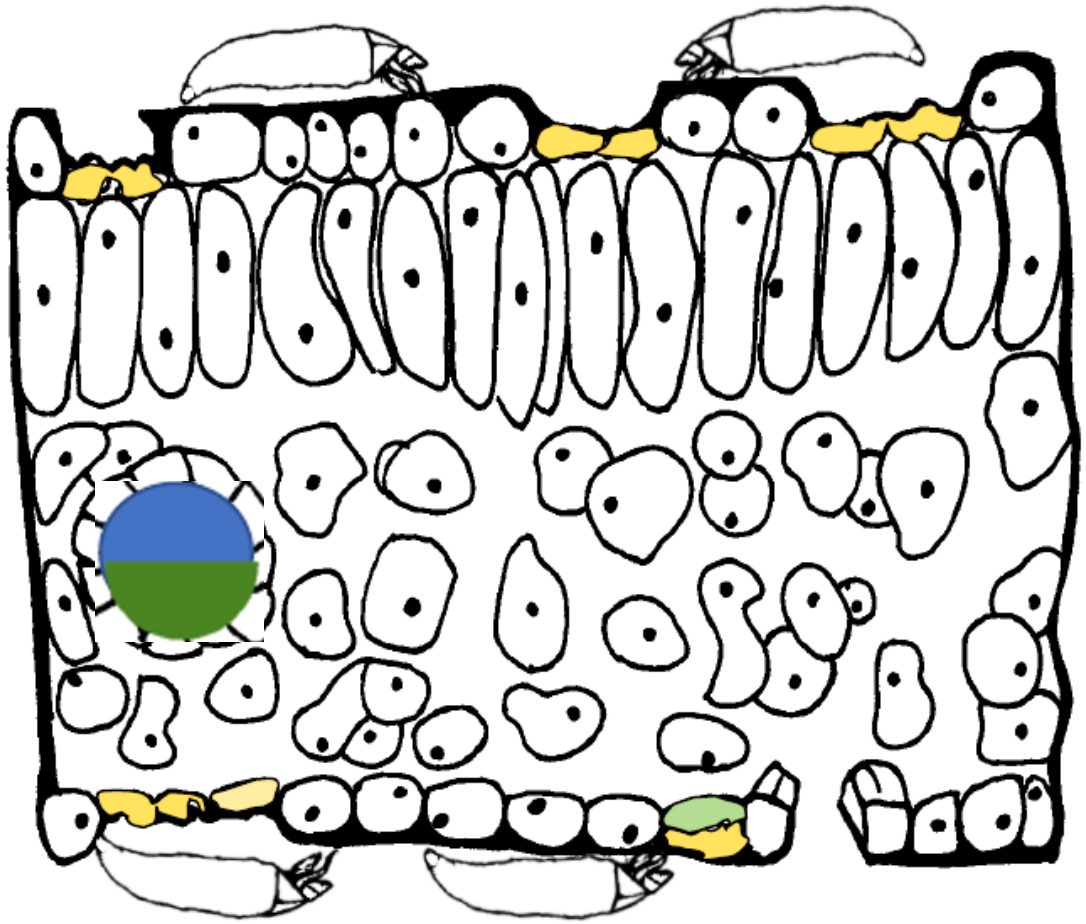


Rust mites are tiny mites that are too small to see without the aid of a microscope. Typically, they are of little concern to fruit growers.

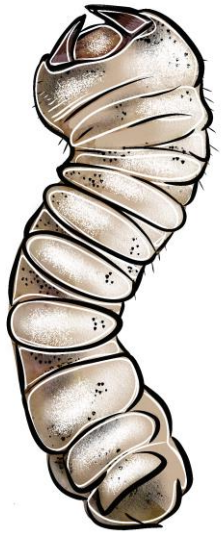
Foliage of pear is sensitive to rust mites, and symptoms can be seen in moderate to high populations. Lower populations can be tolerated, and serve as food for beneficial insects.

Eriophyid mites feed on and damage epidermal cells





Predators include minute pirate bugs (left), predatory mites (below left) and predatory thrips (below)



Insects that borer within fruit or wood

- Rounded headed borers
- Flat headed borers

Wood Boring Moths
Clearwing moths

Codling Moth

The larvae of these moths infest fruit, tunneling inside and causing damage. Female codling moths lay eggs on the fruit, and upon hatching, the larvae bore into the fruit, feeding on the seeds and pulp. Infestations can lead to reduced fruit quality and yield.

The codling moth is a significant pest all US apple growing regions

- **Insecticides are useful when applied to coincide with periods when eggs are laid and before the newly hatched caterpillars borer into fruit. Pheromone traps can be useful in timing sprays.**
- **The use of netting can be used to exclude coddling moths.**
- **Mating disruption for codling moth is also utilized in apple and pear orchards and can be very successful under the correct circumstances.**

Peach Twig Borer

Larva borer into stems initially and then attack fruit.
There are likely three generations in western Colorado
The date of consistent moth flight, called biofix is used with GDD models to help determine when to spray or place pheromone traps.

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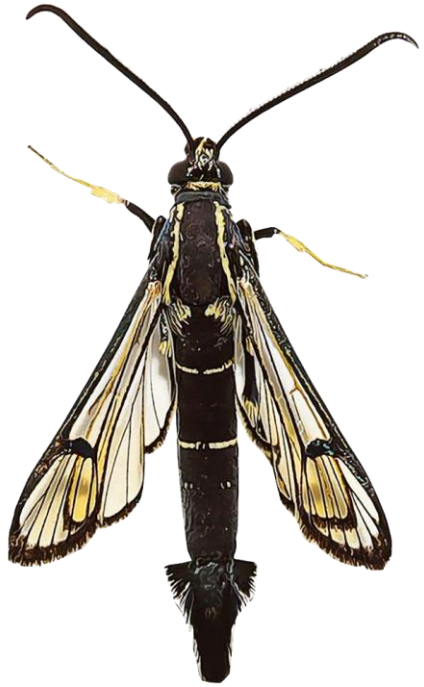


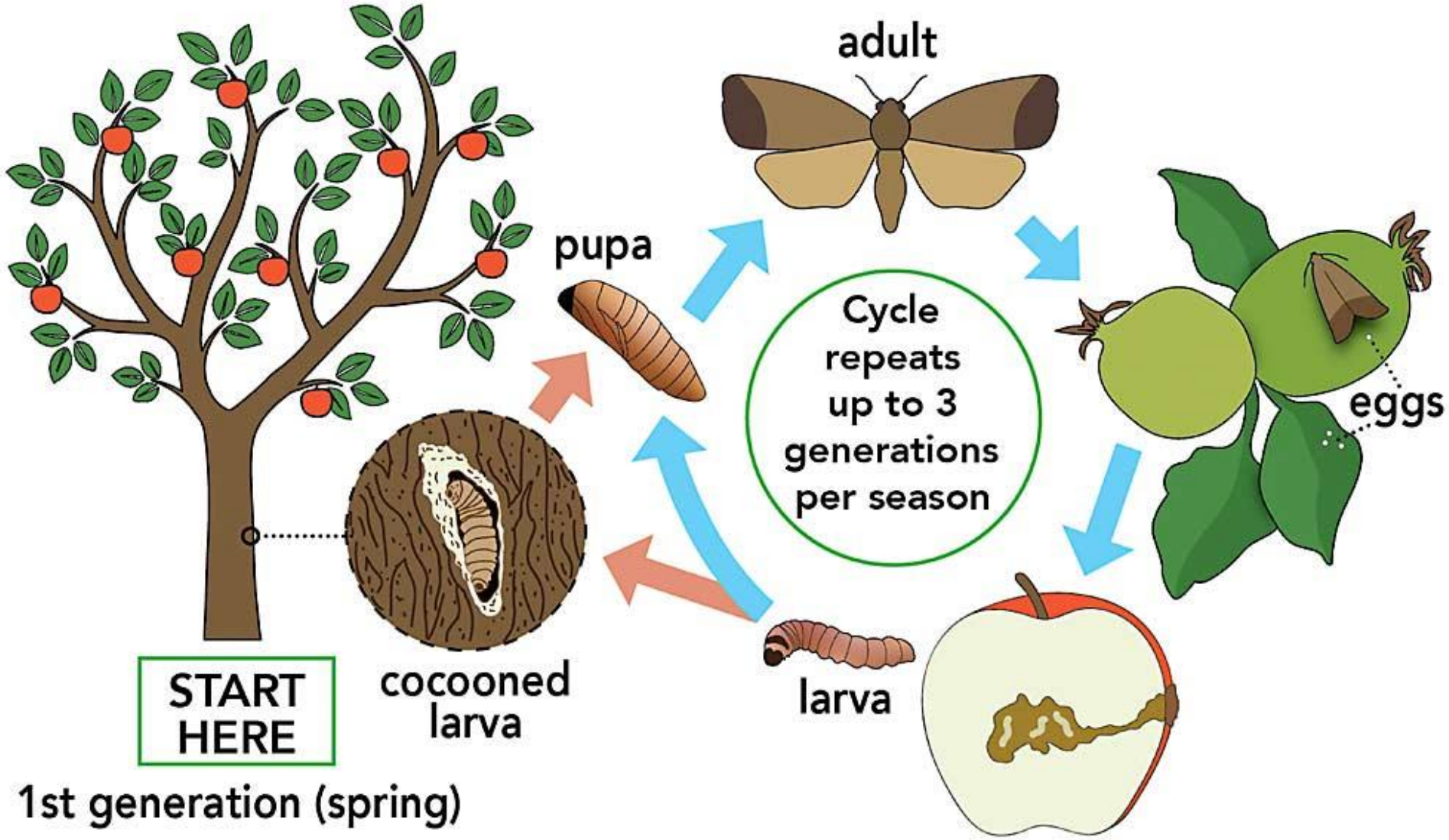
Greater Peachtree Borer

Heavy feeding from larvae can harm establishing trees in their first years after planting. Gummosis can be an indicator that larvae are under the bark! There are limited insecticides that will last through egg lay. Mating disruption is the recommended control for commercial stone fruit

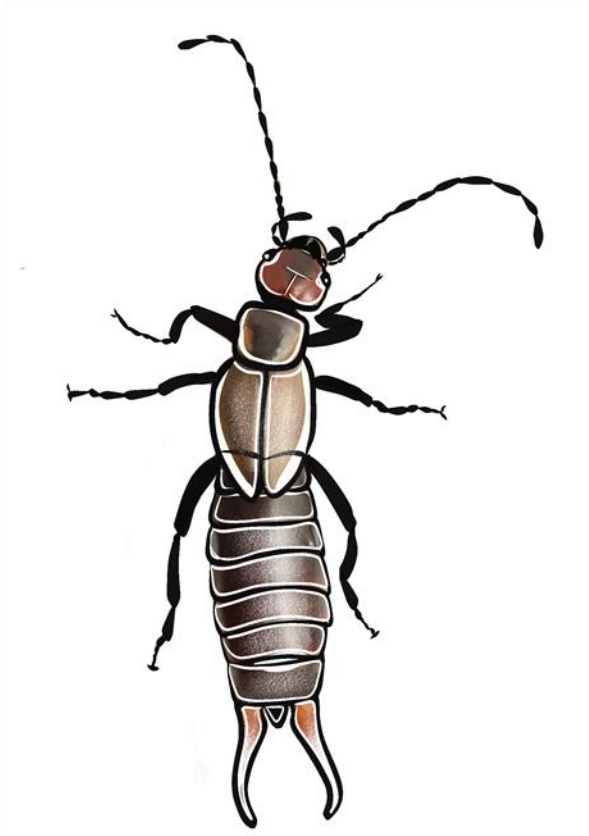
Peachtree Borer Larva

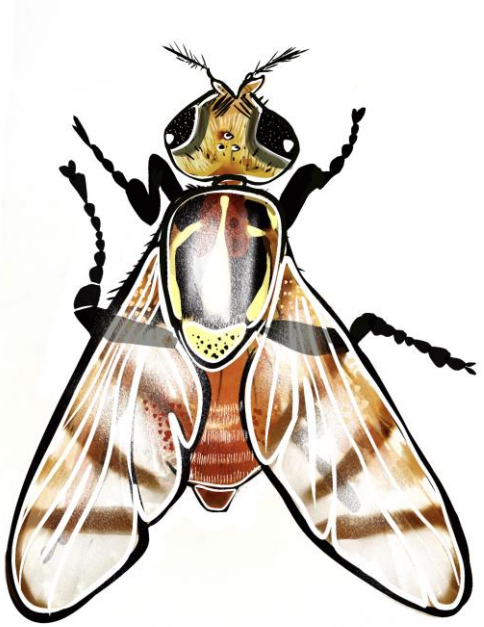
Use good cultural practices (i.e., fertilization, irrigation to maintain healthy trees. Establish a monitoring program to time pheromones

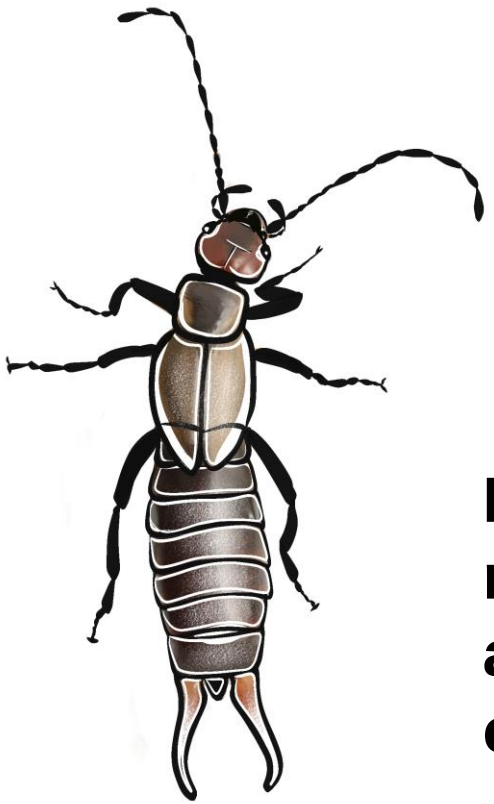
Codling moth lifecycle



Insects attracted or are opportunists on sugars & organic matter







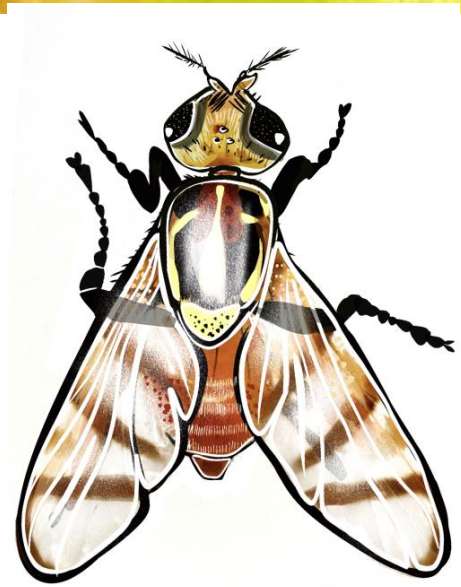
European Earwigs

Earwigs eat both insects and plant material making them both a friend and an enemy, depending on the time of year.

Earwigs will climb the trunk to reach ripening fruit as they near maturity. They often gain entry by wounds or openings, such as split-pits in peaches. They seek tight hiding spaces. Use carboard or vegetable oil traps with soy sauce to monitor.

Earwigs also feed on other insects, so they can be beneficial. They prey on aphids, pear psylla, mites, and insect eggs (including those of codling moth) They contribute considerably to woolly apple aphid and pear psylla suppression in orchards.

Western Cherry Fruit Fly



Traps in cherry orchards need to be placed before the first fly is expected by the end of May and insecticides are applied 5 – 7 days after the first catch.

Damage occurs when adult females insert eggs with their ovipositor, larvae consume fruit from the inside out!

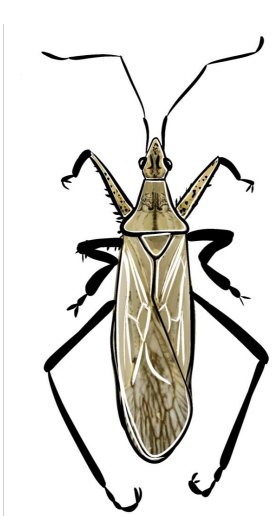
Larvae develop inside the fruit. The result is “wormy” fruit that is unmarketable.

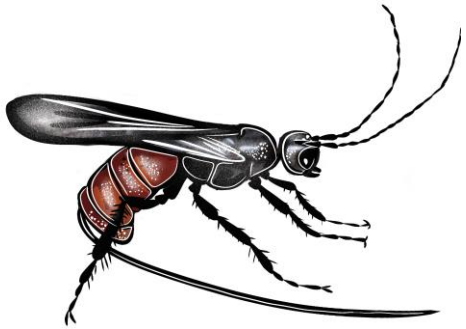
Dusky Wing Sap Beetles

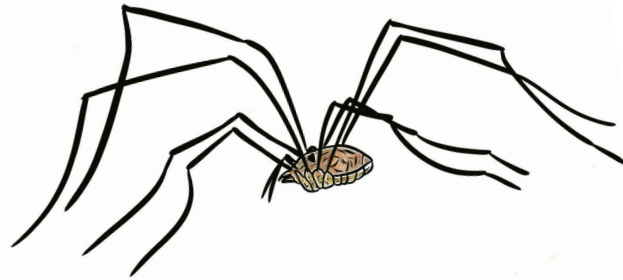
Sap and dried fruit beetles lay their eggs on or near ripe or overripe fruit/ veggies. Larvae develop/feed in organic matter/fruit and pupate. Adults and larvae feed on the flesh of fruit, esp. those contaminated by fungi and yeasts.

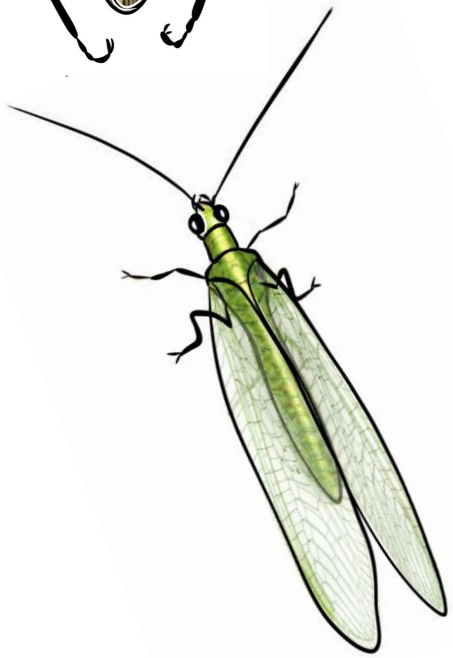
Insecticide should be a last resort during harvest. Assail®, Brigade®, Dibrom® and PyGanic® are registered for control of sap beetles with short pre-harvest intervals. Always read the product label carefully.

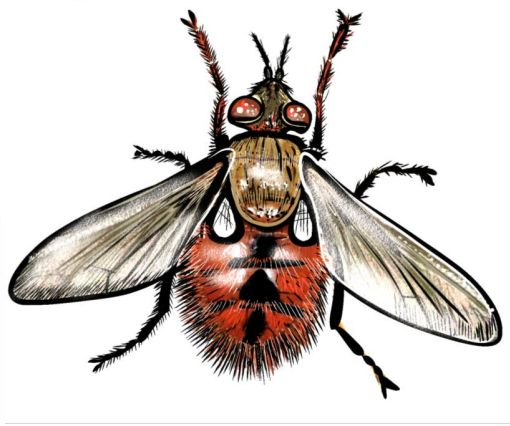
Arthropod Predators in Orchards

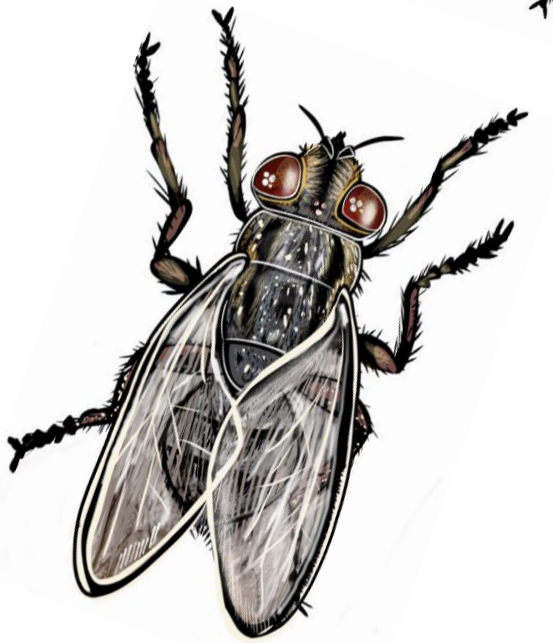


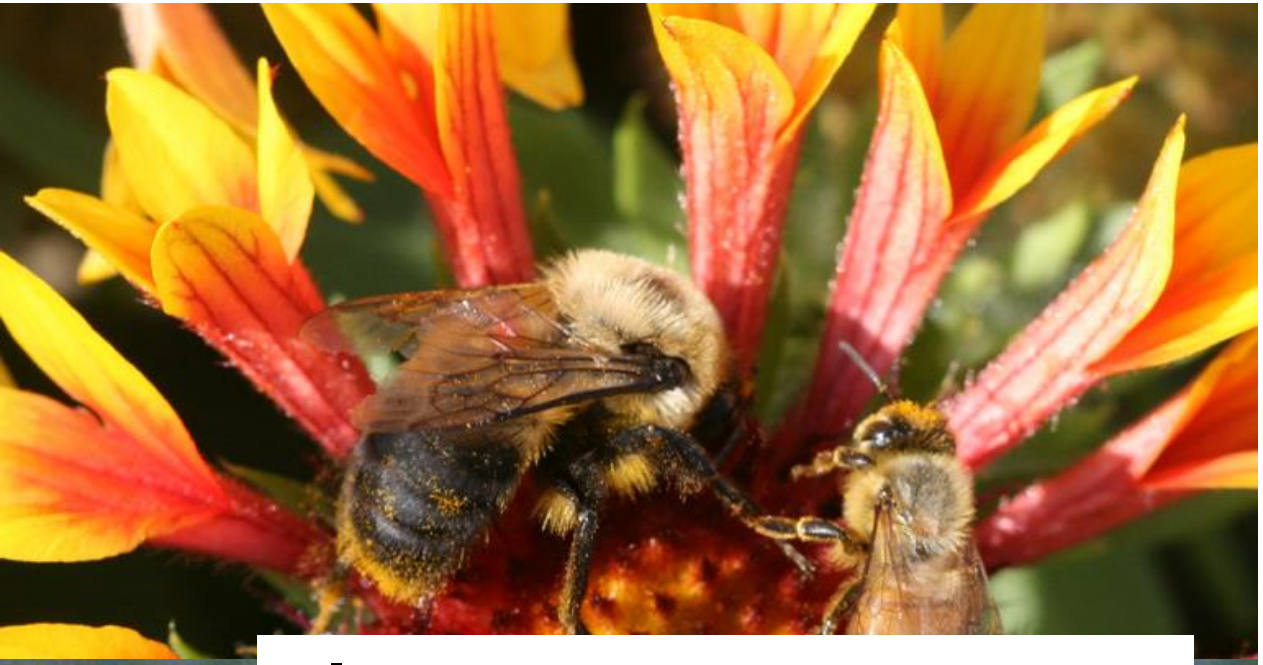










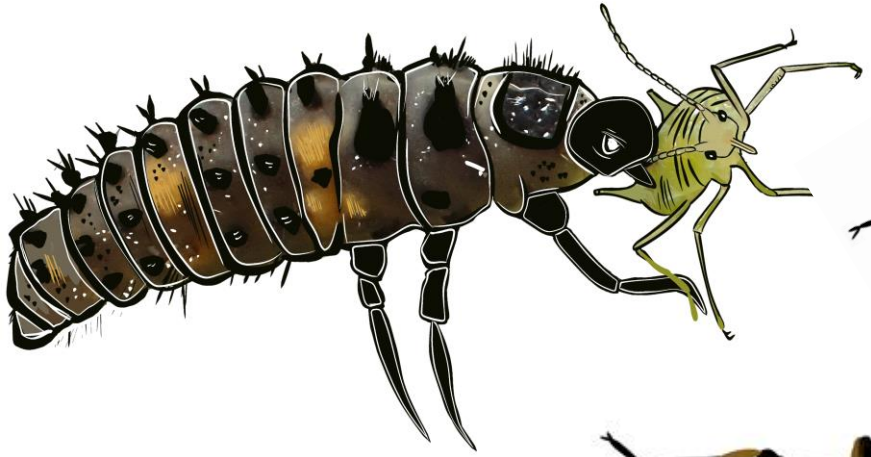


Plants can support populations of desirable insect species

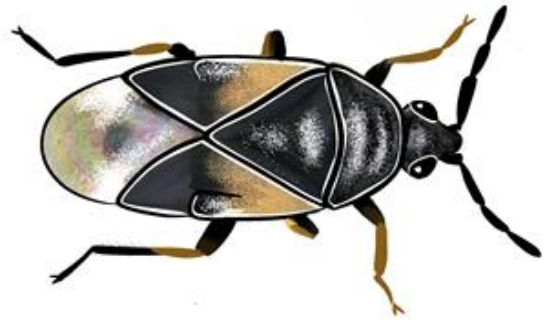
Plants may contribute to incidence of pests that limit plant value

Adults of many predators use flowers (nectar, pollen) for sustenance

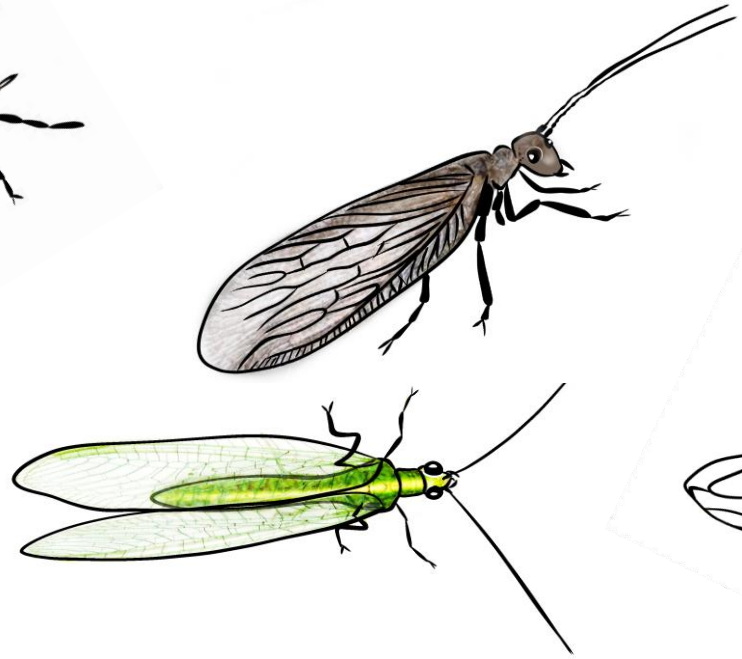
Insects that eat aphids!



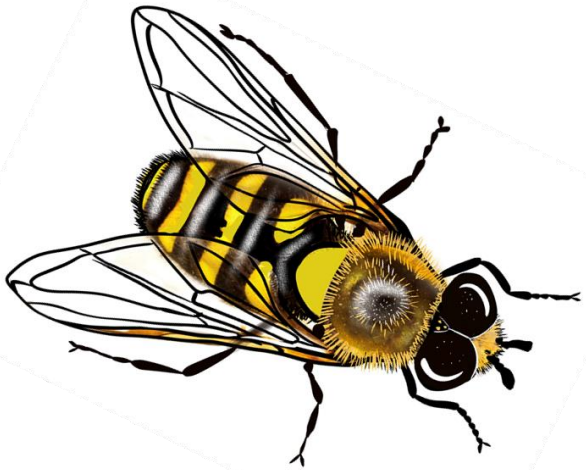
Lady beetle larvae consume hundreds of aphids



Minute pirate bug eat small bodied bugs

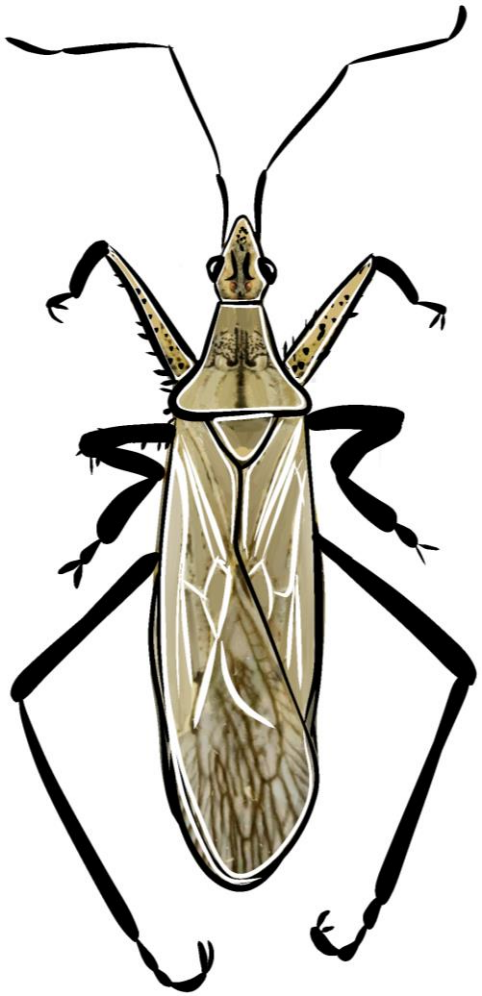


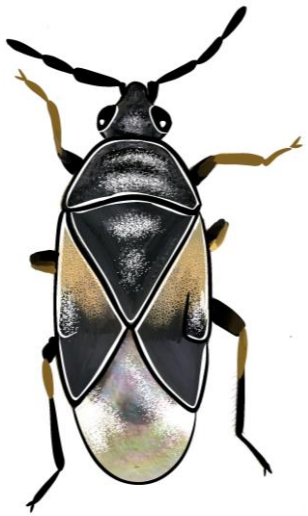
Green and brown lacewing larvae are called aphid lions

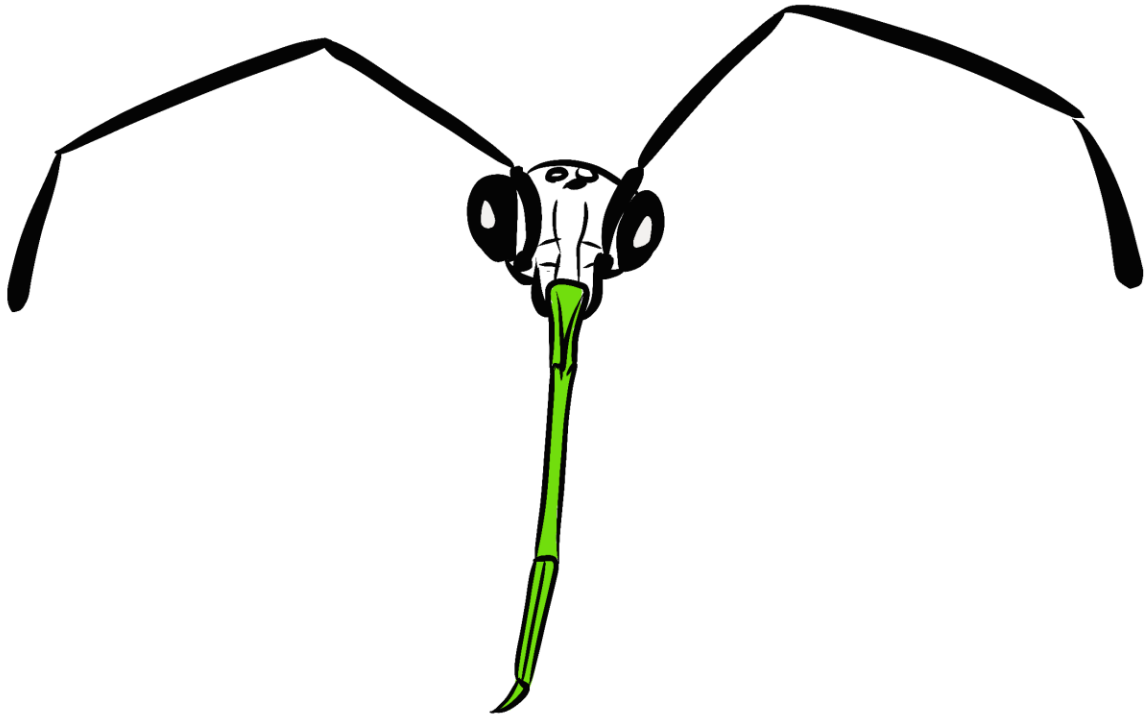


Flower fly larvae eat aphids

Hemipterous Insects





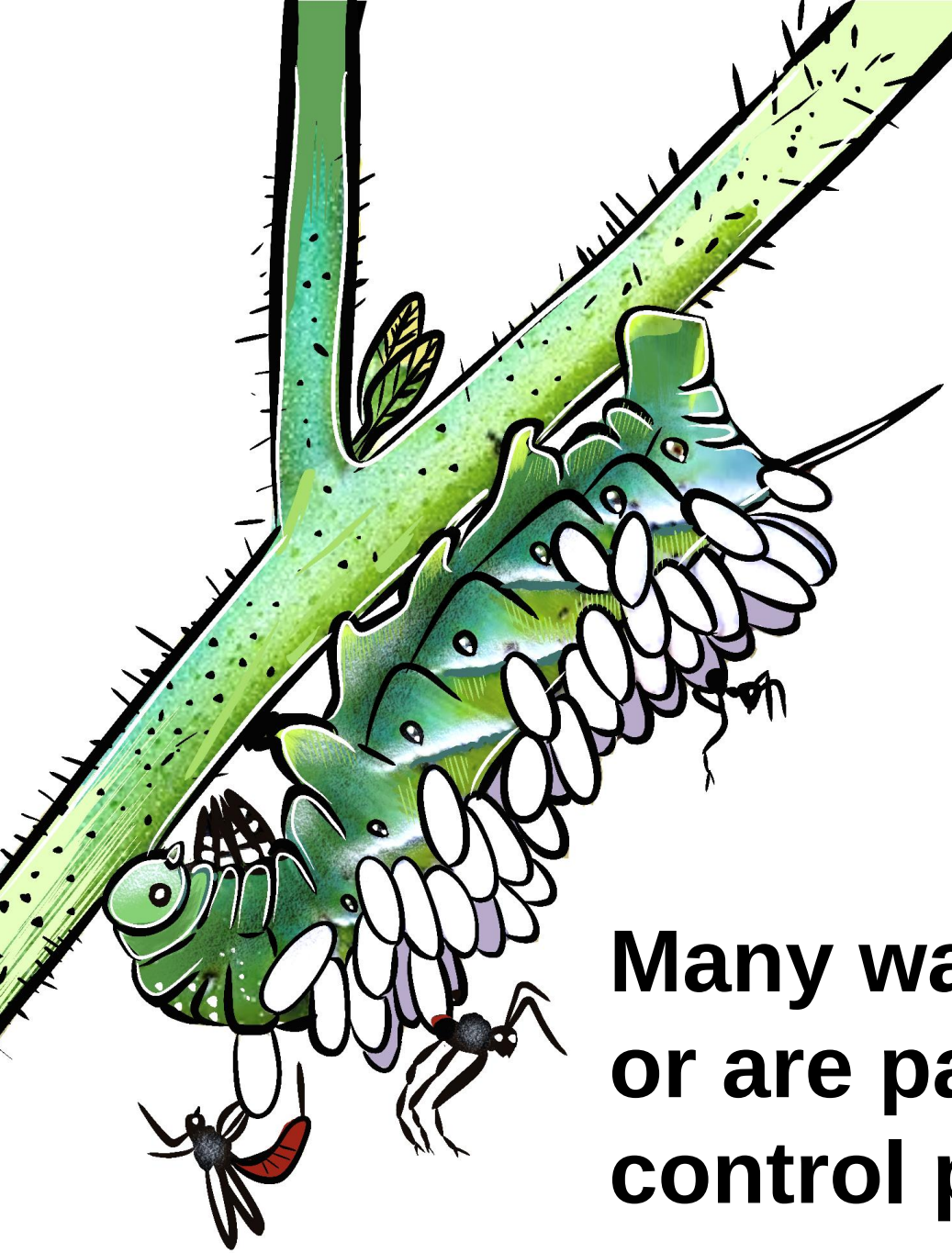


Mouthparts are fluid feeding and are used to pierce and suck fluids of either insects or plants

Wasps

Families Sphecidae, Crabronidae, Pompilidae

Parasitoid wasps maintain themselves on nectar and pollen



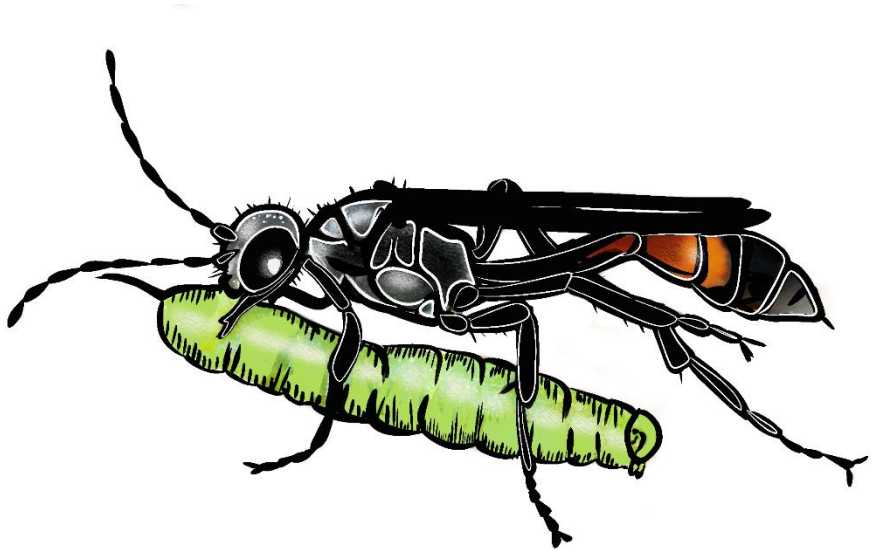
Hunting wasps control caterpillars, horse flies, grasshoppers

Many wasps are parasitic or are parasitoids and control pest species

Parasitoid wasps seek environments and food sources for their young

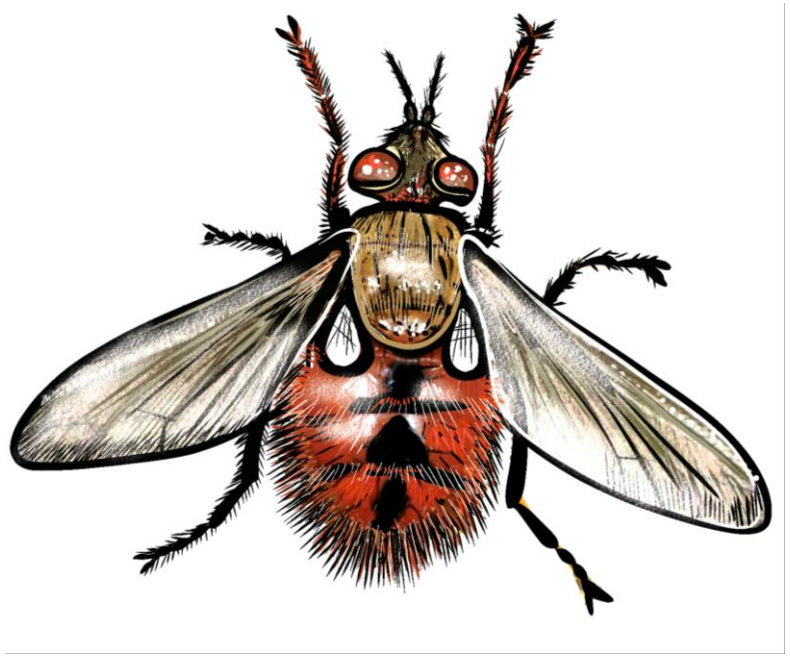
Hunting Wasp Habits

- Solitary wasps – no colony structure
- Young are fed paralyzed prey
- Nests are produced to rear young
  - Dug in soil, plant stems
  - Constructed of mud
  - Existing cavities

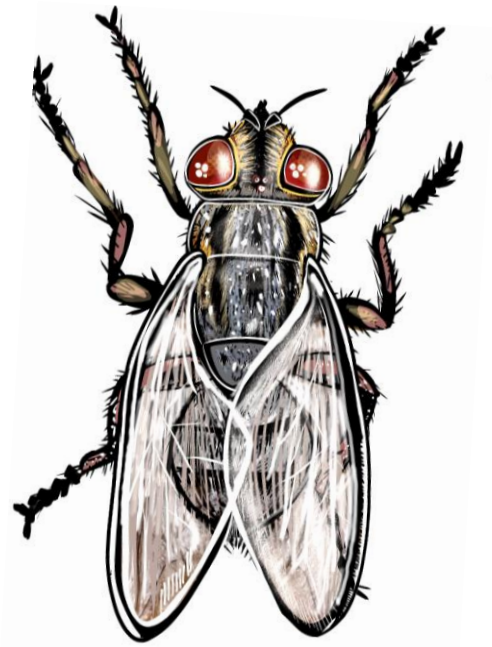


Predatory true flies

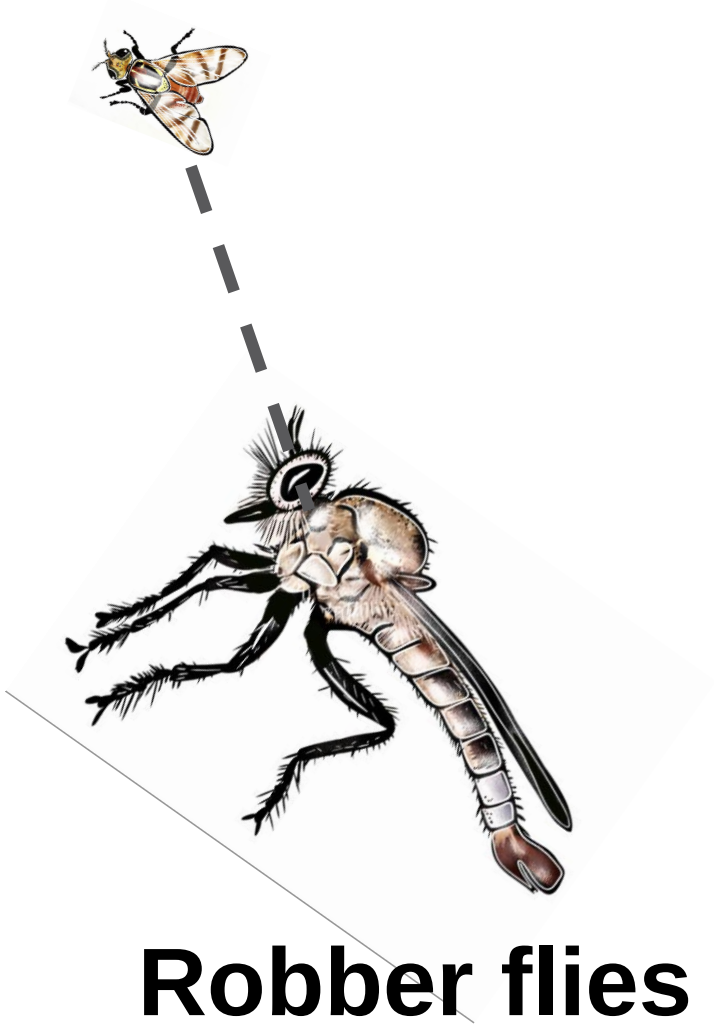
***parasitize other arthropods (bees, cicadas, grasshoppers/locusts**



***Tachinid flies**



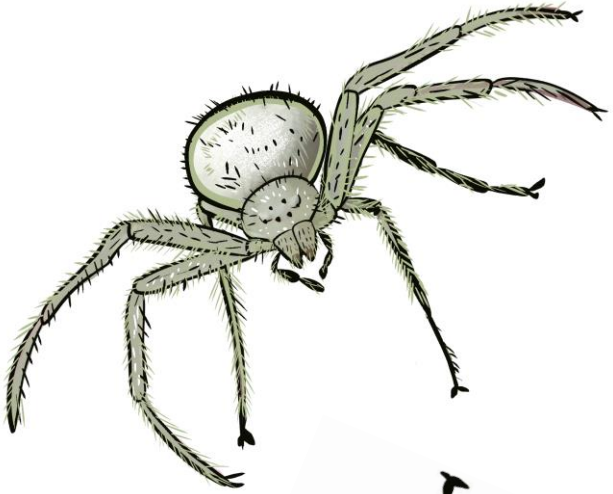
***Sarcophagid flies**

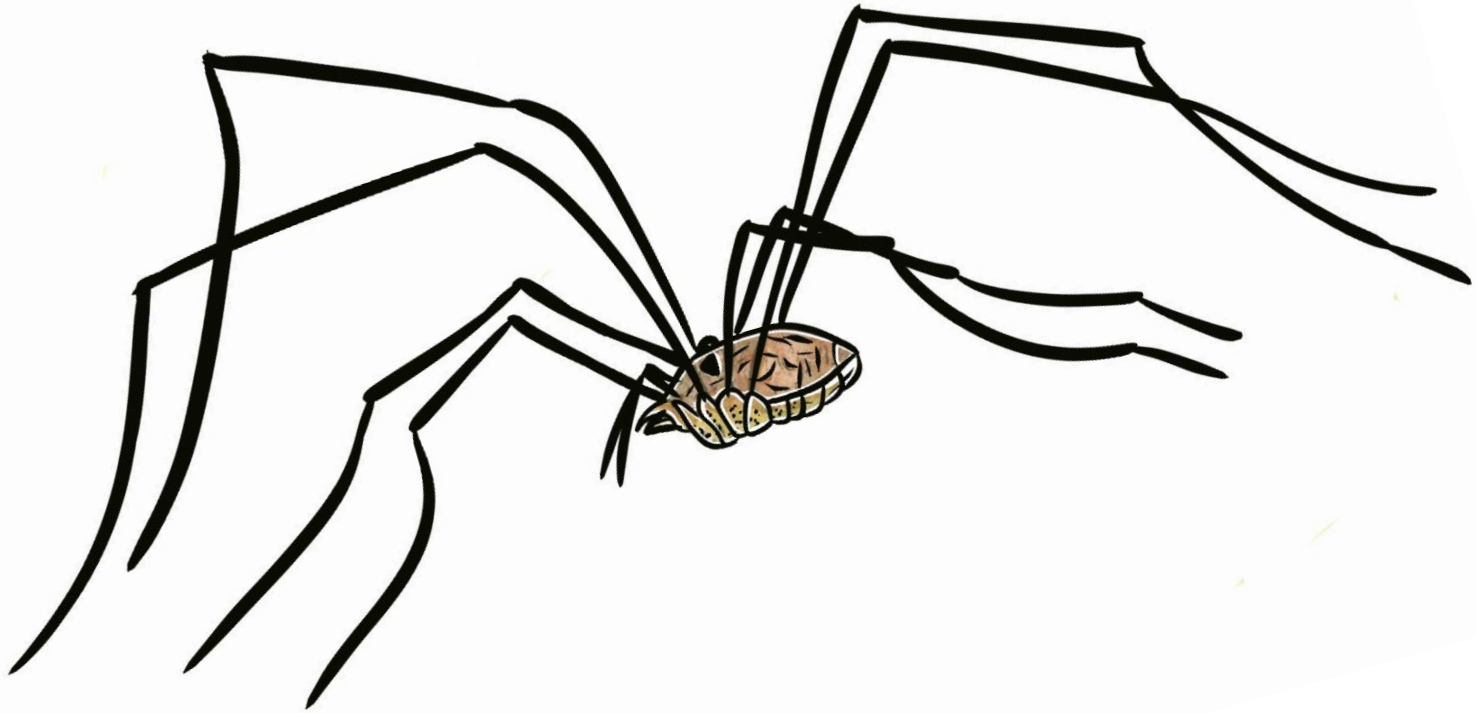


Robber flies are aerial predators

Tachinid fly adults sustain themselves on nectar

Larvae develop within and kill other insects





Spiders and harvestman are common predators in orchards preying on other arthropods

Some spiders use webbing to snare prey

Some spiders hunt prey without the aid of silk

Bark Crab Spiders

Promote habitat diversity to optimize natural enemies

Thank you!

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