

Beneficials

Predators

- **Predators attack, kill, & feed on numerous organisms within their lifetime**
- They can be specialized (feeding on one or few types of prey) or generalists (feeding on whatever they capture)
- Examples: beetles (ladybugs, ground beetles, soldier beetles, tiger beetles, rove beetles) , true bugs (minute pirate bugs, ambush bugs, assassin bugs, damsel bugs, some stink bugs), flies (hover fly larvae, robber flies, wasps & ants, lacewings, most earwigs, mantids, some thrips, spiders, some mites



Parasitoids

- **Parasitoids are insects that live, feed, & kill one host in its lifetime**
- Parasitoids are usually only parasitic in the immature stages & kill the host when they reach maturity
- May specialize on a stage of an particular insect (i.e. larva of beetles) or may specialize in a stage of all insects (i.e. eggs)
- Examples: wasps (wasps have ore parasitoids than any other insect order), flies

Pathogens

- **Pathogens are parasitic organisms that cause disease & can impair normal activities of the host**
- Examples: bacteria (*Bacillus thuringiensis*), fungi (*Beauveria bassina*), protozoa, viruses, nematodes (*Steinernema* & *Heterorhabditis*)





Pests

What is considered a pest?



- When you find insects in your yard, you need to figure out if the insect is a beneficial, pest, or just an insect that happens to be there
- While some insects are lumped into beneficial/ good & pest/ bad groups, you need to think about where the insect is and what it is doing before making your final decision
- Examples: Ladybugs eating aphids in the garden are beneficials while ladybugs overwintering in your house are pests OR termites breaking down trees that fall in the forest are beneficials while termites eating your house are pests



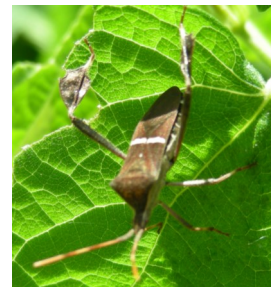
Chewing pests

- Chewing pests have mandibles that bite and chew the same as we do
- Damage can vary based on the size and type of insect
- Damage usually shows up as chewing of soft tissues of the plant leaving a lacy appearance, small holes, or large pieces of the plant eaten
- Examples: caterpillars, adult and immature beetles, adult & immature grasshoppers, some ants



Sucking pests

- Sucking pests have tube-like mouthparts they use to pierce plants to suck out juices
- Damage appears as yellow to whitish speckled foliage, curling or browning of foliage, wilting, stunted growth
- Some sucking pests feed on sap and can produce a sticky, substance called honeydew (this can lead to growth of a fungus called sooty mold on the plant)
- Examples: aphids, mealybugs, hoppers, scale insects, most stink bugs, leafhoppers, & on mammals mosquitoes, fleas



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