



Creating Sustainable School and Home Gardens: Beneficial Biological Control Insects

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Insects and arthropods, some of the most abundant residents in school and home gardens, play many significant roles as predators, herbivores, detritivores, and parasites. Predators are particularly important in the garden because they help keep the “bad,” herbivorous, pest insects under control.

Biocontrol is long-lasting, inexpensive, and supports pollinators and the natural enemies that live in your garden.

Biological control (biocontrol) occurs when humans use living organisms (typically predators, pathogens, or parasites) to control pest populations. While any predator might be able to eat herbivores, many **generalist** predators will eat anything, good or bad, which can include other predators and pollinators! **Specialist** predators are specifically adapted to target key pests (caterpillars, aphids, slugs) and typically do not harm other beneficial insects like pollinators.

On small scales, like school and home gardens, encouraging biological control agents can be highly effective, reducing the need for insecticides that harm the environment, humans, and beneficial insects. For example, you might notice some aphids harming a plant and purchase a specialized, natural predator like green lacewings or lady beetles to control the aphids rather than spraying the plant with a toxic insecticide.

You can encourage beneficial insects by providing alternative food (nectar and pollen plants) throughout the year, overwintering habitat (shelter, shrubs, perennial plants, leaf litter), and avoiding using pesticides. For example, you might plant sunflowers, zinnias, marigolds, and nasturtiums among your garden plants.

Learn More and Explore With Your Own Field Guide

For more information, see the Resources section, with links to learning materials for promoting helpful insect populations. Also see a related Utah State University (USU) Extension fact sheet: [Creating Sustainable School and Home Gardens: Welcoming Pollinators](#). A simple field guide titled **Quick Reference Field Guide for Garden Biocontrol Agents**

follows at the end of this fact sheet. You may want to print the field guide and laminate it for use in your garden! Biocontrol is long-lasting, inexpensive, and supports pollinators and the natural enemies that live in your garden.

Resources

USU Extension Fact Sheets and Websites

- [General Concepts of Biological Control](#)
- [Integrated Pest Management](#)
- [Aphid Natural Enemies and Biological Control](#)
- [Beneficial Insects: True Bugs](#)
- [Beneficial Insects: Beetles](#)
- [Mason, Potter, and Mud Dauber Wasps](#)

Pest Control in School Gardens

- [Dealing With Garden Pests and Diseases](#), Kids Gardening
- [A Guide to Controlling Insects in the School Garden](#), Louisiana State University Ag Center
- [Bug 2 School](#), University of Illinois Urbana-Champaign

Other Resources

- [Beneficial Insects](#), [Arbico Organics](#), biocontrol agents seller
- [Stink Bugs: Telling the Good Ones From the Bad Ones](#), Ask an Entomologist
- [Biological Control Information Center](#), North Carolina State University Extension
- [Why Provide Habitat for Beneficials?](#) North Carolina State University Extension

Acknowledgments

[Smart Foodscapes](#) (usu.edu/smart-foodscapes) Scan the QR code to learn more.

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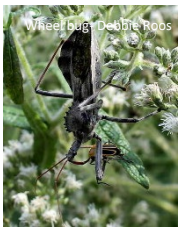


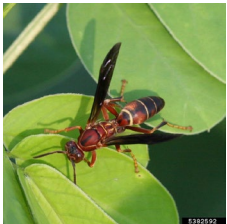


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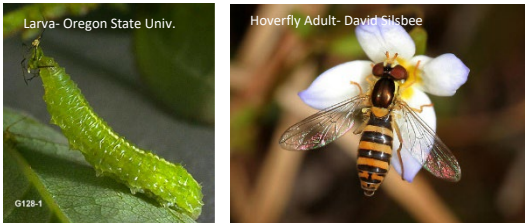

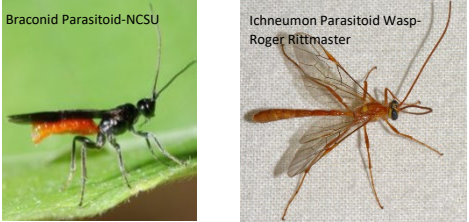
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Quick Reference Field Guide for Garden Biocontrol Agents

Generalist Biocontrol Agents	Specialist Biocontrol Agents
<p>Spiders (Araneae)</p> <ul style="list-style-type: none"> • 8 legs, 2 main body sections. • Catch insects by actively hunting, ambushing, or with webs. <div data-bbox="207 369 412 583"> <p>Wolf spider- Patrick Edwin Moran</p>  </div> <div data-bbox="444 369 664 583"> <p>Jumping Spider- Sarah Siefken</p>  </div>	<p>Lady Beetles (Coccinellidae)</p> <ul style="list-style-type: none"> • Eat aphids, scale, whiteflies as adults, and larvae. • Black and red/orange, usually with spots as adults (1/4"); larvae look like spikey little black and orange monsters. <div data-bbox="834 369 1122 594"> <p>Lady Beetle Larva- Patrick Murray</p>  </div> <div data-bbox="1138 369 1425 594"> <p>Lady Beetle Adult- Seth Ausubel</p>  </div>
<p>Praying Mantids (Mantidae)</p> <ul style="list-style-type: none"> • Large, long slender bodies, grasping forelegs for prey capture, and brown, green, triangular head. • Ambush and capture prey on vegetation. <div data-bbox="261 762 620 984"> <p>European Mantis- Charles J. Sharp</p>  </div>	<p>Big-Eyed Bugs (Geocoridae)</p> <ul style="list-style-type: none"> • Eyes wider than body, triangle on back, small (1/6"). • Eat small insects, insect eggs, aphids, and mites. <div data-bbox="932 762 1321 984"> <p>Big-Eyed bug- Julieta Brambila, USDA</p>  </div>
<p>Assassin Bugs (Reduviidae)</p> <ul style="list-style-type: none"> • Wide abdomen, long legs, narrow head with beak-like stabbing mouthpart, and colored brown, green, or gray, sometimes black and orange. • Ambush and capture prey on vegetation. <div data-bbox="240 1199 519 1417">  <p>© RATT BERTONE 2015</p> </div> <div data-bbox="548 1192 724 1417"> <p>Wheel bug- Debbie Roos</p>  </div>	<p>Lacewings (Chrysopidae, Hemerobiidae)</p> <ul style="list-style-type: none"> • Adults green or brown, medium-sized, net-like wings (1/2"-3/4"); larvae look like brownish alligators with big jaws, and some larvae cover up in natural debris. • Larvae eat aphids, and adults eat nectar and pollen. <div data-bbox="816 1199 1230 1417"> <p>Green Lacewing Larva, The backyard arthropod project</p>  </div> <div data-bbox="1234 1199 1474 1417"> <p>Green Lacewing adult</p>  </div>
<p>Wasps and Hornets (Vespidae, Sphecidae, Pompilidae, and many more)</p> <ul style="list-style-type: none"> • Large to medium, clear or black wings, slender bodies, narrow waist, typically yellow and black, black, or brown and yellow. • Some specialize on caterpillars, spiders, roaches, grasshoppers. <div data-bbox="188 1705 412 1927">  <p>© 2008 G. C. B. / iStockphoto</p> </div> <div data-bbox="425 1705 738 1927">  </div>	<p>Soldier Beetles (Cantharidae)</p> <ul style="list-style-type: none"> • Elongate with soft, leathery wings, usually black and red or yellow/orange. • Adults eat pollen and aphids, and larvae eat caterpillars and soil pests. <div data-bbox="964 1673 1279 1896"> <p>Soldier Beetle</p>  <p>© 2008 G. C. B. / iStockphoto</p> </div>

<p>Centipedes (Chilopoda)</p> <ul style="list-style-type: none"> Large to medium, long, and many segmented with many legs (2 legs per segment), fast-moving on the ground. Eat soil-dwelling arthropods. <div data-bbox="159 281 743 501">  </div>	<p>Minute Pirate Bugs (Anthracoridae)</p> <ul style="list-style-type: none"> Black and white, extremely small (< 1/16"). Eat thrips, mites, aphids, and tiny caterpillars. <div data-bbox="911 289 1304 510">  </div>
<p>Robber Flies (Asilidae)</p> <ul style="list-style-type: none"> Medium to large fly with clear wings, large eyes, long pointed abdomen, fuzzy head with beard; sometimes mimics bees. Eat anything they can catch; often catch flying insects. <div data-bbox="159 737 748 957">  </div>	<p>Ground Beetles (Carabidae)</p> <ul style="list-style-type: none"> Shiny black (can also be iridescent or with orange legs), fast-moving on the ground, usually medium to large (> 1/2"). Eat soil-dwelling pests (caterpillars, beetle grubs, slugs, snails, cutworms) as adults and larvae. <div data-bbox="950 737 1252 957">  </div>
<p>Ants (Formicidae)</p> <ul style="list-style-type: none"> Small, wingless, black, brown, red, or orange, often forming large colonies. Eat any insects on ground or vegetation and scavenge dead insects; may protect aphids in exchange for sugary secretions. <div data-bbox="147 1184 764 1404">  </div>	<p>Hoverflies (Syrphidae)</p> <ul style="list-style-type: none"> Adults yellow and black, mimicking bees (1/8"-1/2"); larvae very small, green/yellow, caterpillar-like (~1/8"). Adults pollinate, larvae eat aphids. <div data-bbox="875 1190 1398 1411">  </div>
<p>Predatory Stink Bugs (Pentatomidae) Spined Soldier Bugs</p> <ul style="list-style-type: none"> Shield-shaped with piercing mouthpart. Most stink bugs are herbivores, but predatory stink bugs have thicker piercing mouthparts and single-color antennae; they often have pointy shoulders. Ambush prey on vegetation and flowers. <div data-bbox="168 1686 651 1906">  </div>	<p>Parasitoid Wasps (Braconidae, Ichneumonidae, others)</p> <ul style="list-style-type: none"> Diverse—extremely tiny to large, often with long ovipositor (tail) for injecting eggs into host; often long and thin, with black wings. Adults lay eggs in larvae and eggs of various insects, eventually killing them; adults drink nectar. <div data-bbox="933 1680 1398 1900">  </div>