



BIOCONTROL SUCCESS STORY

Beetles aren't always "Bad Guys." Purple Loosestrife (*Lythrum salicaria*) is a non-native invasive plant that used to cover wetland areas here in the Northeast. Since wetland organisms are sensitive to herbicides and other pesticides, and some areas are inaccessible, biological control was a more sustainable option.

Enter the *Galerucella* beetles. Like the Lily Leaf Beetle, this insect feeds on the foliage of only one plant, in this case purple loosestrife. This beetle has been very successful in suppressing the invasive loosestrife population. As the loosestrife population rises, so does the beetle population. When the beetle's food source declines, the insects populations decline too.



Photo: David Cappaert, Bugwood.org

REFERENCES & RESOURCES

Gardiner, M. *Good Garden Bugs*, Quarry Books, Beverly, MA, 2015

Shelton, A. "Biological Control: A Guide to Natural Enemies in North America" Website: biocontrol.entomology.cornell.edu/index.php

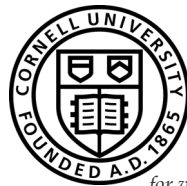
University of Rhode Island Biocontrol Lab:
Lily Leaf Beetle Project:
<https://web.uri.edu/biocontrol/>

Photo ID Guide:
<https://web.uri.edu/biocontrol/lily-leaf-beetle-larval-collections-2016/lily-leaf-beetle-photo-identification-guide/>



Photo: NYS IPM Program via Flickr

Lily Leaf Beetle larvae (above) cover themselves with their own excrement, a *charming* adaptation that may help them evade predation or detection. While we can't be sure why they do that, most gardeners agree it's pretty icky! Parasitoid wasps lay their eggs on or in Lily Leaf Beetle larvae.



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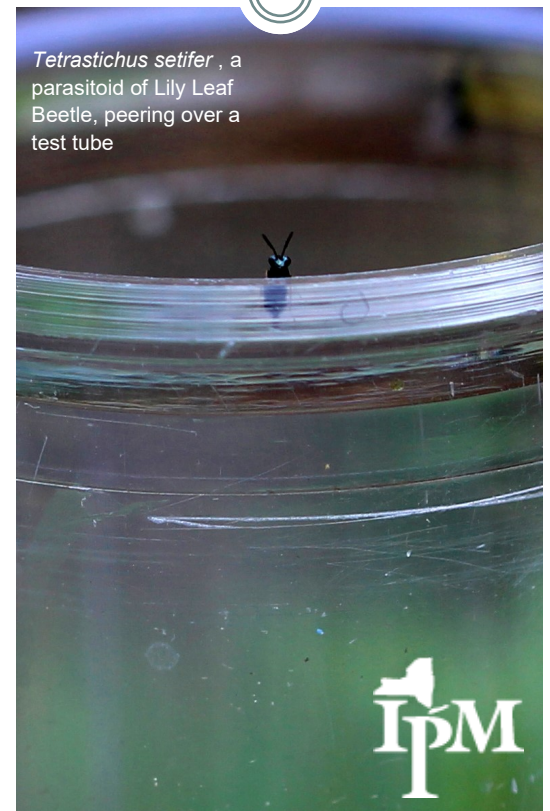
Reviewed 2019



Biological Control a sustainable solution



Tetrastichus setifer, a parasitoid of Lily Leaf Beetle, peering over a test tube



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PREDATOR, PARASITE OR PARASITOID?

Predators are insects that eat other insects. Some have a wide host base and may eat beneficial insects as well as pests. Preying mantids are one example.

You may have heard the term **Parasite**. These generally do not kill the host so they are not very useful as biocontrol. However, some parasites vector diseases which do kill the host.

Parasitoids kill the host. They lay their eggs in or on the egg, larvae, or body of the adult pest. The tobacco hornworm below has been parasitized by a braconid wasp. The white, rice-shaped, cocoons will eventually break open and adult wasps will emerge. The caterpillar will die.

PARASITOIDS AS GARDEN ALLIES

Parasitoids are species-specific. That means they attack only a specific pest, or closely-related pests. They often have a direct relationship to their host, even synchronizing their lifecycles to those of the pests. As a pest population grows, so does the parasitoid population. As the parasitoids suppress the pest, their numbers decline as well.

Generally, parasitoids feed from individual hosts to complete their life stage. Once they reach a host, they usually finish it off.



White cocoons of a braconid wasp emerging from tobacco hornworm Photo: Jen Lerner



Galerucella sp. Leaf beetle
Photo: David Cappaert, Bugwood.org

Why Biological Control is a more Sustainable Option

- Biological control, or biocontrol employs natural enemies such as parasitoids, predators, pathogens, antagonists, or competitors to suppress pest populations.
- Biocontrol can be target-specific. Some organisms attack only certain harmful species and leave others untouched.
- Biocontrol is an environmentally sound method of pest control, especially compared to broad-spectrum pesticides which may cause unintended harm to beneficial insects, animals and humans.
- Biocontrol can be implemented as part of an Integrated Pest Management (IPM) program.
- If a population of beneficial organisms can be established, it can become a self-sustaining form of pest management, working in synchrony with pest populations.

LILY LEAF BEETLE

Biological Control in Action

Lilies are an important greenhouse and nursery crop. If you have lilies in your garden, you have probably noticed a small insect devouring them. The Lily Leaf Beetle (*Lilioceris lili*) is an invasive species that decimates both foliage and flowers on garden lilies and rare native lilies.

Cornell Cooperative Extension and NYS Integrated Pest Management were part of a three-year, USDA-funded biocontrol project to release several parasitoid wasps that attack this pest and greatly reduce its population. These tiny wasps (smaller than a grain of rice) have been released in New England states with excellent results. A group of entomologists, IPM specialists, and CCE educators received the necessary permits to release these helpful insects across NYS.

The releases wrapped up in 2019. It's a multi-year project for these beneficial insects to become established and spread but we're optimistic that in time these beneficial insects will reduce Lily Leaf Beetle populations and keep them low.

Lily Leaf Beetle, a destructive pest of lilies.
Photo Joellen Lampman, NYS IPM

