

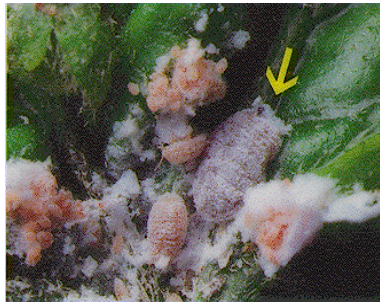
What is Biological Control?

Anticipating New Pest Problems

United States Department of Agriculture
Agricultural Research Service

Biological Control:

- C is the use of natural enemies such as predators, parasites, and pathogens to control insect and weed pests.
- C is an environmentally friendly alternative to expensive and potentially harmful pesticides.
- C is a cost-effective, permanent and self-sustaining method of managing pests.
- C reunites pests with their natural enemies.
- C is useful in agriculture, landscapes, gardens, forests, rangeland, nurseries, homes and stored food products.



Predators prey on many agricultural crop pests including mealy bugs (shown above), scale insects, whiteflies, and aphids. (Photo: M. Johnson)



Parasites help control tarnished plant bug, a pest of numerous field, fruit and vegetable crops.



The Emerald Ash Borer, now invading Michigan, Ohio, and Ontario, is causing severe damage and mortality to ash trees. Through explorations in Asia and locally, we are investigating long term use of natural enemies to suppress this beetle should current eradication efforts be unsuccessful. (Photo: J. Wildonger)

As the principal in-house research arm of the U.S. Department of Agriculture, the Agricultural Research Service has a mission to:

Conduct research to develop and transfer solutions to agricultural problems of high national priority and provide information access and dissemination to: ensure high-quality, safe food and other agricultural products, assess the nutritional needs of Americans, sustain a competitive agricultural economy, enhance the natural resource base and the environment, and provide economic opportunities for rural citizens, communities, and society as a whole.

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Biological Control



Beneficial Insects Introduction Research Unit, Newark, Delaware

What the Newark Unit Does:

- C Addresses pest problems of regional and national importance including Russian wheat aphid, gypsy moth, tarnished plant bug, and Asian longhorned beetle
- C Imports new natural enemies into the U.S. to solve pest problems, using environmentally friendly and self-sustaining biological control methods
- C Studies the biology and ecology of parasites and predators of insect pests
- C Evaluates establishment and impact of natural enemies

Beneficial Insects Introduction Research Unit
501 South Chapel Street, Newark, DE 19713
Tel: 302-731-7330
FAX: 302-737-6780
Email: Roger.Fuester@ars.usda.gov
Web site: <http://www.ars.usda.gov/naa/biiru>

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“How Does . . .

Reduces Pesticide Use



Biological control can reduce pesticide use on the farm and around the home. For example, the alfalfa weevil biological control program reduced pesticide use by 95% from 1968 to 1983 and is saving farmers \$122 million each year in insecticide and application costs.

Results in Permanent Control



Once established, biological control agents exert long-term control on the target pest without further input. The alfalfa blotch leafminer has virtually disappeared from alfalfa fields in the northeastern U.S. since parasites introduced by BIIR became established in the 1970's, saving farmers \$20 million each year.

.. Biological Control . .

Decreases Costs to Consumers



Natural enemies introduced from Europe have greatly reduced populations of the cereal leaf beetle. This not only saves money for farmers (\$19M/year) by reductions in pesticide use, but also helps consumers, who end up paying less for bread and other cereal products.

Protects Forest & Shade Trees



Biological control helps protect valuable shade trees and forest ecosystems from invasive plant pests. Biological control of gypsy moth, a major defoliator of many tree species, helps to maintain healthy landscapes and reduce harmful effects of pest outbreaks on wildlife.

... Benefit Me?"

Combats Invasive Pest Species



The Asian longhorned beetle is an invasive species from China, where it causes widespread mortality in hardwoods. Established U.S. populations are primarily on maples, which comprise 30% of urban trees. Natural enemies from China and other non-insecticidal approaches to control this pest are under investigation.

Enhances Nature Conservation



Invasive plant species such as *Phragmites* have had disastrous effects on wetlands and other natural habitats in North America. We are exploring possibilities for using biological control agents to reduce the harmful environmental effects of these invaders.