

Biological Control:  
Utilizing Living Organisms to Control Living Organisms  
By Daniel Thorpe  
Plant Pathology Intern  
The Morton Arboretum

There is nothing more agonizing than having your plants infested by pests. Whether the plant is grown for monetary or aesthetic purposes, in many cases, pests can greatly diminish the value of the plant. Unfortunately, pests are diverse including organisms such as insects, fungi, bacteria, and nematodes leading to a wide array of infections on plants. The diversity of pest infestations has led to a diversity of control methods over the years. Cultural practices such as weeding and mulching, chemical practices such as pesticides, and now genetic practices such as gene resistance have all been and are all still desirable control methods for specific circumstances. One control method that is not as highly recognized is biological control.

Biological control is the use of a living organism to reduce the population of another living organism. The advantage of using biological control is that it takes into account natural enemies that already exist in nature. Because they are already occurring in nature, biological control agents are environmentally friendly when used correctly. One of the only difficulties with using biological control is finding the specific organisms. This is particularly difficult when non-native plants are planted because the pests that attack these plants do not usually encounter their natural enemies being that they are outside of their natural surroundings. Many natural enemies have been found and are offering successful control measures for different pests.

There are several different categories of natural enemies. Predators are those that consume more than one prey over its lifetime and are usually larger than their prey. Parasitoids, on the other hand, develop on or within a single organism during their lifetime by allowing the adult to lay eggs in the host. Another difference between predators and parasitoids is that parasitoids are usually host-specific. A less obvious natural enemy is pathogens. Pathogens such as fungi have been known not only to suppress insects, but some are also capable of suppressing other fungi. It is important to remember these three “p’s”, predators, parasitoids, and pathogens when discussing biological control.

There are different ways for beginning and regulating a biological control system. One approach is known as classical biological control. In this system, natural enemies are imported from other locations. This system can be successful because of the non-native plant species along with their pests that have been introduced in new areas. A second biological control system is known as conservation. This system is very important for maintaining successful natural enemies in a certain location. To conserve natural enemies, it is important to first be able to recognize the biological control agent in order to protect it. Another factor is to minimize the use of pesticides that could very easily kill the beneficial organisms. A third factor for conservation is to maintain a natural habitat where the natural enemies live. It may be necessary to maintain crop residues and other vegetation. A third biological control system is called augmentation where natural enemies are placed into areas with low numbers of natural enemies. Inoculative releases use few natural enemies in hopes that they will reproduce and increase in number over time. Inundative releases use large numbers of natural enemies in hopes of eliminating the pest problem very quickly and providing only a short-term effect.

One common example of a biological control agent is the lady beetle. Most lady beetles feed on harmful, soft-bodied insects such as aphids, scales, and mites. Lady beetles are predators and if used are usually involved in inundative releases, even though they tend to fly away from the intended site if conditions or food sources are unfavorable. An example of a successful parasitoid is the *Trichogramma* wasp. They have the potential to control many species of caterpillars in various crops by laying their eggs into the eggs of moths or butterflies. There are many more examples of the use of biological control agents, and many can be found at:

[Http://www.nysaes.cornell.edu/ent/biocontrol/](http://www.nysaes.cornell.edu/ent/biocontrol/)

Environmental protection is becoming more and more the focus when dealing with plant health and protection. Unfortunately, time and money have been the concern for too long. Biological control is a very useful alternative for its effectiveness and environmental safety. Biological control may not be a quick and easy method, but as the saying goes, good things come for those who wait.

Other internet sites that may be useful:

[Http://ipmwww.ncsu.edu/biocontrol/newindex.html](http://ipmwww.ncsu.edu/biocontrol/newindex.html)

[Http://www.entomology.wisc.edu/mbcn/mbcn.html](http://www.entomology.wisc.edu/mbcn/mbcn.html)