



Old World climbing fern, *Lygodium microphyllum* invading a cypress stand

What are the Benefits of Biological Control?

Biological control is both cost-effective and sustainable, and can be integrated with chemical, mechanical, and cultural control methods. Unlike these other methods, however, biological control can permanently transform weeds into less invasive forms, making them more vulnerable to herbicides, fire, and frost. As a result, less pesticide is applied into the environment thereby decreasing costs and reducing risks. Biological control contributes to the recovery and rehabilitation of natural ecosystems by promoting native species, including threatened and endangered plants and animals. Additional benefits of this research include reducing the recurrent costs of invasive plant control, protecting water and food supplies, and improving water management.

A Biological Control Example



Study showing *Melaleuca quinquenervia* recovery after fire with biological control agents present (left) and absent (right)



For additional information and tour scheduling please contact our main office at 954-475-6540

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Agricultural Research Service

The Invasive Plant Research Laboratory



The melaleuca weevil, *Oxyops vitiosa*

Developing biological solutions to weed problems in natural and agricultural systems



An air potato (*Dioscorea bulbifera*) infestation



Air potato beetles, (*Lilioceris cheni*), controlling air potato



A diverse, native Florida Everglades habitat

What are Invasive Weeds?

Invasive weeds are non-native plants that threaten natural and managed ecosystems throughout the U.S. They negatively alter habitats of threatened and endangered species, radically change water and fire dynamics, and outcompete and damage crops.

How Safe is Biological Control?

Very safe. Intensive host range evaluations are conducted using highly predictive tests to determine the safety of imported natural enemies. Worldwide, of the nearly 400 insects, mites, and fungal species released for control of exotic weeds, only 2 caused damage to non-target plants; both of which were predicted from host range testing.

Why Protect Natural Systems from Weeds?

Natural systems provide many ecological, economic, and social benefits including reducing flooding, conserving biological and genetic diversity, increasing water quality and quantity, producing food, and providing recreation. These habitats are valuable: an acre of wetland returns a value of \$36,518 annually. Without long-term sustainable management of invasive weeds like melaleuca, Old World climbing fern, and waterhyacinth, large parts of the country, including the Everglades ecosystem, will be permanently degraded. This will result in significant losses in biodiversity along with reduced water availability for agricultural and urban needs. Herbicides and mechanical removal can be expensive solutions as they must be applied in perpetuity, plus they often produce collateral damage to native plants.

What is Biological Control?

Invasive weeds often leave their natural enemies behind when they invade new areas. Biological control reunites weeds with their original natural enemies and can produce landscape-level and permanent suppression of the weed. To date, the USDA Invasive Plant Research Laboratory (IPRL) has developed and deployed 25 insects against nine weed species.

How Effective is Biological Control?

Biological control rarely controls a weed completely. Most successful programs weaken the weed while reducing the scale of the problem. This approach returns \$16-\$35 for every \$1 invested. Biological control agents on melaleuca reduce tree biomass by 77%, seed production by 95%, growth rate by 50%, thin field populations by 47%, and make the tree 36% more susceptible to fire and 30-40% more susceptible to herbicides.