



Small Scale Solutions for your Farm

Biological Pest Management for Insects and Disease



Do You Have Problems With:

- Insects or disease in your crop, pasture or hay fields.
- Insects or rodents around the house and/or farm buildings.

Biological Pest Management Control

is using a naturally occurring disease, parasite, or predator to control a pest. Natural enemies to pests include a wide range of small and large creatures that may already be present on your farm.

Potential Benefits and Purposes of Biological Pest Management

- Reduced need for chemical pesticide use
- Savings on pesticide costs
- Reduced risk of chemical residues on farm products
- Reduced on- and off-farm environmental risks
- Decreased fuel and machinery use
- Increased plant and animal diversity
- Opportunities for additional secondary farm income (bird watching, photography, etc.)

The goal is to attract natural predators to your farm, keep them in your fields, and avoid killing them when applying pesticides.

Methods of Biological Pest Control

Beneficial Insects

Beneficial insects are insect predators and parasites that feed on pests. Thousands of native insects and spiders can play a useful role in controlling farm pests. The lady beetle is probably the best-known beneficial insect. Others include green lacewings, parasitic wasps, praying mantis, predatory mites, and parasitic nematodes.

Beneficial insects can be encouraged by providing habitat with a diverse range of locally native plants and trees that flower at different times, hollow trees and branches, logs and natural litter such as leaves and wood on the ground.

Buffer practices that use a variety of native plants are useful in providing habitat for beneficial insects. These practices include:

- Field borders
- Hedgerows
- Early successional habitat management

Unfortunately, beneficial insects are susceptible to many pesticides. Use of insecticides can reduce beneficial insect populations, so choose and use these with care and only as needed to control pest populations.



Wasp and fleas feeding are a method of bio-control.



Appropriate wildlife habitat is critical.





Birds

Native birds may help reduce populations of undesirable insects and small mammals. Providing perches, nesting sites and boxes and establishing habitat around the edges of crop fields can encourage these predators to take up residence and feed on pests that may harm your crops.

Insects comprise all or most of the diet of many common songbirds, including purple martins, blue birds, gnatcatchers, flycatchers, and swallows.

Birds of Prey

Birds of prey, such as hawks and owls, can be useful in controlling rodents and other small mammals. Among the many species of owls, the barn owl is among the most helpful to farmers. A family of barn owls may consume more than 1,000 small mammals during a nesting season. Barn owls hunt at night and lay their eggs in hollow trees, crevices in cliffs, and holes in sandbanks. They also like to live in abandoned buildings, granaries or barns and are fairly easy to attract by installing nest boxes.

Hawks, kestrels, and shrikes eat meadow mice, small birds, grasshoppers and other insects. They can be attracted by installing perches and nest boxes. Hawks prefer large perches which can comfortably hold their whole body and provide a broad view of the surrounding land. Large trees with dead limbs sticking up above leaves are an ideal roost.

If enough birds live on your property, in addition to their help in managing pests, you may be able to generate income from birdwatchers and photographers willing to pay for the privilege of visiting your farm.

Bats

Bats play key roles in many plant communities, eating insects, pollinating flowers, and dispersing seeds. Bats can also be useful in controlling pest populations and are the only major predator of night-flying insects including moths, beetles, flies, and mosquitoes.

Probably the most common item eaten by weight is moths, which are a significant agricultural pest. A typical colony of 150–200 bats will eat 5 pounds of insects per night.

To attract bats, install bat houses in proximity to a reliable food source or enhance existing roosting sites in unused buildings. Bats prefer places that are warm, dry and protected from disturbance.

It is relatively easy to find bat houses to purchase or you can obtain plans, available from many sources to build your own. Houses can be placed on poles, the sides of buildings, dead trees, or other structures. The bottom of the bat house should be 12 to 15 feet off the ground. Place the house in an area where it will receive plenty of sun. Bat houses within a quarter mile of a lake, pond, river, stream, or open marsh have a greater chance for success.



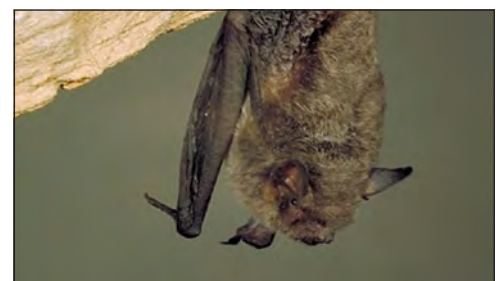
A ladybug eating an aphid.



Borders of natural vegetation on field edges provide habitat for beneficial insects.



American Kestrel (*Falco sparverius*) and Barn Owl (*Tyto alba*). Photos courtesy of US Fish and Wildlife Service



Gray Bat (*Myotis grisescens*). Photo courtesy of Duke University





Associated Costs

Using biological controls for insects, disease and rodents on your farm mainly involves managing habitats that are attractive to and that will support creatures which prey upon the pests. Desirable habitats include field borders, vegetated buffers, and other areas of native grasses, saplings, and small shrubs.

Costs may include:

- Equipment time, fuel, and maintenance
- Labor for establishment and annual maintenance of vegetated areas
- Reduced crop acreage if some areas are no longer cropped
- Purchase or construction of bird and bat houses.



Eastern Bluebird (*Sialia sialis*) with insect.



Technical and Financial Assistance

Whether you measure your farm in terms of feet or acres, your local Natural Resources Conservation Service (NRCS) office has experienced conservationists that can help you develop a Conservation Plan to conserve, maintain, and restore the natural resources on your land and improve the long-term health of your operation.

There is no charge for our assistance. Simply contact your local office to set up an appointment. You may also be eligible to receive financial assistance. Your NRCS office will explain any programs that are available so you can make the best decision for your operation. All NRCS programs and services are voluntary.

In accordance with Federal civil rights law and U.S. Department of Agriculture (USDA) civil rights regulations and policies, the USDA, its Agencies, offices, and employees, and institutions participating in or administering USDA programs are prohibited from discriminating based on race, color, national origin, religion, sex, gender identity (including gender expression), sexual orientation, disability, age, marital status, family/parental status, income derived from a public assistance program, political beliefs, or reprisal or retaliation for prior civil rights activity, in any program or activity conducted or funded by USDA (not all bases apply to all programs). Remedies and complaint filing deadlines vary by program or incident.

Persons with disabilities who require alternative means of communication for program information (e.g., Braille, large print, audiotape, American Sign Language, etc.) should contact the responsible Agency or USDA's TARGET Center at (202) 720-2600 (voice and TTY) or contact USDA through the Federal Relay Service at (800) 877-8339. Additionally, program information may be made available in languages other than English.

To file a program discrimination complaint, complete the USDA Program Discrimination Complaint Form, AD-3027, found online at [How to File a Program Discrimination Complaint](#) and at any USDA office or write a letter addressed to USDA and provide in the letter all of the information requested in the form. To request a copy of the complaint form, call (866) 632-9992. Submit your completed form or letter to USDA by: (1) mail: U.S. Department of Agriculture, Office of the Assistant Secretary for Civil Rights, 1400 Independence Avenue, SW, Washington, D.C. 20250-9410; (2) fax: (202) 690-7442; or (3) email: program.intake@usda.gov.

For More Information

Visit the Natural Resources Conservation Service or visit farmers.gov/service-locator to find your local NRCS office. You can also check with your local USDA Service Center, then make an appointment to determine next steps for your conservation goals.