Biological Pest Management for Insects and Disease

Small Scale Solutions for your Farm

NRCS
Natural Resources Conservation Service

Do you have problems with…

Insects or Disease in your crop, pasture or hay fields?

Insects or Rodents around the house and farm buildings?

Aphids
Photo courtesy of USDA-ARS

Mosquito

Fall Armyworm
Photo courtesy of USDA-ARS

Packrat

Biological control is using a naturally occurring disease, parasite or predator to control a pest. Natural enemies to pests include a wide range of large and small 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 challenge is in finding ways to entice natural predators to your farm, keep them in your fields, and avoid killing them when applying pesticides.

Wasp parasitizing a gypsy moth caterpillar

Flea beetle feeding on leafy spurge

Photos courtesy of USDA-ARS

How much does it cost?

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

Costs may include:

- Equipment time, fuel, 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.

Photo: Mike Dunn

Methods of Biological Pest Control

A ladybeetle eating an aphid
Photo courtesy of USDA-ARS

Beneficial Insects

Beneficial insects are insect predators or parasites that feed on specific 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 insects. 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 on the ground. Choose plants that provide good habitat for the desired insects, but do not harbor insects that are likely to become pests.

Conservation buffer practices that contain a diversity of native vegetation are useful in providing habitat for beneficial insects, including pollinators, close to crop fields. These practices include:

- Field borders
- Hedgerows
- Cover crops
- Riparian forest buffers
- Early successional habitat management

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

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

American Kestrel (Falco sparverius)

Eastern Bluebird (Sialia sialis)

Photos courtesy of US Fish and Wildlife Service

Birds

When used in combination with other pest control treatments, native birds may help reduce populations of undesirable insects and small mammals. Providing perches and nesting sites 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.

To encourage these helpful birds to take up residence on your farm, install suitable nest boxes and establish field borders and other areas of native grasses, weeds, saplings, and small shrubs. This will encourage beneficial insects as well.

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 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. They are fairly easy to attract by installing nest boxes.

Barn Owl (Tyto alba)
Photo courtesy of US Fish and Wildlife Service

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 are ideal roosts, with dead limbs sticking up above leaves used more than branches within the canopy.

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.

Gray Bat
(Myotis grisescens)
Photo courtesy of Duke University

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, and 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 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.

Help is Available

NRCS Natural Resources Conservation Service

SMALL SCALE SOLUTIONS FOR YOUR FARM

Technical Help Is Available

Your local Natural Resources Conservation Service (NRCS) office has experienced conservationists that can assist you with biological pest management for insects and disease. They can also help you develop a Conservation Plan to solve other problems you have identified on your farm.

There is no charge for our assistance. Simply call your local office at the number listed below to set up an appointment and we will come to your farm.

You may also be eligible to receive financial assistance, through a state or federal program. 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.

Helping People Help the Land

For More Information Contact the:

Natural Resources Conservation Service

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NRCS accepts applications on a continuous basis throughout the year.

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