Clean Waters

Starting in Your Home and Yard

Integrated Pest Management and Biological Controls for the Homeowner

Clean Waters *is a collaboration of the Connecticut Sea Grant Extension Program and the University of Connecticut Cooperative Extension System's NEMO Project, educating individuals about the impacts of everyday activities on water quality and simple techniques that help protect water resources from the home well to Long Island Sound.*

Does the word "pest" bring to mind your little sister or a nosy neighbor? A pest, by definition, is any unwanted organism. In garden, landscape or lawn management, insects, animals, bacteria, fungi, viruses and weeds may all be pests. Integrated pest management, or IPM, is a pest management strategy that has received increased attention in recent years. As a homeowner, you can practice IPM on your own property, whether you are growing and maintaining trees and shrubs, turfgrass, herbaceous perennials, flowering annuals, or a fruit and vegetable garden.

What is IPM?

IPM is a decision-making process that uses biological, chemical and cultural practices to manage pest problems in the production and maintenance of plants, in a way that minimizes risks to human health, society and the environment.

- Biological control is the use of naturally occurring predators, parasites and pathogens to manage pests. A common example is using lady beetles to reduce aphid populations before they cause plant damage.
- Chemical control is the use of commercially available pesticides to protect plant material.
- Cultural control involves selecting the appropriate plant material for the growing conditions on your property, and then maintaining the plant's health through proper fertilization, irrigation and pruning practices. Healthy plants are less susceptible to insect and disease attack.

The most common misconception about IPM is that it does not include chemical pesticides, which would be an "organic" approach. This is not true. IPM may involve the use of chemical pesticides, but in a way that minimizes the overall reliance on them as the only pest control method. A more intelligent use of these products reduces their negative impacts on the applicator and the overall environment. An example of the IPM approach is to spot spray only the problem plants, rather than treating the entire area.

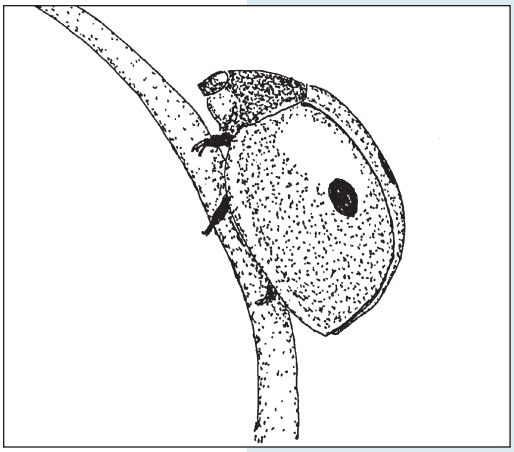
Homeowners taking care of their property, whether it is the lawn, landscaping or gardens, can have a significant impact on the overall health of the landscape. Many people may not be aware of simple cultural practices that can prevent or reduce their most troublesome pest problems without using chemicals. The following information will assist with pest control, while also protecting the environment and water quality.

Accurate pest identification is needed for successful pest management, especially if you want to use biological control organisms that are host specific. First, determine if there is really a problem. Most insects have no negative effect on plants and many provide important services like pollination. Frequent inspections or scouting of valuable plants, once every one to two weeks, will enable you to catch pest problems early when they can be more easily treated. If you cannot diagnose the problem, have a sample analyzed for correct identification. For example, it is completely ineffective to treat unusual leaf spots with a fungicide if bacteria, insects, or poor environmental conditions are actually causing the problem. Your local Cooperative Extension office or Agricultural Experiment Station can help you make proper identification of your pest problems.

Where Do I Begin? – Cultural Practices

IPM begins with the establishment of the proper growing environment. Soil preparation and cultural practices such as proper mowing, pruning,

4
Fact Sheet
December 1999



Judy Ricketts-White

fertilization and irrigation are extremely important to plant health. If a plant is not in the correct growing conditions (improper soil, too much or too little moisture, and excessive or inadequate sunlight), it will be prone to problems. Also, try not to wound plants unnecessarily. Mow and prune correctly and avoid mower and other mechanical injury to healthy trees and shrubs. It is also necessary to recognize the fact that plants, like other living organisms, age. Plants that are old and dying, or stressed, are more susceptible to pest problems.

Do not allow pests to become established. Purchase plant material that is free of disease or insect problems. You may never have a problem with certain insects if you do not introduce them into your landscape. Given the opportunity, use pest-resistant plant varieties to reduce pesticide usage in your landscape.

Proper sanitation will help prevent many pest problems. Many pests survive the winter among weeds or in plant debris. Remove weeds and any decaying plant material. If possible, when a plant has died due to a pest problem, replace it with a pest-resistant variety of the same species or with a different species to prevent repeating the problem. Exclusion barriers, such as plastic netting for birds and Japanese beetles, or plastic or woven landscape fabric for weeds, can also prevent or reduce pest damage. Soil solarization, the practice of covering soil with clear plastic to raise the soil temperature for two to three weeks, will kill many weed seeds.

Calling in Reinforcements – Biological Controls

Landscapes and gardens have natural populations of helpful organisms at work. These "workers" are the beneficial predators, parasites and pathogens that naturally target pest organisms in the environment. Beneficial organisms include a wide assortment of organisms such as: bacterial and/or fungal diseases; spiders; mites; centipedes; nematodes; various lady beetles; ground beetles; rove beetles; lacewings; predacious bugs (minute pirate bugs, big-eyed bugs, damsel bugs, stink bugs); and numerous parasitic wasps. Most pest management practices are designed to manage against the pests; instead, manage for beneficial organisms that are already providing valuable pest control.

Why is biological control important? The preservation and use of common beneficial organisms ensures that the natural ecological balance is maintained and promotes a safe home landscape by reducing pesticide use. The misuse of pesticides can impact directly on beneficial organism/pest interactions. Pesticide resistance develops in pest organisms that were once killed by a specific application of pesticide and through genetic evolution can now survive the application. Increased rates of application may not provide greater control either, making a once reliable pest control weapon useless. Pest resurgence occurs when natural biological control organisms are reduced by broad-spectrum pesticides, either by one that persists in the environment for long periods of time or by numerous applications of chemicals with short residual times, to a level where they can no longer keep the pests in balance. This causes an increase in the pest populations.

A disruption of natural enemies can also lead to secondary pest outbreaks. Pesticides reduce the natural enemy populations and a pest insect, that was not causing the original problem, increases in population to a damaging level. Pesticides also affect non-target organisms such as wildlife, pets and humans.

One method of biological control is augmentation. This practice involves the purchase and release of beneficial organisms, usually insects, into the infested area. In order for this practice to be effective, the correct organism must be purchased and released at the appropriate time. Many beneficial insects choose specific hosts or prey as food sources. Anyone considering this

tactic must have the knowledge to select the proper beneficial insects.

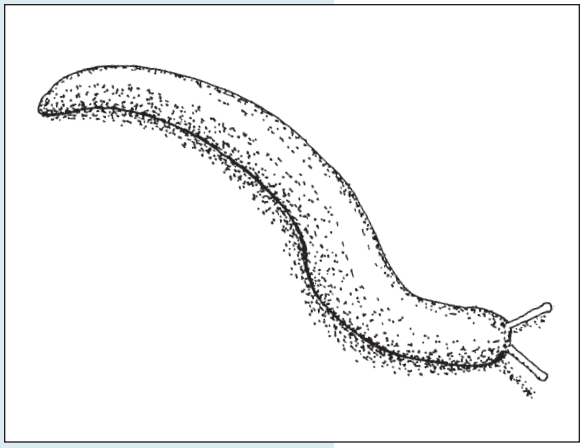
Conservation of natural enemies present in the environment is the easiest and most cost-effective method of biological control available for gardeners. Conservation involves changing and improving management practices to either reduce harmful effects on beneficial organisms or to improve the environment to increase their populations. Reducing pesticide impacts would be the first and most important change to conserve natural enemies. Many insecticides and some fungicides directly affect natural controls by killing them at the time of application. Others have long residual activity and harm beneficial organisms that later move into the treated area. Pesticides can also indirectly harm beneficial organisms by causing lengthened development time of the immature stages, reduced prey consumption, reduced reproductive capability, and repellency, where beneficial organisms are driven away from the treated plants by the chemical pesticide. An easy and colorful method of promoting beneficial insects is to grow a wide variety of plant materials in the home landscape or garden. An herbaceous perennial border, with a variety of species that flower at different times during the growing season, will provide alternate food sources (i.e. pollen) for some beneficial insects when there are no prey insects available.

The Last Resort: Chemical Pesticides

If you have a pest problem serious enough to require the use of a chemical pesticide, check the product label to be sure both the plant and pest are listed. Read The Entire Label Carefully and, above all, Follow The Directions Exactly. Remember that The Label Is The Law, literally, for pesticide application. By using higher application rates than the directions call for, you will only waste money and risk contaminating the environment without eliminating any more of the pests.

The following recommendations can reduce pesticide impacts.

- Use the fewest number of applications possible, and use only when necessary.
- When possible, use insecticidal soap or horticultural oil rather than a longer residual synthetic insecticide.
- If synthetic insecticide is to be used, try to use one with a short residual activity.
- Use granular formulations or systemics (which are absorbed into the plant through the roots or leaf surfaces) instead of long-lasting foliar sprays.
- If possible, time pesticide applications for when natural enemy populations will not be harmed, such as during pupation or when they are on another host plant.
- Use reduced rates whenever possible and treat only infested plants, not entire areas.



Judy Ricketts-White

When selecting and using chemical pesticides, keep in mind that low toxicity does NOT mean non-poisonous! It means that these pesticides pose the least environmental risk, as they tend to break down rapidly into non-toxic components when exposed to air, high temperatures, and sunlight.

Reference List

Adams, R. 1994. *Integrated Pest Management for Insects and Related Pests on Ornamental Plants: A guide for arborists and groundskeepers*. University of Connecticut Cooperative Extension System.

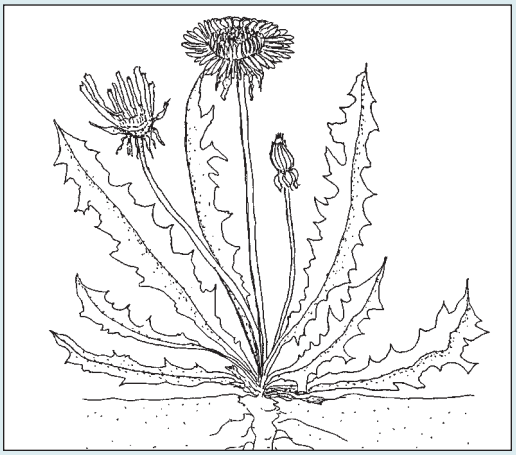
Casagrande, R, B. Maynard, R. Clark, S. Gordon, K. Lagerquist, W. Green, and A. Simeoni, Jr. 1995. *Sustainable Trees and Shrubs for Southern New England*. University of Rhode Island Cooperative Extension.

Kerbow, Dawn. 1994. *Pesticide Alternatives for the Homeowner*. University of Connecticut Cooperative Extension System.

Klass, C. and D. Karasevicz. 1998. *Pest Management Around the Home, Parts I & II*. Cornell Cooperative Extension. Miscellaneous Bulletin S74.

Olkowski, W., S. Daar and H. Olkowski. 1991. *Common-Sense Pest Control: Least-toxic solutions for your home, garden, pets and community*. The Taunton Press, Newtown CT.

Raupp, M., R. Van Diesche and J. Davidson. 1993. *Biological Controls of Insect and Mite Pests of Woody Landscape Plants: Concepts, agents and methods*. University of Maryland Cooperative Extension Service.



Judy Ricketts-White

WEED MANAGEMENT

Control Method	Target
Soil solarization	most weed seeds
Hand pulling	all weeds
Mulch, plastic or fabric barriers	all weeds
Repeated cutting back	all weeds
Boiling water	all weeds
Glyphosate	all weeds

DISEASE MANAGEMENT

Control Method	Target
Soil solarization	club root, corky root, some fusarium and verticillium wilt, crown gall
Bordeaux mix	brown rot, shot hole (tree fruit), some grape diseases, apple scab, apple black rot, anthracnose, early blight, and late blight
Fungicidal soap	brown rot, peach scab, apple scab, powdery mildew, downy mildew
Horticultural oil	powdery mildew
Lime sulfur	powdery mildew, anthracnose, apple scab, brown rot, peach leaf curl
Sulfur	brown rot, peach scab, apple scab, powdery mildew, and downy mildew
Terramycin	some bacterial diseases

INSECT, MITE AND SLUG MANAGEMENT

Control Method	Target
Physical barrier (row covers, etc.)	a wide variety of insects
Hard stream of water	mites
Hand picking	all visible insects and eggs
Bacillus thuringensis "BT"	Colorado potato beetle, elm leaf beetle, many moth larvae, and mosquitoes
Diatomaceous earth	household pests, slugs, many crawling insects
Insecticidal soap	mites, aphids, mealy bugs, thrips, fungus
Horticultural oils	aphids, psylla, scale, mites, mealy bugs, leafhoppers
Pyrethrum	many flying insects
Neem	beetles, moth larvae, whiteflies, leafminers, gypsy moths, and mites
Rotonone	beetles, weevils, slugs, loopers, mosquitoes, thrips, flies
Nematodes	borers, grubs, cutworms
Ryania	codling moth, thrips, corn borers
Sabadilla	bugs, leafhoppers, striped cucumber beetles, caterpillars, thrips

The materials listed above are registered for use on specific pests, plants, or areas of the country. Information is for educational purposes only. The recommendations on this fact sheet are based on available knowledge at the time of printing. Any reference to commercial products, trade names or brand names is for information only; no endorsement or approval is intended. Registrations change frequently.

USE PESTICIDES ONLY IN ACCORDANCE WITH CURRENT FEDERAL AND STATE LAWS.

Written by –
Timothy M. Abbey, Nursery IPM Specialist,
The Connecticut Agricultural Experiment Station
Windsor CT 06095

For more information contact: Connecticut Sea Grant,
1084 Shennecossett Rd. Groton, CT 06340
www.seagrant.uconn.edu

Sea Grant
Connecticut

The Connecticut Sea Grant College Program, based at the University of Connecticut, is part of a national network of university-based programs sponsoring coastal and marine-related research, outreach and education.

NEMO

Fact Sheet #4