

Green Facts

Green Gardening: Environmentally Friendly Alternatives to Chemicals

Strategies for a Healthy Garden

There are a number of ways to prevent pest problems before they occur. Preventative strategies include proper plant health care practices that make plants more resistant to pests. In addition, cultural, mechanical and biological methods can be used to manage pests and keep them at levels that will not impact the health of the plant(s).

Cultural Control Methods

Methods used to modify the growing conditions to boost plant vigour or impact a pest's life cycle are known as cultural controls. Here are a few strategies for pest control and healthy gardens.

Landscape Planning-Appropriate Plants for Environmental Conditions

Choosing plants that are most appropriate for your garden environment can be the most important factor in growing healthy plants and avoiding pest problems. When planning your garden and selecting plants consider soil type, drainage and pH, light and moisture conditions. Plants that are native to an area are the best choice for healthy growing. They are usually quite resistant to pests common to the area, and thrive in the natural climate.

Healthy Soil and Nutrients

Healthy soil is the basis for a healthy garden. Soil can include clay, sand, air, water and organic matter. The fungi, bacteria and other microscopic life forms in healthy soil are important because they break down organic matter, which, in turn, releases carbon and nitrogen into the soil for the plants to feed on. The more organic matter in your soil, the better for growing plants.

Properly composted plant material is valuable to the environment because it reduces materials going into the waste stream and provides a rich nutrient source you can put back into the garden. Synthetic fertilizers should be applied at the recommended rates. If you give your lawn or ornamentals too much synthetic fertilizer you may damage your plants. Be sure to spread the fertilizer only on the target area since any excess spillage on driveways and sidewalks can runoff into drains and eventually into lakes and rivers.

Water

Too much, too little or infrequent watering can cause diseases or the death of plants. A rule of thumb is to water deeply to encourage deep root growth of trees, shrubs and grass. Deep watering also helps to reduce drought stress. The frequency of watering will depend on the plant, soil conditions and the amount of rainfall. It also depends on the season in spring and fall water deeply (2.5 cm) once a week, if there is no rain. During the hot summer water more frequently but for less duration (depending on rainfall). Water in the late morning (0.25 cm - 0.5 cm) every other day or so to cool and decrease stress on the grass.

Crop Rotation

Rotating what you plant in a specific location from season to season can help prevent pest infestations. This is especially true for vegetables. Try not to plant two vegetables from the same family in the same spot in consecutive years. Use the following list of plant families as a guide.

- okra, beans, peas
- onions, leeks, garlic
- kale, cauliflower, cabbage, brussel sprouts, broccoli, kohlrabi, rutabagas, turnips, radishes,

- bok choy
- peppers, tomatoes, eggplant, potatoes, celery, beets, carrots, parsnips

Cutting the Grass

Do not scalp your lawn when mowing in an attempt to reduce the number of times you need to cut the grass. Not only does the lawn look unattractive, it also places stress on the grass and allows weed seedlings to easily establish. Lower the wheels on the mower and cut the grass so that only one third of the grass blade is removed. Make sure the blade is sharp as dull blades tear the grass making it susceptible to the entry of disease organisms whereas sharp cuts heal quickly. Also, use a mulching blade to return the nutrients from the clippings back into the lawn.

Weed seeds need light to germinate; keeping the grass 7cm in height reduces weeds.

Variety

When you incorporate a large variety of plants into your yard, you are more likely to create a balanced ecosystem. This means that your yard or garden will provide food and living conditions for a number of beneficial living things that will act as biological pest controls. Provide water, whether it's a jar or a bird bath, to attract beneficial organisms (ensure the water is replaced on a weekly basis to deter the breeding of mosquitoes). By having a diverse garden, you will minimize potential overall damage because most pests only attack specific plants.

Clean up Debris

By removing as much of the dead vegetable and plant debris as possible from your garden in the fall, you will eliminate a food and habitat source many pests need in order to survive over winter. This will minimize the potential for an infestation when you plant the following season. Clean up remaining leaves, stems and other plant debris in the spring.

Mulches

Mulches are materials placed on top of the soil and are effective in reducing weed and insect pests. Materials such as landscape cloth, wood and bark chips or plastic can be used to reduce weeds. Mulches also help retain soil moisture and warmth.

Companion Planting

Different plants attract different pests, and repel different pests. Companion planting involves planting

things together strategically so that one plant repels the pests that the other may attract. Although this theory is sometimes recommended it may not be effective in managing pests. Companion plants are usually aromatic plants such as onions, garlic and herbs planted in or around crops to prevent infestation. Basil is commonly recommended as a companion for tomatoes, and marigolds are used to repel nematode pests from certain crops.

It may be more effective to encourage beneficial organisms to your crops by planting annuals or perennials that produce pollen and nectar. Wild flower mixes will attract many beneficial insects such as lacewings, ladybeetles, mantids, parasitic wasps and flies, hover flies etc.

Mechanical Control Methods

Despite all your efforts to prevent pest problems from developing, sometimes they happen all the same. Many pests such as slugs and cutworms attack plants at night. It is essential that the pest be properly identified in order to take the appropriate action. If you detect an infestation in your yard or garden try some of the following mechanical or physical approaches that are environmentally friendly.

Hand Picking and Pruning

Simply remove diseased or infested leaves and branches by hand to control the problem. If the problem is still relatively contained, hand picking or pruning threatening areas is an effective, environmentally friendly way of managing the pests, and most of the time does no harm to the plant.

Taking some time to hand pick weeds from your yard or garden is another great method of management. Hand picking also gives you a chance to get to know your garden better. When you are familiar with your garden, you are likely to notice pest problems early enough to manage them through chemical-free methods.

A Blast from the Hose

A strong stream of water has a lot of force and is ideal to use on trees or shrubs to flush out insects. A blast of water can wash away small colonies of pests before they infest your garden. This method can be used to control aphids on ornamentals, but to be effective it must be done repeatedly.

Barriers

Keep pests away from your plants by using barriers. Fine screening or row covers can be used as a barrier when placed over plants. They allow light, air, and sun to reach the plant, but can block out many pests. Knowing the life cycle of the pest and when to cover plants is important for effective control.

Garden centres sell coloured sticky lures (yellow to lure whiteflies and aphids and blue to lure thrips). Barrier tape can be used around trees and shrubs to prevent many pests from climbing up the tree. Copper strips can be used along garden edging to deter snails and slugs.

Traps

A trap is similar to a barrier, and is just as environmentally friendly. You just need to attract the pest to a container that it can't escape from. Here are some ideas for different traps.

- If slugs or snails are your problem, then beer is your solution. Fill a dish with stale beer and place it somewhere in your yard or garden. The pests will climb into the dish and drown.
- A good way to control earwigs is to place a hollow tube in your garden overnight. Cut the tube from an old hose. Earwigs will gather in the tube, and in the morning you can remove the tube and tap out the pests into warm, soapy water to drown. The more tubes the more earwigs!
- Commercial wasp traps can be used to collect scavenging yellow jacket wasps when placed between a nesting site and a food source.
- Other commercial sticky and pheromone traps are available to reduce Japanese beetles, Gypsy moths, Apple maggot, Codling moth and numerous other cutworms, armyworms and borers.

Biological Control Methods

Let nature do its job. Many insects in your garden prey on other insects. A few insects will not damage plants and they will provide a food source for beneficial insects as well as birds.

Ladybeetles

Ladybeetles are among the most beneficial insects you can have in your garden to help control harmful insect populations. Ladybeetles can be purchased for release into your garden (these varieties are not the

multicolored Asian lady beetle (*Harmonia axyridis*) that has invaded Southern Ontario these past few years). You can also attract ladybeetles to your garden by providing a food source of pollen or nectar for them, a source of water and shelter.

Other beneficial insects such as bees, soldier beetles and parasitic wasps can be attracted to your garden using commercially available lures. Pollinating Mason bees can be attracted using commercially available cedar nesting sites.

Parasitic nematodes can also be purchased commercially and applied according to label rates to control some species of lawn grubs such as June and Japanese beetles.

Consider placing bird and bat houses, bird feeders and toad houses in your garden to attract these insect-feeding predators. Butterfly shelters will also attract pollinating butterflies to your garden as will planting ornamentals that attract butterflies such as butterfly bushes.

Additional Information Sources:

Gardener's Handbook, The - An Integrated Approach to Insect and Disease Control. Publication 64. Ministry of Agriculture and Food (OMAF), Queen's Printer for Ontario, Toronto, To obtain copies: <http://www.gov.on.ca/OMAF>

Turfgrass Management Recommendations Publication 384. Ministry of Agriculture and Food (OMAF), Queen's Printer for Ontario, Toronto, To obtain copies: <http://www.gov.on.ca/OMAF>

Common Sense Pest Control - Least-toxic solutions for your home, garden, pets and community. The Taunton Press (www.taunton.com/books/fg/index.htm), United States, 1996. By W. Olkowski et al. 715 pages.

Chemical-Free Lawn, The - The Newest Varieties and Techniques to Grow Lush, Hardy Grass. Rodale Press (www.rodalestore.com), Emmaus, Pennsylvania, 1989. By W. Schultz. 194 pages.

Healthy Lawn Tips. Health Canada. 2002. (www.healthylawns.net),

Building a Healthy Lawn
Authors: Stuart Franklin
Vermont: Garden Way Publishing, 1988

The Chemical-Free Lawn
Author: Warren Schultz
Emmaus, Pennsylvania: Rodale Press, 1989

Dead Daisies Make Me Crazy:
Garden Solutions without Chemical Pollution
Authors: Loren Nancarrow and Janet Hogan Taylor
Ten Speed Press, 2000

Ecological Gardening: Your Path to a Healthy Garden
Author: Marjorie Harris
Toronto: Random House, 1991

Great Lakes Great Lawns: A homeowners guide to growing lawns without pesticides.
Wisconsin's Environmental Decade Institute
Madison, Wisconsin: Wisconsin's Environmental Decade Institute, 1996

How to get your lawn & garden off drugs: Pesticide-free gardening for a healthier environment.
Author: Carol Rubin
Ottawa: Friends of the Earth, 1989

How to get your lawn off grass: A North American Guide to Turning Off the Water Tap and Going Native
Author: Carol Rubin
Ottawa: Friends of the Earth, 2002

Introduction to Permaculture
Author: Bill Mollison
Tagari Publications, 1991

Nature Scape Alberta: Creating and caring for wildlife habitat at home
Authors: Myrna Pearman & Ted Pike, Forward by Robert Bateman
Red Deer River Naturalists, 2000
Federation of Alberta Naturalists, 2000
Rodale's Chemical-Free Lawn and Garden
Emmaus, Pennsylvania: Rodale Press, 1991

Rodale's Successful Organic Gardening: Lawns, Grasses and Groundcovers
Authors: Nancy Hill and George Lewis
Emmaus, Pennsylvania: Rodale Press, 1995

Further information

Visit the ministry's home page at www.ene.gov.on.ca. You can also reach MOE's Public Information Centre by dialing 1-800-565-4923 (toll-free) or (416) 325-4000 in Toronto.

The Federal Pest Management Regulatory Agency (PMRA) also has useful information at their website: www.he-sc.gc.ca/pmra-arla or at 1-800-267-6315.