

12. Use low-impact pesticides as a last resort

What should you do if one of your plants looks sick? Start by examining it closely to properly identify the cause of the problem. If you don't see any particular insect pests or diseases, make sure that the plant isn't just suffering from inadequate growing conditions (insufficient light or water, nutrient deficiency, overfertilizing, pH too high or too low, frost or wind damage, etc.).

If an insect pest or disease is to blame, first assess the scope of the problem and decide whether you actually need to do something about it. Given the right growing conditions, strong plants can withstand a few insects or pathogens.

If you do decide to act, start by using cultural, physical, mechanical and biological (see sidebar) methods. If you're not satisfied with the results and you decide that you have to use pesticides, choose ones with a low impact. They are not very toxic in the short or long term for human health and the environment. They break down quickly and most of them destroy harmful organisms without interfering much with useful organisms.

Pesticide usage is governed by the Pest Management Regulatory Agency (federal), the Pesticides Management Code (provincial) and municipal by-laws, including City of Montréal By-law 04-041 concerning pesticides use. Check with your municipality before using any product.

Read and follow the instructions on the label before getting started. Pay careful attention to dosages, application methods, safety instructions and treatment intervals. Finally, keep an eye on the plant afterward and adjust your cultural methods accordingly.

Resources available at the Botanical Garden

Through the Botanical Garden, the City of Montréal has all kinds of resources available on organic gardening. Check them out!

- Watch for gardening information activities offered by the Botanical Garden in your borough.
- Consult the Green Pages (fact sheets on insect pests and diseases, home gardener's checklists, organic lawn care, etc.) available on our Website, at www.ville.montreal.qc.ca/jardin
- Come talk to our experts at the Garden's horticultural information counter, at 4101 Sherbrooke Street East (Pie-IX metro). Hours are posted on our Website. Bring samples of diseased or infested plants, if you like.
- Send in your questions by email via our Website at www.ville.montreal.qc.ca/jardin

Suggested reading

Franklin, Stuart. *Building a Healthy Lawn: A Safe and Natural Approach*. Storey Books, 1988. 184 p.

Harris, Marjorie. *Ecological Gardening: Your Path to a Healthy Garden*. Toronto: Random House, 1996.

Mollison, Bill; Slay, Reny Mia. *Introduction to Permaculture*. Tagari Publications, 1998. 216 p.

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

Note: All of Rodale's publications on gardening. Emmaus, Pennsylvania: Rodale Press.

On the Web

City of Montréal By-Law concerning pesticides use and more
www.ville.montreal.qc.ca/pesticides

Pesticides Management Code
www.menv.gov.qc.ca/pesticides/permis/code-gestion

Pest Management Regulatory Agency
<http://www.pmra-arla.gc.ca/>

Coalition for Alternatives to Pesticides
www.cap-quebec.com

Healthy Lawn Tips. Health Canada.
www.healthylawns.net



JARDIN BOTANIQUE
DE MONTRÉAL

UN MUSÉEUM NATURE MONTRÉAL

**PESTICIDE-FREE
GARDENING —
NATURALLY!**

People used to think that the best way to control insect pests, diseases and weeds in their gardens was with regular applications of pesticides. Over the years, though, it became obvious that this was not viable in the long term, because it upset the ecological balance and endangered people's health. Now the emphasis is on adapting our gardening methods so that we can grow strong, healthy plants able to resist different types of stress. In fact, the best way to avoid problems in your garden is to start out with resistant plants that suit your site, and to look after them properly. This means using pesticides only as a last resort, when all other methods have failed.

Here are twelve rules for an attractive pesticide-free garden.

1. Put the right plant in the right place

A plant that needs shade will be much more susceptible to drought and insect pests and diseases if you plant it in dry soil in full sun. That's why it's important to choose the right plants for your growing conditions. In most cases, you are best to move a plant that is obviously in the wrong place than to try to keep it healthy by using pesticides.



2. Choose insect- and disease-resistant plants

Even given excellent growing conditions, some plants are especially susceptible to insect pests and diseases. Unless you are prepared to devote a lot of time and energy to keeping them attractive and healthy, the best solution is to replace them with stronger plants. This doesn't necessarily mean that you can't grow your favourites. You'll find that nurseries sell resistant cultivars for most types of plants: phlox and bee balms that are less mildew-prone, flowering crabapples better able to withstand rust, roses that aren't bothered by black spot, etc.

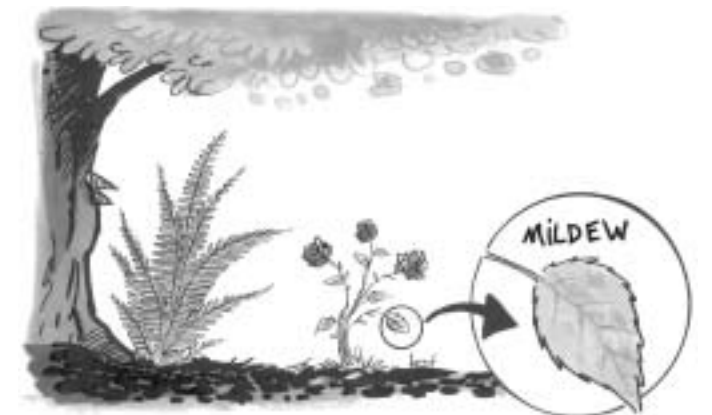
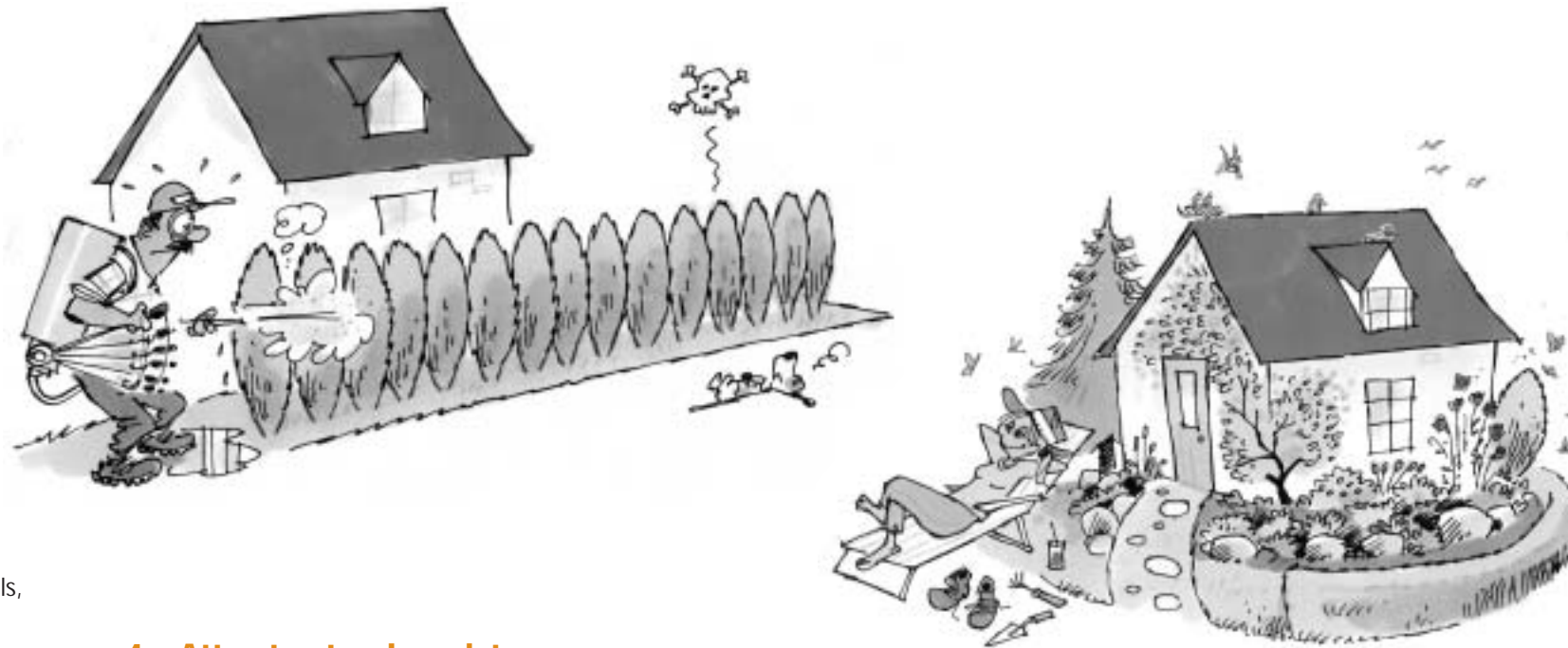


Photo: Michel Tremblay Illustrations: Jacques Goldsbyn

3. Create a diversified habitat

In a natural ecosystem, there are a wide variety of organisms that depend on each other. It is a diversified setting where populations of prey and predators tend to keep each other in balance. For instance, the aphids that attack a honeysuckle are gobbled up by ladybird beetles, which in turn are eaten by birds.

All you have to do to reproduce these natural relationships is to plant several different families, genera and species of plants that will attract large numbers of living organisms. The important thing is not to choose just one kind of plant. For a hedge, you will have more success with different shrubs than a wall of white cedar. And a bed filled with shrubs, perennials and bulbs is much better than a rose garden. If you have the space and you would like some shade, then plan to have different levels of plants. A few trees in your yard, underplanted with shrubs and shade-loving perennials, will provide some pleasant shade and welcome all sorts of living organisms.



4. Attract natural predators

Flowering plants that produce nectar, pollen and fruit are a good source of food for natural predators (insects, mites, birds, etc.) that feed or are parasitic on harmful organisms. Various plants that attract beneficial insects belong to the carrot (Apiaceae), mustard (Brassicaceae), mint (Lamiaceae) and daisy (Asteraceae) families. Many of them would look good in a home garden. Plan to have some plants in bloom at all times and include some perennials, trees and shrubs that produce seeds and fruit to attract birds. Don't forget to add a few conifers where wildlife can take shelter in winter.

5. Amend your soil with compost

Compost makes an ideal soil amendment and fertilizer for your garden: it adds micro-organisms to the soil and provides them with food and shelter, in addition to improving the soil's structure, balancing its pH and adding nutrients that plants need in order to grow. Because these nutrients are released gradually, plants have a constant, steady source of food. Moreover, there is growing evidence that plants fed with compost are less susceptible to diseases.

6. Use natural fertilizers

For a "green" garden, you should use natural fertilizers along with compost. Since such organic (plant or animal waste) or mineral (rock powders) fertilizers have not been chemically processed, most of them have to be broken down by organisms in the soil before they can release their nutrients. This means that in addition to feeding the plants, they encourage biological activity in the soil. Another advantage is that there is less risk of leaching and burning plants' roots.

It is best to use natural fertilizers in the following circumstances:

- when soil test results show a mineral deficiency;
- to pep up a plant that has suffered considerable stress from disease, insect pests, drought, overpruning, transplanting, etc.;
- for plants grown in pots or containers.

7. Mulch

Organic mulch will keep the soil cool and moist in summer, cut down on weeds and improve the soil's ability to retain water and nutrients as the mulch decomposes. It's a good idea to mulch around trees, shrubs and perennials. Alpine plants and groundcovers requiring well-drained soil could rot under a thick layer of organic mulch, however. You're best to use pea gravel instead around this type of plants.

8. Water deeply during extended droughts

New plants must not be allowed to dry out before they are fully established. Once well established, however, most do just fine with natural rainfall. In fact, a plant that is well suited to its growing conditions should not need to be watered unless there is an extended drought.

Plants that do need watering should be watered deeply. Try to avoid wetting the foliage so as not to encourage fungal diseases.

9. Prune trees and shrubs properly

The main reason to prune trees and shrubs is to keep them healthy. Dead, diseased and damaged branches should be removed as quickly as possible. It is also a good idea to prune overly bushy branches on trees and shrubs in order to give them more air and light, making them less susceptible to insect pests and diseases.

10. Eliminate sources of infestation

You can prevent or at least minimize some problems by eliminating all sources of infestation. For instance:

- disinfect your tools regularly to get rid of bacteria, viruses and fungal spores and prevent them from spreading between plants;
- gather up and destroy all diseased or insect-infested plant litter;
- remove weeds before they go to seed.

11. Keep an eye on your plants

No matter how well you maintain your garden, problems can still arise. That's why it is important to watch for anything unusual on your plants, including chewed, stained or discoloured leaves, misshapen shoots and galls or discoloured spots on branches. If you identify symptoms caused by insect pests, a disease or poor growing conditions at the start, you can address the problem before it gets out of hand. The majority of "green" methods are most effective when used early on. Finally, the more you know about your plants' individual needs and the problems that could affect them, the better equipped you will be to act quickly.

Control methods

Cultural

These are methods that you can use to improve the growing conditions for your plants, including pruning overly bushy plants and using mulch, compost and natural fertilizers. In fact, most of the preventive methods mentioned in this leaflet could be included in this category.

Physical and mechanical

Physical and mechanical control methods rely on the use of tools, equipment, traps, bait, physical barriers and hand picking to eliminate or control the proliferation of harmful organisms. For instance:

- pruning diseased or overly infested parts;
- spraying with water to dislodge aphids and mites;
- boiling water or a propane gas or infrared torch to burn weeds;
- manual, mechanical and high-pressure water tools to extract weeds;
- bait and traps to lure and trap slugs, earwigs and wasps;
- floating covers (agro-fabric) to protect cabbages from cabbage flea beetles.

Biological

You can use living organisms (insects, mites or micro-organisms) to control some insect pests. Spreading nematodes on your lawn can help limit white grub damage, for example.

Such beneficial organisms are commonly introduced by greenhouse growers, but less frequently by home gardeners. It is best to try to attract and protect those that are already present in our flower and vegetable gardens.

Low-impact pesticides

The City of Montréal By-law concerning pesticide use authorizes the use of certain products without a permit. These are:

PMRA-recognized biopesticides

- Btk (*Bacillus thuringiensis* ssp. *kurstaki*)
- Bti (*Bacillus thuringiensis* ssp. *israelensis*)

Mineral oils

Authorized active ingredients under Schedule II of the Pesticides Management Code

Insecticides

- Acetamiprid
- Boric acid and borax
- Silicon dioxide (diatomaceous earth)
- Disodium octaborate tetrahydrate
- Methoprene
- Ferrous phosphide
- Insecticidal soap
- Spinosad

Herbicides

- Acetic acid
- Mixture of capric and pelargonic acids
- Herbicidal soap

Fungicides

- Sulphur
- Calcium sulphide or calcium polysulphide (Lime sulphur)