



### Think prevention first

The best way to keep your garden healthy is to choose resistant plants suited to their growing conditions and to maintain them properly (use compost, mulch, natural fertilizers, etc.). If insect pests, diseases or weeds do appear despite your best efforts, try to take an environmentally friendly approach: picking them off or digging them out by hand, pruning, using traps, etc. You should turn to low-impact pesticides only as a last resort, when all other methods have failed.

### Resources available at the Montréal Botanical Garden

Through the Botanical Garden, Montréal has all kinds of resources available on environmentally friendly gardening.

- Consult the Green Pages of the Montréal Botanical Garden Website. You'll find a number of fact sheets on insect pests and diseases and all kinds of tips for maintaining your lawn, garden and indoor plants.  
[ville.montreal.qc.ca/jardin/en/biblio/carnet](http://ville.montreal.qc.ca/jardin/en/biblio/carnet)
- Come talk to the experts at the horticultural information counter in the Montréal Botanical Garden Reception Centre. Hours are posted on the Botanical Garden Website. Bring samples of diseased or infested plants.
- Send in your questions by e-mail to the Botanical Garden Website, by mail (to 4101, rue Sherbrooke Est, Montréal, Quebec, H1X 2B2) or by fax (514 872-3765).

### On the Web

- For more details on the Montréal *By-law concerning pesticide use, the Clean Home and Green Garden – Guide to healthy home maintenance and ecological gardening, etc.*:  
[ville.montreal.qc.ca/pesticides](http://ville.montreal.qc.ca/pesticides)
- Ministère du Développement durable, de l'Environnement et des Parcs (*Pesticides Management Code, alternatives to pesticides, etc.*):  
[mddep.gouv.qc.ca/pesticides/permis/code-gestion-en](http://mddep.gouv.qc.ca/pesticides/permis/code-gestion-en)
- Pest Management Regulatory Agency (approval of pesticides):  
[pmra-arla.gc.ca](http://pmra-arla.gc.ca)

### Further reading

- Direction de l'environnement de la Ville de Montréal. 2006. *Clean Home and Green Garden – Guide to healthy home maintenance and ecological gardening*. Montréal, 36 p.
- Rubin, Carole. 1989. *How to get your lawn & garden off drugs: Pesticide-free gardening for a healthier environment*. Ottawa: Friends of the Earth.
- Harris, Marjorie. 1996. *Ecological Gardening: Your Path to a Healthy Garden*. Toronto: Random House.
- Nancarrow, Loren and Taylor, Janet Hogan. 2000. *Dead Daisies Make Me Crazy: Garden Solutions without Chemical Pollution*. Ten Speed Press.
- Schultz, Warren. 1989. *The Chemical-Free Lawn*. Emmaus, Pennsylvania: Rodale Press. 194 p.

### Regulations and by-laws

Authority to regulate pesticide usage in Canada is shared by the federal and provincial governments and municipalities.

The provinces and territories may regulate the sale, use, storage, transportation and disposal of pesticides approved by Health Canada's Pest Management Regulatory Agency (PMRA). They may also restrict or prohibit the use of approved products. The Quebec *Pesticides Management Code* has been in effect since April 2003.

For their part, municipalities may pass more stringent by-laws, mainly governing pesticide usage in urban areas. Montréal's *By-law concerning pesticide use* (04-041) was adopted in April 2004.



JARDIN BOTANIQUE  
DE MONTRÉAL

UN MUSÉUM NATURE MONTRÉAL

## LOW-IMPACT PESTICIDES

### Getting to know low-impact pesticides

Although Montréal has a by-law prohibiting the outdoor use of pesticides, certain low-impact pesticides may be used at all times. Their active ingredients are considered to have low toxicity for human health and the environment.

This brochure contains information on twelve active ingredients used in making low-impact pesticides, how they work, their targets, how to apply them and, of course, what precautions you should take when using them.

### What is a pesticide?

A pesticide is a natural or synthetic substance for controlling or destroying any undesirable organism.

Synthetic or "chemical" pesticides contain organic compounds produced in a laboratory. Natural pesticides are derived from micro-organisms (bacteria, fungi, viruses, etc.), from plant, animal or mineral sources. Watch out, though. "Natural" doesn't necessarily mean safe! Snake venom is natural, too, but some snake bites can be poisonous or even fatal.

### Low-impact pesticides

Low-impact pesticides have low toxicity for human health and the environment. They usually have little effect on organisms other than those they specifically target, break down quickly and are unlikely to cause target species to develop resistance.

### Active ingredients

An active ingredient is a compound that makes a pesticide effective. It may act on insects (insecticide), weeds (herbicide), fungal diseases (fungicide), mites (acaricide) or molluscs (molluscicide), etc. To find out what active ingredient a product contains, look on the label after the "guarantee."

### At a glance

The following table lists 12 active ingredients in low-impact pesticides approved for household use in Canada. The details found here are for information only – always check the label on any product before using it and be sure to properly identify the problem so that you can choose the right product.

### Precautions

- It is best to wear gloves, goggles, long sleeves and pants and a mask when preparing and applying pesticides.
- If you suspect that a plant is sensitive to a particular pesticide, test it on a few leaves first and wait 24 to 48 hours, watching for signs of phytotoxicity (discoloured, spotted or dropped leaves, etc.). Do not treat the plant if such symptoms appear.
- Avoid applying pesticides on windy days, to minimize drifting.
- Do not use pesticides near any body of water or wetland, or dump any pesticide or rinse your equipment near or into any bodies of water, wetlands or sewers, as this will contaminate the water.
- Keep pesticides out of the reach of children.

Active ingredient and how it works	Target organisms (not a complete list)	Application	Precautions
<b>FUNGICIDE-ACARICIDE</b>			
<b>Sulphur</b>  Preventive Contact	Black spot • Mites • Powdery mildew • Rust • Scab •	Use as a preventive or as soon as symptoms appear. Depending on the formulation, dust or spray onto plants. Shake the sprayer well before and during treatment. Allow at least 30 days between the application of sulphur and treatment with mineral oil (horticultural oil). Do not use at temperatures over 24°C.	May be toxic to some plants, including cucumbers ( <i>Cucumis sativus</i> ), squash ( <i>Cucurbita</i> spp.), Boston ferns ( <i>Nephrolepis exaltata</i> 'Bostoniensis'), melons ( <i>Citrullus lanatus</i> , <i>Cucumis melo</i> ), some varieties of pears ( <i>Pyrus</i> spp.) and grapes ( <i>Vitis</i> spp.).
<b>FUNGICIDE-ACARICIDE-INSECTICIDE</b>			
<b>Calcium sulphide or calcium polysulphide</b> (lime sulphur)  Preventive Contact	Aphids • Black knot • Black spot • Downy mildew • Mites • Powdery mildew • Rust • Scab • Scale	Coat all parts of the plants to be treated thoroughly, to the point where the product drips off. May be applied during dormancy in combination with mineral oil (horticultural oil). During the growing season, allow at least 30 days between an application of calcium sulphide and treatment with mineral oil. Apply when temperatures are below 27°C, in the early morning or late afternoon or evening.	When applied during the growing season, may cause the foliage of some species such as plums ( <i>Prunus</i> spp.) and some varieties of apples ( <i>Malus</i> spp.) to turn yellow and drop off. May stain some surfaces, including painted wood, brick and stone.
<b>HERBICIDE</b>			
<b>Acetic acid</b>  Contact	Black medic ( <i>Medicago lupulina</i> ) Chickweed ( <i>Stellaria media</i> ) Dandelion ( <i>Taraxacum officinale</i> ) Lamb's quarters ( <i>Chenopodium album</i> ) Plantain ( <i>Plantago major</i> ) Ragweed ( <i>Ambrosia artemisiifolia</i> )	In spring or early summer, on warm, sunny days, spray the leaves of young weeds, coating the entire plant. In a border or on a lawn, spray it directly on weeds and avoid contact with other plants. Repeat applications may be necessary to kill perennial or large weeds.	Apply only to undesirable plants, as it is not selective. May damage some metal surfaces or lawn furniture.
<b>Corn gluten meal</b>  Germination inhibitor	Dandelion ( <i>Taraxacum officinale</i> ) Large crabgrass ( <i>Digitaria sanguinalis</i> ) Smooth crabgrass ( <i>Digitaria ischaemum</i> )	Apply on established lawns in either early spring (May) or late summer (mid-August) before weed seeds germinate. Apply when the soil is moist. If it does not rain within 48 hours of applying the pesticide, water the lawn.	Should not be applied to a newly seeded lawn, because it prevents grass seed from germinating. Acts over a period of approximately 5 to 8 weeks. When fertilizing your lawn, keep in mind that corn gluten meal is high in nitrogen (nearly 10%).
<b>Mixture of capric and pelargonic acids</b> (fatty acids)  Contact	Chickweed ( <i>Stellaria media</i> ) Lamb's quarters ( <i>Chenopodium album</i> ) Mustard ( <i>Sinapis arvensis</i> ) Plantain ( <i>Plantago major</i> ) Redroot pigweed ( <i>Amaranthus retroflexus</i> )	Spray the leaves of young weeds in the spring or early summer. Cover the entire plant, without run-off. Do not apply if rain is forecast. Wait three days after applying the herbicide before planting or seeding. Repeat applications may be necessary to kill perennial or large weeds.	Apply only to undesirable plants, as it is not selective. May leave white residue on some brick or concrete surfaces. These deposits will disappear within a few weeks.
<b>Herbicidal soap</b> (potassium salts of fatty acids)  Contact	Algae • Lichen • Liverworts • Moss	On structures (roofs, wood framing, sidewalks, etc.), spray on enough to thoroughly wet all surfaces to be treated. On lawns, wet the moss and surrounding lawn before applying the product. Thirty minutes after treatment, rinse the treated area. Reseed bare patches on lawns.	The pesticide should be applied only to target organisms, as it is not selective. May leave white residue on some brick or concrete surfaces. These deposits will disappear within a few weeks.
<b>INSECTICIDE</b>			
<b><i>Bacillus thuringiensis</i> ssp. <i>kurstaki</i> (Btk)</b>  Ingestion	Cabbage worms • Gypsy moths • Oblique-banded leaf rollers • Tent caterpillars • Tomato hornworms	Specific to some species of caterpillars. Has no effect on adult insects (moths and butterflies). Spray on leaves, covering them thoroughly, without run-off. Use in the early stages of an infestation, when young larvae are feeding actively. Delay treatment if rain is forecast.	Should be kept in a cool place (between 4° and 15°C) to maintain its effectiveness, and used within 12 to 24 months of the manufacturing date.
<b>Borax or boric acid</b>  Ingestion	Ants • Earwigs	Depending on the formulation, spread a thin layer of powder or a few drops of the liquid or place traps along insect routes or near ant nests. Avoid using powder formulations in damp or wet locations.	Some products may contain peanut butter, and may be hazardous for people with allergies. Avoid applying powder or liquid formulations near plant roots. Can cause plants to dry out and/or interfere with photosynthesis.
<b>INSECTICIDE-ACARICIDE</b>			
<b>Mineral oil</b> (horticultural oil)  Contact Asphyxiant	Aphids • Mites • Scale • Whiteflies	Coat all plant parts thoroughly with the solution, to the point that it drips off. When plants are dormant, may be used in combination with calcium sulphide or calcium polysulphide. During the growing season, allow at least 30 days between an application of mineral oil and treatment with lime sulphur or sulphur. Ideally, the product should be sprayed on in the morning, to allow time for it to dry.	Should not be applied if there is a risk of frost or rain within 24 hours, during very humid weather, to plants suffering from drought, or on very hot days. May be toxic to some plants, including hickories ( <i>Carya</i> spp.), sugar maples ( <i>Acer saccharum</i> ), Japanese maples ( <i>Acer palmatum</i> ), beeches ( <i>Fagus</i> spp.), hollies ( <i>Ilex</i> spp.), some apple varieties ( <i>Malus</i> spp.), walnuts ( <i>Juglans</i> spp.) and Douglas firs ( <i>Pseudotsuga menziesii</i> ). May discolour the needles of conifers with bluish foliage. New shoots will be a normal colour, however.
<b>Insecticidal soap</b> (potassium or alkanolamine salts)  Contact	Aphids • Earwigs • Mites • Scale • Whiteflies	Spray directly onto pests or affected plant parts (stems, leaves). Apply early in the morning or evening or on a cloudy day. Do not apply on very windy days. Not effective once dry.	May be toxic to some plants, including nasturtiums ( <i>Tropaeolum</i> spp.), ferns, impatiens ( <i>Impatiens</i> spp.) and sweet peas ( <i>Lathyrus odoratus</i> ). To minimize the risk of phytotoxicity, it is best not to apply the product in full sun or to plants subject to stress (drought, extreme heat, etc.) Not selective; may harm beneficial garden organisms.
<b>INSECTICIDE-MOLLUSCICIDE</b>			
<b>Silicon dioxide</b> (diatomaceous earth)  Contact	Ants • Earwigs • Potato beetles • Slugs	Apply during dry weather to pests or to spots that they frequent. May also be sprinkled on leaves (avoiding flowers) or on the soil (without working it in) around the base of plants.	Not selective; may harm beneficial garden organisms.
<b>MOLLUSCICIDE</b>			
<b>Ferric phosphate</b>  Ingestion	Slugs • Snails	Spread around the base of affected plants. Moisten the soil, without soaking it, before applying the product. Apply the product in the evening, because slugs and snails are active mainly at night and early in the morning.	

