



Canadian Organic Growers

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Canadian Organic Growers Inc is Canada's national membership-based education and networking organization representing farmers, gardeners and consumers in all provinces.

COG Reference Series **#12, Organic Care of Trees, Shrubs and Roses**

Increased concerns about pesticide residues in the environment and on the foods we eat have led to serious questions about pesticide use and a growing interest in organic gardening. People not only want alternatives for food crops, but for ornamentals as well. Information on growing ornamentals organically, especially trees and shrubs, is not as readily available as it is for food crops.

A tree or shrub in a your yard is a piece of a functioning ecosystem, even though the planting was not done by nature. A holistic approach to pest management should be adopted instead of using chemicals as “quick-fixes” for apparent problems. These “problems” (i.e. insects and diseases) are actually symptoms of an imbalance in the ecosystem. A balanced ecosystem can be developed by using growing techniques that promote and maintain plant health and encourage natural pest controls. These must be supported by control measures that have low or no toxicity to people and the environment, and are respectful of the integrity of ecosystems.

Prevention

The following preventive techniques are an important part of an organic care program. They help maintain plant health since a healthy, vigorous plant is more resistant to insect and disease infestations. Research has shown that when attacked by insects, plants produce their own toxic substances which discourage further feeding by insects. These toxins are produced by re-channeling energy that would normally go into plant growth and the production of seeds. Weak plants or those under stress caused by drought, damaged roots or poor soil conditions have a more difficult time producing these toxins, and are naturally more attractive to insects.

1. Healthy Soil

Soil health is the backbone of any organic growing system. Healthy soil leads to healthy plants which are more resistant to insect pests or diseases. The best way to ensure a healthy soil is to add generous amounts of organic matter.

This basic principle is true for farming and vegetable growing, as well as growing ornamentals. Compost and green manures are types of organic matter that can be incorporated into the soil.

2. Plant Selection

The first two steps in the plant selection process are done before bringing a plant home.

Step 1: When selecting a plant for a particular site, make sure the plant you choose will grow and thrive in the conditions under which it is expected to grow. Don't select a plant that requires full sun for a shady or semi-shady location or vice versa. Pay attention to the kind of soil in which it will grow and the availability of moisture. In other words, match plant requirements with site conditions.

The selection of resistant varieties is just as important for ornamental plants as it is for vegetables. If you know of any specific diseases that may cause problems in your area, try selecting resistant varieties. Many new varieties of roses are bred for resistance to diseases like blackspot and mildew.

Step 2: Next comes the task of choosing the actual plant at a nursery or garden centre. Or you may decide to dig up a plant growing wild, with permission, from a friend's property. Starting with a healthy plant will give you a good head start. Don't be a good Samaritan and take in a sickly, weak plant in the hope of nursing it back to health.

Here are some important points to remember when selecting plants:

Foliage: avoid plants that are already infested with insects or diseases. The foliage should be typical for the species, i.e. color, size and shape.

Shoots: Look for good growth from the previous season. Last year's growth will appear fresher and more highly colored than older growth. If there are many specimens of the same variety, compare them to determine what is the average growth for the species and select one that has reasonably good growth.

Roots: Whenever possible, especially with bare root and plants in containers, inspect the roots. Look for healthy, disease-free roots of a good color (usually white). For plants in containers, avoid overly potbound or disfigured roots; otherwise some serious root pruning will be required.

Trunk: Examine the trunk of trees; this criteria is not as critical for shrubs since they regularly grow new shoots from the base. Avoid damaged trunks since this puts adds stress to the tree and some of the energy that would normally be used for growth has to be used to heal the wound.

3. Cultural Practices

Garden Diversity: Plant a variety of different species of trees and shrubs to avoid problems brought on by monoculture. Mixed borders attract a greater variety of birds and beneficial insects which help control insect pests.

Proper preparation of planting beds:

The soil for shrub beds should have lots of organic matter to help keep the plants healthy.

Planting procedures for individual plants:

(a) Individual plants should be planted in the original soil. Organic matter can be added over the planting area as a mulch. If organic matter is added to the soil in the planting hole the soil in the planting hole may be too rich and the roots will not readily grow out into the surrounding soil. The plants could eventually be damaged by drought stress.

(b) Do not add gravel or coarse material to the bottom of the planting hole for drainage. This practice hinders drainage and may subject the roots to overly wet conditions.

(c) Do not crowd roots into a small hole. Dig a hole that is large enough to accommodate all the roots or prune the roots to fit the planting hole. In heavy soils, make the planting hole twice the diameter of the root spread and scarify the sides of the hole with your shovel to eliminate glazed sides. This breaks up hard packed soil and gives the roots a chance to penetrate more quickly, making for more successful transplants. Crowded roots can grow irregularly and result in deformities or circling roots which may eventually girdle the trunk at, or slightly below, soil level and lead to the decline of the tree.

(d) Do not add mixed fertilizer to the bottom hole or to any backfill (phosphorous is an exception). Any fertilizer is best applied to the surface of the soil where it can be washed down to the root zone by rainfall or irrigation. Feeder roots (those that absorb nutrients and moisture) in young trees are relatively close to the surface; i.e. in the top 12 inches. Therefore, placing fertilizer at the bottom of the planting hole is futile; the roots won't benefit from it and the nitrates will be leached out. A surface application is more effective. However, phosphorous is not water-soluble and a surface application would take a long time to reach the root zone. Mix bonemeal or rock powder with the backfill soil. Extra phosphorous is not harmful and creates a reserve for future years. Roses need yearly fertilizer (N, P and K) in late April, early June and mid-July but not later. In most soils trees and shrubs need very little fertilizer.

(e) Container grown trees and shrubs need very little pruning at planting time. Prune any branches growing inward. Trees need a central leader. If they are bare-root at planting time, thin out many small branches, to compensate for the loss of roots, but preserve the basic framework. Always cut at a side shoot or bud without leaving "dead-end" stubs.

(f) Do not stake a tree unless it cannot stay up on its own. An unstaked tree will develop a more extensive and stronger root system than a staked one, because it is free to move. It will also develop a stronger and better tapered trunk. If a tree must be staked, as in windy sites, use two stakes well away from the trunk, i.e. just outside the root zone and tie low on the trunk, 2 feet above the ground, and loosely to allow for some movement on the tree. Remove the stakes after one year. If the stakes are left on longer, the trunk can be damaged as it grows in girth and gets strangled by the tie.

(g) Use mulches over the root zone of newly planted trees and shrubs for the first 3 to 5 years. Do not allow grass to grow over the root zone as it competes with tree roots for moisture. After it is well established and has developed an extensive root system, a tree is more capable of competing with grass for available moisture. Mulches provide moisture retention, weed suppression, quick establishment of transplants, and a strong and more extensive root system.

Proper pruning of established plants: It's important to use the latest pruning techniques on trees to reduce stress. Briefly, flush-cutting the branch to the trunk is not recommended. A technique which doesn't breach the branch collar is preferred. This allows the tree to isolate and compartmentalize the wound more effectively and results in less chance of a trunk infection. Wound dressings (pruning paints) are not needed.

Avoid trunk injuries: Trunk injuries caused by mowers, weedeaters, or anything else create stress on the tree and provide opportunities for disease organisms to infect the tree.

4. Garden Hygiene

Regular removal of plant parts infected with diseases or insects is an important part of prevention. Pruning tools used on diseased plants should be cleaned with alcohol before using them on other plants. Many diseases such as blackspot of roses and apple scab overwinter on infected foliage. A good fall clean-up reduces the incidence of infection the next season. Some weeds harbor insects which may act as vectors for viruses. There is no cure for a virus-infected plant except removal, therefore, it is better and much easier to remove weeds that host such insects.

5. Biological Agents

In any ecosystem, there are numerous natural factors which keep pests under control and maintain everything in balance. This is one area where nature does its work quietly, behind the scenes so to speak. We rarely witness these forces at work, except for perhaps the most visible of them, the birds, as they hop from tree to shrub, foraging for insects.

Other biological agents include predators like mice, shrews, bats, squirrels, chipmunks, ladybird beetles, the praying mantis, lacewings and ground beetles (which are nicknamed “fiery caterpillar hunters”).

One important group of natural “regulators” are parasites. Parasites are organisms that live on or in another host and consume the host as they complete their own life cycle. Studies on destructive insects like spruce budworm and gypsy moth have demonstrated that parasites and predators are very important in keeping insect populations at harmless levels. However, when insects reach outbreak levels the insects become too numerous for natural controls to be effective. At this point other natural factors contribute to their downfall.

When insects reach high density levels natural diseases and viruses begin to attack the insects. The availability of food sources may diminish, or the quality of food decrease, thus contributing to a decline of the insect population. These factors, once put into motion by nature, usually cause a quick decline in insect pests. During this decline phase, the actions of parasites and predators help the process along.

The use of broad-spectrum insecticides disrupts this natural cycle and actually favours the survival of the problem pests. These products not only kill target insects but the beneficial ones as well.

Ways to encourage biological helpers:

Birds will naturally forage for insects. To make your place more attractive to birds:

- provide birdhouses for hole-nesting species;
- landscape your yard to provide shelter for birds to nest in and protection during inclement weather. Evergreens are great for this. Include shrubs and trees that produce berries and seeds for birds to eat in your yard;
- provide water for birds by installing birdbaths or small ponds. Birds also appreciate dripping water or bathing under a sprinkler used to water gardens;
- provide feed for birds during winter months to attract migrants and keep resident

populations healthy and alive. Many resident birds such as chickadees, woodpeckers and nuthatches regularly forage for dormant insects and eggs on trees during the winter. Providing winter feed does not discourage them from foraging but simply helps them survive very cold nights when they have not found enough insects during the day to keep their bodies warm.

Bats consume large numbers of flying insects at dusk and dawn and can be attracted by providing bat houses for them to nest and roost in.

Attract insect parasites and predators to your garden by allowing a portion of your property to grow “wild” with wildflowers and grasses. These parasite and predator patches attract many garden spiders and other predators, and the wildflowers, even our so-called “weeds”, attract adult parasitic wasps and flies which feed on the pollen and nectar. Once attracted to the area, parasites will search out suitable hosts. These preventive techniques do not guarantee a pest-free garden but they reduce the likelihood of infestations by making plants less desirable to insect pests, and certainly contribute to a more pleasant gardening ambience.

Entomologists have estimated that in an average mixed vegetation garden about 95% of all insects present are beneficial and only 5% are harmful. A single application of a broad-spectrum insecticide, even a natural one, will affect all insects, including the beneficial ones.

Direct Insect Control

Despite efforts to prevent insect damage by creating good growing conditions and protecting beneficial insects, problems with harmful insects will occur. Early detection by regular observation of your trees and shrubs stops the population buildup and the need for severe action. Observe the following procedures:

- **Identify the insect.** A good identification guide for Eastern Canada, and to some extent the west, is [The Gardener's Handbook for Integrated Approach to Insect and Disease Control](#) published by the Ontario Ministry of Agriculture and Rural Affairs. It contains insect identifications and illustrations and lists which plants are attractive to certain insects.

- **Physically remove** the insects by handpicking or shaking them from flowers into a bowl of soapy water. Nests of tent caterpillars and sawfly larvae (on pine and mountain ash) can be pruned out.

- **Use traps.** For cankerworms apply sticky tape on tree trunks in the fall and spring. During the day gypsy moths hide under burlap tied around tree trunks and earwigs hide in crumpled paper towels.

- **Pheromones** are substances produced by females to attract males and can be placed on sticky traps. They can also be used to monitor insect populations. They are available from Natural Insect Control.

There are insects for which the above methods cannot be used and spraying may be necessary. The following insecticides are safe for the environment and for humans but may harm beneficial insects. Always read and follow the directions and precautions on the label.

- **Dormant oil** for scale insects, eggs of overwintering aphids and mites, and gall-forming insects. Apply before buds break in early spring.

- **Bacillus thuringiensis (Bt)** for caterpillars and other larvae. Be sure to choose a brand that is not made using by genetic engineering.
- **Insecticidal soap** for aphids, mites and earwigs.
- **Home-made sprays.** One of these is made by taking a colony of live caterpillars (preferably with a few dead ones) and blending them into a puree which can be diluted and sprayed on other caterpillar infestations. The theory behind this spray is that every colony of insects contains some sick individuals and some disease. By making a solution of these and spraying it on other caterpillars, you will be inoculating them with these diseases and will contribute to their demise.

Disease Control

Almost all plant diseases are caused by fungi, whose spores are carried by air currents or humans to the foliage or bark of the host plant. The spores need a wet leaf surface for about half a day to germinate and penetrate into the tissue causing tissue breakdown which is seen as leaf spot. Examples include black spot on roses, scab on crabapple and leaf spots or blight on many deciduous trees. Many foliar diseases develop in wet weather. To help prevent disease water plants early in the day, so that the leaves will dry off well before evening. Powdery mildew does not need a wet surface to germinate.

Some varieties of roses and other plants have been bred to be resistant to certain diseases, meaning that they are less susceptible but not immune to the diseases. As a general rule fungi of foliar diseases overwinter on fallen leaves, hence removal of leaves is helpful. They can also overwinter on the bark.

Except for roses there is very little a home gardener can do to curtail diseases on trees and shrubs. However, cutting out diseased branches, for example fireblight infected branches on crabapple or mountain ash, is effective. Spraying large trees is expensive and does not eradicate disease.

Black spot and powdery mildew on roses can be treated. The fungus overwinters on fallen leaves as well as on the bark. Spraying the bush with lime-sulfur as a dormant spray in mid-April helps curtail the infection. Sulfur by itself is organically acceptable for spraying foliage as soon as it develops, every five days during wet weather and every ten days during dry periods. This is only a preventative protection for healthy foliage, not a way to eradicate established leaf spots.

It is not possible in the scope of this publication to deal with the many diseases that may affect trees and shrubs. See the references listed below for more information.

Conclusion

To keep the trees, shrubs and roses around your home healthy and attractive work with nature by caring for the soil, keeping the plants healthy, encouraging natural pest controls and diversity in your yard, observing the plants regularly and avoiding quick-fix solutions. Be sure to plant trees, shrubs and roses that are adapted to your climate, soil type and the location in the yard where you choose to plant them.

Sources of Information

The Gardener's Handbook for Integrated Approach to Insect and Disease Control. *Ontario Ministry of Agriculture, Food and Rural Affairs.* Publication 64.
<http://www.gov.on.ca/OMAFRA/english/products/hort.html#Ornamentals/>

Natural Insect Control. Supplier of products for organic gardening with extensive directions for their use. R.R. 2 Stevensville, Ontario. L0S 1S0. (905) 382-2904. <http://www.natural-insect-control.com/>
The Organic Gardener's Handbook of Natural Insect and Disease Control. Eds. *Barbara W. Ellis and Fern Marshall Bradley.* Rodale Press. Emmaus, PA. 1996.
Saskatchewan Naturally. Articles such as "Rose Gardens Needn't Involve Fuss and Bother" and "Healthy Trees will Survive Caterpillar Infestations" by *Brian Baldwin.*
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Spring Pruning. *Diana Beresford-Koeger.* in *Cognition*, Spring 1997. p. 19.

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