



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

#8, Organic Gardening: The First Steps

Organic gardeners try to follow a system that will build good soil structure and fertility by duplicating nature's methods as closely as possible without the use of synthetic fertilizers. Chemical pesticides (poisons) are also avoided.

To describe a very complex system in simple terms - in nature what is fed by the soil returns to the soil. Fauna and flora (organic matter) in varying stages of decay are converted into humus by the never ending work of microorganisms in the soil. Humus, in turn, provides the source of nourishment for all plant life. Thus:

HUMUS is the PRODUCT and the SOURCE of all living material.

Gardening and agriculture are in themselves unnatural practices. They break the nutrient cycle by the removal of plants and animals from the land with little return. To maintain soil that is biologically active and healthy, it is necessary to replace what is lost. This most important task of the organic grower is to regularly incorporate organic matter, such as compost, into the soil. This procedure can totally eliminate the need for chemical fertilizers.

A rough guide is to work about 2 kilograms of well-rotted organic matter into every square meter of soil in spring and fall.

Good soil, rich in humus, creates a favorable environment for the gradual release of plant nutrients; improves aeration, drainage structure; and acts as a reservoir in the soil to keep nutrients from leaching away from plant roots. Earthworms and bacteria are the main microbial agents in humus formation. Earthworms tunnel into the soil and make burrows, leaving their nutrient rich castings behind. Soil is full of creatures you can't see, all working hard in their own spheres to obtain nourishment and in turn creating soil fertility. There are many books that describe the activity that takes place in the soil. One paperback that is clear and simply written is *The Soul of the Soil*.

Seasoned gardeners can tell what soil they have by the look, feel, smell and taste - yes taste! If a handful runs through your fingers easily, it is probably sand; if it is sticky in your hand when squeezed, it is likely to be clay; and if it is light in texture, soft and crumbly, it will be loam or silt, the best of all, especially if dark in colour. All can be improved with the addition of organic matter. Soil can also be sour (acidic) or sweet (alkaline); the latter can be reduced by the addition of peat moss or limestone, and acid soil can be sweetened with wood ashes. Most vegetables prefer a slightly acidic to neutral medium which can be measured at about 6.5 on the acid/alkaline or pH scale, which runs from 1 to 14.

If you have a sizeable garden and want to know the state of your soil more scientifically you can buy a home gardener's kit fairly cheaply from which you can learn your pH level and if there are any marked deficiencies of essential elements in your soil. Your local provincial agricultural office can send samples away for you for testing. There is a charge for the service. If tests show deficiencies you may need to add mineral supplements, until your own system takes over and/or your own compost is available. Material rich in the elements you may need are:

Nitrogen:	Composted manure, fishmeal, bloodmeal, kelp, cottonseed meal, leathermeal
Phosphorous:	Colloidal, soft rock and hard rock phosphate, organic bone meal; rock powders, composted manure, kelp
Potassium:	Hardwood ashes, greensand, granite dust, composted manure, kelp
Calcium:	Agricultural limestone or agricultural gypsum (add composted manure for balance, they work well together), ground oyster shells, calcified seaweed
Magnesium:	Dolomitic limestone
Trace Minerals:	Liquid seaweed extract (not chemically fortified), kelp meal, greensand, rock powders

Fresh manure should not be added to the soil directly as it is too acidic for plant roots. It can be incorporated in the soil in fall to rot down for the spring. Raw manure should preferably be included in the compost heap, along with small amounts of the above-mentioned elements, if required.

Composting: Organic gardeners favor this method of utilizing organic wastes from the house and garden. The method is explained in *COG Reference Series #4, "Composting for Gardeners"*. A large amount of compost can be made in a small space and when incorporated into the soil can supply your nutrient needs. Dig about 2 inches of compost into your planting areas as soon as the ground can be worked in the spring. This can be repeated as a top dressing as the season progresses.

Green Manures: Not all manure comes from animals. Manure is anything that through decay introduces organic matter and nutrients into the soil to compensate for that which is removed by crops, livestock and the elements. Crops such as clover or rye are grown in the fall or early spring specifically to enrich the soil, then tilled in before they produce seeds. The decomposing plants turn into organic matter rich in nutrients. When legumes are used they add nitrogen to the soil. Buckwheat is an ideal crop to "clean" weeds from a piece of land prior to being used for cropping but is frost sensitive so needs to be planted during warm months.

Diversity and Rotation: The second most important task in the natural or ecological garden is to create diversity. Plants differ in their demands on the soil; to prevent imbalance, grow as many varieties of vegetables, herbs and flowers as possible and *rotate your vegetables around the garden* in order not to grow the same produce in the same place each year. Make a plan of your proposed rotations. Rotations help kill off bugs and diseases by:

- exposing them to weather and enemies during fall tillage;
- destroying them by tilling in crop residues; and
- not providing hosts in the spring for those that have overwintered. Don't plant related crops on one site more than once every three or four years.

Related crops are as follows:

1. Beets, Swiss chard, spinach
2. Chives, garlic, leeks, onions, shallots
3. Cabbage, cauliflower, kale, collards, turnips, rutabaga, Brussels sprouts, mustard greens, Chinese cabbage, broccoli, kohlrabi, bok choy, arugula
4. Peas, broad beans, snap beans, lima beans, soybeans and French beans
5. Carrots, parsley, celery, celeriac, parsnips
6. Potatoes, eggplant, peppers, tomatoes
7. Pumpkins, squash, cucumbers, melons, zucchinis
8. Endive, salsify, lettuce

If your area is limited, plant more intensively in small patches; larger gardens can combine both rows and blocks. Maintain diversity in both methods. Vegetables and herbs look attractive in beds, even in flower beds - think of them as part of the landscape. Try to buy certified or disease-resistant seeds and seedlings. Don't make too big a garden to start off; catalogues can lure you into buying far more than you need for harvest and preservation. Buy seeds and seedlings adapted to your region. Follow deep-rooted plants with shallow-rooted ones and heavy feeders such as brassicas (group 3) should precede crops such as peas and beans (group 4) which are light feeders. Stay out of the garden when plants are wet with rain or dew to prevent spreading diseases and **don't smoke in the garden**; mosaic virus disease may be spread by your hands to tomatoes and related plants. **Dispose of diseased plants before they contaminate others.** Bag them up for the garbage dump.

Interplanting means alternating rows of different plants and/or planting varieties within rows or varietal squares within blocks. **Companion planting** refers to growing different plants side by side to the benefit of one or both plants.

Weed Control: Don't be afraid of weeds, they are indicators of soil conditions and their study can tell you a lot. Many weeds harbor beneficial insects that destroy bad bugs. Remove weeds from the planting space to eliminate competition with vegetables. Elsewhere either hoe them into the soil or remove them to the compost heap. Alternatively, **mulch** the soil to suppress weeds by covering it with organic materials such as old or poor hay, straw, sawdust, grass clippings, compost or leaves. Mulch keeps moisture in the ground, acts as an insulator and finally decomposes into the soil. Don't add mulch until plants are well up.

Insect Control: Identification and control of insects is a study in itself. Organic methods themselves do reduce infestation considerably. Interplanting herbs and flowers such as mint, marigolds and nasturtiums seems to deter insects. Many weeds harbor beneficial insects - leave clumps of weeds about the garden. Goldenrod supports more than 75 species of beneficial and pigweed more than 30!! Attract birds, frogs and toads; they devour insects by thousands.

Check regularly for egg clusters, beetles and caterpillars and kill them. Keep records of insect appearances and time plantings to avoid peak periods. There are many strategies that deter or kill bugs, such as putting paper or tin collars around tomato seedlings to foil cutworms. Ask other organic gardeners for their advice and consult books on these tactics as well as about companion planting ideas. Experiment yourself. Organic and conventional gardeners share many procedures. You can also use insecticidal soap.

Organic gardeners shun poisons as they affect soil, water and humans and can be taken up by plants. They also kill beneficial insects with the harmful ones. Restoring soil cycles, creating diversity and rotation, and composting will make your gardening efforts a success.

Useful Sources of Information

Canadian Organic Growers Reference Series.

- #1 Part I Ecological Agriculture - Early Writings
- #1 Part II Ecological Agriculture - Selected Books and Websites
- #2 Seed Sources for Organic Gardeners
- #4 Composting for Gardeners
- #13 A Gardener's Guide to Improving Soil Fertility

Eco-Farm & Garden. Canada's national organic magazine. *Canadian Organic Growers.* A quarterly periodical produced by Canadian Organic Growers (COG).

Ecological Agriculture Program. *McGill University, Montreal.* <http://www.eap.mcgill.ca/>

The Encyclopedia of Organic Gardening. *Staff of Organic Gardening.* 1992. Rodale Press.

The Harrowsmith Northern Gardener. *Jennifer Bennett.* 1982. Camden House.

Let it Rot! the Gardeners Guide to Composting. *Stu Campbell.* Storey Publishing, Pownal, VT. 1998.

The New Organic Grower: A Master's Manual of Tools and Techniques for the Home and Market Gardener. 2nd Edition. *Eliot Coleman.* 1995. Chelsea Green Publishing, White River Junction, Vermont. 340 pp.

The Organic Gardener's Handbook of Natural Insect and Disease Control. *Barbara W. Ellis and Fern Marshall Bradley.* Eds. 1996. Rodale Press, Emmaus, PA. 534 pp.

The Rodale Book on Composting, Easy Methods for Every Gardener. *Grace Gershuny and Deborah Martin.* Eds. 1992. Rodale Press, Emmaus, PA. 278 pp.

The Soul of the Soil: a Soil-Building Guide for Master Gardeners and Farmers, 4th edition. *Grace Gershuny & Joe Smillie.* 1999. Chelsea Green Publishing, White River Junction, VT, 173pp.

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