DOWLING COMMUNITY GARDEN

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Improving Your Soil

Healthy plants come from healthy soil. Make sure your garden is providing the right nutrients in the right proportions for optimum results; too much or too little of soil nutrients can affect how well your garden grows.

The structure of your soil is important. Loose, crumbly soil that contains organic matter will allow plants roots to grow deeper, provide nutrients, channel water to plant roots and hold water more easily.

Healthy soil will also contain micro-organisms that convert organic matter into nutrients plants need to grow.

What is Healthy Soil?

Healthy soil contains the right proportions of air, water, minerals, and organic matter that plants need for growth.

Soil Structure This determines how water drains and is held in the soil, the amount of air space, and if nutrients are easily released for use by plants. Add organic matter to improve soil structure: 1" of fine compost or manure per year, 3-4" of bulkier materials like straw or leaves. (Turn leaves, other non-composted material into your garden in the fall, so it will have broken down by the time you plant in spring.) Avoid compacting soil by walking on your garden beds, or working soil when it is wet.

Nutrients Plants need macro-nutrients like nitrogen, phosphorus, potash (the N-P-K in fertilizers) calcium, magnesium and sulfur to thrive, and other minerals in smaller amounts (iron, manganese, copper, zinc and others). The availability of nutrients in the soil is affected by ground and air temperatures, moisture levels and soil pH. Organic fertilizers slowly break down in the soil and make nutrients available to plants as they need them.

About pH Plants require certain ranges of acidity-alkalinity (pH). A 5.5-7.5 pH range allows essential nutrients to be available to plants. In general, soils in Minneapolis are alkaline, and city water is a pH near 8. Organic materials such as conifer needles, sawdust, peat moss and oak leaves will slowly help to acidify your soil.

Have your soil tested by the University of Minnesota (*contact soiltest@umn.edu or 612/625-3101 for information on sending soil samples*) to determine the percentages of nitrogen, potassium and phosphorus present in your garden, amount of organic matter, and its PH. Add amendments to your soil to replace missing nutrients.

Soil Amendments

ORGANIC FERTILIZERS. Apply dry organic fertilizers in spring before planting, in amounts recommended by your soil test results. Spread evenly over your garden and work them into the top 4-6" of soil. Common organic sources of macro-nutrients are:

Nitrogen Cottonseed meal, alfalfa meal, blood meal, fish emulsion and fish meal, soybean meal, animal manure, coffee grounds.

Phosphorus Bonemeal, phosphate rock.

Potash Granite dust, greensand, kelp meal, wood ashes.

Calcium Eggshells, gypsum, limestone.

Magnesium Epsom salts, limestone.

COMPOST. Compost is a combination of organic matter that is decomposed to form humus. It improves soil structure, helps retain moisture and contains a balance of macro-nutrients. Add 1" of fine compost each season (more if you need to improve soil structure), or use compost as a mulch. Make "compost

References

Bradley, Fern Marshall; Ellis, Barbara, ed. *Rodale's All New Encyclopedia of Organic Gardening.* Rodale Press, 1992.

Coleman, Eliot. *The New Organic Grower.* Chelsea Green Publishing, 1995.

http://www.spiritualskyincense.com/mulching-your-garden.htm

www.gardeners.com/gardening/content.asp?copy_id=5060

For more information

Erin Hynes. *Improving the Soil.* Rodale Press, 1994.

Grace Gershuny. *Start with the Soil.* Rodale Press, 1997.

Useful web sites

pH needs of vegetables:
www.gardenersnet.com/atoz/phlevel1.htm

Organic gardening:
www.organicgardening.com

Composting:
http://www.ci.minneapolis.mn.us/solid-waste/yardwaste/solid-waste_yardwaste-composting

COMPOST TEA

Soak a cloth bag of compost in a 5-gallon pail of water for a few days. Dilute the liquid with more water until it's the color of weak tea and use to water plants. Re-use the cloth bag a few more times, then start over.

MANURE TEA

Put a shovelful of manure in a cloth bag and submerge in a 5-gallon pail of water. Leave for one week. Dilute until it's the color of weak tea before using.

(both from *Rodale's All New Encyclopedia of Organic Gardening.* Rodale Press, 1992*)*

tea" to feed plants when you water.

ANIMAL MANURES. Animal manures provide nutrients and organic matter. They must be well composted before using in the garden, or you risk damaging your plants. Look for a crumbly texture and pleasant smell. Apply 1" on top of your garden and turn into the soil. Make "manure tea" to feed your plants when you water.

Using Cover Crops to Fertilize

Cover crops, also known as green manures, are any green plant tilled back into the soil. Cover crops can add nitrogen and organic matter to the soil, catch nutrients and moisture that have leached deep into the soil, loosen compacted soil and reduce soil erosion over winter. They may be planted in late summer/ early fall to mature in the following spring, or sown in spring and used as a living mulch. See Dowling Community Garden's publication "Using Cover Crops" for more information (available for download on the web site).

Mulches

A mulch covers the soil, moderating temperatures by insulating the soil from extreme heat and cold, preventing erosion, retaining soil moisture, and improving soil structure. Mulches help keep crops clean and disease free, and act as a weed barrier.

When mulches are made from organic materials, they will gradually add nutrients and organic matter to your soil. Adding a 3-6" layer of mulch to soil that has been thoroughly weeded will discourage weeds from growing. Mulches made from wood chips or sawdust tend to remove nitrogen from the soil as they break down. Mulches from non-organic materials like plastic provide better weed control, but do not allow healthy air exchange in soil, may build up heat, or not allow for sufficient water to pass through.

Organic Mulches Straw, leaves, grass clippings, compost, composted manure, wood chips, sawdust, pine needles

Non-Organic Mulches Plastics, weed barrier fabric, stones or gravel

More About Compost

Make compost in your garden or backyard from plant waste and food scraps. Combine "green" materials (higher in nitrogen) with "brown" materials (higher in carbon) in the right proportions, add water and let microorganisms such as bacteria and fungi break down your plant wastes. Layer green and brown materials, with a little soil between layers, and water so pile is the consistency of a wet sponge. Periodically turn the layers with a pitchfork to provide air and speed decomposition. A properly constructed and maintained compost pile will not smell. Your compost is ready to use when it looks like soil.

Do not add the following to your compost pile: animal wastes, meat scraps, fats or oils.

Green Materials Grass clippings, green plants, vegetable peelings.

Brown Materials Leaves, straw, woody plants, dry dead plant matter (from healthy plants; don't put diseased or insect infested plants into the compost), pine needles, sawdust, woodchips.

Other Materials to Add Coffee grounds, eggshells.

More information on constructing a compost bin and making compost may be found at the Minneapolis Solid Waste and Recycling web site under "Home Composting", www.ci.minneapolis.mn.us/solid-waste.