

# Massachusetts Master Gardener Association

## FACT SHEET

**Have gardening questions?** Contact the **Master Gardener Help Line.**

Two locations / two ways to contact us:

At *Mass Hort, Wellesley*: [mghelpline@masshort.org](mailto:mghelpline@masshort.org), 617-933-4929

At *Tower Hill Botanic Garden, Boylston*: [hortline@towerhillbg.org](mailto:hortline@towerhillbg.org), 608-869-6111 x104

Please visit our web site for Help Line open hours <http://massmastergardeners.org/what-i-do/>



### Soil—the good gardener’s secret

A good gardener has dirt on her hands and soil in her garden.”

What’s the difference?

Surprisingly, good soil is 25% air, 25% water and 50 % solid material. The solid parts of the soil are made up of mineral bits—sand, silt and clay as well as organic material. Every soil benefits from addition of organic matter. It can be compost—the black gold of the garden—manure, peat moss, leaves and so forth. In sandy soils, the addition of organic matter acts like a sponge, holding water and nutrients for the roots. In clay soils, it helps water, air and nutrients move through the soil more easily

Scientists say to create a thriving ecosystem above the ground you must have an equally thriving one below. That means you also need billions of bacteria, fungi, nematodes and worms toiling happily underground. Now you might ask. Aren’t fungi and bacteria bad? Not in this case. These tiny organisms till through the soil, turning the organic matter you’ve added into nutrients available to the roots of your plants. These actions are vital to the life of plant material. If you’ve ever kicked over leaf litter in the woods, you may have noticed white strands seeming to connect the dead leaves. This is the first stage of those leaves decomposition and evidence of the microscopic world at work below us.

Roots need to breathe, in order to take up water and nutrients. If the ground is hard packed, think of a path across the school yard nothing can grow there. Air spaces may temporarily fill with water after a rain, to help carry water to the roots, but the drainage must be good enough to allow air to return.

Keeping your plants happy also means keeping track of the soil acidity. New England soil began as the granite of our mountains so it is naturally acidic. We suffer from acid rain, and most fertilizers you may use are acidic. The result can be soil more acidic than boric acid, too acidic for plants. When the pH (that’s the measure of soil acidity) is too low, it affects the solubility of the nutrients in the soil. Iron, for instance, dissolves too readily in acidic soil to the point where it stops being a benefit and can be toxic to plants.

You can send soil off to a lab such as the one at the University of Mass or even use kits bought at local garden centers, to tell you the pH. More sophisticated tests run in labs can tell you if you are lacking nutrients and the amount of organic matter present in your soil. The addition of ground limestone can solve a pH problem.

Even plants in good soil need additional food. On every package of fertilizer sold, there are three letters and numbers. N, for nitrogen, necessary for stem and leaf growth, and dark green foliage; P, for phosphorus, needed for root growth, flower production and fruit development; and K, for potassium, vital for plant metabolism and food manufacturing. With some fertilizers, minute amounts of trace elements, also critical to plant growth, are included.

Organic fertilizers are made from animal or vegetable byproducts including fish emulsions, blood meal, cottonseed meal, sewage sludge and animal manures. They generally provide much lower amounts of nutrient per pound, and are more bulky and expensive. Research has shown that plants do not recognize a difference between properly applied organic or inorganic fertilizer. But the soil does. All that vital microscopic life underground will not thrive on a diet of inorganic fertilizer alone. Therefore, it is important to be certain that your soil has a good base of organic material whichever fertilizer you use.

How do you build good soil when faced with ‘dirt’? Begin with a test so you know what’s lacking. Then start turning the soil, by hand or mechanically and adding organic material. Compost is best, but chopped leaves, peat, aged manure, even saw dust or wood chips will all begin improving the structure of the soil. If it’s a lawn you don’t want to tear up, put away the clippings catcher and leave them on the lawn. Clippings do not cause thatch, but will decompose improving the soil and adding nitrogen without you needing to apply more fertilizer. Sweeten too acidic soil with limestone. Keep this up and in a few years, you’ll have loamy soil that will make the TV gardeners jealous.

*The Massachusetts Master Gardener Association is a non-profit organization whose mission is to share knowledge and experience with the public through outreach programs in education, horticulture and gardening; to provide the Master Gardener Training Program to interested members of the public; and to provide graduates of the Master Gardener Training Program with educational and practical opportunities to extend their knowledge and interests in gardening and related topics.*

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