

## Consider testing garden soil before fertilizing

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Summary: Knowing about garden soil helps gardeners grow healthy plants, protect ground and surface water, as well as efficiently use resources like nutrients, water and money.

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BOZEMAN – Knowing about garden soil helps gardeners grow healthy plants, protect ground and surface water, as well as efficiently use resources like nutrients, water and money.

Soil nutrients and organic matter are important for a healthy garden. If plants aren't thriving, soil nutrients could be lacking, out of balance or even too high. Adding fertilizer, compost or manure may not solve the problem or may actually make the problem worse if nutrients are in excess.

"A good starting point is with a soil test," said Clain Jones, Extension soil fertility specialist in the Department of Land Resources and Environmental Sciences at Montana State University.

Early spring is the best time to sample because the results will best represent what is available to this year's plants. Plus there is time to make adjustments before the plants need the nutrients. Soil test reports generally provide recommended fertilization rates.

Due to time and cost of a typical soil analysis (\$20-\$50), many gardeners use standard fertilizer rates often given on fertilizer bags rather than soil tests.

"If you are using standard fertilizer rates and your plants appear healthy, then your current fertilizer strategy is likely working," said Jones.

Other soil properties to consider, aside from nutrient levels, are soil pH and soil organic matter. Most Montana soils are high in pH (greater than pH 7). "Although vegetables generally prefer pH levels between 6 and 7, they grow just fine in high pH soil," said Jones. This is good, because little can be done to lower soil pH. Elemental sulfur lowers pH, but at a high cost and at the risk of increasing sulfate and soil salts to harmful levels. If your pH is below 6, consider liming to increase soil pH.

Many gardeners love to add organic matter to supply nutrients, keep soil loose, and help hold water.

"Yet, if the organic matter is manure or food compost, a garden can accumulate too much of a good thing," cautioned Jones.

One inch of composted manure adds more than 10 times the nitrogen and potassium annually removed by vegetable harvest, and 50 times the phosphorus. Excess nutrients, whether from organic material or conventional fertilizer, can be unhealthy for the plants and contaminate water.

If your soil has high phosphorus and potassium, Jones suggests adding organic matter high in carbon, such as straw, dry leaves, wood-shavings, or peat moss. However, these can tie up nitrogen for a few months, leaving insufficient amounts for the plants. Consider using urea, blood meal or legumes (beans, peas) in rotation to supply extra nitrogen.

Unlike conventional fertilizers, compost supplies a diversity of nutrients at relatively low, unknown concentrations. Lab analysis can determine nutrient concentrations, but not with the same confidence

as the label on a bag of pelleted fertilizer. A concern with compost is the potential for residual herbicides. If in doubt, conduct a simple test by comparing beans, peas or tomatoes grown in pots with and without the compost. If plants don't germinate, die young, or have abnormal growth, the compost is likely contaminated.

Compost slowly decomposes and supplies nutrients, so should be applied and turned into the soil in the fall. It can be used as very thin topdressing during the growing season. Liquid or pelleted fertilizers release their nutrients quickly and can be applied to the side of the seed row or early to mid-growing season.

The foundation of a healthy garden is a healthy soil. Understanding soils leads to wise nutrient use, promotes maximum plant health and yields, and protects our water and air. More information is available in a new SoilScoop publication (<http://landresources.montana.edu/soilfertility/soilscoop.html>).

Montana State University Extension's MontGuide *Home Garden Soil Testing and Fertilizer Guidelines* outlines soil sampling and fertilizer calculations. There are many other MontGuides with gardening information and tips at MSU Extension Yard & Garden (<http://www.msuextension.org/category.cfm?Cid=5>). For more information on soil fertility, see Jones's website <http://landresources.montana.edu/soilfertility>, or contact Clain Jones at [clainj@montana.edu](mailto:clainj@montana.edu) or 406-994-6076.