

MESSENGER-INQUIRER

	University of Kentucky College of Agriculture, Food and Environment <i>Cooperative Extension Service</i>
	extension.ca.uky.edu HORTICULTURE EDUCATION Annette Meyer Heisdorffer, PhD Daviness County Extension Office

September 28, 2024

Testing the soil for Plant Nutrient Needs
By Annette Meyer Heisdorffer, Ph.D.
Extension Agent for Horticulture Education-Daviness County

Common questions about fertilizing plants in the garden and the lawn are what fertilizer do they need, and do I need to add lime? Testing the soil is the best way to determine what is available in the soil for the plants. A soil test determines the amount of phosphorus and potassium in the soil and the pH of the soil.

Testing the soil is important to avoid excess or improperly applied fertilizer which can end up in storm sewers and contribute to nutrient pollution in lakes, streams, and rivers. Excess phosphorus promotes rapid and abundant algae growth in freshwater. Too much algae disrupts ecosystems, harms wildlife, negatively impacts water recreation, and may contain toxins that sicken people and pets. Testing the soil protects the environment and saves money and time when applying the materials.

The soil test does not determine the level of nitrogen. Plants need nitrogen to grow. The amount of nitrogen applied is determined by the plant or crop. The amount needed is reported on the soil test results.

MESSENGER-INQUIRER

Phosphorus is essential for seed and fruit formation and root growth. The soil test, as well as the fertilizer bag, refers to phosphorus as P_2O_5 . The University of Kentucky soil test results refer to phosphorus as phosphate.

Potassium, also mentioned as potash, is essential for root development and plant growth. The soil test result and fertilizer bag use K_2O when referring to potassium.

The soil test determines pH of the soil. The pH indicates the degree of acidity or alkalinity of the soil. It is important because pH affects the availability of nutrients to plants.

The pH scale ranges from 0 to 14. A pH of 7 is neutral. Values below 7 make up the acidic range of the scale, and values above 7 make up the alkaline range. The pH scale is not a linear scale but a logarithmic scale. Soil with a pH of 7.5 is ten times more alkaline than soil with a pH of 6.5, and soil with a pH of 4.5 is ten times more acidic than soil with a pH of 5.5. Many plants will grow at pH levels of 6.0 to 7.0. Acid-loving plants, such as azaleas and rhododendrons, prefer a pH of 4.5 to 5.0. The pH is used to determine if lime should be applied to increase the pH of the soil or if sulfur should be applied to decrease the soil pH.

When collecting soil for a test, it is best to keep soil from the front lawn separate from the back. Keep problem areas, areas from shrubs, flower beds, or vegetable gardens separate from the lawn.

When collecting a soil sample from the lawn, insert a garden trowel 4 inches into the soil. Remove a trowel full of soil and set it aside on a sheet of newspaper so it will be easy to place back into the hole. Go to the back of the hole and make a slice of soil about 1 inch thick and 4 inches deep. Place it into a plastic container or reuse a plastic bag. Repeat these steps in 8 to 10

MESSENGER-INQUIRER

locations in the yard. Taking soil from different locations provides a representative sample from the lawn.

Remove the thatch and aboveground parts of the grass from the container before mixing all the soil together and crumbling big clods. If the soil is wet, place it on newspaper to air dry for one or two days out of the way to avoid contamination by foreign matter.

Take two cups of soil to the County Cooperative Extension Service Office. In Daviess County, the soil tests are free for residents due to a grant from the Daviess County Soil Conservation District. Tests are completed in about ten working days.

To collect a soil sample from the landscape beds or vegetable garden, repeat the steps listed for the lawn, except push the trowel down to a depth of 6 inches. Other plants have deeper root systems than grass. Collect soil from 8 to 10 locations within the garden.

The soil test result comes back with the amount of nitrogen, phosphorus, and potassium needed to apply. It also indicates if the pH needs to be changed by applying lime or sulfur.

When looking for the fertilizer, look for the three numbers separated by hyphens on the label of the bag of fertilizer. The numbers represent the amount of nitrogen, phosphorous, and potassium, respectively, contained in the bag on a percentage basis by weight. For example, a bag of 10-10-10 fertilizer contains 10 percent nitrogen, 10 percent phosphorus, and 10 percent potassium. A 100-pound bag of a 10-10-10 fertilizer contains 10 pounds of nitrogen, 10 pounds of phosphorus, and 10 pounds of potassium. The remaining 70 pounds is filler used to spread the fertilizer evenly.

MESSENGER-INQUIRER

Look for the appropriate numbers on the fertilizer bag as recommended by the soil test. Phosphorous and potassium may not be needed so look for a number for nitrogen and zeros or very low number for phosphorus or potassium.

Test the soil every three to four years in the landscape, garden, and lawn. For more information, contact the Daviess County Cooperative Extension Service at 270-685-8480 or annette.heisdorffer@uky.edu.

Annette's Tip:

As vegetables are finished producing in the garden, destroy or remove the plants to slow down the development of disease and to prevent insects from overwintering in the debris for the next gardening season.

The Martin-Gatton College of Agriculture, Food and Environment is an Equal Opportunity Organization with respect to education and employment and authorization to provide research, education information and other services only to individuals and institutions that function without regard to economic or social status and will not discriminate on the basis of race, color, ethnic origin, national origin, creed, religion, political belief, sex, sexual orientation, gender identity, gender expression, pregnancy, marital status, genetic information, age, veteran status, physical or mental disability or reprisal or retaliation for prior civil rights activity.