

## Responding to High Fertilizer Prices in 2022

by Justin Keay, *Horticulture Field Specialist*

Fertilizer prices in 2021 have increased substantially and these price increases are expected to continue throughout 2022. Increasing fertilizer prices affect the profits farmers can make on a crop, leaving many growers wondering where they can cut costs on their operation. One cost that farmers should not avoid is the cost of a soil test. MU Extension agronomist Tim Schnakenberg notes “If there was ever a time to do a soil test, this is it.” In addition to soil testing, MU Extension offers several other laboratory tests that can help you accurately apply the amounts of nutrients your plants need.

### Soil Testing

The cost of a soil test is a small price to pay to be able to accurately apply the amount of nutrients your crop needs to thrive. This information can help you avoid overapplying nutrients your plants don't need or underapplying nutrients and reducing crop yields, either scenario negatively impacts a farmer's bottom line.

Every soil across the state of Missouri contains a certain amount of the different nutrients which are essential for plant growth. Fertilizer recommendations given on a soil test report are calculated from the requirements of the crop as well as the nutrients already found in your soil. For example, some Missouri soils are high in phosphorous and may require little if any additional phosphorous fertilizer to be added. Other soils in Missouri are high in organic matter content and these soils will require a lower amount of nitrogen to produce a bountiful crop, compared to those low in organic matter. Every 1% of organic matter in the soil will release approximately 20 lbs of nitrogen per acre over the course of the growing season. A soil with 4% organic matter could reduce nitrogen applications by as much as 80 lbs per acre, potentially saving well over \$100 per acre in nitrogen fertilizer costs.

Soil test reports will also help you understand your soil pH, which can impact a crop's ability to access nutrients present in the soil. The availability of phosphorous in the soil decreases when soil pH falls below 6.0 or above 7.0. Adjusting your soil pH to optimum levels will help your plants access nutrients that are already present in your soil, saving you money on fertilizer costs. Without a soil test, fertilizing a crop involves a lot of guesswork. Taking a soil sample and following the recommendations given could potentially save you hundreds of dollars per acre on fertilizer costs.

MU Extension offers soil testing for commercial producers of vegetables and fruits and provides detailed recommendations to both optimize soil pH and fertilizer applications for these crops. It is recommended to test soil at a minimum every 2-3 years, however annual testing can better allow farmers to track the impact of their fertilization practices.

### Sampling Your Fields

A soil analysis report will be representative of the soil sample that was submitted. The rules of thumb for soil sampling are as follows:

- A flat uniform field of up to 20 acres can be sampled as one field
- Hilly or rolling land should be sampled in 5-acre sections
- Areas with different soil color and texture should be sampled as separate fields

To ensure your soil sample is the best representation of your field, a minimum of 8-12 subsamples should be taken in a random grid pattern across a field for each sample submitted. The subsamples should be pulled from the surface of the soil down to a depth of 6 inches. The subsamples should be dried and mixed thoroughly, and 2 cups of this mixed soil will be necessary for analysis.

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## Manure and Compost Use and Testing

Farmers who have previously relied on synthetic bagged fertilizer may consider sourcing animal manure and compost to decrease fertilizer costs and improve soils. Manure can be a valuable fertilizer source, but every type of animal manure (broiler chickens, laying hens, turkey, dairy, etc.) contains varying amounts of nutrients essential for plant growth. For example, dried dairy manure may be between .6% and 2.1% nitrogen and between .7% and 1.1% phosphorous by weight; while dried poultry manure may contain between 2% and 4.5% nitrogen, and between 4.5% and 5% phosphorus by weight. Just like soil, the only way to understand what levels of nutrients manure and compost contain is to have it tested by a laboratory. A manure or compost analysis report will provide detailed info on the amounts of nutrients present in sampled manure and compost. This information will ensure you are able to apply the correct amount of manure/compost to supply the amount of nutrients your crops need. Similar to soil sampling, 8-10 subsamples should be taken from throughout a manure or compost pile and mixed thoroughly to provide a representative sample. A quart sample of manure or compost is required for testing, a sealable plastic bag inside of a cardboard box is the best way to package manure or compost for shipping to the laboratory.

In recent years, vegetable producers in Missouri have encountered issues with manure or compost that is contaminated with herbicides. The herbicides of concern are sprayed on pastures for broad leaf weed control. These herbicides pass from hay or forage into manure and/or compost and then into the soil and crop where the manure or compost is applied. These herbicides can remain active for several years, and if contaminated manure is tilled into the soil cash crops could be killed or damaged until the herbicide is neutralized over time. It is important to check with your supplier of manure that animals have not been fed hay or forage treated with the following herbicides: aminopyralid, clopyralid, fluroxypyr, picloram, or triclopyr. If you have concerns related to contaminated compost or manure please reach out to your local MU Extension specialist for more information.

## Submitting Soil, Manure and Compost Samples

Soil, manure and compost samples can be dropped off directly at your local extension office and will be shipped to the soil and plant testing lab in Columbia. Request that your soil sample be submitted on a Commercial Fruits and Vegetables form. You can select 3 different crops to receive fertility recommendations for, with each soil sample submitted. Soil, manure and compost samples can also be sent directly to the MU Soil and Plant Testing Laboratory. It is suggested to call the laboratory first before sending samples, to ensure the lab has everything they need to process your samples and return your results. The lab can be reached by phone at 573-882-0623 or by mail at:

Soil and Plant Testing Laboratory

23 Mumford Hall, University of Missouri  
Columbia, MO 65211

## Produce Safety Update

by Londa Nwadike, *KSU/MU Extension Food Safety Specialist*

Winter is a good time to think about your plans related to produce safety for the next growing season. If a buyer is asking that your produce be GAP certified, the University of Missouri Extension has a program where MU can directly pay the auditor up to half the cost of your USDA or Quality Fresh GAPs audits. You will pay the other half of the audit cost to the audit company. At this point, this program will last until August 2022. If you are interested in this, you can just tell your GAPs auditor that you would like to participate in MU Extension's GAPs cost share program.

Some of you may have heard that the US Food and Drug Administration (FDA) has announced a new proposed rule to revise the water quality requirements for pre-harvest produce water. This new rule is not yet finalized, as the FDA is still collecting comments on the proposed rule. MU Extension will be providing more information on the new proposed water rule in Produce Safety Annual Supervisor trainings that we are planning to hold in communities across the state. If you are interested in holding a 90- minute Produce Safety Annual Supervisor training in your area, please contact Patrick Byers from the University of Missouri Extension at 417-859-2044 or [byerspl@missouri.edu](mailto:byerspl@missouri.edu).

It is still important that produce growers continue to test their water used both pre-harvest and post-harvest. MU Extension is continuing to provide free microbial water testing for produce growers throughout all of 2022. You can get the test kits from your local public health department and can also return the water samples to your local public health department.

MU Extension can also help answer any questions that you may have related to produce safety. Please contact Londa Nwadike at 913 307 7391 or Patrick Byers at 417 859 2044 or by mail at 800 S. Marshall St, Marshfield, MO 65706 if you have questions related to produce safety.

# Tomato Tissue Sampling for Optimum Fertility Management

by Patrick Byers, *Horticulture Field Specialist*

Tomato performance in the field, the greenhouse and the high tunnel is strongly dependent on good nutritional management. While a soil test is helpful in determining preplant fertilizer applications, an excellent way to know the status of nutrients in tomato plants on an ongoing basis is to conduct a simple tissue test of the tomato leaves. Especially as the spring approaches and tomatoes are growing rapidly, growers can lean on tissue testing to help guide injections of soluble fertilizers to meet plant needs. Maintaining optimum levels of nutrients in tomato plants is critical to maintain high yields and continuous harvests.

The tomato tissue test is based on collecting a sample of the most recently matured leaves on the plant, including all of the leaf blade and the leaf stem. Generally, this leaf is the 3rd to 5th leaf from the growing point of the plant. Include 8-10 leaves for a good sample, avoid leaves that are diseased or insect-damaged, and sample different varieties separately.

The tissue test is helpful to identify the cause of visible nutritional problems; in this case, collect a sample of normal leaves and a sample of leaves exhibiting the problem for comparison. Collect the tissue samples at first bloom, early fruit set, at first ripe fruit, and during harvest (weekly if

possible). Once collected, dry the leaves for several days, place the leaves in a paper (not plastic) container, and ship the leaves to a laboratory for analysis. The tissue nutrient levels are compared to nutrient “sufficiency ranges” (Table 1), and any shortages are noted on the tissue test report. Growers can then adjust fertilizer injection rates and timings to address any nutrient shortages.

The University of Missouri plant testing laboratory (<https://extension.missouri.edu/programs/soil-and-plant-testing-laboratory/spl-plant-analysis>) provides tissue testing services. The charge for a regular analysis (levels of N, P, K, Ca, Mg) is \$17; a regular analysis plus micronutrients is \$23. Contact your local MU Extension office for assistance in collecting and submitting tomato tissue samples. A video on tomato tissue sampling is posted at <https://www.youtube.com/watch?v=jj5yzXWeA1c>. The lab can be reached by phone at 573-882-0623 or by mail at:

Soil and Plant Testing Laboratory  
23 Mumford Hall, University of Missouri  
Columbia, MO 65211

**Table 1** Nutrient sufficiency levels in tomato tissue samples<sup>1</sup>.

Elements	Sufficiency Range
Nitrogen (N)	4.00-6.00%
Phosphorus (P)	0.25-0.80%
Potassium (K)	2.50-5.00%
Calcium (Ca)	1.00-3.00%
Magnesium (Mg)	0.40-0.90%
Sulfur (S)	0.30-1.20%
Iron (Fe)	40-300 ppm
Manganese (Mn)	40-500 ppm
Boron (B)	25-75 ppm
Copper (Cu)	5-20 ppm
Zinc (Zn)	20-50 ppm
Molybdenum (Mo)	0.6-30 ppm

<sup>1</sup> University of Missouri Soil and Plant Testing Laboratory

# Private Pesticide Applicator Training 2022

By Sam Polly, *State Director of Pesticide Safety Education*

The 2017 Center for Disease Control (CDC) data shows 38 to 49 out of every 100,000 people reported exposure to pesticides. This translates to about 2,300 to 3,000 people exposed in one year. Aside from the rare accidental equipment rupture, most of these exposures are preventable. The haunting story of a wife daily laundering her husband's contaminated clothing, resulting in lung failure and eventual death, illustrates the importance of safe and effective pesticide usage to our loved ones and communities. Safety starts with continuing education to stay at the top of our game.

The need for private pesticide applicator training (PPAT) has never been more important for farmers. PPAT is **required** for agricultural producers who wish to purchase and use restricted use pesticide (RUPs) on land they own or rent. Following rules and regulations associated with pesticides use helps protect pesticide users from additional regulations that may be passed because of the misuse of pesticides and ensures public confidence in the agricultural industry.

Appropriate pesticide usage is a pillar of environmental stewardship in the agricultural industry. Benefits that link pesticide applicator training and licensing to the success of your operation, even for producers who only apply general use products, include:

- Keeping abreast of the latest pests and diseases in the region
- Getting updated on newly available or cancelled crop protection products and techniques
- Staying informed on current issues impacting agriculture and how you can help protect our industry's future
- Keeping pace with ever-changing regulations
- Learning when to take additional precautions beyond the label to minimize risk
- Reviewing the basics of pesticide application to maximize profits

Between the Covid 19 situation and changing EPA regulations, Missouri's PPAT program is in transition. Last year's mail-in study guide is no longer available. For 2022 there are two training options for the farming community, including in-person meetings and zoom sessions. Ask your county Extension office or check out our website for times and locations at: <https://extension.missouri.edu/events/?programs=Pesticide+Applicator+Training&lpurl=%2fevents>. If you have questions related to pest management, pesticide labels, application, selection, or use, please reach out to your local county Extension office. Together we can prosper and make Missouri outstanding!

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