

## **Soil Considerations for Garden Tomato Production**

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**I**t is hard to find a vegetable garden without tomatoes planted, and the ever increasing variety of tomatoes available at garden centers and in seed catalogs keeps things interesting. As seed catalogs begin arriving in your mailbox remember to include soil fertility in your garden planning with layouts and variety selection.

Soil fertility is described as the combined effects of the chemical, physical and biological properties of soil. Soil fertility can have a large impact on the quality of the tomato plants you grow and the fruit they produce. Below is a cheat sheet detailing several macronutrients and the impact they can have on the growth of tomatoes in your garden.

**Phosphorus** is critical to most of the metabolic processes that occur within a tomato plant, including respiration, photosynthesis, and protein synthesis. Phosphorus is also critical in tomato plant growth due to its role in the process of moving water into the cells of developing fruit. Phosphorus is essential for juicy tomatoes. Phosphorus is sensitive to soil pH, and is most available to your plants with a soil pH of 6.0 – 6.5. Phosphorus deficiency is visible in tomato plants as stunted spindly growth, delayed maturity, leaves dark in color, poorly developed root systems, plants are late in setting fruit, fruit is slow to ripen, seeds are smaller in size than usual, leaf undersides are reddish in color, slender fibrous stems, and small leaves.

**Potassium** is thought to be consumed in greater amounts by tomatoes than any other nutrient. Its ability to be easily leached from the soil results in a greater chance for soil deficiencies to be found in the field. Tomato yield is reduced before the potassium levels reach low enough for deficiency symptoms to be viewed. Regular attention to soil nutrient levels through soil testing is critical for optimal tomato production. Potassium is readily moveable in the tomato plant and so deficiency symptoms are most commonly seen on older (lower) leaves. Interveinal scorching and necrosis, outer leaves that curl and crinkle, and chlorosis are some of the symptoms shown from a deficiency of potassium.

**Magnesium** is often found deficient in New Jersey soils, particularly those that are lighter in color. Magnesium deficiency results in a loss of both quality and quantity in tomato crops. It is an important component of the chlorophyll molecule and is essential for photosynthesis. Magnesium affects crop maturity timing, size of roots, size of fruit and the overall quality of the crop. Deficiency symptoms include: chlorosis first appearing on the lower leaves, brittle leaves that tend to curl upward, and veins remaining dark surrounded by yellowing foliage. During fruiting these symptoms will increase in their severity.

**Calcium's** nutritional role is varied in both plants and the soil. It is an integral part of the plant cell wall structure. In the soil calcium has the ability to neutralize acidity. A large amount of calcium is absorbed by tomato plants. Only a small portion of the absorbed calcium is used in forming the fruit, although this amount is extremely important. The vast majority of the absorbed calcium can be found within the vegetative structures of the plant. Clay soils have a higher holding capacity for calcium compared to sandy soils. Calcium's role in the cell wall structure is the reasoning for blossom end rot in tomatoes. Calcium may be present in the soil, but may not enter the plant roots if soil moisture levels are deficient. Calcium is absorbed through a process called "mass flow" which means it is absorbed through the roots when contained in the soil water. Drought

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stress prevents the tomato from absorbing available water, and therefore available calcium. Calcium deficiency in tomato can also result from excessive magnesium levels in the soil. The most notable calcium deficiency symptom other than blossom end rot is the appearance of chlorotic leaves at the upper portion, newer leaves, of the plant.

What do you do if your soil is incredibly poor for tomato production? Containerized plantings are a great option for those with a lack of land, rocky soil, heavy clay, or extreme slopes. For those looking to add topsoil as a means of improving their soil quality please read *Topsoil Suitable for Landscape Use* by Dr. Joseph Heckman, Rutgers Extension Specialist in Soil Fertility: <http://njaes.rutgers.edu/pubs/publication.asp?pid=FS901>.

The simplest way to assess the fertility of your soil is through a soil test. Rutgers Soil Testing Lab provides test kits for \$20.00. These self-mailers include packaging for your soil sample and a short questionnaire about your current soil and your future planting plans. Typically within two weeks of sending in your kit you will receive a soil test report from the soil testing lab. This report will include your soil sample pH and analysis for both micro and macro nutrients. If there are any soil modifications needed the report will include details on what and how to apply amendments to your soil. Soil test kits are available at Rutgers Cooperative Extension county offices: <http://njaes.rutgers.edu/county> or visit the Rutgers Soil Testing Lab website at: <http://njaes.rutgers.edu/soiltestinglab> or call 848-932-9295. □

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