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Understanding Fertilizers

AGRI-VIEWS

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I quietly lurk on a garlic growers Facebook page. Nearly daily there are questions about soil fertility and fertilizers. Many of the answers that are given to "help" people with their issues range from just flat out wrong to possibly making problems worse. I occasionally wade in with a detailed response of first explaining WHY and then HOW to remediate the issue. What it most often comes down to is a lack of understanding of plant nutrition, soil fertility and how fertilizers work. I'm not going to make you an expert in one column but maybe I can help shed some light on the mystery known as fertilizers.

First rule: plants need nutrients to live. A very few plants are epiphytes that obtain their nutrients from the air and rainwater (many orchids are epiphytes) and a few are parasitic (mistletoe or dodder), obtaining their nutrients from a host plant. But most plants, that gardeners and farmers care about, need to obtain nutrients from the soil. While a few fertilizers are sold as "foliar feeders", leaves are designed for photosynthesis and roots are designed to obtain nutrients from the soil and water.

Second rule: there is not an inexhaustible supply of nutrients in the soil. In a natural, unmanaged ecosystem there will be a certain "steady state" of nutrients where the plants growing and thriving can do so on the nutrients that are available as plant parts die and are recycled in the soil. Native prairie plants exist on quite low levels of nitrogen and phosphorus. To grow highly productive crops like farmers and gardeners want to do, nutrients (fertilizer) need to be added.

Third rule: there are nutrients that are needed in large quantities, macronutrients, like nitrogen, phosphorus, potassium and to a lesser extent sulfur. These are needed in the tens to hundreds of pounds per acre per year. Then there are micronutrients that are needed in a few ounces to a few pounds per acre per year. These are nutrients like iron, zinc, copper, manganese, and many others.

Fourth rule: regardless of what source of fertilizer you are using (manufactured or "organic") the nutrients often have to go through some chemical or biological reactions to get into a plant usable form. Some nutrients, like nitrogen from manufactured fertilizer, become plant available very quickly, and even move with water into the root zone and on through the root zone if too much is applied at once or too much rainfall/irrigation occur after application. Most organic nitrogen fertilizers (composted manure for example) can take quite some time to "break down" so that they are plant available. If you are in the middle of the growing season and your tomato plants are severely nitrogen deficient, manure may not be the best choice as it may take the rest of the growing season before the nitrogen is available. Or, nutrients like phosphorus do NOT move readily in soil water and often times need to be incorporated, or tilled, into the soil so the roots can get to them.

Many of the problems I help growers fix come down to not understanding what the plants need and how to get those nutrients to the plant as quickly as possible to help the plant grow better. It's important to determine what the plant needs and then the best fertilizer to use. It's something that needs to be addressed starting before planting (for gardens, lets start the fall before) and then monitored during the growing season. Don't depend on advertisements for products or recommendations from the internet. Talk to me so we can fix the issue properly!