

## Field Notes:

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### **There is no substitute for soil fertility.**

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Good soil fertility is fundamental to soil productivity and plant growth. Regardless of this fact, we often take it for granted and fail to give it the attention it deserves. With the exception of drainage, soil fertility should be given priority over other factors connected with growing plants.

Rather than being static as most people seem to believe, soil fertility factors are constantly changing. Acidity or pH, the most common problem for soils in our area, changes with time since our local soils are naturally acid and will return to low pH levels if not limed according to soil test recommendations. The addition of nitrogen fertilizers which are necessary for most crops also causes the formation of acids.

Fertilizer nutrients are constantly carried away when crops are harvested. They are also leached downward in the soil, out of range for plant roots; and they are carried away by runoff water. Nutrient balance is also an important factor often ignored by people who seem to believe that just applying “fertilize” is enough. Nutrients should be supplied in approximately the same ratio as plants use them; this is normally a ratio of 3 to 4 parts nitrogen (N), 1 part phosphorus (P), and 3 to 4 parts potassium (K). Other elements, including sulfur (S), calcium (Ca), and magnesium (Mg) are also very important, and should be added if soil test results indicate they are deficient. Several other elements known as “micronutrients” are also needed in very small quantities, and are usually included in good quality fertilizer products.

As mentioned above, pH is our most common soil fertility problem, and should be addressed first. Left alone, most of our local soils will have pH between 4.7 and 5.2, which is too low for most plants we grow well. Exceptions include centipede grass, blueberries, strawberries, and azaleas which do well in acid soils. Bahiagrass is also capable of tolerating moderately acid soils with pH around 5.7 or above. Most crops need pH levels somewhere between 6.3 and 7.0. Unless the soil is very sandy, it takes about two tons of agricultural lime per acre to raise the pH from the “natural” level to a good level for crops. Very sandy soil may show this kind of response with as little as one ton of lime per acre. Lime should preferably be applied in the fall so that it will have the winter to find its way into the soil and react fully with acids that are present, however lime can and should be applied anytime the need for correcting pH is found.

Lime is the “key” that unlocks the availability of fertilizer nutrients. When pH is too low, plants cannot utilize fertilizer even though it is applied in adequate quantities. Another fact that is usually overlooked is that when pH is too low, toxic elements like aluminum and manganese are released into the soil and prevent plants from developing good roots. The result is seen in plants that don't grow well and are very susceptible to drought injury. A third result of low pH is that soil organisms cannot function properly; a good example of this is the failure of soybeans and other legumes to develop the nitrogen-fixing root nodules that supply nitrogen to these plants.

These facts about soil fertility are common to virtually all kinds of growing plants, including vegetables, fruit trees and vine crops, lawns and ornamental gardens, pastures and forage crops, and field crops like cotton, corn, and soybeans. Most of our “crops” are grown in the warm season, however winter crops like ryegrass, wheat, oats, clovers, and even our favorite cool season vegetable, turnip greens, are affected by the same set of rules. The only way you can really know what your soils should receive is to take a soil sample and have it analyzed. Then, of course, you need to follow the recommendations that you receive from the laboratory. Once upon a time the MSU Soil Testing Lab. would analyze your soil free; then they charged three dollars per sample for many years. Last year the charge for testing a soil sample was raised to six dollars per sample, but this is still a good deal. Take your samples carefully and make sure they represent the soil area well, and your results will be more accurate. Don't combine areas that are known to be different, such as a bottom and a hill; take a separate sample in each different area.

Do a good job of supplying the soil with the right amounts of lime and nutrients, and you will be much more successful with your efforts to grow plants. Thanks for your time.