

Adjusting Soil pH

AGRI-VIEWS

by Chuck Otte, Geary County Extension Agent

One of the more important soil chemistry characteristics that we need to monitor is soil pH. Is the soil acid, neutral or alkaline. Every plant has a specific preferred soil pH and a range of pHs that it can tolerate. Blueberries really need an acid soil and is fairly intolerant of pH levels that approach neutral. Tall fescue prefers a soil pH of 6.5 (slightly acid - 7.0 is neutral) but does just fine from about 4.7 (fairly acidic) to 8.5 (quite alkaline.) For most garden plants and lawns though, that slightly acidic 6.5 pH seems to work just pretty well.

Soil pH also impacts the availability of nutrients in the soil. Many of our major nutrients like nitrogen, phosphorus, potassium and sulfur start to become less and less available as the pH drops below 6. Iron becomes less and less available as the pH goes above 7.5. This can be a real problem with certain shade trees like pin oaks, sweet gums and some maples. There's plenty of iron in the soil, but the high pH ties up the iron in plant unavailable forms which result in the leaves turning yellow and can even kill the tree over time. It becomes starved for iron to the point that it can no longer carry on critical biochemical processes. It basically starves to death!

The more rainfall a region receives the more weathered the soil becomes which leads to lower pH levels. The more arid an area is the higher the pH levels tend to be. Areas east of Kansas tend to deal with many more acid soils than we do. Long term fertilizer use can also change soil pH. High levels of nitrogen fertilizer over an extended period of time will lower the pH. In our area we find highly variable soil pH levels. River bottom soils are often neutral to acidic. But many of our upland soils are going to be neutral to alkaline.

It becomes very important to know the soil pH of your garden or especially if you want to reseed your lawn. Acid soils can have that acidic nature neutralized with ground limestone which we have an abundance of in our area so the cost isn't too prohibitive. High pH soils are lowered with sulfur which we can do on small scales in our gardens but on large scales simply isn't practical because of cost. Whichever one you need to apply it must be incorporated into the soil so that the particles can react with the soil particles. In the case of the acid soil to neutralize the acidity when limestone is applied, think of it as an antacid for your garden. When sulfur is applied it reacts with soil moisture to create a weak sulfuric acid solution which lowers the soil pH. Spreading either of these on the soil surface simply won't work.

How much lime or sulfur you have to apply depends on several factors including the actual pH, the buffer pH (a measure of how much inherent buffering ability the soil has) as well as what plants you are trying to grow. But you need this information, from a good soil test (the Extension Office can help with this) before you begin. Once you know what you need you can apply the correct amount of the amendment, rototill it into the soil, in the fall or the spring, and proceed.

It's going to take 2 to 3 years for the full neutralizing action to take place of either the sulfur or lime. Putting on more isn't going to make it go faster, but it may change the end point. About 15 years ago I needed to add sulfur to my garden as it was about a 7.8 pH. I applied some, waited two years, checked it again and it was 7.6. So I applied more. I checked it this summer and it is now 5.7 which is too acid. I wasn't patient enough, I tried to hurry it and now I get so add lime to try to get it back to the target level of 6.5. So apply the right amount of the right amendment, if you need it and then be patient!