

News Column

by Greg McClure, KSU-Riley County Extension Agriculture Agent  
110 Courthouse Plaza  
Manhattan, KS 66502

For Release 08/17/20  
Phone: 785/537-6350  
Fax: 785/537-6353

## SOIL PH AND LIMING

I have often said that the best part of my job is that I get to learn something new every day. Now that I'm getting older, the job could be really fun. If I can't remember what I learned last week, then it can all be new again the next time I need that information.

Today's topic is one of those that I know I learned over 20 years ago. The problem is that I remember learning about soil pH and liming, and I know where I was and what month it was, but I don't remember what I actually learned.

Because I wear rose-colored glasses, today is a good day — I get to learn about soil pH and liming all over again!

You probably know that we routinely test pH every time we do a soil test. Then, if the pH is too low – meaning the soil is too acidic – we apply lime to raise the pH. Its just a matter of chemistry, lime is basic (high pH) so we add a high pH material to low pH soils to achieve something in the middle. Depending on where your farm is in Kansas, the target pH maybe be 6.8, or it might be just 6.0.

A routine soil test will reveal the pH level of the soil and this will determine whether lime is needed. Generally, east of the Flint Hills, lime is recommended for alfalfa if the pH drops below 6.4, with the target pH being 6.8. In the Flint Hills and west, lime is recommended for alfalfa and all other crops when the pH drops below 5.8, with the target pH being 6.0.

That's something I didn't learn 20 years ago. I didn't realize the target pH was different

in different parts of the state.

So, why is the target different?

The reason for the differing target pH's is because the pH of the subsoil is different. East of the Flint Hills and south of the Kansas River the subsoil tends to be acidic, and a higher target pH is used to assure adequate pH conditions in the root zone.

From the Flint Hills west, most subsoils have high pH levels that can provide additional calcium and magnesium to meet the crops' needs. Therefore, the target pH for the top six inches of soil doesn't need to be as high.

When you look at your soil test report, you will notice two pH numbers. The first number is just the pH of the soil and this is the number that is used to tell if lime is needed. However, this number isn't enough to determine how much lime is needed.

The second pH number you will see on a K-State soil test report is labeled as the buffer pH. The buffer pH number is used to determine how much lime is needed to get the soil pH back up to the desired level.

Soils with more clay and organic matter will have more acidity at a given pH, and will require more lime to reach a target pH, than will sandy soils. This is why two soils can have the same pH, but vastly different lime requirements.

When soil test results come back from the lab, if lime is needed, the liming rate will be given in pounds of effective calcium carbonate (ECC) per acre. Lime is calcium carbonate, but it isn't all readily available to neutralize acidic soils. The ECC number tells the percentage that is readily available.

While there are difference in the chemical neutralizing vale of lime materials, the biggest difference in determining ECC is the fineness of crushing, or particle size. The finer the lime is

ground, the greater the surface area of the product, and the faster it will react to neutralize pH.

If a lime product is 60% ECC, that means that you need to apply 1,000 pounds of product to get 600 pounds of Effective Calcium Carbonate. And, a ton of a 60% ECC product contains 1,200 pounds of ECC.

Since no-till is so prevalent, it is important to note that traditional liming recommendations are designed for incorporation with the top six inches of soil. In no-till fields, where lime is surface applied and not incorporated, the liming rate should be reduced by 50 percent to avoid over-liming and raising the pH higher than is desirable in the top two to three inches of soil.

If you have questions, you can reach me at the Riley County Extension Office at 785/537-6350. Or, you can send e-mail to [gmclure@ksu.edu](mailto:gmclure@ksu.edu).

K-State Research and Extension is an equal opportunity provider and employer.