

FOR IMMEDIATE RELEASE

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Understanding Soil pH

FOR IMMEDIATE RELEASE: Many producers are curious about the conditions of the soils they farm. Does the North 40 need lime? Is the Old Home Place low in phosphorus or potassium? Does the alfalfa look poor due to the soil or is it another factor? Soil sampling can offer many benefits to better understanding the condition of the soil, but when the results come back, they may be hard to understand. Soil pH and buffer pH, in particular, can be difficult concepts to grasp.

On a basic soil sample, the soil pH is given. The pH scale ranges from 0 to 14, with 7 being neutral. Numbers that are less than 7 indicate acidity while numbers greater than 7 indicate alkalinity. Most agricultural soils in southeast Kansas fall between a pH of 5 to 7 (slightly acidic to neutral). The pH tends to increase slightly in areas in the western part of the state where the pH can easily reach a value around 8 (slightly alkaline). Much like the variation of pH across the state, the pH can greatly differ within a field resulting in fluctuating lime needs to increase the soil pH. The amounts of soil organic matter present as well as the clay content are two of the many contributing factors that can affect the lime needs within a field.

On a soil test report, when soil samples have a low pH, the buffer pH is also given. The amount of lime needed to increase the pH to a desired level varies with the soil's cation exchange capacity (CEC) and its buffering capacity. The higher the organic matter and heavier the soil texture, the higher the soil's CEC. Acidic soils with a high CEC contain more acidity than low CEC soils with the same pH resulting in more lime needed to get the same change in pH in a high CEC soil than a low CEC soil. Soils are most highly buffered, or resistant to change, at very acidic or very alkaline values. This could be good or bad, depending if the soil needs a large increase in pH or if the soil is naturally resisting a decrease in pH.

Not only can the pH vary across a field, the crop needs are highly diverse as well. Crops are impacted differently by soil acidity. In Kansas, wheat is one of the most acid tolerant crops, while alfalfa and sweet clover are two of the least acid tolerant. In southeast Kansas, most of our forage grasses and crops such as corn and other small grains can withstand the soil pH around 6.0. Soybeans and other legumes require soils with a pH greater than 6.4 to perform adequately. Alfalfa performs optimally at soils with a pH of 6.8.

Many fields vary in organic matter content and soil texture. It is important to take a representative amount of soil samples across a field that will capture the variability of pH and buffering capacity. While the soil pH and buffer pH may be difficult to fully understand, knowing the basic concepts of each will lead to better informed land management decisions.

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