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LIME RESPONSE

Nebraska Extension, through our 25 crops and water educators across Nebraska, will get inquiries about soil testing and testing for lime needs. At my office, I always maintain a supply of soil test bags and many times clients will borrow one of my soil probes to do a better job sampling the soil. Our Farmers Cooperative or a crop consultant should always be your first choice in soil sampling crop fields to do the job right. Gardeners that are having trouble growing a good garden will inquire too. I often say if you soil test your garden you know it will bring on many more questions!

I have learned in my career on cash rented land, liming is often ignored and that is a problem to the owner and operator for the long-term productive capacity of the farm. There is an easy way to solve that through a separate side agreement on the lease to amortize out the lime cost to a tenant. I have also learned very few gardens are in need of lime in our area. Never apply lime without sampling first.

Lime is a soil amendment and is not a fertilizer. We are not applying it to meet the calcium needs of the plants but rather we apply lime when soils become too acid or have a lower pH. When the pH of the topsoil (zero to 6 or zero to 8 inches) is below 6.0 we are applying lime to change the chemistry of the soil to a pH level up to 6.5. We do this because certain nutrients become harder for the plants to take up from soil solution in acid soils.

With soybeans, maintaining soil pH between 5.5 and 7.0 will enhance the availability of nutrients such as nitrogen and phosphorus, as well as microbial breakdown of crop residues. Symbiotic nitrogen fixation in soybean root nodules by rhizobium bacteria is optimal between pH's of 5.5 and 7.0, although the bacteria will function at pH levels as low as 5.0. A lime requirement test (buffer pH) is routinely performed during soil test procedures on soils with a pH of 6.2 or less. The buffer test is a calibration to weigh-in the factor of the soils resistance to change pH. On soybean, lime application is likely to be profitable on soils where the 0- to 8-inch surface pH is 5.8 or less, and where the subsoil pH is 6.0 or less to a depth of two feet or more. Farmers counting their dollars carefully will use Ag lime, which are the fines from road rock or cement manufacturing material operations. Liquid lime materials and finely processed lime materials work great, but triple the cost of the lime. Once the quality of lime is known and soil test for the field from single or soil samples is evaluated, then typically 1 to 3 tons per acre of Ag lime is applied.

Lime can be incorporated which will react to change the pH in 2-3 years or be left on the surface in no-till fields which will increase the reaction time to 3-4 years. As part of the soybean profitability project years ago in Eastern Nebraska, one field was limed in test strips and yields taken on the corn and soybeans for 7 years. The cost of the lime was \$44 per acre in this sample field. The pH in the field was 5.5.



The pH level in the limed area was changed to 6.3, pretty close to the target of 6.5, within 3 years. Yield increases which can be attributed to the lime applications produced \$60 worth of returns in the seven years. Almost all the yield improvements came from the soybean crop. Corn yield was significantly higher in two out of four years and soybeans in three out of three years. This is a pretty normal yield response. In ten years lime will generally pay out two or 2.5 times the initial cost.

Just remember, liming is a soil amendment not a fertilizer. It is a long-term investment not a short-term payback. Alfalfa and soybeans are the highest response crops and the grass crops are less responsive. There are ways to lower risk to a tenant on a cash rent farm with a separate side agreement with the owner, if the owner is not willing to pay for the lime. Let me know if you need help with this.

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