Issue 867

K-STATE Research and Extension

Extension Agronomy

eUpdate

08/05/2021

These e-Updates are a regular weekly item from K-State Extension Agronomy and Kathy Gehl, Agronomy eUpdate Editor. All of the Research and Extension faculty in Agronomy will be involved as sources from time to time. If you have any questions or suggestions for topics you'd like to have us address in this weekly update, contact Kathy Gehl, 785-532-3354 kgehl@ksu.edu, or Dalas Peterson, Extension Agronomy State Leader and Weed Management Specialist 785-532-0405 dpeterso@ksu.edu.

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1. Liming prior to fall seeding of alfalfa

Correcting acidic soil conditions through the application of lime can have a significant impact on crop yields, especially for alfalfa. Since seeding alfalfa is expensive and a stand is expected to last for several years, getting lime applied and acidity corrected before seeding is critical. Liming is one of the most essential, but often overlooked, management decisions a producer can make for alfalfa production. Acidic soils can significantly reduce nodule establishment and activity in alfalfa, affecting nitrogen status and overall nutrient and water uptake (Figure 1).

Unfortunately, lime is not always available close to where it may be needed. In many cases, trucking and spreading costs may be more than the cost of the lime itself. Lime quality can also vary widely and no one wants to apply more than is necessary. So to make the best decisions on how much and what kind of lime to apply, it is useful to know how lime recommendations are made.

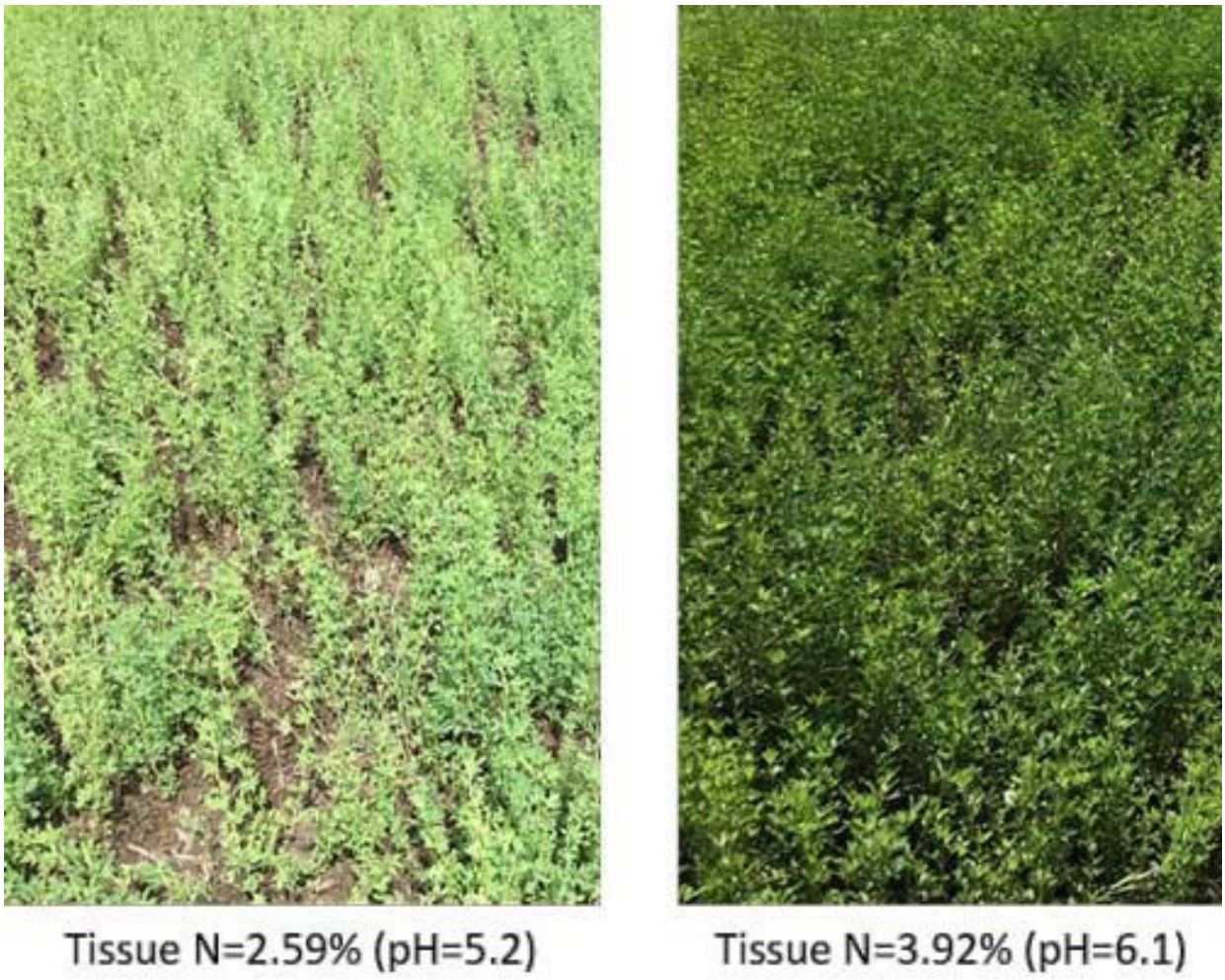

Figure 1. Soil pH affects nodule formation and activity for N fixation in alfalfa, in addition to nutrient availability and uptake. Photo by Dorivar Ruiz Diaz, K-State Research and Extension.

How lime recommendations are made by K-State

A routine soil test will reveal the pH level of the soil, and this will determine whether lime is needed on the field. Generally, east of the Flint Hills, lime is recommended for alfalfa if the pH drops below 6.4, with a target pH for liming of 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 a target pH of 6.0. Target pH is simply the pH goal once the lime reacts with the soil.

Why is the target pH different for the two areas of Kansas?

They differ because of the pH of the subsoil. East of the Flint Hills, especially 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, and provide sufficient amounts of calcium and magnesium. From the Flint Hills west, most soils have high-pH, basic subsoils that can provide additional calcium and magnesium to meet crop needs.

Determining the soil pH is the first step in determining if lime is needed. However, it does not tell you the amount of lime you need to apply. Soils with more clay and organic matter will have more acidity at a given pH, and will require more lime/ECC (effective calcium carbonate) to reach a target soil pH, than will a sandy soil. This is why two soils may have the same soil pH but have quite different buffer pHs, and different lime requirements.

To make that rate determination quickly in the lab, we use a buffer solution and measure the soil's buffer pH. A buffer is simply a strong salt solution designed to resist change in pH. The buffer is added at a high pH, 7.5, and calibrated so that when it reacts with an acid soil, the pH drops. The lower the buffer pH goes; the more lime will be needed to bring the pH up to the required target pH.

Calculating lime rates

Lime rates are given in pounds of effective calcium carbonate, ECC, per acre. How does that relate to agricultural lime and how much lime to apply? Lime materials can vary widely in their neutralizing power. All lime materials sold in Kansas must guarantee their ECC content and dealers are subject to inspection by the Kansas Department of Agriculture.

The two factors that influence the neutralizing value of aglime are the chemical neutralizing value of the lime material relative to pure calcium carbonate, and the fineness of crushing, or particle size, of the product. The finer the lime is ground, the greater the surface area of the product, the faster it will react, and the faster the neutralizing of the acidity will occur. These two factors are used in the determination of ECC. Expressing recommendations as pounds of ECC allows fine-tuning of rates for variation in lime sources, and avoids under- or over-applying lime products.

Lime sources

Research has clearly shown that a pound of ECC from agricultural lime, pelletized lime, water treatment plant sludge, fluid lime, or other sources is equal in neutralizing soil acidity. Therefore, under most circumstances, the cost per pound of ECC applied to your field should be a primary factor in source selection. Other factors such as rate of reaction (fineness), uniformity of spreading, and availability should be considered, but the final pH change, and subsequent alfalfa growth, will depend on the amount of ECC applied.

Application methods

All lime sources have a very limited solubility. When planting alfalfa, the best performance occurs when lime is incorporated and given time to react with and neutralize the acidity in the soil. When surface-applied and not incorporated, as in no-till systems, the reaction of lime is generally limited to only neutralizing the acidity and raising the pH in the top 2 to 3 inches of soil. Surface applications are adequate in slightly acidic soils, but may not provide as good a soil environment for nodulation and nitrogen fixation in the extremely acid soils.

In no-till or limited-till systems, where no incorporation of lime is planned, lower rates of lime application are normally recommended to avoid over-liming and raising the pH higher than needed in the surface 2-3 inches of soil. Over-liming can also reduce the availability of micronutrients such as zinc, iron, and manganese, and trigger deficiencies in some soils. Current K-State lime recommendations suggest that "traditional" rates designed for incorporation and mixing with the top 6 inches of soil should be reduced by 50 percent when surface-applied in no-till systems, or when applied to existing grass or alfalfa stands.

What about the calcium and magnesium contents?

Most agricultural limes found in Kansas contain both calcium and magnesium, with calcium exceeding magnesium. The exact ratio of these two essential plant nutrients will vary widely. Dolomitic lime (magnesium-containing) and calcitic lime (low-magnesium, high-calcium) provide similar benefits for most Kansas soils.

For more information, see K-State publication *Soil Test Interpretations and Fertilizer Recommendations*, MF-2586: http://www.bookstore.ksre.ksu.edu/pubs/MF2586.pdf

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2. Sorghum midge activity in the Southwest

Grain sorghum is in various stages of flowering in the southwest right now. Once flowering begins, growers might want to keep an eye out for sorghum midge. Historically, sorghum midge has not been a significant pest in Kansas and has been primarily observed in the southeast portion of the state. However, in the last several years, there have been localized outbreaks in the south central and southwestern portions of the state. Growers that had issues in previous seasons should pay close attention to their fields as it is unclear if this pest is going to start playing a bigger role in our annual sorghum pest line up. Sorghum growers in these regions are encouraged to scout for sorghum midge this year. If midges are observed, sharing that information with your local extension specialists would provide useful information as to the distribution of the midge during the 2021 growing season.

To scout for sorghum midge, carefully observe a flowering head while the anthers are still bright yellow and look for tiny red flies on and around the flowers (Figure 1). The best time of day to do this is in the morning before the afternoon sun and wind pick up. Midges are delicate fliers and do not live more than 48 hours. Alternatively, you can use a clear plastic bag to scout. To use the bag, place it over the flowering head and shake the bag. Keeping the bag on the flowering head, look to see if any midges fly up and collect inside at the top of the bag. Later in the season as heads mature, growers can scout for evidence of midge damage as well. The damage will appear as blank zones on the flowering heads (Figure 2). In these blank zones, the grains never formed because the midge larvae consumed the seeds while they were developing; the area where a mature seed should be will be relatively flattened. Be careful not to mistake bird damage for midge damage. Bird damage will have more of a “blasted” look (Figure 3).

Figure 1. Close-up of a sorghum midge on a flowering sorghum head. Photo by K-State Extension Entomology.

Figure 2. Sorghum midge damage. The damage appears as blank zones on the flowering heads. Photo by Anthony Zukoff, K-State Research and Extension.

Figure 3. Bird damage on a sorghum head. This damage can be mistaken for midge damage. Bird damage will give the sorghum head a "blasted" appearance. Photo by Anthony Zukoff, K-State Research and Extension.

Sharing reports of damage would be useful while we track this pest. At the time of this writing, midge has not been observed on any sorghum flowers so far in the Garden City area. However, sorghum midges were collected in the area from flowering Johnsongrass (another host) on July 1.

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3. Don't miss out on entering the 2021 Kansas Corn Yield Contest

Corn harvest in Kansas is just around the corner! Corn producers in the state are encouraged to keep in mind the Kansas Corn Yield Contest before they fire up the combines this year.

Kansas Corn, in conjunction with K-State Research and Extension, are conducting the 2021 Kansas Corn Yield Contest. New this year, the Kansas Corn Yield Contest has joined the National Corn Yield Contest (NCYC). To participate in the Kansas Contest, growers must enter the NCYC. This will the simplify entry process while building Kansas participation in both contests.

All corn producers are eligible to enter the contest, but must be members of the Kansas Corn Growers Association (KCGA). A KCGA membership includes one to the NCGA.

Entry deadlines

- **Final entry**: **July 1 – August 18, 2021**. $110 per online entry plus one-time affiliated State/NCGA membership fee (if applicable)
- **Harvest entry**: **August 19 – November 30, 2021**

Many seed companies will cover the cost of entry. For more details in this voucher program, go to https://www.ncga.com/get-involved/national-corn-yield-contest/profile/voucher-program.

Benefits of contest participation

The contest is a fun way for producers to showcase and compare their high yielding and high quality corn with other growers in their districts and state, and provide motivation to producers to improve productivity. The contest also serves as a vehicle to improve farming practices and increase awareness of best management practices (BMPs) to improve and sustain corn yields.

In addition to grower recognition, cash awards will be awarded at the district and state levels. The districts align with crop reporting districts, plus a NNE district which includes Doniphan and parts of

Brown and Atchison counties (Figure 1). In addition, one statewide dryland winner and one statewide irrigated winner will be announced. District winners will receive $300 and a plaque. Second place entries will receive a $200 prize and third place will receive a $100 prize. The highest yielding dryland and irrigated entries statewide will receive an additional $500 prize. National Corn Yield Contest winners will be announced December 15, 2021. Kansas Corn Yield winners will be recognized at the Kansas Corn Symposium in January 2022.

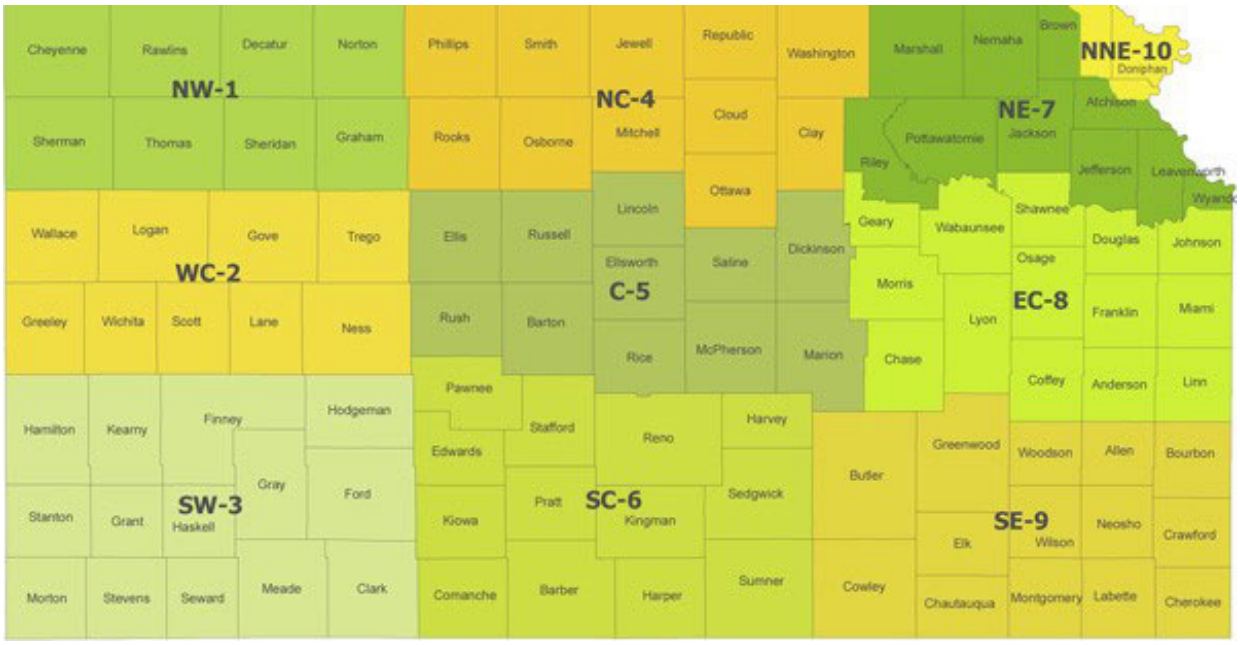

Figure 1. Dryland and irrigated contest districts. Note: NNE includes only those fields north and/or east of KS Hwy 73 in Brown, Doniphan, and Atchison counties.

A publication summarizing the results from the 2019 Kansas Corn Yield Contest can be viewed at:

https://bookstore.ksre.ksu.edu/pubs/MF3463.pdf. The 2020 contest results will be summarized in a similar publication that will be soon be available to view online. A list of the 2020 Kansas Corn Yield Contest winners is available at: https://kscorn.com/yieldcontest/#2020Winners.

For complete contest information, visit https://kscorn.com/yieldcontest/.

For questions, call Kansas Corn at 785-410-5009 or email dohlde@ksgrains.com

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4. Kansas Ag-Climate Update for July 2021

The Kansas Ag-Climate Update is a joint effort between our climate and extension specialists. Every month the update includes a brief summary of that month, agronomic impacts, relevant maps and graphs, 1-month temperature and precipitation outlooks, monthly extremes, and notable highlights.

July 2021: Statewide cool but unevenly dry

July was drier than normal. It ranked as the 54th driest July since 1895. As a percent of normal, the Northwest Division was the driest with 1.50 inches, 43 percent of normal. The Southeast was the wettest at 5.42 inches, 133 percent of normal. Unfortunately, uneven distribution was a problem, particularly in the southeast with heavy precipitation causing floods and followed by rapid drying (Figure 1).

Cooler-than-average temperatures slowed changes to the US Drought monitor. The statewide average for July was 1.4 degrees cooler than normal, ranking it as the 35th coolest July of record. There was one new daily record high maximum temperature and four record warm minimum temperatures. There were also 9 new record low maximums and 11 record low minimums. Despite the overall dryness, there were 65 new daily precipitation records, three of which were new daily records for July. Severe weather was limited in July with the report 0 tornadoes, 11 hail events, and 51 damaging wind events.

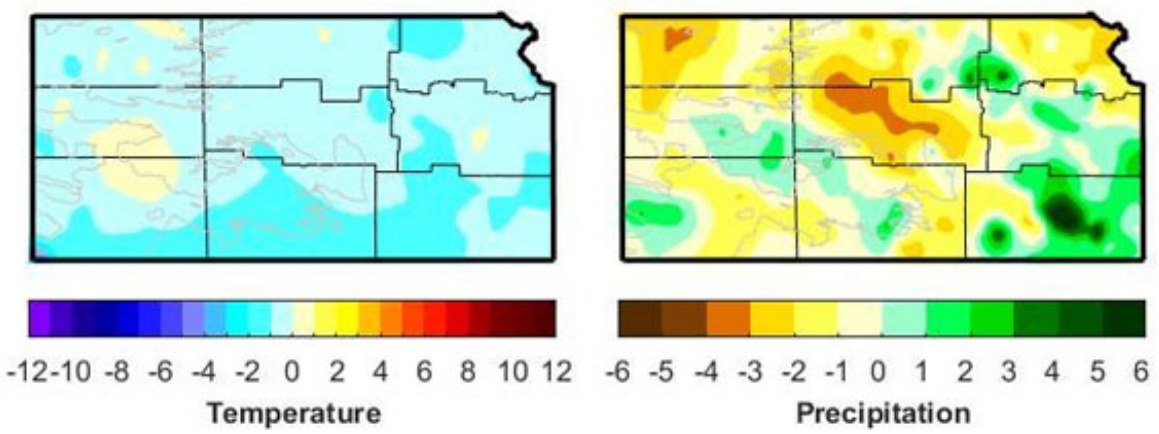

Figure 1. Departures from normal temperature (°F) and precipitation (inches) for July 2021 in Kansas. Maps by the Kansas Weather Data Library.

View the entire July Ag-Climate Update, including the accompanying maps and graphics (not shown in this short article), at http://climate.k-state.edu/ag/updates/.