These e-Updates are a regular weekly item from K-State Extension Agronomy and Kathy Gehl, Agronomy e-Update 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 Curtis Thompson, Extension Agronomy State Leader and Weed Management Specialist 785-532-3444 cthompso@ksu.edu.

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1. Excessive rainfall delays wheat sowing progress in Kansas

Precipitation in the Kansas wheat growing region during the period of October 2 – 8 brought anywhere from <0.6 of an inch in the far western tier of counties to as much as 6.8 inches in portions of northwest, central, and north-central Kansas (Figure 1). This early-October precipitation occurred after above-normal precipitation in late-September, resulting in fields with a full soil moisture profile for most of the state (Figure 2), but also in water-logged soils which are delaying field work (Figure 3).

Figure 1. Cumulative precipitation during October 2 – 8, 2017. Map by K-State Weather Data Library.
Figure 2. Calculated soil moisture anomaly across the United States as of October 8, 2017. Central and western Kansas shows anywhere from 1.6 to 3.2 inches of positive anomaly. Map by Climate Prediction Center (http://www.cpc.ncep.noaa.gov/products/Soilmst_Monitoring/US/Soilmst/Soilmst.shtml#)
These suboptimal conditions for field work caused by the excessive rains resulted in a delay in sowing progress in Kansas. Historically, according to crop reports by the USDA-NASS, 35% of Kansas wheat is usually sown by October 5, and 41% by October 11. This year, the crop stands at only 14% sown (Figure 4).
In addition to already delayed sowing, most of Kansas fields are too wet to allow for any field work, which will likely cause a further delay in sowing progress and could cause some fields to be planted after the optimum sowing window for the region. If producers are forced to delay sowing past their optimal window, fall growing dynamics will change with less time to tiller. This sowing delay might require some management adjustments to maximize crop productivity.

Management adjustments to consider as sowing is delayed past the optimum sowing window include:

- Increase seeding rate: Planting late will decrease the crop’s fall tillering potential. Tillering is related to temperature and moisture availability, with higher temperatures resulting in more tillers. As planting is delayed, the crop will have less time to tiller in the fall, thus relying more on the primary tillers. As a consequence, we recommend increasing plant population if sowing is delayed past the optimum window. Every week planting is delayed past the end of
the optimal planting date range should be compensated by increasing seeding rates by about 150,000 – 225,000 seeds per acre (or 10 to 15 lbs per acre) in western Kansas, or 225,000 – 300,000 seeds per acre (15 – 20 lbs per acre) in eastern Kansas. Final seeding rate should not be above 90 pounds per acre in western Kansas and 120 pounds in eastern and central Kansas for grain-only wheat production.

- Place starter phosphorus (P) fertilizer with the seed: Phosphate-based starter fertilizer promotes early-season wheat growth and tillering, which can help compensate for the delayed sowing date. Additionally, P is less available at colder soil temperatures, which can result in P deficiency under cold weather conditions. When planting late, producers should strongly consider using about 20-30 lbs per acre of P fertilizer directly with the seed, regardless of soil P levels. This placement method is more effective at that time of year than other application methods. The later the planting date, the more fall root development is slowed. The closer the fertilizer is to the seed, the sooner the plant roots can get to it.

- Use fungicide seed treatment or plant certified seed: Late-planted wheat is sown into colder soils, which generally increases the time needed for germination and emergence. As a consequence, there is increased potential for seed and soil-borne diseases that affect seedlings and early-season wheat development. Fungicide seed treatments can protect the seed and seedling during the extended time it is subjected to potential seedling diseases, improving stand establishment under poor growing conditions. It is important that the seed treatment thoroughly coat the seeds to ensure good protection. For fungicide seed treatment options, please refer to the most current version of K-State fungicide seed treatment chart available at: https://www.bookstore.ksre.ksu.edu/pubs/MF2955.pdf

- Variety selection: It is probably too late to make any changes in which wheat variety to plant this fall. However, a few points to consider when it is known that wheat will be planted late (e.g. when planning to sow wheat following soybeans) are tillering ability and maturity. A variety that has good tillering ability may offset some of the consequences of late planting as it might still be able to produce one or two tillers during the fall, whereas a low-tiller variety may produce none. Also, late-planted wheat is typically behind in development going into the winter, which might translate into slower development in the spring. This delay can result in plants being exposed to moisture stress and especially heat stress during grain filling, reducing the duration of the grain filling period. Thus, selecting an early-maturity variety with good yield potential may offset some of the consequences of late planting by decreasing the chances of a grain filling period subjected to warmer temperatures.

On a final note, a couple positive points about the sowing progress delay are:

- The majority of the state has good soil profile moisture, which will not only ensure good stand establishment, but also possibly contribute to wheat grain yield.
- Late-planted fields are less likely to be infected with wheat streak mosaic, as the wheat curl mite populations would be more active in warmer temperatures generally observed under early planting. Thus, we are probably decreasing the risk of another wheat streak mosaic outbreak due to the delayed planting.
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2. Mesonet freeze monitor returns: Freeze warnings for portions of western Kansas

The cold is coming. Freeze warnings have been issued for portions of western Kansas for the first time this fall. The Kansas Mesonet’s Freeze Monitor (mesonet.ksu.edu/freeze) will be available again for the 2017 fall frost/freeze season. This tool focuses on displaying the coldest temperatures observed across Kansas during the previous 24 hours. It answers the frequent question: How cold did it get last night? It also tracks the first fall freeze date for each station for comparison to local climatology. Data will update every five minutes on both the map (Figure 1) and table (Figure 2).

Important for producers and gardeners, the lowest temperatures below freezing are also addressed, as some crops and commodities have lower thresholds for damage. This feature allows users to select options to view maps/data of the duration below freezing (32 degrees F) and also the number of hours below 24 degrees F. While both are of interest, the lower threshold is of great importance to wheat growers later into the fall season.

Figure 1: View of the Freeze Monitor webpage: mesonet.ksu.edu/freeze
The data displayed in the tables below the maps can be sorted. By clicking on the header of a particular column, it will sort the table by that column. This makes it much easier to see what area was the coldest in the state, as well as earliest freeze and earliest climatological freeze data. This table can also be copied from the browser and pasted into a spreadsheet for further analysis.

![Image of table]

**Figure 2: Select headers (highlighted) to sort the table data from lowest to highest.**

For cold temperatures occurring further into winter, the Freeze Monitor will still be active but the maximum and minimum temperatures can also be viewed on their particular pages along with the maximum wind gusts: [http://mesonet.k-state.edu/weather/maxmin/](http://mesonet.k-state.edu/weather/maxmin/).

The Freeze Monitor is updated in the spring, as a new growing season arrives, to show the spring freeze climatology.
The Freeze Monitor is available at: http://mesonet.k-state.edu/freeze/

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