Issue 767

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Extension Agronomy

eUpdate

09/27/2019

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. Wheat planting conditions: Late-September 2019

A drier pattern has dominated September in the western parts of Kansas (Figure 1). In the majority of the wheat growing regions, namely central and western Kansas, this was accompanied by warmer-than-normal temperatures and windy conditions. Therefore, estimated root-zone soil moisture is relatively low in the west as compared to eastern Kansas (Figure 2).

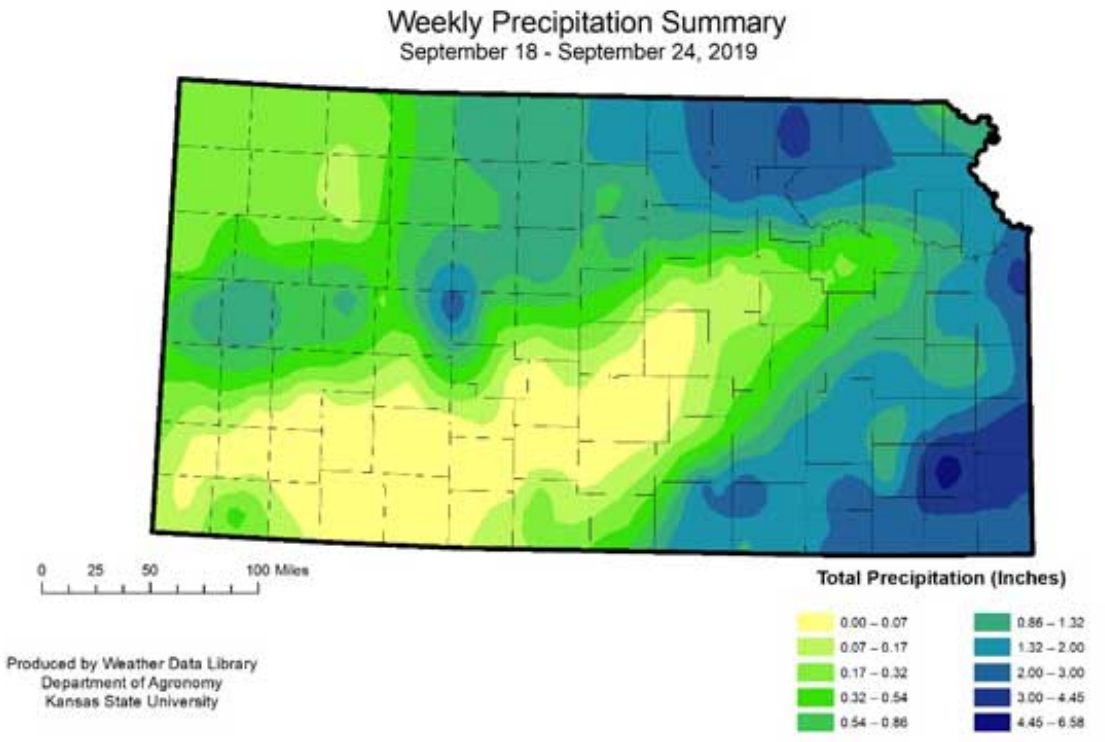

Figure 1. Total cumulative precipitation for the period between September 18 and 24, 2019. Map by K-State Weather Data Library.

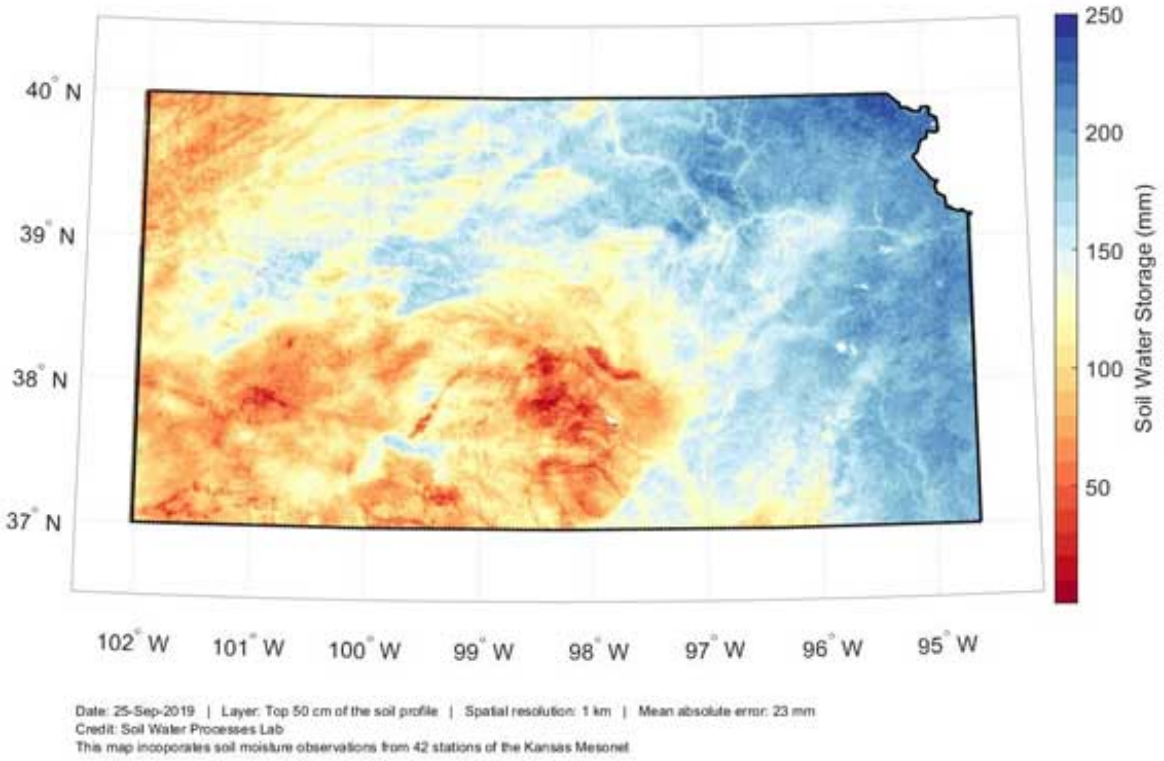

Figure 2. Total soil water storage in the root-zone (top 20 inches (50 cm) of the soil profile) as of September 25, 2019. Map by Soil Water Process Lab using data from the Kansas Mesonet.

Weather Forecast

The weekly quantitative precipitation forecast for Kansas indicates that the probability of precipitation for the next seven days exists for totals ranging from 0.1 inches in southwestern Kansas to as much as 7.00 inches in the eastern portion of the state (Figure 3). Northwest Kansas might miss out entirely on precipitation. Despite the drier profile in western Kansas, the 8- to 14-day forecast (Figure 4) is favorable and might bring much needed moisture for a good start to the wheat-growing season, although the eastern third of the state is likely to face excessive moisture issues.

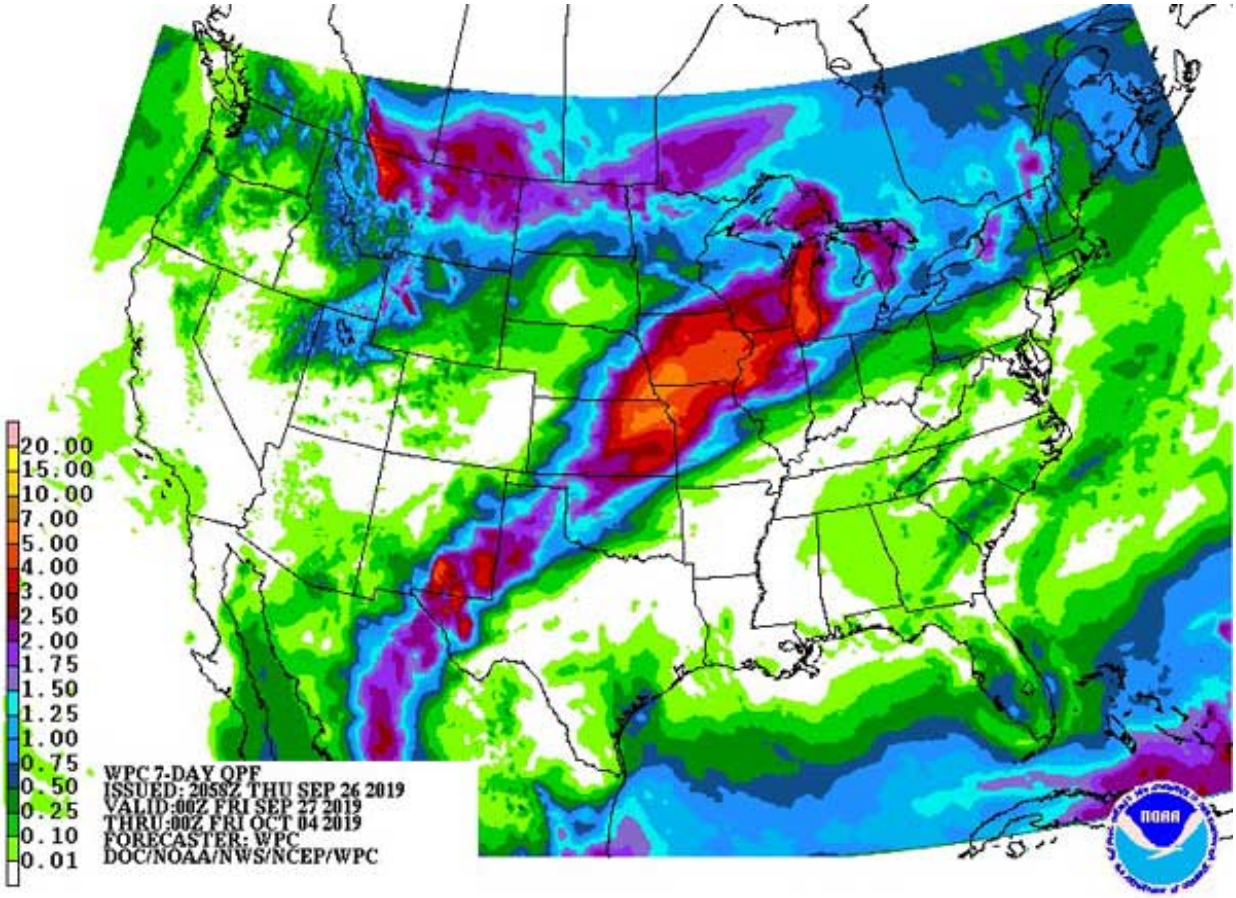

Figure 3. Weekly precipitation forecast as of September 26, 2019 by the National Weather Service Weather Prediction Center (NOAA). Precipitation probabilities in Kansas for the next 7 days range from 0.10 to 7.00 inches.

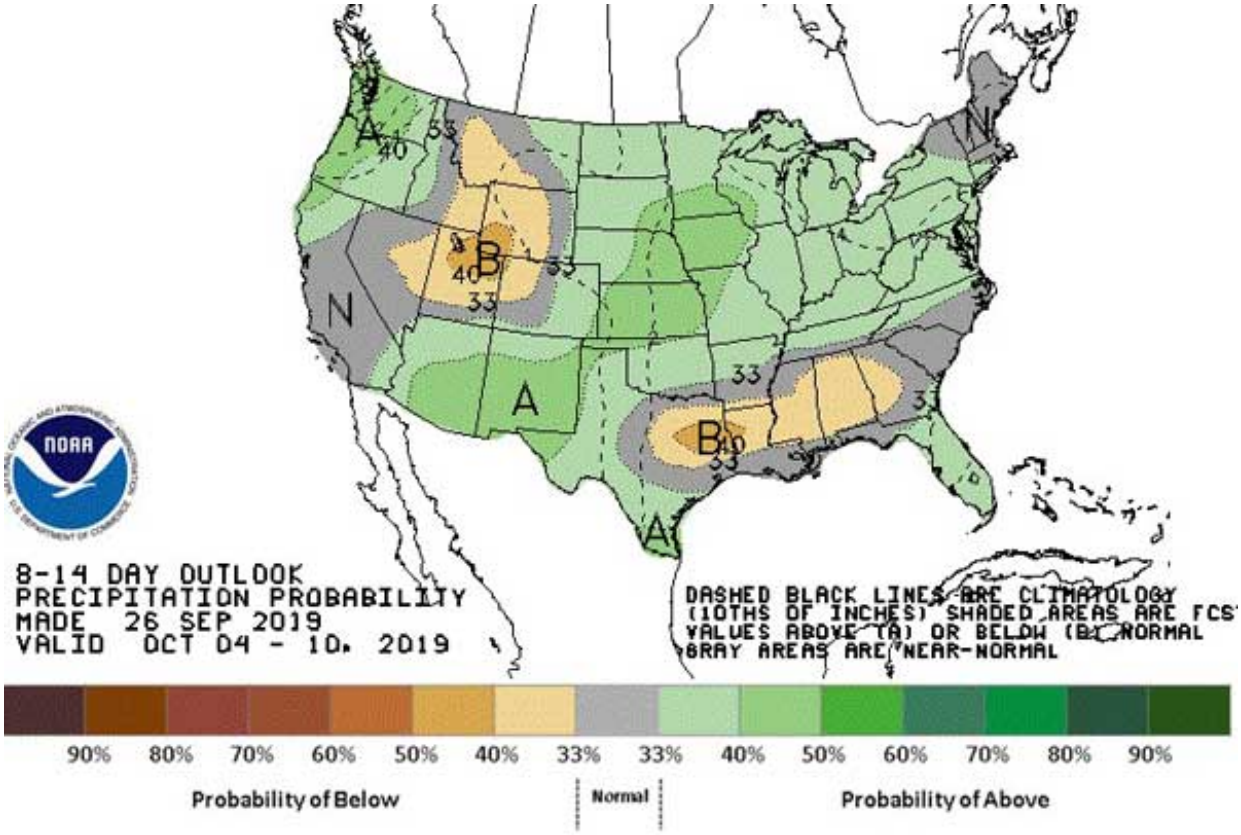

Figure 4. The 8- to 14-day precipitation forecast as of September 26, 2019 by the National Weather Service Weather Prediction Center (NOAA). Precipitation probabilities in Kansas for the next 7 days range from 0.10 to 7.00 inches.

Possible challenges for wheat planting and crop establishment

The current wheat-planted acreage in Kansas, according to the USDA-NASS crop progress report, was 15% as of September 22. This is very close to the 5-year average of 16%, and the crop might be favored by the forecast rain.

One challenge that early-planted fields often face is high soil temperature stress, which can lead to germination problems, especially in wheat varieties with high-temperature germination sensitivity (varieties that will not germinate when soil temperatures are greater than 85 degrees F). However, average weekly 2-inch soil temperature during September 22-28 ranged from 64 to 72 degrees F (Figure 5); thus, high temperature germination issues should not have been a problem unless earlier planted fields encountered soil temperatures above 85 degrees F. Sufficient rainfall events will continue to decrease soil temperatures and germination should occur.

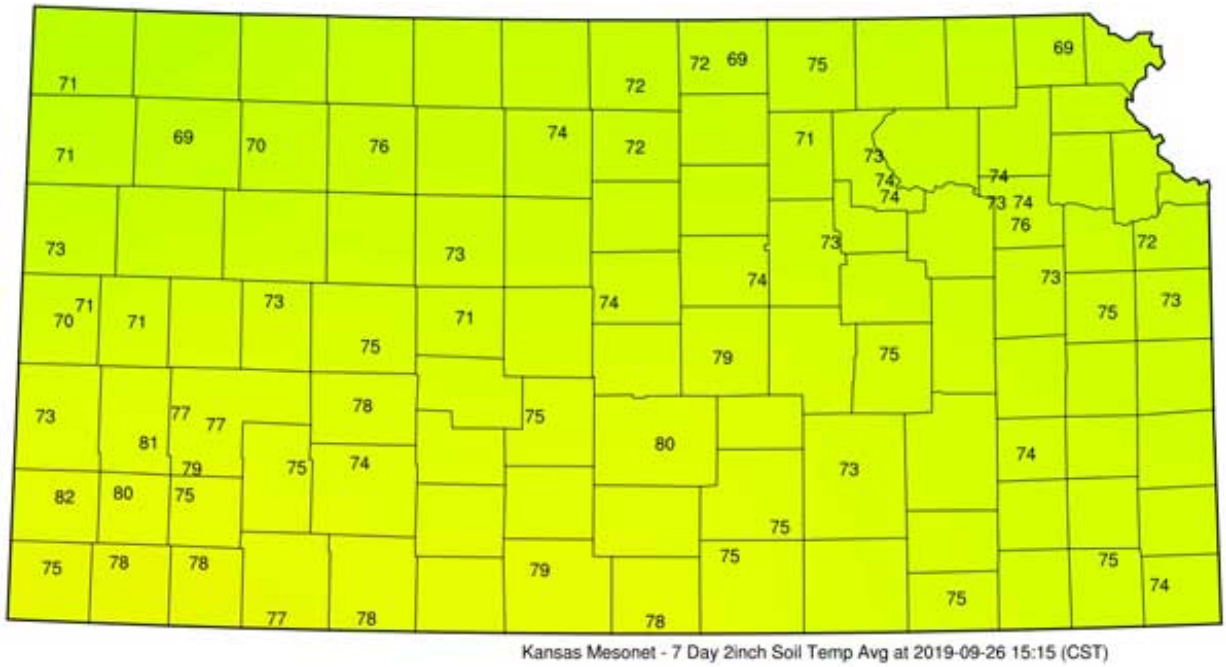

Figure 5. Weekly average 2-inch soil temperature during the September 20 – 26 period. Map by Kansas Mesonet.

With about 80% of the winter wheat area still to be planted, the crop sowing progress in the following days will depend on weather conditions. While many producers might try to plant some acres before the forecast rain, a delay in planting progress can be expected after the rains, especially in central and eastern Kansas, depending on total precipitation and soil moisture conditions.

Soil conditions

If precipitation is excessive, waterlogging might occur in fields that were already planted and final stand decreased. In fields yet to be planted, producers should not hurry and sow wheat into extremely moist soils. Planting wheat under wet conditions can present either mechanical or biological challenges.

Mechanical challenges include:

- Inability to get the equipment in the field to perform plowing or sowing operations.
- Mudding up the equipment after field operations are started.
- Increased soil compaction due to machinery traffic in moist soils. Soil compaction can restrict adequate root growth, affecting plant anchorage and decreasing its ability to uptake water and nutrients.

Biological challenges include:

- Delayed crop emergence due to wet and cold soils.
- Possibly increasing early-season disease and insect problems.

Planting wheat into a dry topsoil can also be challenging. While a good seed distribution is generally achieved when sowing wheat into dry soils, if the forecast rain does not materialize, the lack of

moisture for germination can result in uneven stands and high within-field stand variability (Figure 6), which can ultimately impact grain yield. Otherwise, the forecast rain will help ensure a good stand establishment.

Figure 6. Uneven wheat stands resultant from sowing into dry soils. Photo by Romulo Lollato, K-State Research and Extension.

Even in late September, we are still in the optimum wheat planting date range for most of Kansas, so producers should not hurry and sow wheat into extremely moist soils. Waiting for the water to drain and/or evaporate so the soil dries adequately before performing the sowing operation would be the best option.

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2. Soybean dry down rate before harvest

The latest USDA-National Agricultural Statistics Service crop progress and condition report classified 56% of the soybean crop to be in good or excellent condition. Overall, 27% of all soybeans in Kansas are dropping leaves.

Weather outlook

The weather conditions expected for October will be critical for soybeans as related to seed filling and determining final seed weight.

While current conditions have been warmer-than-average, temperatures are expected to trend towards cooler than normal during the next 8- to 14-day period. The current October outlook does suggest an increased chance for warmer-than-normal conditions to return for October. Drying may still take a significant amount of time, as typical October temperatures are much cooler than September. There is a slight chance for wetter-than-normal conditions in the short term (6-10 days), but the outlook for October favors drier-than-normal conditions in the southeastern corner of Kansas, and equal chances for the rest of the state. Keep in mind that there is a significant drop in normal rainfall amounts from September to October as we move into a typically drier part of the year.

Soybean dry down

Soybeans will reach final maturity with high seed water content, moving from 90% to around 60% from beginning of seed filling until final maturity. Final maturity is defined as the formation of the black layer in the seeds. The dry down rate will depend on the maturity group (affecting the length of the season), planting date, and weather conditions experienced during the latter part of the reproductive phase.

Changes in the water content during the seed-filling process (Figure 1) were previously described in our "Soybean Growth and Development" poster. As described for corn, seed water loss for soybeans can also divided in two phases: 1) before "black layer" or maturity, and 2) after black layer.

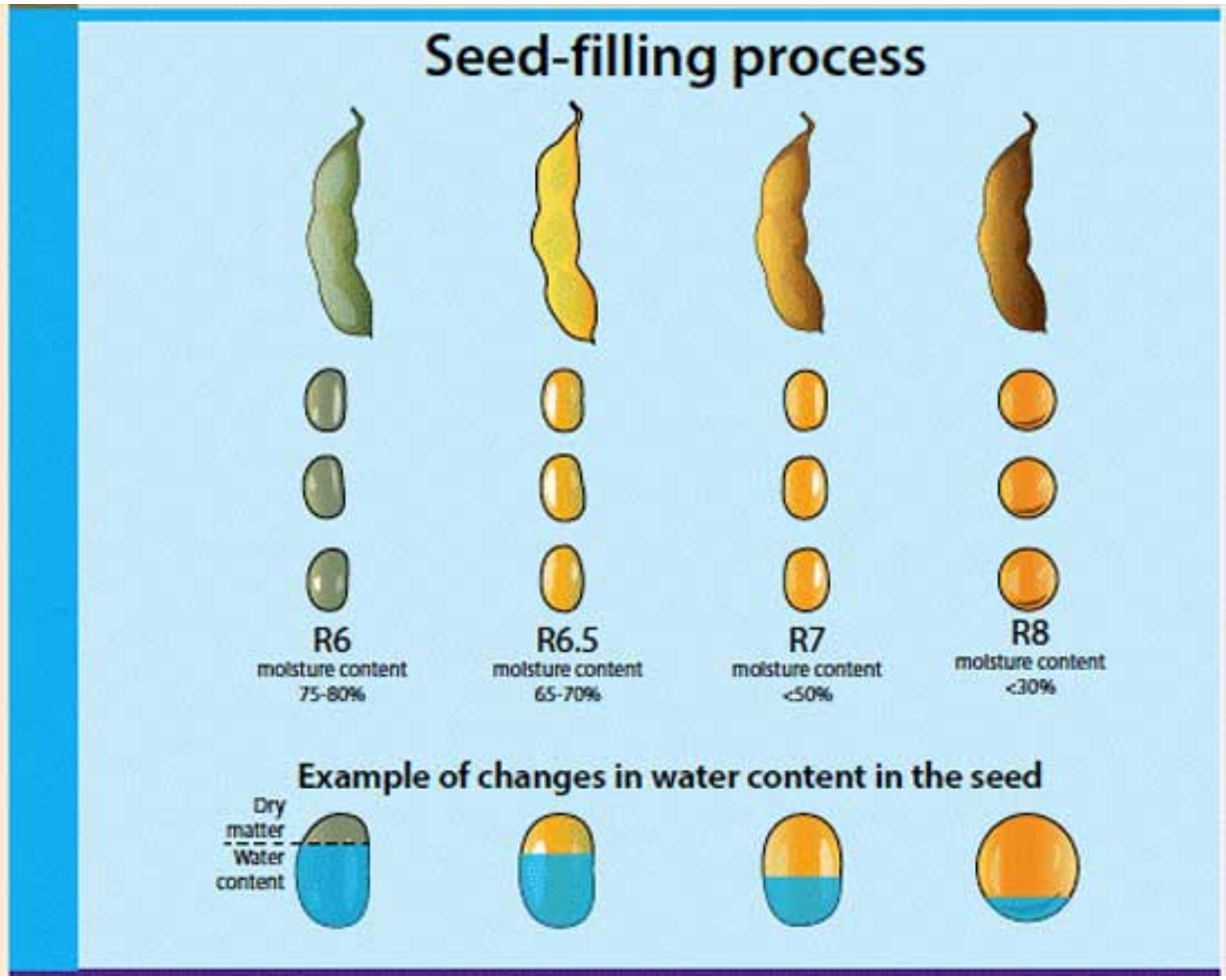

Figure 1. Soybean seed filling process from full seed to full maturity. Photo and infographic prepared by Ignacio Ciampitti, K-State Research and Extension. Taken from Soybean Growth and Development.

To address the question related to the dry down rate for soybeans, a study was conducted to investigate the changes in water content from black layer formation (maturity) until harvest time (Figure 2). During the last days of September and mid-October 2016, the overall dry down rate was around 3% per day (from 58% to 12% seed moisture) – taking an overall period of 15 days.

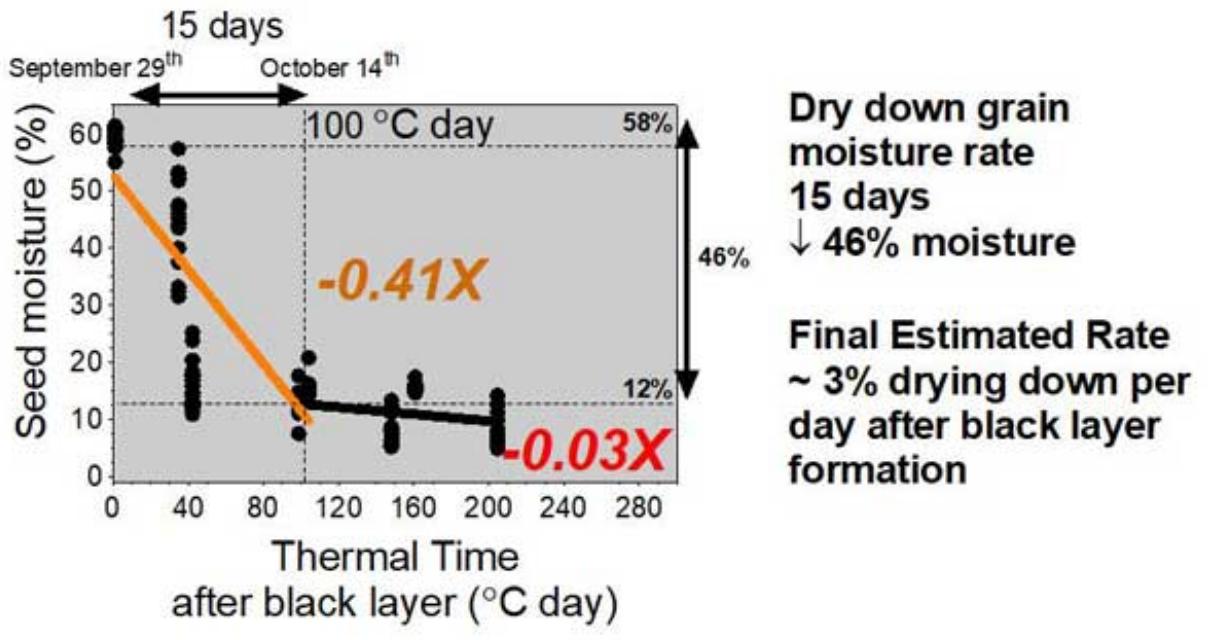

Figure 2. Grain moisture dry down (orange line) across three hybrids and different N rates near Manhattan, KS. Horizontal dashed lines marked the 58% seed moisture at black layer formation. * Graph prepared by Ignacio Ciampitti, K-State Research and Extension.

**Note: It is desired to reach harvest with 13% seed moisture to maximize the final seed volume to be sold, thus the importance of timing harvest with the right seed moisture content.*

Soybean dry down rate was three-time faster, 3% per day, relative to corn at 1% per day. These dry down rates for corn and soybeans are primarily affected by temperature, humidity, and overall water content at the point of black layer formation (maturity). These main factors should be considered when the time comes to schedule soybean harvest.

For more information on dry down rates for corn, see the eUpdate article, "Rate of dry down in corn before harvest", in the September 13, 2019 issue.

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3. The challenge of collecting a representative soil sample

At first glance, soil sampling would seem to be a relatively easy task. However, when you consider the variability that likely exists within a field because of inherent soil formation factors and past production practices, the collection of a representative soil sample becomes more of a challenge.

Before heading to the field to take the sample, be sure to have your objective clearly in mind. For instance, if all you want to learn is the average fertility level of a field to make a uniform maintenance application of phosphorus (P) or potassium (K), then the sampling approach would be different than sampling for pH when establishing a new alfalfa seeding or sampling to develop a variable rate P application map.

In some cases, sampling procedures are predetermined and simply must be followed. For example, soil tests may be required for compliance with a nutrient management plan or environmental regulations associated with confined animal feeding operations. Sampling procedures for regulatory compliance are set by the regulatory agency and their sampling instructions must be followed exactly. Likewise, when collecting grid samples to use with a spatial statistics package for drawing nutrient maps, sampling procedures specific to that program should be followed.

Regardless of the sampling objectives or requirements, some sampling practices should be followed:

- A soil sample should be a composite of many cores to minimize the effects of soil variability. Take a minimum of 12 to 15 cores from a relatively small area (two to four acres). Taking 20-30 cores will provide results that are more accurate. Take a greater number of cores on larger fields than smaller fields, but not necessarily in direct proportion to the greater acreage. A single core is not an acceptable sample.

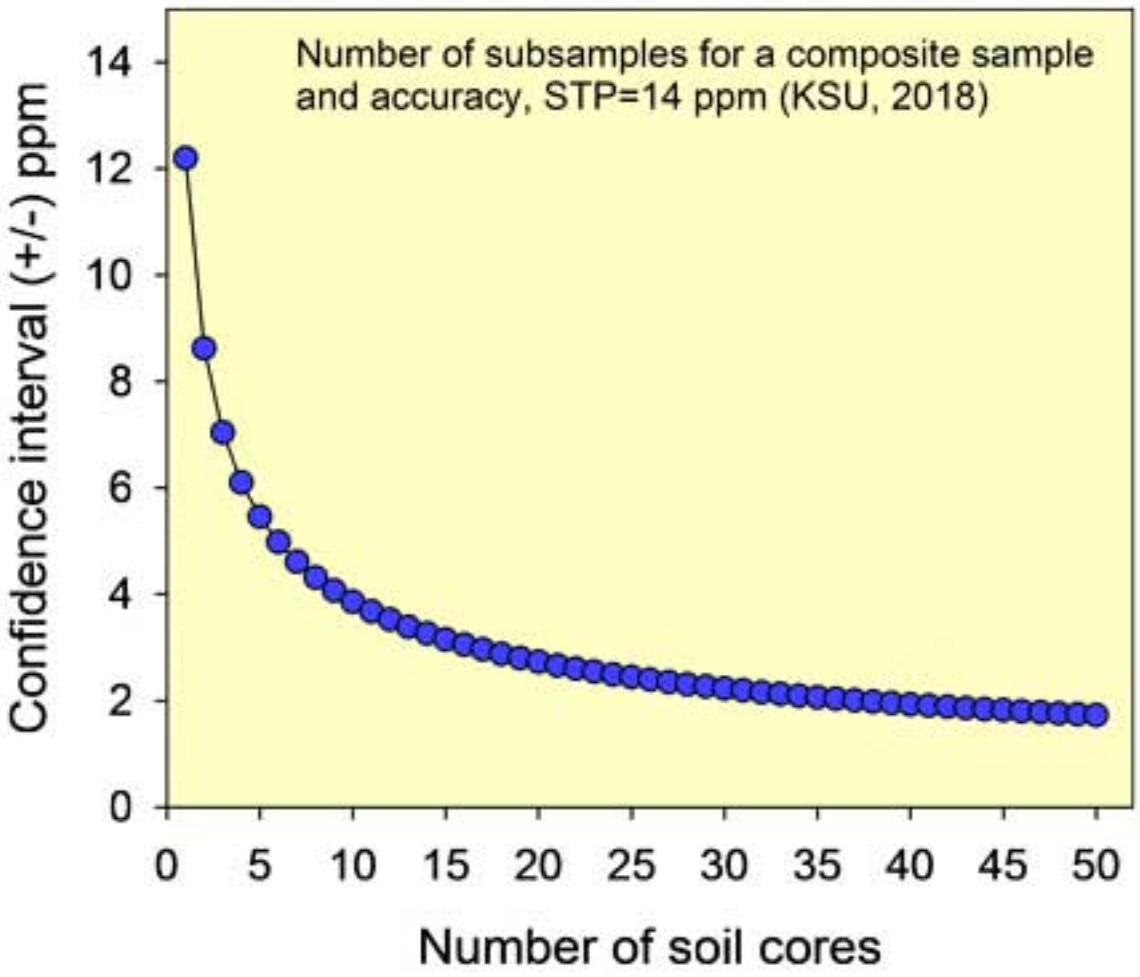

Figure 1. The level of accuracy of the results of a soil test will depend, in part, on how many subsamples were taken to create the composite sample. In general, a composite sample should consist of 15 or more subsamples. For better accuracy, 20-30 cores, or subsamples, should be taken and combined into a representative sample. Graph by Dorivar Ruiz Diaz, K-State Research and Extension.

- Use a consistent sampling depth for all cores because pH, organic matter, and nutrient levels often change with depth. Match sampling depth to sampling objectives. K-State recommendations call for a sampling depth of two feet for the mobile nutrients – nitrogen, sulfur, and chloride. A six-inch depth is suggested for routine tests of pH, organic matter, phosphorus, potassium, and zinc (Zn) (Figure 2).
- When sampling a specific area, a zigzag pattern across the field is better than following planting/tillage pattern to minimize any past non-uniform fertilizer application/tillage effects. With a GPS system available, recording of core locations is possible. This allows future samples to be taken from the same areas in the field.
- When sampling grid points for making variable rate nutrient application maps, collecting cores in a 5 to 10-foot radius around the center point of the grid is preferred for many spatial statistical software packages.

- Avoid unusual spots obvious by plant growth and/or visual soil color/texture differences. If the information on these unusual areas is desired, collect a separate composite sample from these spots.

- If banded fertilizer has been used on the previous crop (such as strip tillage), then it is suggested that the number of cores taken should be increased to minimize the effect of an individual core on the composite sample results, and to obtain a better estimate of the average fertility for the field.
- For permanent sod or long-term no-till fields where nitrogen fertilizer has been broadcast on the surface, a three- or four-inch sampling depth would be advisable to monitor surface soil pH.

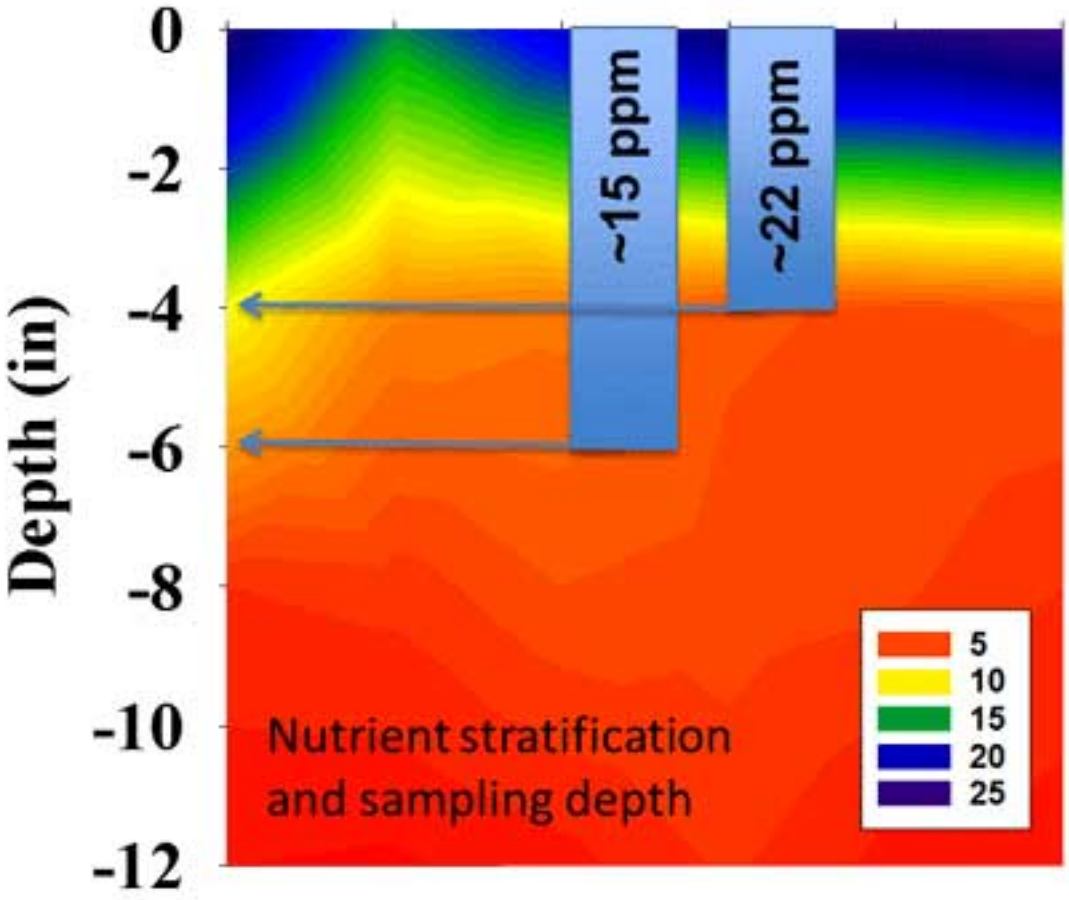

Figure 2. Consistency is sampling depth is particularly important for immobile nutrients like P. Stratification of nutrients and pH can be accentuated under reduced tillage. Image from Dorivar Ruiz Diaz, K-State Research and Extension.

Soil test results for organic matter, pH, and non-mobile nutrients (P, K, and Zn) change relatively

slowly over time, making it possible to monitor changes if soil samples are collected from the same field following the same sampling procedures. However, there can be some seasonal variability and previous crop effects. Therefore, soil samples should be collected at the same time of year and after the same crop.

Soil testing should be the first step for a good nutrient management program, but it all starts with the proper sample collection procedure. After harvest in the fall is good time for soil sampling for most limiting nutrients in Kansas.

For instructions on submitting soil samples to the K-State Soil Testing Lab, please see the accompanying article "**Fall soil sampling: Sample collection and submission to K-State Soil Testing Lab"** found in this eUpdate issue.

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4. Fall soil sampling: Sample collection and submission to K-State Soil Testing Lab

Soil testing provides producers and homeowners important information concerning the fertility status of the soil. This information can help produce better crops and reduce costs by guiding management decisions like the type and amount of fertilizers to apply. If you plan to do your own soil sampling and use the K-State Soil Testing Laboratory, the following outline provides specific information on methods for collecting soil samples and mailing instructions.

- To take a sample, you will need a probe, auger or spade, and a clean pail. (If you're also having the soil analyzed for zinc, be sure to use a plastic container to avoid contamination from galvanized buckets or material made of rubber.) You will also need soil sample containers and a soil information sheet from your local Extension office or fertilizer dealer. You can also order soil sample bags online from K-State Research and Extension by clicking here.

- Draw a map of the sample area on the information sheet and divide your fields into uniform areas. Each area should have the same soil texture, color, slope, and fertilization and cropping history.
- From each area, take a sample of 20-30 cores or slices for best results. At the very minimum, 12-15 cores should be taken per sample. Mix the cores thoroughly in a clean container and fill your soil sample container. For available nitrogen, chloride, or sulfur tests, a subsoil sample to 24 inches is necessary.
- Avoid sampling in old fencerows, dead furrows, low spots, feeding areas, or other areas that might give unusual results. If information is desired on these unusual areas, obtain a separate sample from the area.
- Be sure to label the soil container clearly and record the numbers on the soil container and the information sheet.
- Air-dry the samples as soon as possible for the available nitrogen test. (Air drying before shipment is recommended, but not essential, for all other tests.) Do not use heat for drying.

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- Fill out the information sheet obtained from your Extension office, or download a sheet.
- Take the samples to your local Research and Extension office for shipping. Samples may also be sent directly to the lab by placing them in a shipping container. Information sheets should be included with the package. Shipping labels can be printed from the Soil Testing Lab website listed below. Mail the package to:

Soil Testing Laboratory
2308 Throckmorton PSC
1712 Claflin Road
Manhattan, KS 66506-5503

A listing of the types of soil analysis offered, and the costs is available on the Soil Testing Lab web site, http://www.agronomy.k-state.edu/services/soiltesting . You can also contact the lab by email at soiltesting@ksu.edu and by phone at 785-532-7897.

For more information on the proper procedures for the Soil Testing Laboratory, see K-State publication MF-734 at: https://www.bookstore.ksre.k-state.edu/pubs/MF734.pdf. Detailed information on soil sample collection can be found in the accompanying article "The challenge of collecting a representative soil sample" in this eUpdate issue.

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5. Kansas insect activity update - Soybean, sorghum, and wheat

The following report is taken from the K-State Extension Entomology Newsletter released on September 26, 2019.

Soybeans

Most soybeans in north central Kansas, even double-cropped fields, are getting to the stage where the pods are hardened enough to protect the beans inside (note the pod-feeding scar by bean leaf beetles and an adult bean leaf beetle (Figure 1, left). Woollybear caterpillars (Figure 1, right) are becoming more noticeable. As the soybean leaves start to senesce, the caterpillars are getting larger and thus more visible, and as they move to the ground, looking for overwintering sites.

Figure 1. Bean leaf beetle feeding (left photo) and Woollybear caterpillars (right photo). Photos by K-State Extension Entomology.

Sorghum

Most sorghum throughout north central Kansas is past the soft dough stage, thus not susceptible to "headworms." However, a few late-planted fields, just coming into the "boot" stage, have sporadic small colonies of sugarcane aphids (Figure 2). However, there seems to be significant numbers of beneficials, but these late-developing fields should still be monitored as these populations can "explode" quite quickly.

Figure 2. Sugarcane aphid colony. Photo by K-State Extension Entomology.

Wheat

Some reports have been received recently, mainly from south eastern/south central Kansas, about "worms" feeding on early-planted wheat. First, it is usually better to plant wheat as late as possible to help avoid all wheat pests, whether pathogens or insects. The "worms" reported so far have been either armyworms or fall armyworms, both of which will do about the same type of damage. They feed on leaf tissue and consume more as they get larger, thus it is best to monitor wheat fields early to detect any larvae while they are still small. They usually do not reduce wheat stands, just remove the leaf tissue. However, under stressful growing conditions plant stands may be impacted. Under good growing conditions, plants should be only temporarily affected. Keep in mind, if there are 8-10 worms per sq. ft. and the worms are small (less than ½-inch), treatment may be justified. In addition, if the leaf feeding continues into the winter, it might be caused by army cutworms, which will feed all winter anytime temperatures are over 45 degrees F, and into the spring. However, armyworms and fall armyworms will only feed until the first hard freeze but not through the winter.

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