Issue 690

Extension Agronomy

eUpdate

04/27/2018

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. Effect of row spacing on soybean yield

There are still many questions about row spacing for soybean production. Research from K-State has found that narrow rows (15-inch or 7.5-inch) result in equal or greater yields compared to 30-inch rows when the yield environment is greater than 45-50 bushels per acre (regardless of planting date, seeding rate, or maturity). Below this yield threshold level, narrow rows tend to result in yields about equal to or slightly below (depending on the growing conditions, water status) yields in 30-inch row spacing. Narrow rows have several benefits such as early canopy cover, better light capture, improved weed control, and reduced erosion. Poor stands, however, are more common with narrow row spacing versus wider row spacing.

For the 2015-16 seasons, on-farm studies (collaboration between K-State, Kansas Soybeans, and the United Soybean Board - USB) showed slight yield improvement (+2 bushels per acre) on narrow rows (15-inch; Figure 1) with yields averaging 48 bushels per acre.

Overall Summary

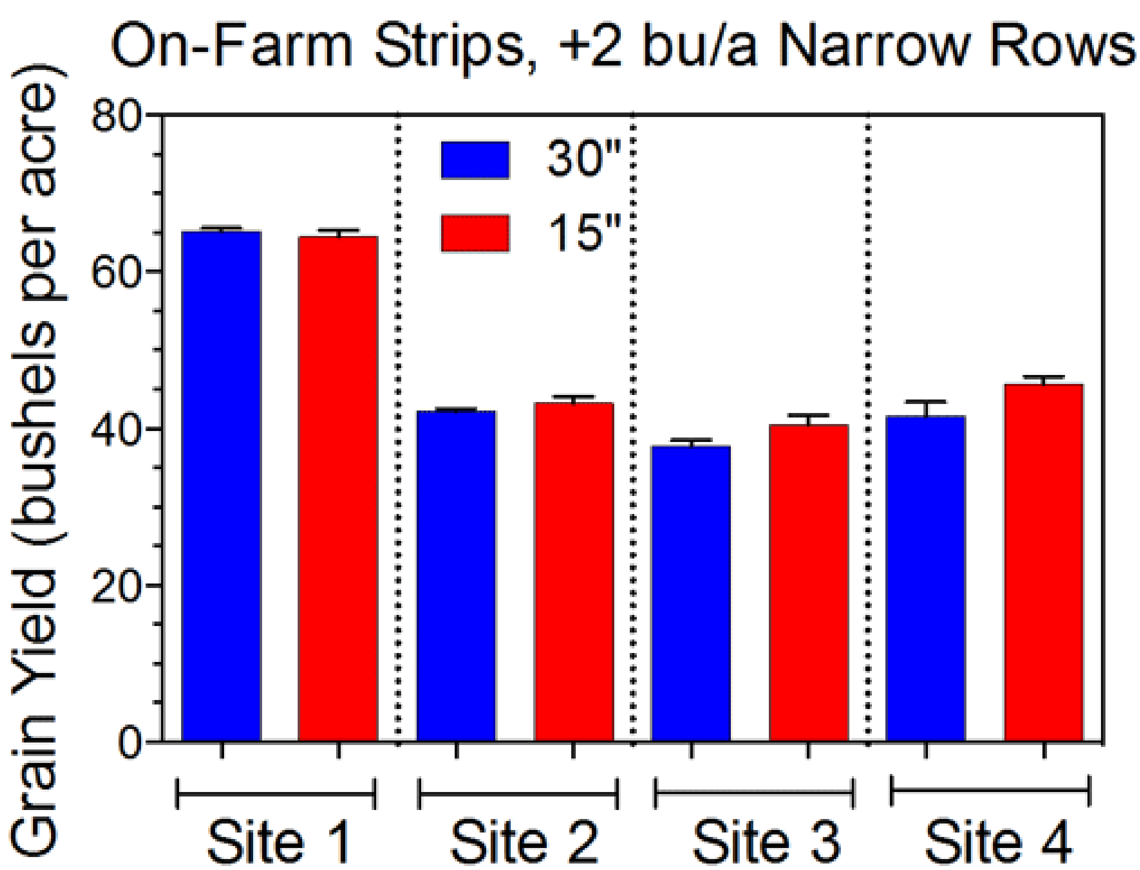
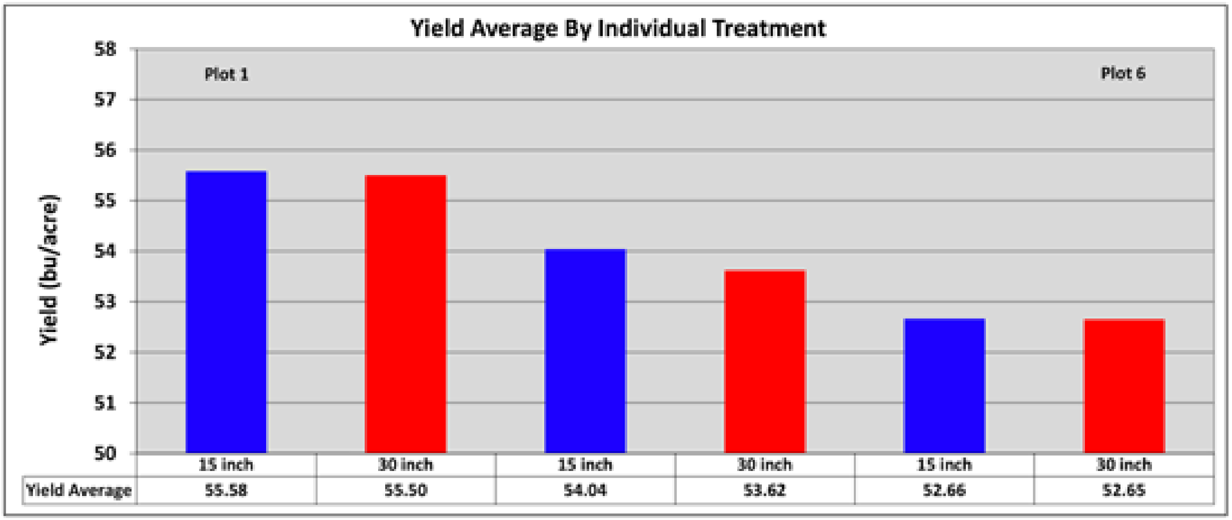


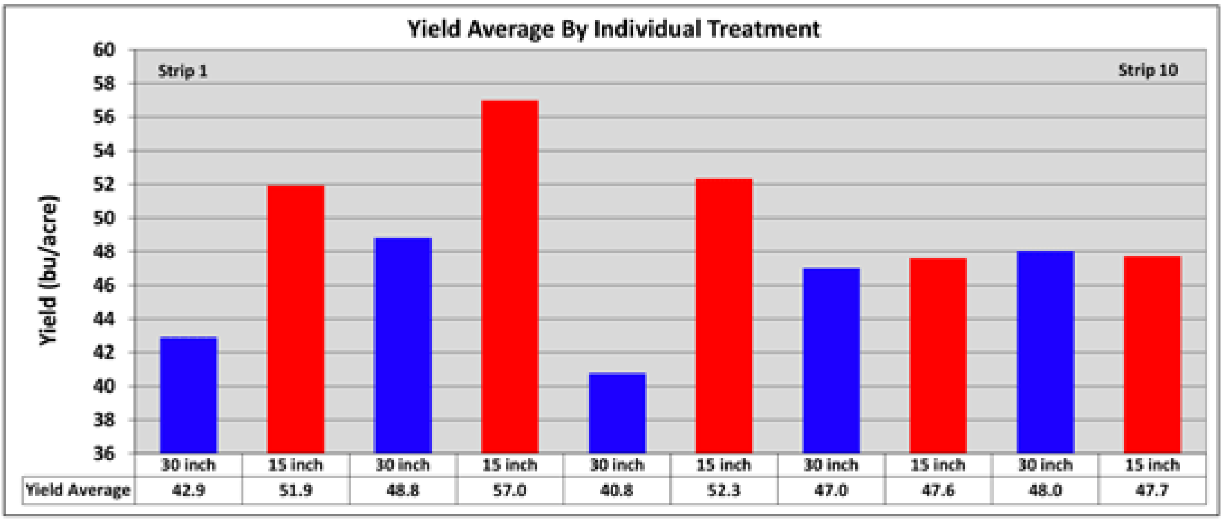
Figure 1. Soybean yield (bushels per acre) by row spacing for conventional (30-inch) versus narrow (15-inch) configuration. Graph by Ignacio Ciampitti, K-State Research and Extension.

For the 2017 season, two studies (collaboration between K-State, Kansas Soybeans, North Central Soybean Research Program) were conducted comparing 15 inch vs. 30 inch rows. The first study was located in Franklin County, Kansas (Figure 2) and the second one was located in Riley County, Kansas (Figure 3).



Yield Average for All Individual Treatments (bu/acre)	15 inch	30 inch	Yield Difference	A randomization test suggested no evidence of a significant yield difference.
	54.09	53.92	0.17	

Figure 2. Soybean yield (bushels per acre) by row spacing for conventional (30-inch) versus narrow (15-inch) configuration, in Franklin County, Kansas. Graph by Ignacio Ciampitti, K-State Research and Extension.



Yield Average for All Individual Treatments (bu/acre)	15 inch	30 inch	Yield Difference	A randomization test suggested some evidence of a significant yield difference.
	51.31	45.50	5.82	

Figure 3. Soybean yield (bushels per acre) by row spacing for conventional (30-inch) versus narrow (15-inch) configuration in Riley County, Kansas. Graph by Ignacio Ciampitti, K-State Research and Extension.

Overall, narrow rows provided a yield response ranging from -0.6 to +5.0 bu/acre. An additional benefit for narrow rows was enhanced early light interception and improved weed control.

For more information visit: http://www.iasoybeans.com/USB/DataViewer/index.htm

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2. Management strategies to minimize iron chlorosis in soybeans

Soybean is one of the most susceptible field crops to iron chlorosis (yellowing), and this problem is not uncommon in Kansas. Iron is a catalyst in the production of chlorophyll, so a deficiency of iron (Fe) displays as a yellowish or pale color in the leaves. Iron is an immobile nutrient in the plant so symptoms first appear on the youngest leaves.

Iron chlorosis is usually caused by a combination of stresses rather than a simple deficiency of available soil Fe. Some of the soil chemical factors that play a role in Fe chlorosis include high pH, high carbonate levels, high salinity (EC), low available iron (DTPA-Fe), and high soil nitrate levels. Other factors that play a role include variety susceptibility and the presence of soybean cyst nematodes and root rotting fungi. Given all these factors, Fe chlorosis is a complex problem and not one that can be determined solely on the basis of a soil Fe test.

One of the factors that can be involved in the development of Fe chlorosis in soybeans is high levels of soil nitrate. Iron is taken up in the ferric form (Fe^{+3}), then is immediately converted within the plant into the ferrous form (Fe^{+2}) (existing in the chlorophyll). High concentrations of nitrate-N seem to inhibit this conversion of Fe^{+3} to Fe^{+2} in the plant, creating Fe deficiencies. It is important remember that high soil nitrate levels alone will not cause iron chlorosis in soybeans, but is simply one additional factor that will magnify the problem.

Figure 1. Wheel tracks are noticeable with greener plants in this field of soybeans with iron chlorosis. Soil nitrate levels in these wheel tracks are much lower than the rest of the field due to some soil compaction and the subsequent N loss by denitrification. Usually where soil nitrate levels are lower, plants are not as green. But in the case of iron chlorosis, it's actually the opposite. That's because higher nitrate levels make iron chlorosis symptoms worse. Photo by Dorivar Ruiz Diaz, K-State Research and Extension.

Fertilization strategies for iron chlorosis

In 2009-10, we conducted tests at eight locations in Kansas with seed coating treatments and foliar Fe treatments to correct Fe deficiency symptoms. We used two varieties, one with good tolerance to Fe chlorosis and one that was susceptible to Fe chlorosis, and locations were under irrigated conditions.

The seed coating treatment was approximately 0.3 lb/acre of actual Fe (chelated EDDHA Fe -6%). The foliar treatments were 0.1 lb/acre EDDHA Fe (6%) and 0.1 lb/acre HEDTA Fe (4.5%). There was an untreated check included. Soil pH at these locations varied from 7.9 to 8.4.

Figure 2. Soybean response to seed coating with chelated iron fertilizer. Photos by Dorivar Ruiz Diaz, K-State Research and Extension.

Greenness**.** The seed coating treatment had a significant effect in improving the greenness of the foliage, as shown by the chlorophyll meter reading results (Figure 3). Overall, the greening response to the seed coating was greater than the response to foliar Fe applications. The variety most susceptible to Fe chlorosis greened up in response to the seed coating much more than the variety more tolerant to Fe chlorosis, even though there is also increase in greenness with the tolerant variety. This indicates that the tolerant variety stayed greener during the growing season but still showed additional benefit from the seed coating treatment. The seed treatment also increased plant height by an average of about 5 inches for both varieties (data not shown).

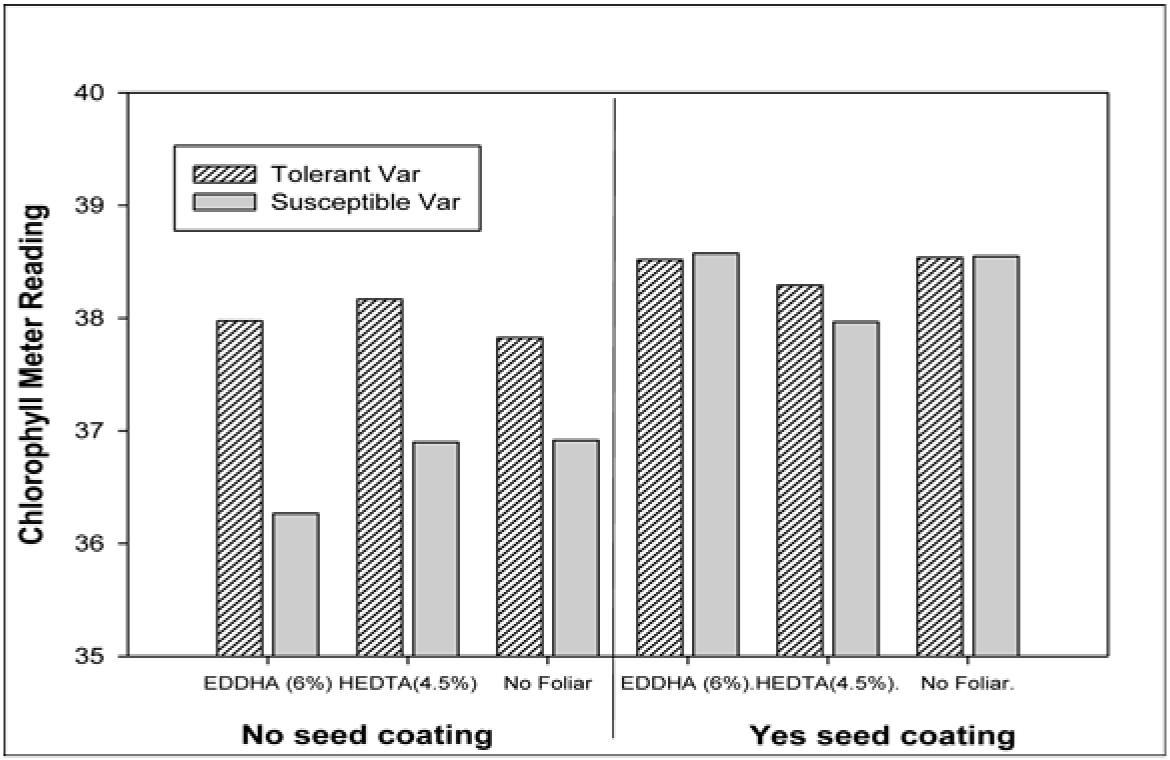

Figure 3. Chlorophyll meter reading after foliar Fe application. Higher values are correlated with greener plant leaves. Under these conditions favorable to iron chlorosis, an iron chelate seed coating improved greenness readings.

Yield**.** Both the tolerant and susceptible variety also had a good yield response to the Fe chelate seed coating, and no significant yield response to the foliar Fe chelate treatments (Figure 4). Yield increase due to the seed coating treatment in the susceptible variety was approximately 10 bushel per acre, while yield increase in the tolerant variety was approximately 20 bushels per acre. Previous studies suggested that tolerant varieties tend to utilize Fe fertilizer sources more efficiently, which would explain these results in plant response observed in our study.

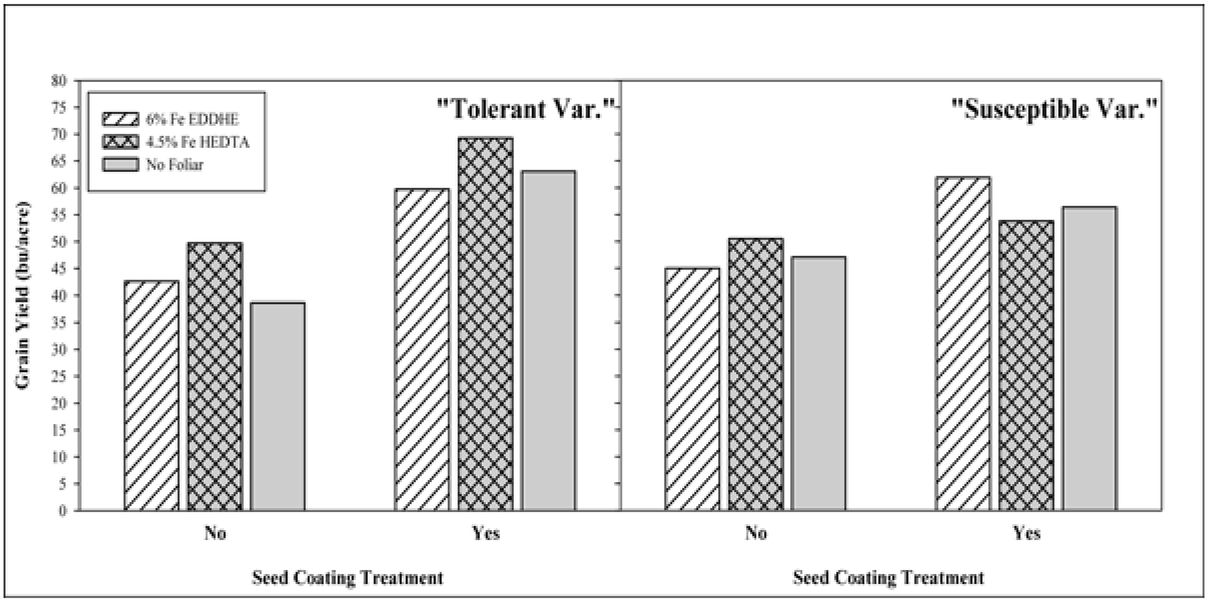

Figure 4. Average yield for the "tolerant" variety without seed coating treatment was 44 bu/acre, and with seed coating treatment was 63 bu/acre. Average yield for the "susceptible" variety without seed coating treatment was 47 bu/acre, and with seed coating treatment was 58 bu/acre.

Summary

- Fe deficiency potential cannot be explained well by any single soil parameter.
- Foliar Fe treatments to soybeans with Fe chlorosis seem to increase the "greenness" effectively but results suggest inconsistent yield response.
- An iron chelate seed coating provides significant yield increases to soybeans under conditions favorable to Fe chlorosis. Another alternative to seed coating is in-furrow application of chelated Fe fertilizer. Seed contact with the fertilizer source seems to be particularly important for reducing Fe chlorosis symptoms.
- If Fe chlorosis has been a common problem in the past, producers should select a soybean variety that is tolerant to Fe chlorosis. It may also pay to use a chelated Fe fertilizer in-furrow, or an iron chelate seed coating.
- Producers should avoid excessive application of nitrogen fertilizer to the crop that precedes soybeans in the rotation. In fields with some risk of iron chlorosis, the high levels of soil nitrate may be a complicating factor.

This study was supported by the Kansas Soybean Commission.

Additional information can be found in: https://store.extension.iastate.edu/product/Micronutrients-for-Soybean-Production-in-the-North-Central-Region

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3. Is there any value to starter fertilizer on soybeans?

Soybean is a crop that can remove significant amounts of nutrients per bushel of grain harvested. Because of this, soybeans can respond to starter fertilizer applications on low-testing soils, particularly phosphorus.

Typically, corn shows a greater response to starter fertilizer than soybean. Part of the reason for that is that soils are generally warmer when soybeans are planted than when corn is planted. The typical response in early growth observed in corn is usually not observed in soybeans. However, yield response to direct soybean fertilization with phosphorus and other nutrients can be expected in low-testing soils.

K-State guidelines for soybeans include taking a soil test for phosphorus (P), potassium (K), sulfur (S), zinc (Zn), and boron (B). If fertilizer is recommended by soil test results, then fertilizer should either be applied directly to the soybeans or indirectly by increasing fertilizer rates to another crop in the rotation by the amount needed for the soybeans.

The most consistent response to starter fertilizer with soybeans would be on soils very deficient in one of the nutrients listed above, or in very high-yield-potential situations where soils have low or medium fertility levels. Furthermore, starter fertilizer in soybeans can be a good way to complement nutrients that may have been removed by high-yielding crops in the rotation, such as corn, and help maintain optimum soil test levels.

Banding fertilizer to the side and below the seed at planting is an efficient application method for soybeans. This method is especially useful in reduced-till or no-till soybeans because P and K have only limited mobility into the soil from surface broadcast applications. Fertilizer should not be placed in-furrow in direct seed contact with soybeans because the soybean seed is very sensitive to salt injury.

Soybean seldom responds to nitrogen (N) in the starter fertilizer. However, some research under irrigated, high-yield environments suggests a potential benefit of small amounts of N in starter fertilizer.

Figure 1. Visual differences with starter P fertilizer on low testing soils. Picture by Nathan Mueller, former K-State Agronomy graduate student and current University of Nebraska Cropping Systems Extension.

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4. Winter stand losses in canola

The 2017-2018 growing season has been a challenging one as the winter hardiness of canola has been tested across Kansas. Much of the canola crop is flowering but development is delayed by colder-than-normal April temperatures and the current drought. Fields that were planted on time and were able to establish a good stand last fall are faring well despite these conditions. Other fields that did not establish a good stand are seeing moderate to severe winterkill. What ultimately causes winterkill in canola is an interaction of the environment, variety, and management practices of the producer. Any time we see winterkill in canola, it is important to examine the circumstances that led to the stand losses.

The 2017-2018 growing season

To understand what has been observed in some fields in Kansas, we need to remember what establishment conditions were like last September. For a large portion of the state, soil moisture was lacking during the optimum planting window and thus many producers waited for rain to begin planting their canola. Soil moisture didn't improve until late September/early October which is pushing the end of the planting window.

Initially, the planting delay wasn't a cause for major concern because the outlook was for warmer-than-normal temperatures. In a way, experiences over previous growing seasons made us accustomed to warm fall temperatures. Thus, even though planting was delayed, we were expecting to achieve adequate growth (6-10 true leaves and 8-12 inches of top growth) to sustain the plants through the winter. Nonetheless, a cold snap in mid-October and dry fall conditions shut the crop down early and plant growth didn't resume as expected. Unless producers were able to plant earlier in the optimum window, many fields were headed for winter with less than adequate top growth.

Winterkill has been observed in research trials and producers' fields from the Nebraska border to the Oklahoma border in Kansas. Varietal differences are being observed. Fields planted just a couple miles from each other have shown dramatic variation in survival. Not all fields have been affected; some fields will see no impacts from winter stand losses. What ultimately is causing winterkill this season is low temperatures (nearing -10 degrees F in some instances) and drought, coupled with the lack of fall growth. Today's top-rated varieties for winter survival are able to withstand extremely low temperatures, but the confounding factors of drought and small plants are not helping the situation (Figure 1).

Figure 1. Differential winterkill was observed at the North Central Experiment Field west of Belleville. Although some varieties showed acceptable survival, the plot was abandoned because of too much variability between replications. Photo by Mike Stamm, K-State Research and Extension.

Cold temperatures can also have unseen negative consequences on crop growth and development. Freezing and thawing cause cracking in the crown or root, allowing fungi to enter that create root decay. Plants may appear to regrow normally in the spring, but after some time, the severely damaged plants will wilt, turn bluish-gray, and eventually die (Figure 2). We are starting to see this occur in a few fields and research plots. Other plants may continue to grow normally and never show any signs of damage.

Figure 2. Spring stand loss caused by severe crown damage over the winter. Photo by Scott Dooley, K-State Research and Extension.

The 2017-2018 season versus previous seasons

As stated previously, winter survival is a complex trait that can be influenced by many factors. Looking back at the recent history of canola production across Kansas, winterkill has been caused by different weather patterns. In recent years, we have observed winterkill caused by:

- Bitterly cold temperatures for extended periods of time (2013-2014)
- Extreme temperature fluctuations on an inadequately cold-acclimated crop (2014-2015)
- Too much fall growth causing severe crown and stem damage as cold temperatures set in (2016-2017)

The causes of winterkill this season are similar to that of the 2013-2014.

Figure 3 shows the low temperatures for the time period of October 1 to April 15 for the 2013-2014 and 2017-2018 growing seasons, and the 30-year average lows. Similar to 2013-2014, winter low temperatures were bitterly cold for several long and frequent periods of time throughout the 2017-2018 season.

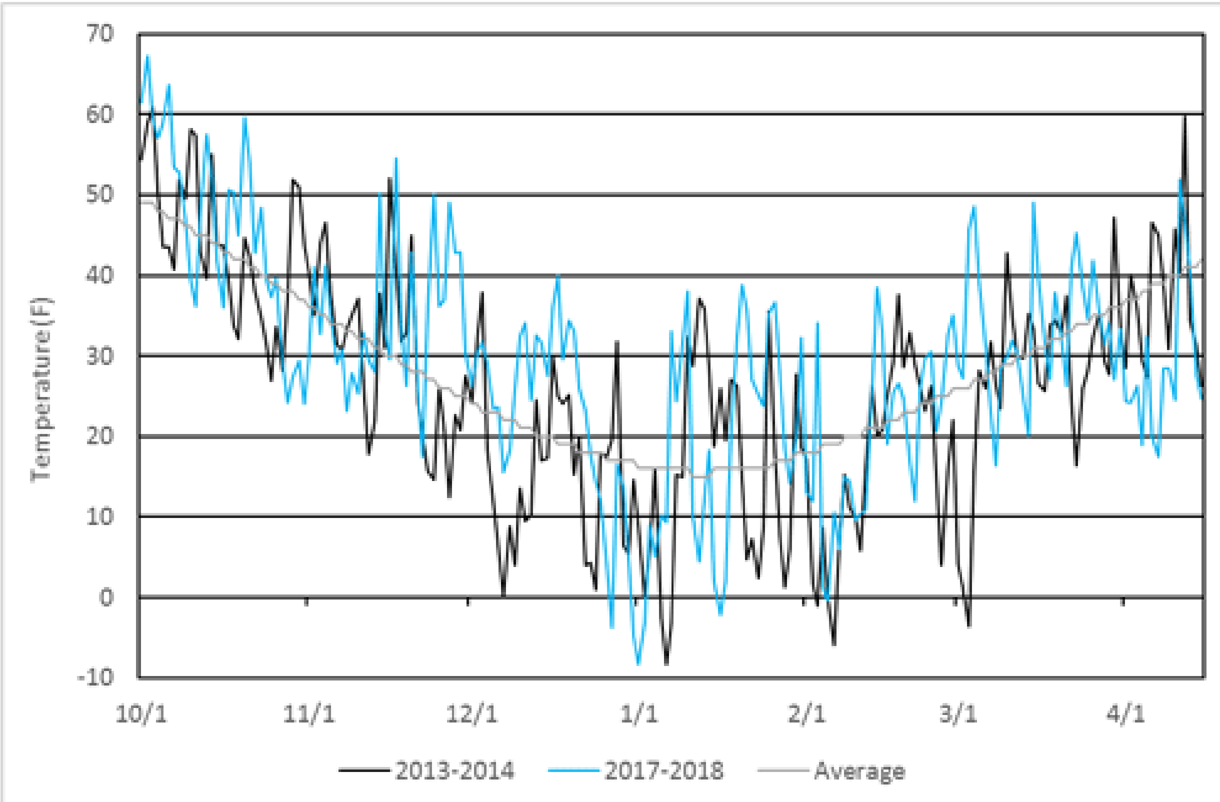

Figure 3. Low temperatures recorded in Manhattan comparing two growing seasons. Weather data courtesy of the Kansas Mesonet.

What is the impact for 2017-2018?

Canola can compensate for a thin stand because it is an indeterminate crop, producing more flower buds than it can actually support. Canola will branch out and fill in gaps in the field when stands are reduced, much like soybean will in a reduced stand. However, moisture is critical for recovery, especially when much of the aboveground vegetation has been lost.

In 2017-2018, spring temperatures have been below-normal and we are seeing the impact of continued drought on the amount of reproductive biomass. Leaf area and number of branches per plant have been reduced as a result and the crop's development is about two to three weeks behind normal (Figure 4). The crop is also shorter-than-normal. Timely rainfall and mild temperatures would go a long way toward helping the crop recover. The flowering and grain fill periods are the points of peak water demand for canola.

Figure 4. Winter canola plots entering beginning bloom on April 23 near Manhattan. Photo courtesy of Mike Stamm, K-State Research and Extension.

Summary

There are some positives to this story:

1. Differential winterkill did occur at a few locations adding to our database of winter survival information, meaning we have useable ratings for many commercial varieties.

2. We know the adaption limits of many varieties and we can make better variety recommendations for Kansas canola growers. This is important information for us to make winter canola consistent and profitable.

Based on previous experiences and observations with winterkill, we certainly need to use diligence when we choose varieties, and just as important, we must use best management practices to ensure sufficient stands and aboveground biomass going into the winter months.

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5. Sudden Death Syndrome and soybean planting date: K-State research

Sudden Death Syndrome (SDS) is a disease caused by the soilborne fungus Fusarium virguliforme (Figure 1). This fungus prefers wet conditions and thus is usually most severe in irrigated fields. SDS also tends to be most severe on well-managed soybeans with a high yield potential. It also tends to be more prevalent on fields that are infested with soybean cyst nematode (SCN) or planted early when soils are wet and cool. Historical yield losses from this disease are generally in the range of 1 to 25 percent.

Figure 1. Soybean leaf symptoms of SDS (upper photo) and trial illustrating differences in SDS between different soybean varieties (lower photo). Photos by Eric Adee, K-State Research and Extension.

Soybean planting dates have been moving earlier in much of the soybean growing region, including Kansas. Yield loss of up to 0.5 bushel per day is not uncommon when soybeans are planted after May 10 in many soybean growing regions. However, in the Kansas River Valley, many of the soybeans have been planted after mid-May because of the perennial problem with SDS on soybeans. Later planting has been prescribed as a management practice to help avoid the cooler/wetter soils that can favor infection by the fungus.

K-State Planting Date Study

Two soybean planting date studies evaluating the severity of SDS and soybean yield were conducted at the Kansas River Valley experiment fields in Topeka from 2015-2017. One study was specifically looking at SDS by promoting infection (early and greater irrigation volume), and the other was targeting best management practices to minimize SDS. In the study promoting SDS, two soybean varieties of maturity group (MG) 3.5, one SDS susceptible and one SDS tolerant, were planted into fields with a history of SDS in 2015, 2016, and 2017 on average planting dates of May 3 and 20, and June 8 and 22. The soil was Eudora silt loam and the previous crop was corn. Both studies had foliar symptoms of SDS develop during the growing season. Foliar symptoms of SDS were rated weekly starting July 29, 2015 at R3 (beginning pods), August 8, 2016 at R4 (full-length pods), and August 25, 2017 at R5 (beginning seed) until R6 (full seed) for all planting dates. Ratings were based on incidence and severity of symptoms resulting in percent defoliation. Harvest was completed by October 12-13 for all three study years.

Best Management Practice Study

Management practices to reduce or avoid SDS were implemented in this study. These include treating the seed with ILeVO (Bayer) at 35 ml/unit of seed to protect against SDS, and withholding irrigation until the crop was getting close to moisture stress (September 1, 2015, August 10, 2016, and July 16, 2017) with less than 3 inches each year. Three soybean varieties of differing maturity groups were planted on three different dates. Soil type, rainfall, herbicide programs, SDS ratings, and harvest were the same as the SDS Planting Date Study.

Results

The severity of SDS was greatest with the early planting dates in both studies (Figures 2 and 4), decreasing to very little SDS for the June planting dates with the varieties having average or below-average tolerance to SDS. Overall, SDS foliar symptoms developed later in 2016 and 2017 than in 2015, resulting in a lower severity of SDS. However, the effect of planting date on SDS was consistent with all studies, confirming that earlier planting dates can result in more severe symptoms of SDS.

The yields were also the greatest with the earlier planting dates in both studies (Figures 3 and 5) except for the susceptible variety (Figure 2). Generally, there is a negative relationship between SDS and yield at each planting date (i.e. the greater the SDS, the lower the yield). However, in these experiments, the increased yield potential with the earlier planting dates was partially realized with the more tolerant varieties despite the yield loss due to SDS.

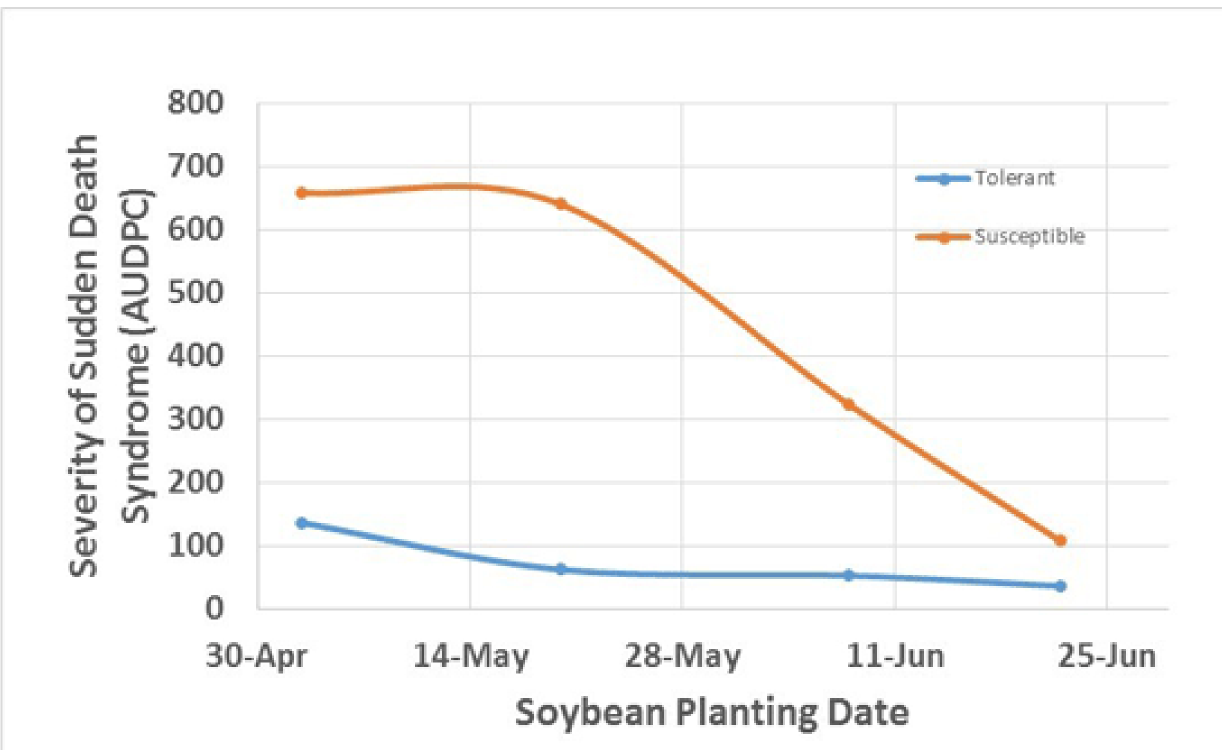

Figure 2. Effect of planting date for two soybean varieties on severity of sudden death

syndrome (SDS) measured as area under disease progress curve (AUDPC), Kansas River Valley experiment fields, 2015, 2016 and 2017 averages.

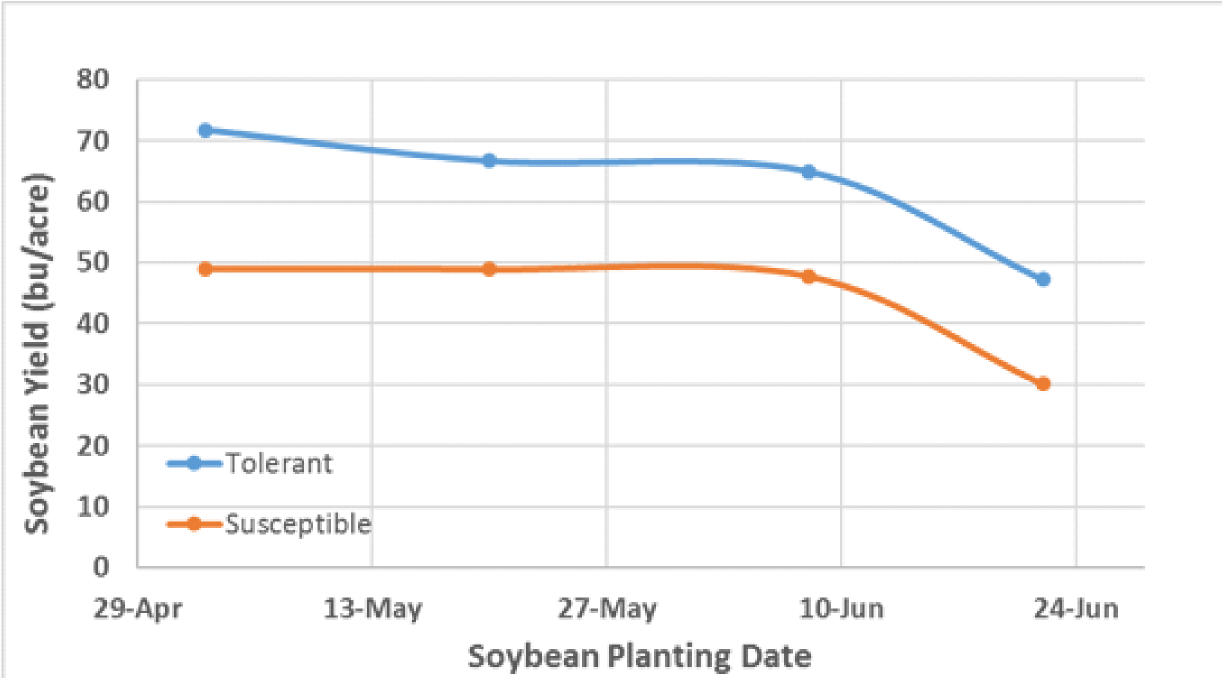

Figure 3. Effect of planting date on yield for two soybean varieties with different levels of susceptibility to sudden death syndrome (SDS), Kansas River Valley experiment fields, 2015, 2016 and 2017 averages.

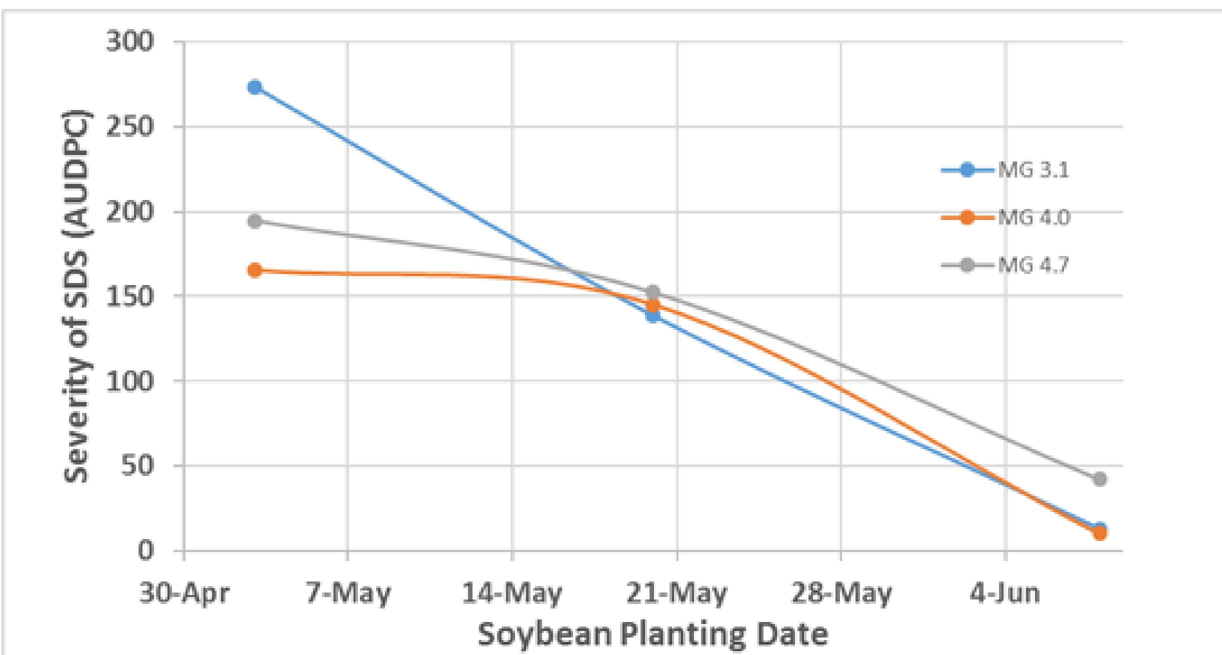

Figure 4. Effect of planting date on severity of sudden death syndrome (SDS) measured as area

under disease progress curve (AUDPC) in soybean varieties of different maturity groups (MG) treated with ILeVO, Kansas River Valley experiment fields, 2015, 2016 and 2017 averages.

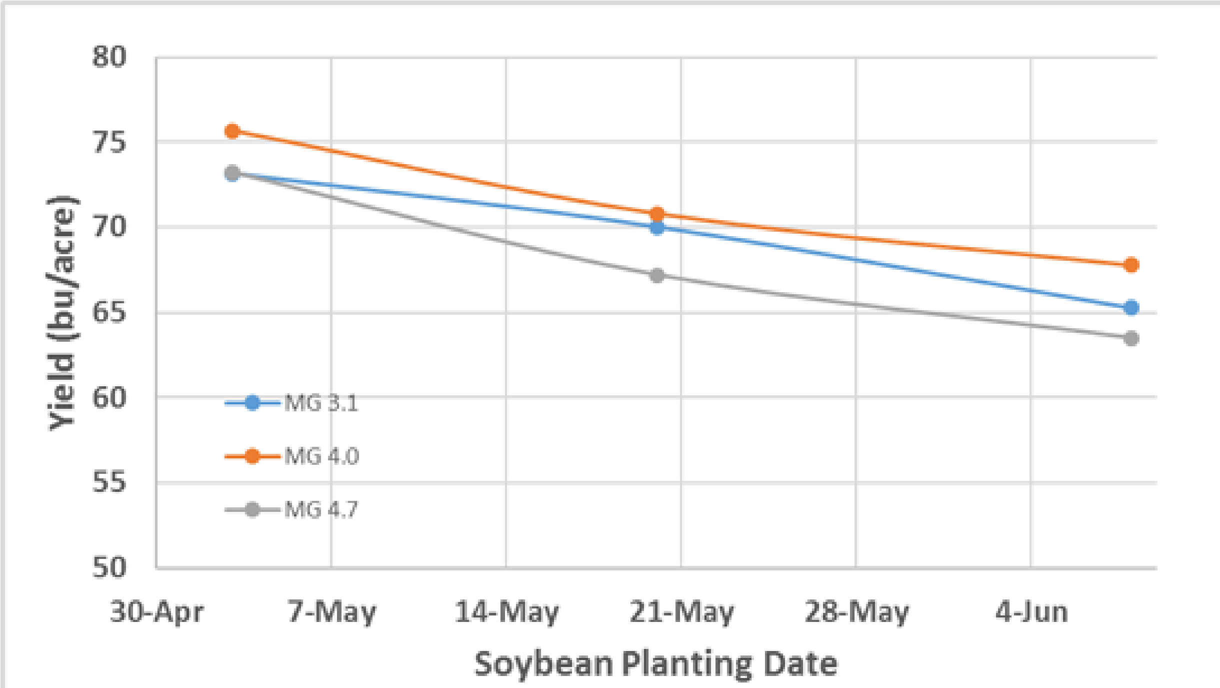

Figure 5. Effect of planting date on yield of soybean varieties of different maturity groups (MG), Kansas River Valley experiment fields, 2015, 2016 and 2017 averages.

The greatest benefit to early planting was with the SDS-tolerant MG 3.5 variety in the Planting Date Study, showing a 0.3 bushel per day yield increase for planting in early May versus mid-May. In the Best Management Practice Study, the MG 4.0 varieties averaged 0.33 bushels per day for the early May planting date versus mid-May. The tolerant varieties were able to realize some of the increased yield potential with the earlier planting. The SDS-susceptible variety of similar maturity responded with essentially no yield increase when planted in early May versus early June. While the severity of SDS was greater at the earlier planting dates, the tolerant varieties were able to respond with increased yield, showing the importance of selecting varieties with better tolerance to SDS and incorporating other measures to reduce SDS.

Summary

Based on three years of data from two experiments, SDS is favored by earlier planting, as well as yield. It will be interesting to see in a year when the SDS is more severe whether the yield potential for early planting date is greatly reduced or if a yield benefit will still be realized. It could be that with more severe SDS, the yield response to earlier planting date may look more like that of a very susceptible variety (no change in yield unless planting date is very late).

These studies show that by choosing the more SDS-tolerant varieties and taking measures to reduce SDS, that there is a very positive benefit for earlier planting dates of soybeans in the Kansas River Valley.

This research was funded in part by the Kansas Soybean Commission.

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6. Kansas Soil of the Month for April: Pawnee

Westward, ho! The month of April was a very popular window of time for settlers to depart from Independence, Missouri and head for the Willamette Valley in Oregon. Therefore, this month we chose an important and prevalent Kansas soil that wagon trains would have traversed in April as they cut across the hills in the northeastern corner of Kansas.

Pawnee soil series

The Pawnee soil series is found extensively in southeast Nebraska and northeast Kansas, comprising over 1 million acres in total (Figure 1). About 700,000 years ago glaciers covered the northeastern corner of Kansas (Figure 2), leaving behind *glacial till*, the parent material for the Pawnee soil series. Glacial till is composed of all of the material that glaciers picked up as they moved towards Kansas. How do scientists know this? A clue is the pink rocks commonly found in northeastern Kansas, called Sioux Quartzite, "a pink metamorphosed sandstone more than a billion years old. Sioux Quartzite found in Kansas came from southern Minnesota, South Dakota, and northwestern Iowa" (Lyle, 2009).

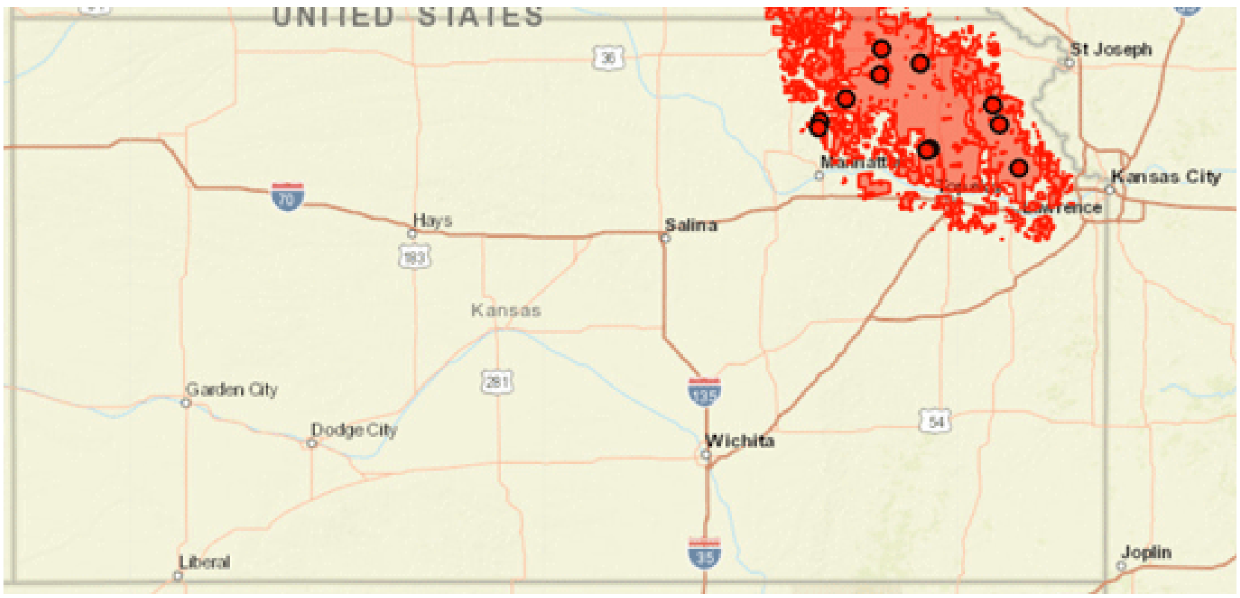


Figure 1. Soil series extent map in Kansas for the Pawnee soil series. Map created using USDA-NRCS Official Soil Series Description website.

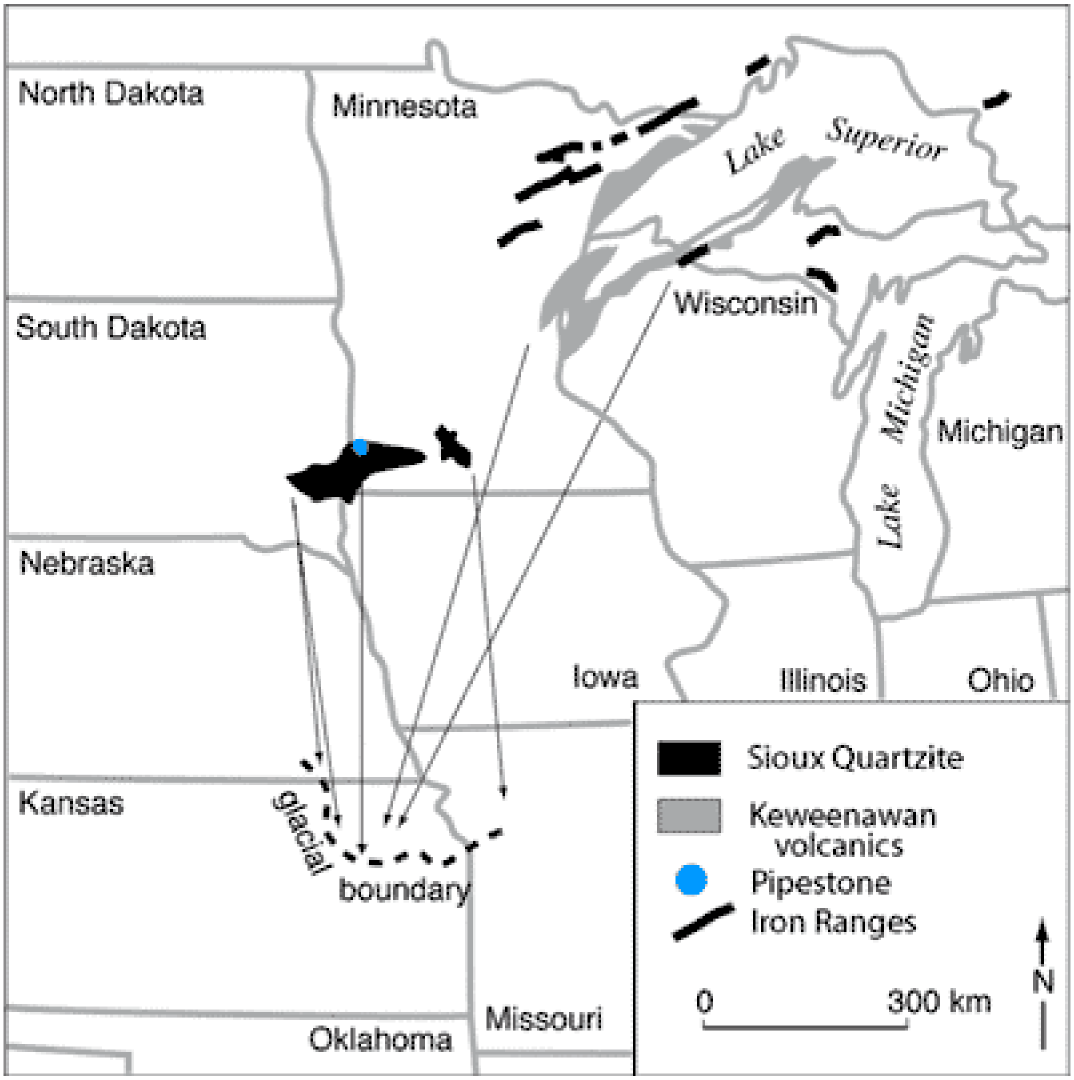
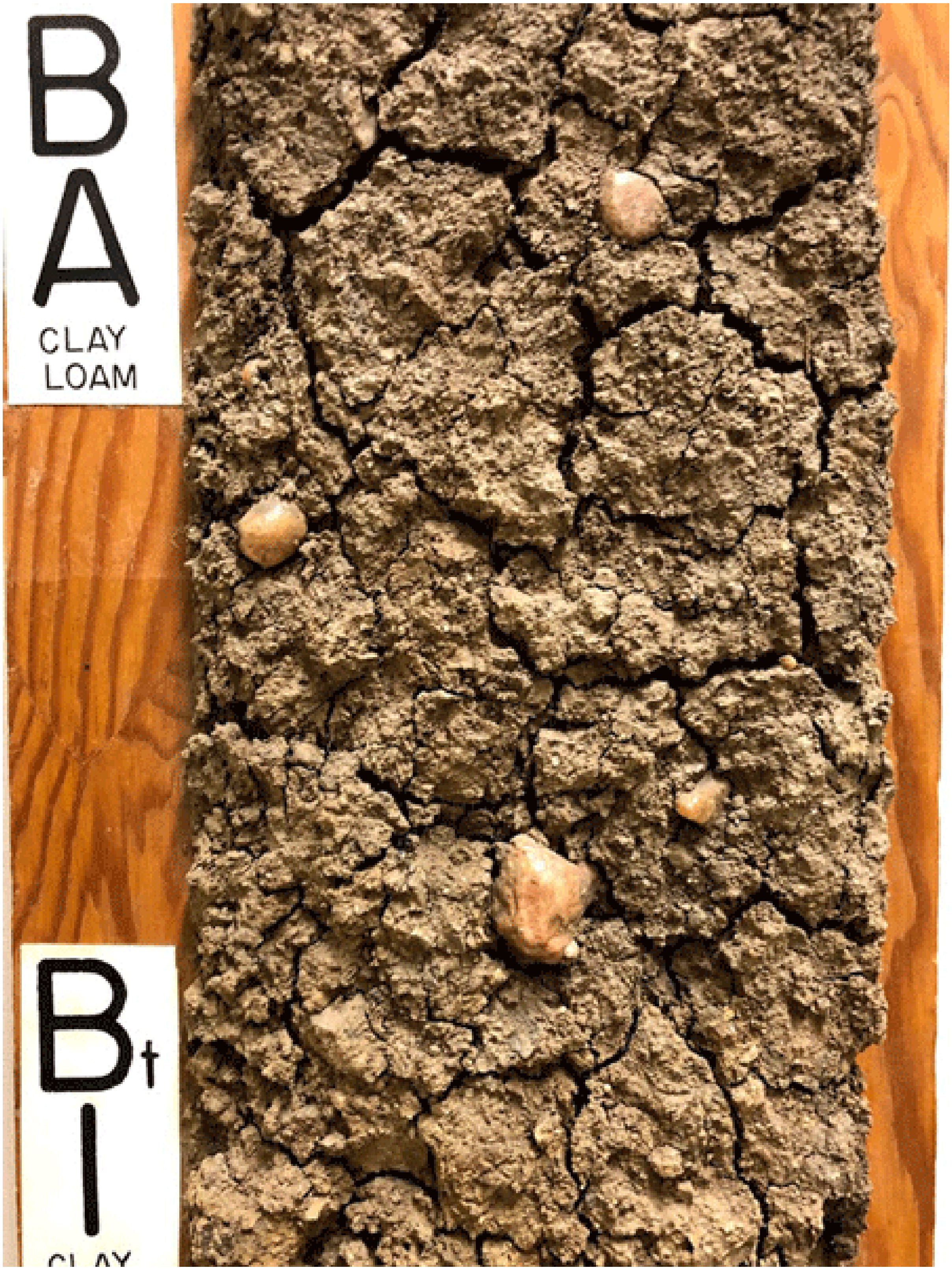


Figure 2. Geographic boundary of glaciation in Kansas. The map shows where Sioux Quartzite bedrock is found in the U.S. Any Sioux Quartzite found in Kansas today was transported from these areas in Minnesota and South Dakota by glaciers 700,000 years ago. Map from http://www.kgs.ku.edu/Publications/PIC/pic28.html**.**

The Pawnee soil monolith shown in the photo below was collected in Brown County, Kansas and you can see small Sioux Quartzite stones—that is how soil scientists know that they are looking at a soil formed in parent material deposited by a glacier (Figure 3, upper photo). So--the Pawnee soil contains billion-year old rocks that were transported to Kansas 700,000 years ago by glaciers.

Another iconic Kansas mollisol

Like many of our soils in Kansas, the Pawnee is a "mollisol", meaning it contains the decomposed tissue of thousands of years' worth of plant, animal, and microbe remains, making it a fertile soil for agriculture (note the trademark deep, dark A horizon of this mollisol; Figure 3, lower photo). Pawnee is an interesting soil in that it can often be in rangeland, cropland, or land that used to be cropland and has been returned to grassland (and then, in some cases, turned back into cropland again). The typical soil textures in the Pawnee soil profile are loam or clay loam at the surface, and clay in the subsoil, so their suitability for buildings with basements and septic system drain fields is less than ideal, but they do make “swell” ponds!



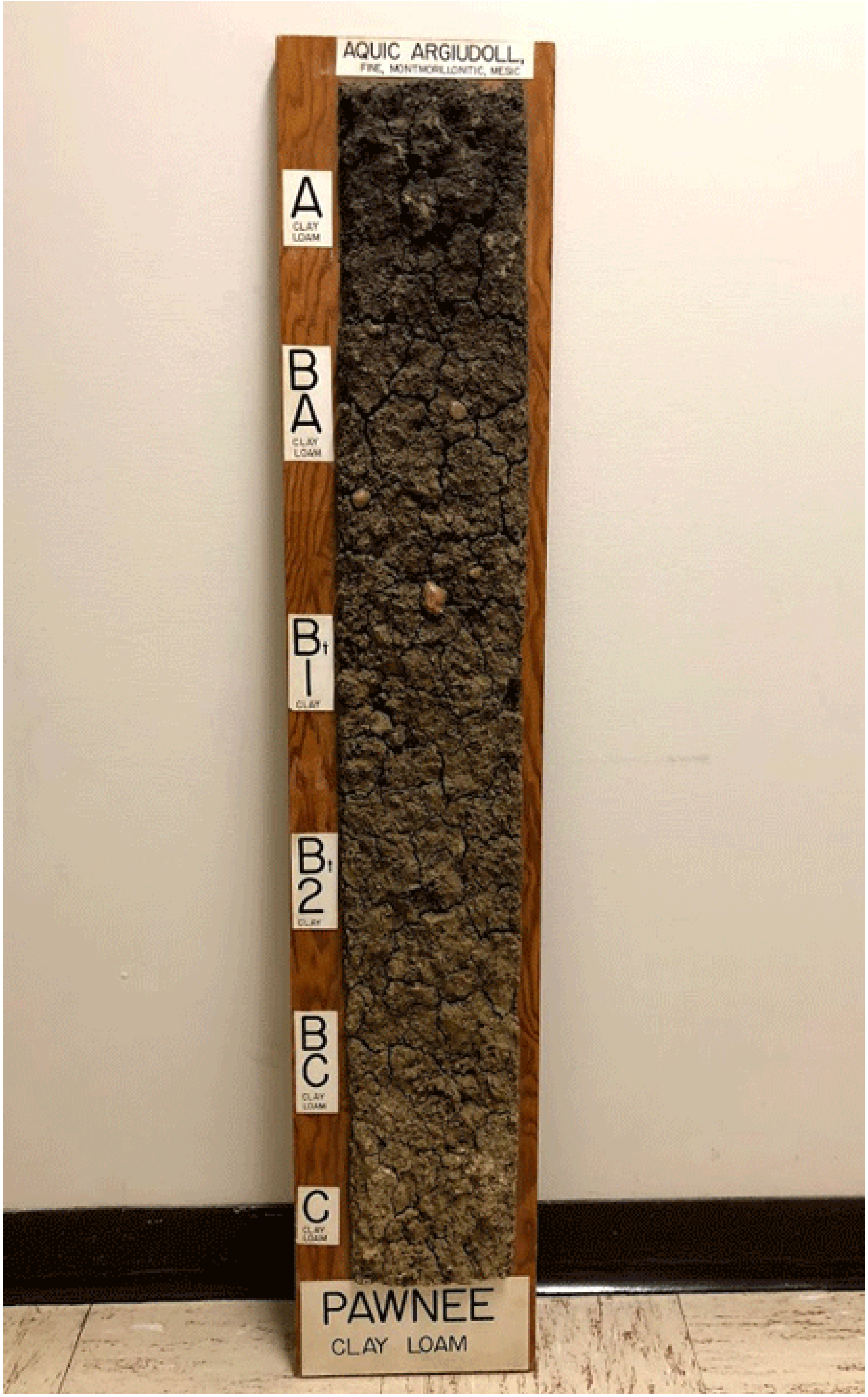

AQUIC ARGIUDOLL,
FINE, MONTMORILLONITIC, MESIC
A
CLAY LOAM
BA
CLAY LOAM
Bt1
CLAY
Bt2
CLAY
BC
CLAY LOAM
C
CLAY LOAM
PAWNEE
CLAY LOAM

Figure 3. Pawnee soil monolith (lower panel) with a close-up view depicting Sioux Quartzite rocks deposited in Kansas by glaciers (upper panel). Photo by Kathy Gehl, K-State Research and Extension.

Pioneers left their mark on the Pawnee soil

During the Oregon Trail's peak years in the mid-1880s, over 400,000 settlers made the journey. While many didn't travel all the way to the Willamette Valley, it stands to reason that most traveled across the northeast corner of Kansas. Pawnee soils still bear signs of trails laid by wagons, now called swales and trail ruts. In fact, all 6 states that were part of the trail have visible swales and ruts to this day (Andrews, 2015). A faint trail, just above the blue arrow (zoom in and look closely), can be seen in a satellite photo (Figure 4) from a native grass pasture in rural Pottawatomie County (the orange lines are marking the soil types). The soil mapped at this spot is a Pawnee clay loam, 4-8% slopes.

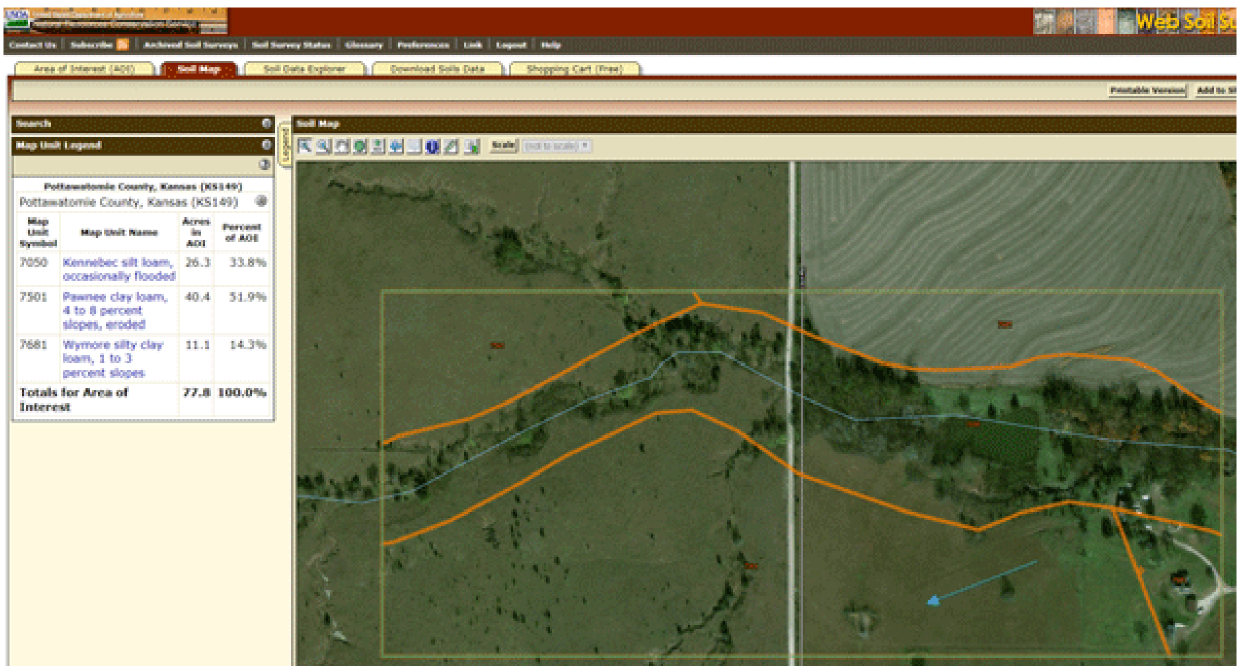


Figure 4. Satellite photo of a pasture in Pottawatomie County, Kansas, depicting faint trail ruts on a Pawnee soil. Photo is from the USDA Web Soil Survey.

Wonder what the settlers thought of all the pink Sioux Quartzite rocks along the trail and if it ever occurred to them that the rocks were settlers too?

If you missed our first two Soil of the Month installments (Jan/Feb and March), you can find them on the Agronomy eUpdate website. Look for the last issue for February and March.

What soil will be coming in May? Stay tuned!

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References:

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Andrews, 2015, http://www.history.com/news/history-lists/9-things-you-may-not-know-about-the-oregon-trail

7. Update on stripe rust in Kansas

Recent weather systems have brought rain to many areas of Kansas during the past two weeks. This is a welcome relief from drought conditions that have dominated most of the winter and spring. The wheat crop is at the flag emergence and boot stage of development in the southeast and south central regions of the state. Wheat in the central and western regions of Kansas is moving through the jointing stages of growth.

The dry conditions appear to be suppressing disease in much of the southern Great Plains with Texas and Oklahoma reporting lower-than-normal stripe rust and leaf rust activity. That began to change this week when Dr. Bob Hunger, wheat pathologist from Oklahoma State University, reported active stripe rust and leaf rust in parts of southern and central Oklahoma. This is potentially important because it sets the stage for disease to spread into Kansas and other key wheat producing states to the north.

Scouting reports from Kansas indicate that the disease levels remain low in most areas. The weather has been favorable for stripe rust in the southeast portion of the state and the disease reported in Montgomery County has moved into upper leaves in some fields (Figures 1 and 2). There are currently no reports of stripe rust or other disease problems developing in other parts of Kansas.

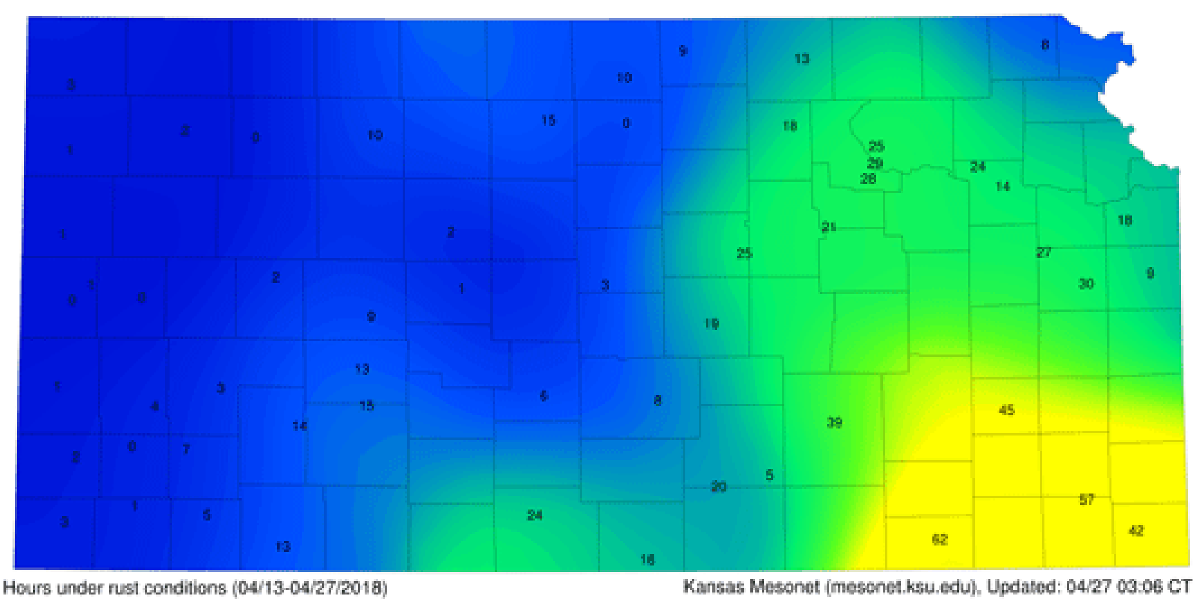

Figure 1. Duration of weather conditions favorable for the development of stripe rust in wheat for past 14 days. Some areas in southeast Kansas have experienced favorable conditions. Data from the Kansas Mesonet (http://mesonet.ksu.edu).

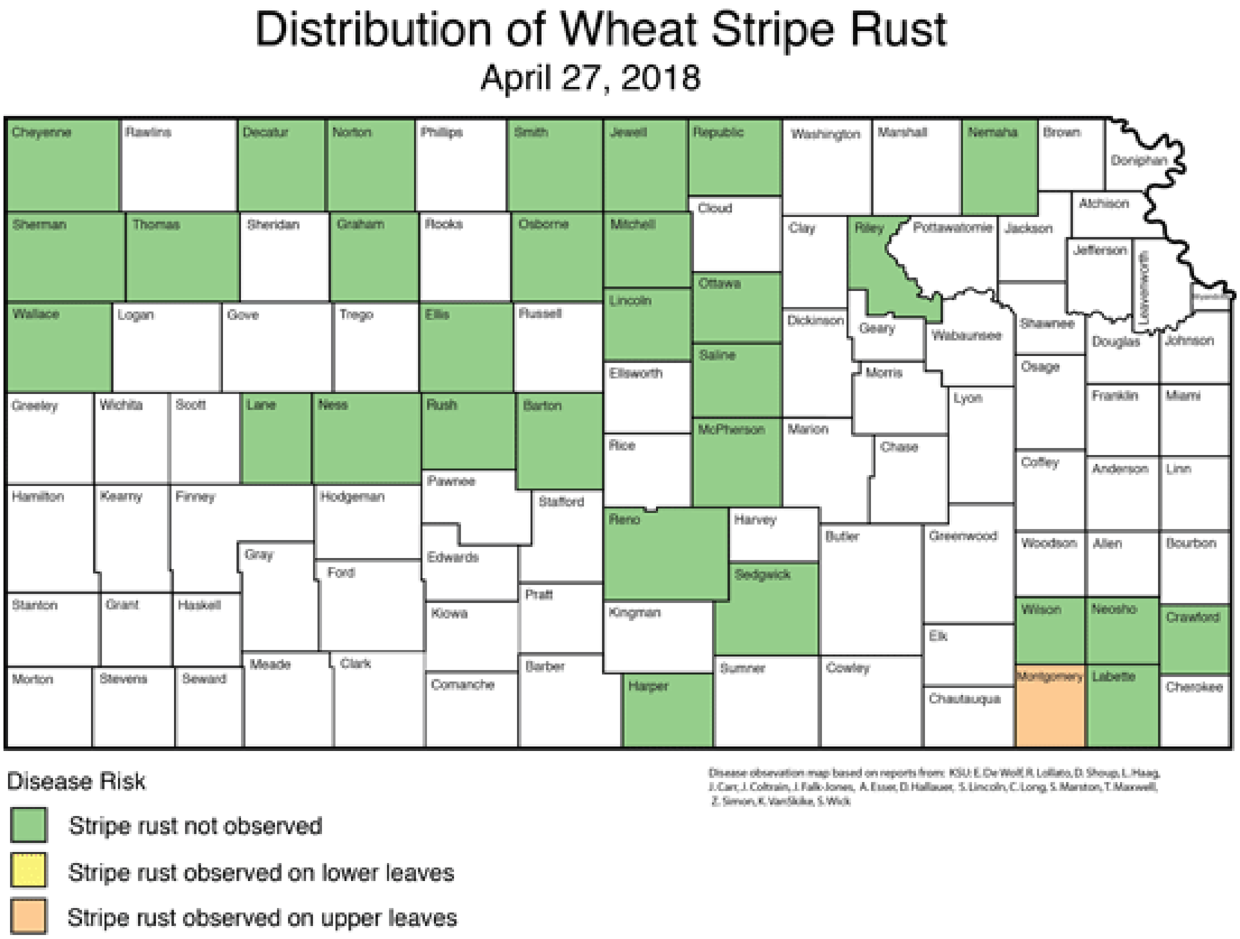

Figure 2. Observations of disease status in the Kansas wheat crop. Map created by Erick DeWolf, K-State Research and Extension.

Josh Coltrain, K-State Extension Agent in the Wildcat Extension District, reports that many growers are considering a fungicide to suppress stripe rust in the southeast region. Most fungicides can be applied to wheat through the heading stages of growth (Feekes 10.5). Once wheat begins to flower, the production options are reduced because of label restrictions. More information about fungicide options can be found online at the KSRE bookstore at: https://www.bookstore.ksre.k-state.edu/pubs/EP130.pdf

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8. Corn planting progress in Kansas: Effects of weather and projected conditions

The cool weather has delayed Kansas corn planting this year. In 2017, 45% of the corn had been planted by the first week in May. The latest numbers from the USDA National Agricultural Statistic Service (NASS) for 2018 show just 15% planted as of April 22 (Figure 1). The majority of the progress has been in the Southeast Division, where warmer temperatures have prevailed.

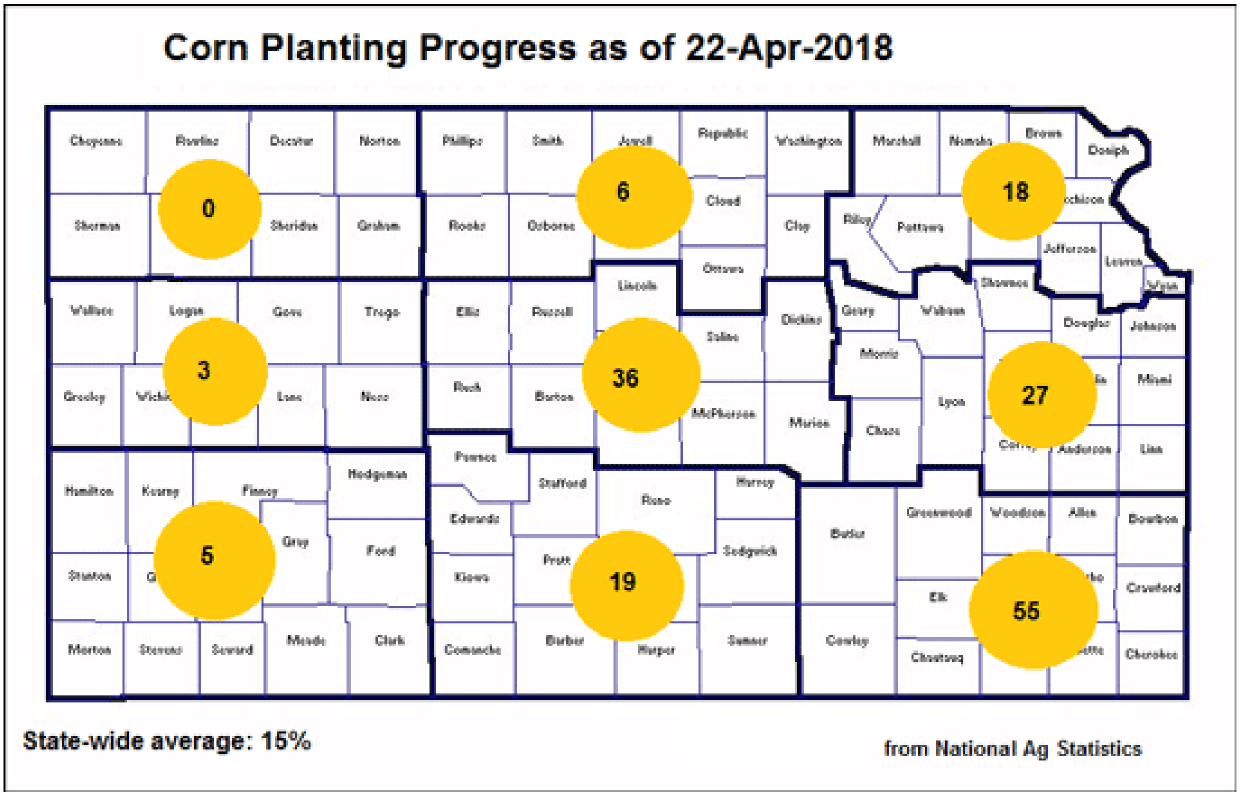

Figure 1. Corn planting progress in Kansas as of April 22, 2018. Source: USDA/NASS.

Cold and dry conditions over the last few weeks are presenting challenging soil environments for early corn stand establishment. As a result, corn growth and development progress has been delayed based on the low heat unit accumulation. This has been delaying emergence of the recently planted corn and slowing down growth progress on any emerged crop.

For the next 7-days, now through May 3rd (Figure 2), the outlook for precipitation shows a probability of receiving from 1.15 inches (central section) to less than a quarter of an inch of rain (western part of the state), adding to the limited precipitation already received this past month (Figure 3). Given the dry conditions, this is unlikely to limit field work, but may provide a more favorable soil moisture environment. Warmer-than-normal temperatures will help warm soil temperatures to more favorable ranges. You can monitor changes in soil temperatures at the Kansas Mesonet: http://mesonet.k-state.edu/agriculture/soiltemp

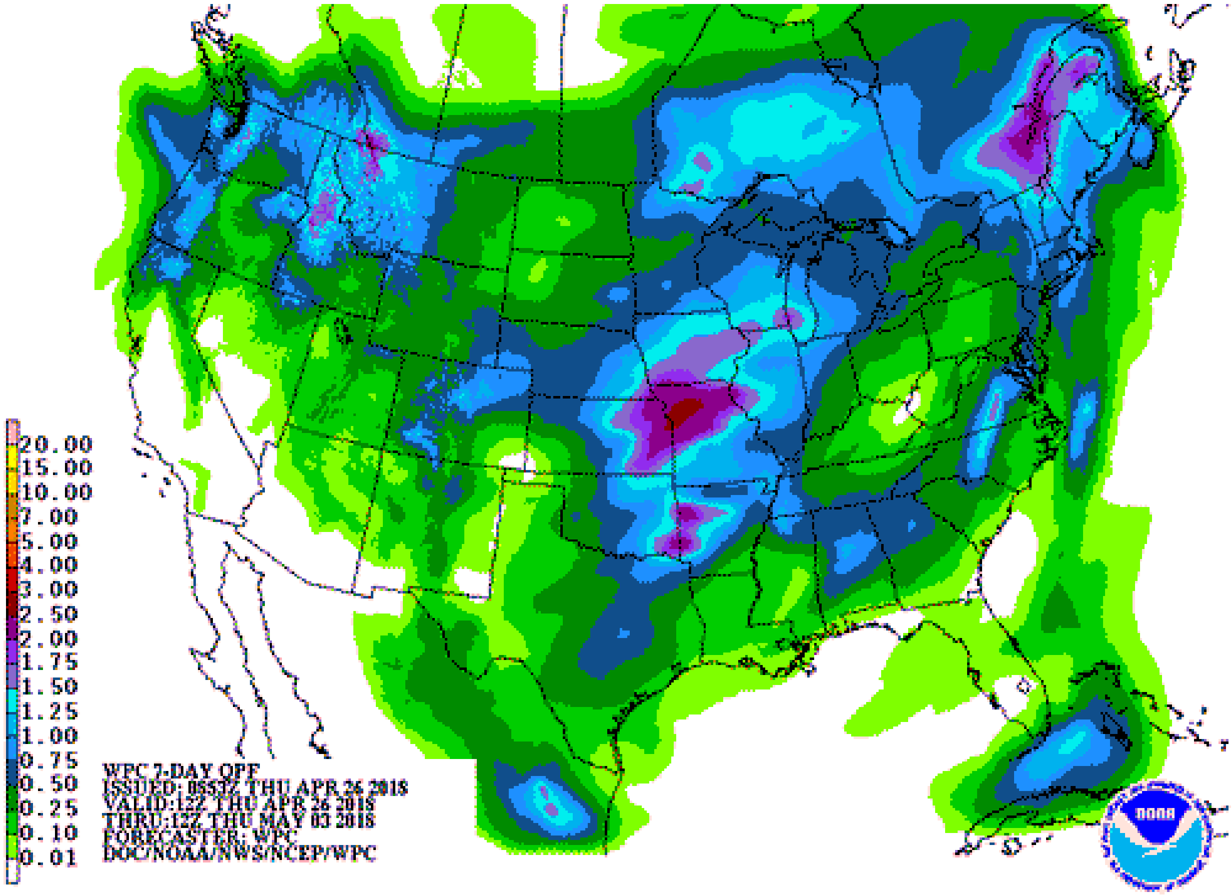

Figure 2. 7-Day outlook precipitation probability for April 26 – May 3. (NOAA)

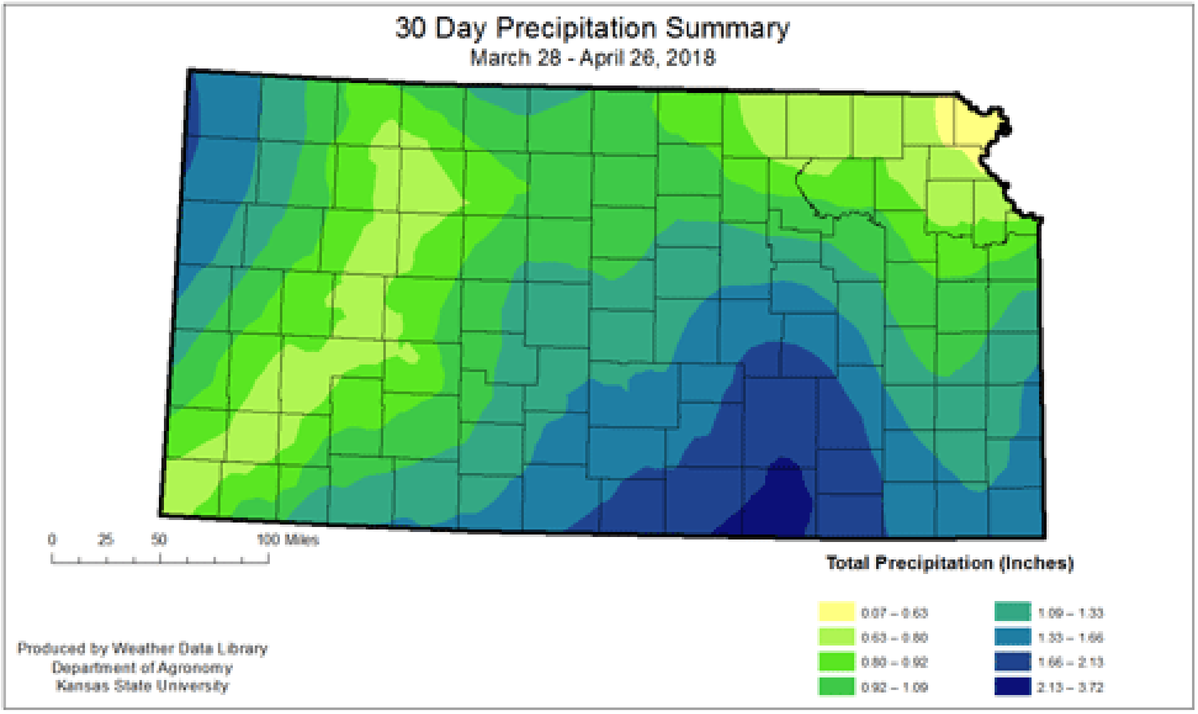

Figure 3. Seasonal precipitation summary for March 28 – April 26, 2018. (Weather Data Library)

The precipitation outlook for the longer term (6-10 and 8-14 days) is calling for a drier-than-normal start to the period in the western parts of Kansas, with an equal chance of above- or below-normal precipitation for the rest of the state (Figure 4, left map). Only the eastern third has a slight chance of above-normal precipitation in the 8-14 day period (Figure 4, right map).

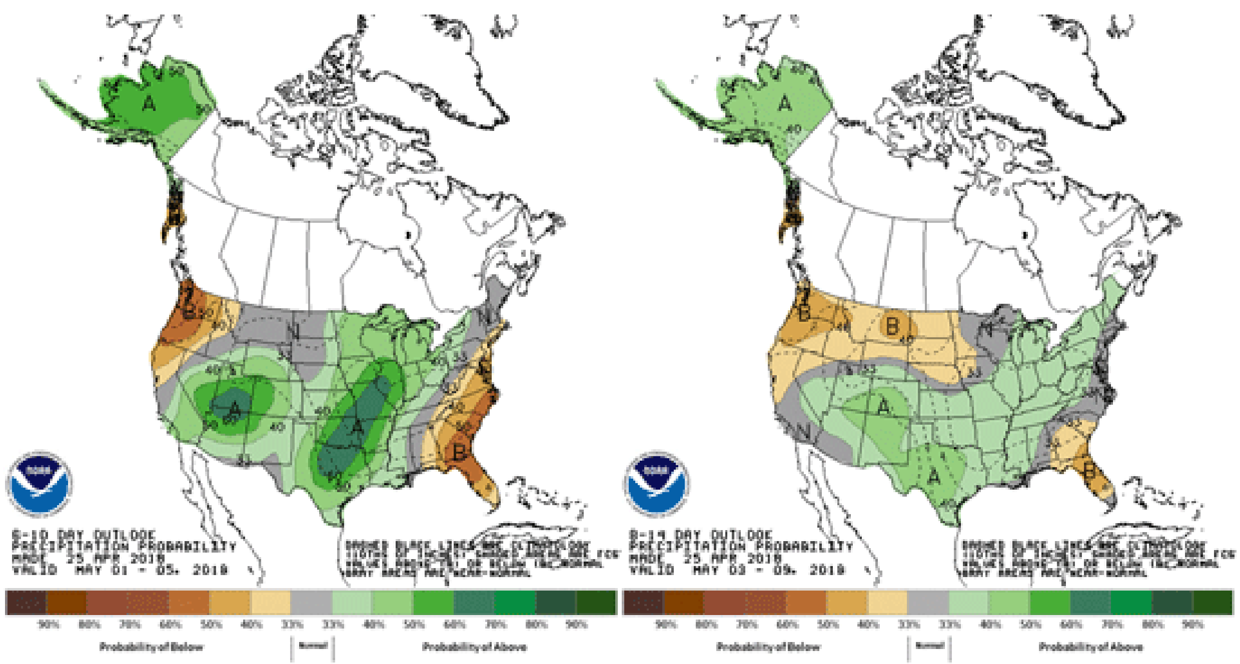

Figure 4. 6-10 (left map) and 8-14 (right map) day outlook precipitation probability. (NOAA)

Optimal soil conditions have a large impact on corn uniformity and early-growth. Lack of uniformity in emergence can greatly impact corn potential yields.

Producers should go back and check corn planted in early-to-mid April to check stand establishment, number of plants emerged as compared to target seeding rate, and early-growth uniformity. If plants did not emerge, dig and check for any seeds that did not germinate or seedlings that died before emergence.

There is still time to plant corn and get good yield potential. If possible, wait and plant under uniform soil temperature and moisture conditions to guarantee a more uniform early-season plant stand.

Stay tuned for more information about corn planting progress and delayed planted corn in upcoming issues of the Agronomy eUpdate.

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9. K-State Composting School - Register by May 4

The Kansas Composting Operators' School provides hands-on training in municipal, agricultural, and commercial large-scale composting for operators and managers of compost facilities who want to gain knowledge and experience in composting. Regulatory staff, environmental consultants, and compost equipment company employees also frequently attend. This year there will be two offerings that will cover the same material but the tours will be different (see below):

- **Hays, May 9-10** – Tour a feedyard and learn about dead animal and manure composting. Classroom is located at the Western Kansas Agricultural Research Center in Hays.
    - Instructors: DeAnn Presley, KSU Agronomy; staff from KDHE Bureau of Waste Management; and Brittany Howell, Fort Hays State University.

- **Winfield, May 15-16** – Tour the city of Winfield's compost facility. Classroom is located at the Cowley County Fairgrounds.
    - Instructors: DeAnn Presley, KSU Agronomy; and staff from KDHE Bureau of Waste Management.

The program includes two full days of classroom and laboratory instruction along with field activities. Field activities will include a demonstration of composting equipment such as a turner, and collection of compost samples for testing for maturity as well as chemical and physical properties.

Training topics:

- Composting science and methods
- Compost biology
- Compost feedstocks
- Food waste composting
- Mortality composting
- Determining compost mixes
- Permit and legal requirements
- Site design and maintenance
- Compost equipment
- Windrow construction and aeration
- Compost moisture
- Field and laboratory monitoring
- Learn to measure moisture, temperature, pH, soluble salts, maturity, interpreting laboratory data
- Compost quality and use
- Methods of composting: static versus active

The fee for the school is $180 and includes lunches, breaks, and training materials. Hotels are not included, however both cities have several options for overnight stay. Payment must accompany registration (payable to KSU Agronomy).

A registration form can be downloaded and printed here. Mail to: Extension Agronomy, 2014 Throckmorton Plant Sciences Center, Kansas State University, Manhattan, KS 66506.

Online registration is available for those who wish to pay with a credit card (additional fees apply), http://www.agronomy.k-state.edu/extension/soil-management/

Registration is due by May 4, 2018. Class size is limited to 20 people so don't wait too long to sign up!

For more information contact DeAnn Presley, 785-532-1218, deann@ksu.edu

Kansas Composting Operators' School

Hays: May 9-10, 2018
Winfield: May 15-16, 2018

K·STATE
Research and Extension

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For information:

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2014 Throckmorton Plant Sci. Ctr.
Manhattan, KS 66506
785-532-1218
email: deann@ksu.edu

REGISTRATION: Kansas Composting Operators' School

Name_______________________________ I prefer to attend (circle): Hays Winfield

Address_________________________________City_______________State_____ZIP_______

Phone_________________________ E-Mail______________________

Company/Agency:____

Please mention any mobility issues or dietary preferences here:________________________________

Fee: $180 – Includes lunches, breaks, and training materials. (Hotels are not included, both cities have several options to choose from). Payment (payable to KSU Agronomy) must accompany registration. Mail to: Extension Agronomy, 2014 Throckmorton Plant Sciences Center, Kansas State University, Manhattan, KS 66506. Online registration available for those who want to pay with a credit card (additional fees apply), http://www.agronomy.k-state.edu/extension/soil-management/ Registration due by May 4, 2018. Class size is limited to 20 people.

10. Kansas wheat management survey - Producer input needed

The Wheat Production Group at Kansas State University has joined forces with the Kansas Wheat Commission to learn from wheat producers around Kansas. We are conducting a **wheat management survey** across several fields around the state so we can analyze and evaluate the collected data later in order to **develop best management practices** for different regions around the state.

On-farm research surveys are different than a typical controlled research experiment as they collect management strategies which a producer has adopted on their individual fields. The **main objective** of this project is to collect field-level information about wheat management for hundreds of wheat fields around Kansas so we can **learn about the most successful management practices adopted for each region**. We are currently collecting data from the past two growing seasons (2015-16 and 2016-17), and from 2017-18 in the near future.

This project is funded through the Kansas Wheat Commission and the **survey can be completed on-line, in person, or over the phone** – whichever is the most convenient for you, the wheat producer. Your identity will be confidential and no personally identifiable information will be associated with your responses. Data will only be presented as aggregated and never on a field by field basis.

If you could spend a few minutes to help us learn more about successfully management practices in your own operation, we would be extremely grateful. You will be helping Kansas State University and the Kansas Wheat Commission **improve our current management recommendations with your own experiences.**

To complete the online survey, please visit: http://kswheat.com/on-farm-research-survey

If you prefer in person or a phone survey, please contact Brent Jaenisch at 785-370-1273 or at bjaenisch5@ksu.edu.

By participating in this survey, you will be automatically entitled to a **detailed report in the end of the project** so you learn about our findings before anyone else.

If you have any questions or concerns don't hesitate to contact us.

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Romulo Lollato, Wheat and Forages Specialist
lollato@ksu.edu

11. 2018 In-Depth Wheat Diagnostic School, May 9-10 in Garden City

K-State Research and Extension will hold the 2018 Wheat In-Depth Diagnostic School on May 9th and 10th at the Southwest Research-Extension Center, 4500 E Mary Street, Garden City. The hours on May 9 are 9 a.m. to 4:30 p.m. On May 10, the hours are 8 a.m. to 2 p.m.

Registration cost is $140 before May 1 and $180 after May 1, including walk-ins. Breakfast and lunch is included with your registration along with an extensive take-home field book.

The latest techniques and technology in agriculture are within your reach! Join us for this year's In-Depth Wheat Diagnostic School to learn from KSRE experts and discover cutting edge breakthroughs in wheat production.

Topics to be covered this year include:

- Wheat growth and development
- Weed management
- Disease identification and management
- Growing 100 bushel dryland wheat in western KS
- Irrigation technology
- Wheat fertilizer management
- Insect management in wheat and canola
- Canola production
- Weed identification
- Production cost of wheat and canola
- Farmer's success story of growing canola in western KS

Speakers at the event include:

- Romulo Lollato
- Stu Duncan
- Dallas Peterson
- Erick DeWolf
- Horton Seed Services representative
- Jonathan Aguilar
- Ajay Sharda
- Dorivar Ruiz Diaz
- AJ Foster
- Sarah Zukoff
- Mike Stamm
- John Holman
- Kevin Donnelly
- Monte Vandeveer
- Tyson Good

This event will also offer Certified Crop Advisory and Commercial Applicator credits.

Interested individuals can register online at http://www.global.ksu.edu/wheat-diagnostic

For registration questions, please contact registration@ksu.edu or call 785-532-5569

2018 In-Depth Wheat Diagnostic School

9:00 a.m. – 4:30 p.m. May 9th *and* 8:00 a.m. – 2:00 p.m. May 10th

Location

K-State SW Research-Extension Center
4500 E Mary Street
Garden City, KS 67846

Cost:

$140 before May 1; $180 for registrations after May 1 and walk-ins. Breakfast & lunch is included with registration and will be provided.

The latest techniques and technology in agriculture are within your reach. Join us for this year's Wheat Diagnostic School to learn from K-State Research and Extension experts and discover the cutting edge breakthrough in wheat production. Registration is $140 before May 1, and includes access to renowned speakers and an extensive take-home field book.

Topics

- Wheat growth and development
- Weed management
- Disease identification & management
- Growing 100 bu. Dryland wheat in Western KS
- Irrigation Technology
- Fertilizer Application Technology
- Wheat Fertilizer management
- Insect Management Wheat & Canola
- Canola Production
- Weed Identification
- Production Cost of wheat & canola
- Farmer's success story in growing canola in Western Kansas

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or
call 785-532-5569.

K-STATE Research and Extension