Issue 744

K-STATE
Research and Extension

Extension Agronomy

eUpdate

04/26/2019

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. 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 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 Soybean, 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

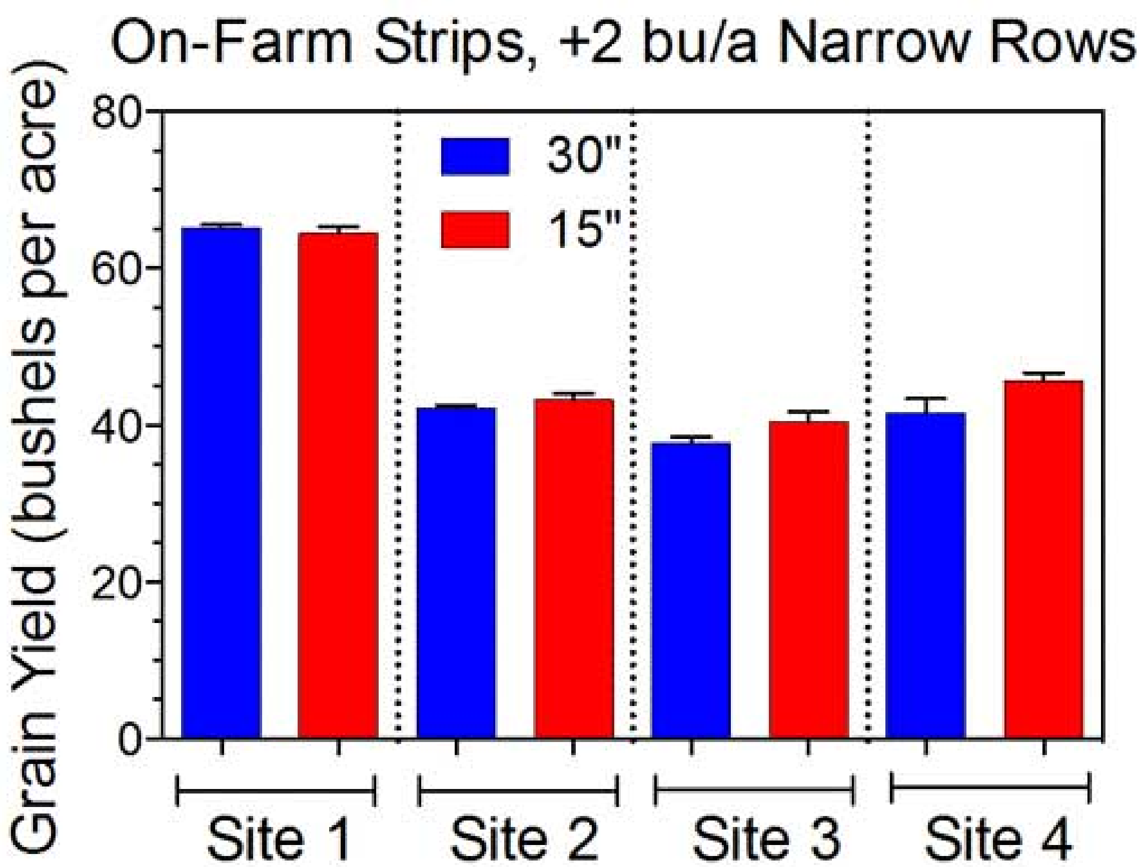
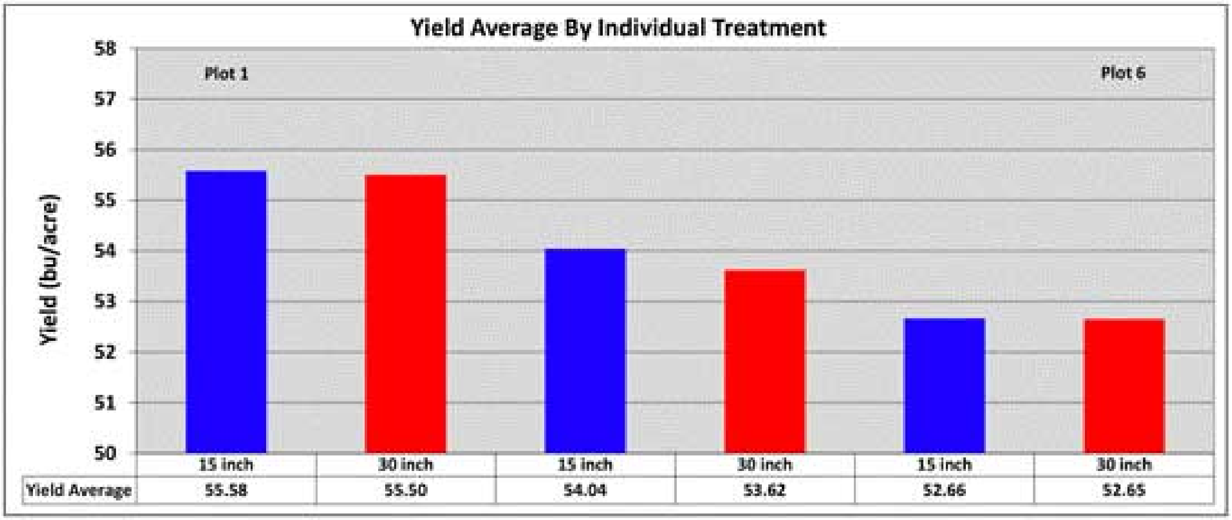


Figure 1. Soybean yield (bushels per acre) by row spacing for conventional (30-inch) versus

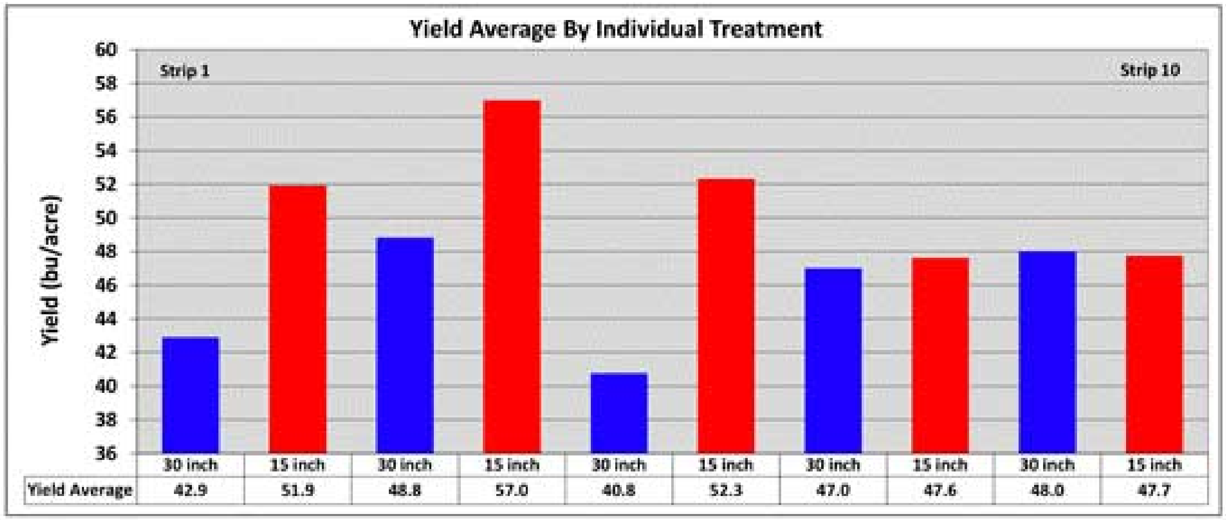
narrow (15-inch) configuration. Graph by Ignacio Ciampitti, K-State Research and Extension.

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. Soil temperature and forecast are critical for successful cotton stand establishment

Cotton has a great ability to overcome many stresses and produce profitable lint yields when the crop gets off to a good, uniform start. So, when is the "best" time to plant cotton to meet those criteria?

First, much as with corn, the goal is to achieve an acceptably uniform and optimal stand. The recommended window for cotton planting is relatively narrow compared to that for other summer crops grown in Kansas – roughly May 1 through June 5. However, it is best to monitor soil conditions rather than the calendar. For a variety of reasons, including seedling chilling, potential herbicide injury, thrips and seedling diseases, it pays to plant when growers can not only get an adequate stand, but also when the crop will grow vigorously.

Soil temperature and the 10-day forecast are two major factors to that fast start. Cotton seed germination and early growth/emergence is favored by soil temperatures above 64 degrees F and adequate, but not excessive, soil moisture. Based on USDA-ARS research work at Lubbock, TX, the seedling cotton requires more than 100 hours above 64 degrees F at the seed level to emerge. In Kansas, we often use 60 degrees F as our baseline temperature at seed level. In addition, growers should be planting high quality varieties (e.g. high cold germination and large seed size, with good cold tolerance and early season vigor ratings).

Information from North Carolina State University's cotton web page illustrating the importance of heat unit accumulation immediately following planting is shown in Table 1.

Table 1. Relationship between predicted DD-60s and Planting Conditions (Source: North Carolina State University, https://cotton.ces.ncsu.edu/)

Predicted DD-60 accumulation for five days following planting	Planting conditions
10 or less	Very Poor
11 – 15	Marginal
16 – 25	Adequate
26 – 35	Good
36 – 49	Very Good
50	Excellent
Avoid planting cotton if the low temperature is predicted to be below 50°F for either of the two nights following planting or predicted daily DD-60s is near zero for the day of planting.	

Cotton seed subjected to cold the first 2-3 days after planting, OR when the seed is imbibing moisture from the soil, is susceptible to imbibitional chilling injury. Cotton seed contains lipids which must be converted to energy, and cell membranes must develop properly. If soil temperatures drop below 50 degrees F during this critical germination period, seedlings may suffer damage. The first 30 minutes after planting, the seed will absorb up to 60% of the water necessary for germination. Cold soil temperatures (<45°F to 50°F) will most likely lead to injury or seedling death. Damage may result in malformed seedlings, loss of or damage to the taproot, and a greater likelihood of seedling disease problems. Injury usually kills the root tip meristematic tissue which stops normal taproot growth and leads to lateral root development (Figure1). If the plants survive, the root system will not develop normally.

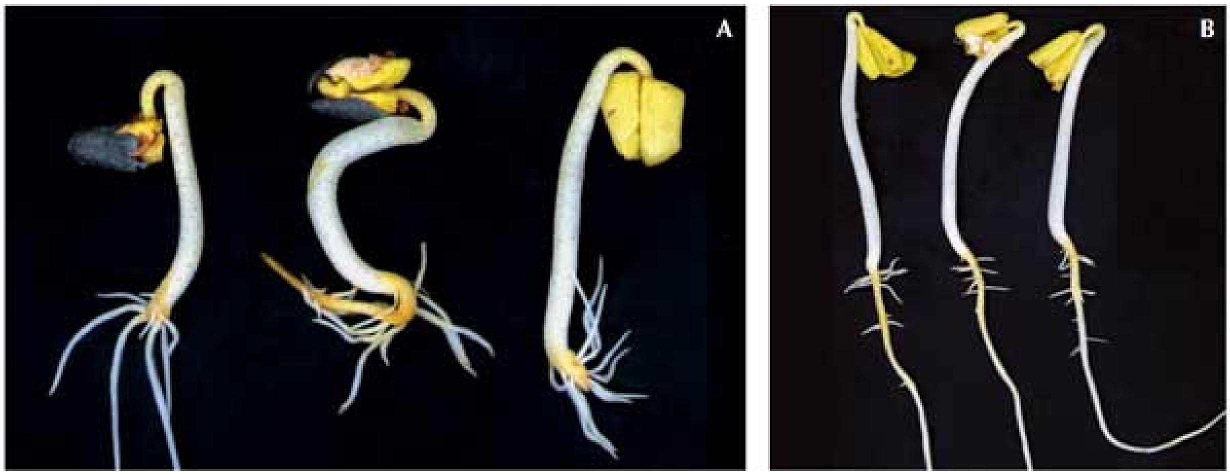

Figure 1. Cotton seedlings subjected to chilling temperatures (A) compared to seedlings not chilled (B) during imbibition from a study conducted by Hopper and Burke. Note the absence of normal taproot growth of the seedlings in A. Seedlings in A and B were exposed to the same temperature (86°F) with the exception of the first six hours of imbibition in which seedlings in A were exposed to chilling temperatures of 40°F. Photos by N. Hopper, Texas Tech University and J. Burke, USDA-ARS, Lubbock, TX.

References

R. Boman and R. Lemon. 2005. Soil Temperatures for Cotton Planting. *Agri*LIFE Extension. Texas A&M System. http://cotton.tamu.edu/General%20Production/scs-2005-17%20Soil%20Temp.pdf

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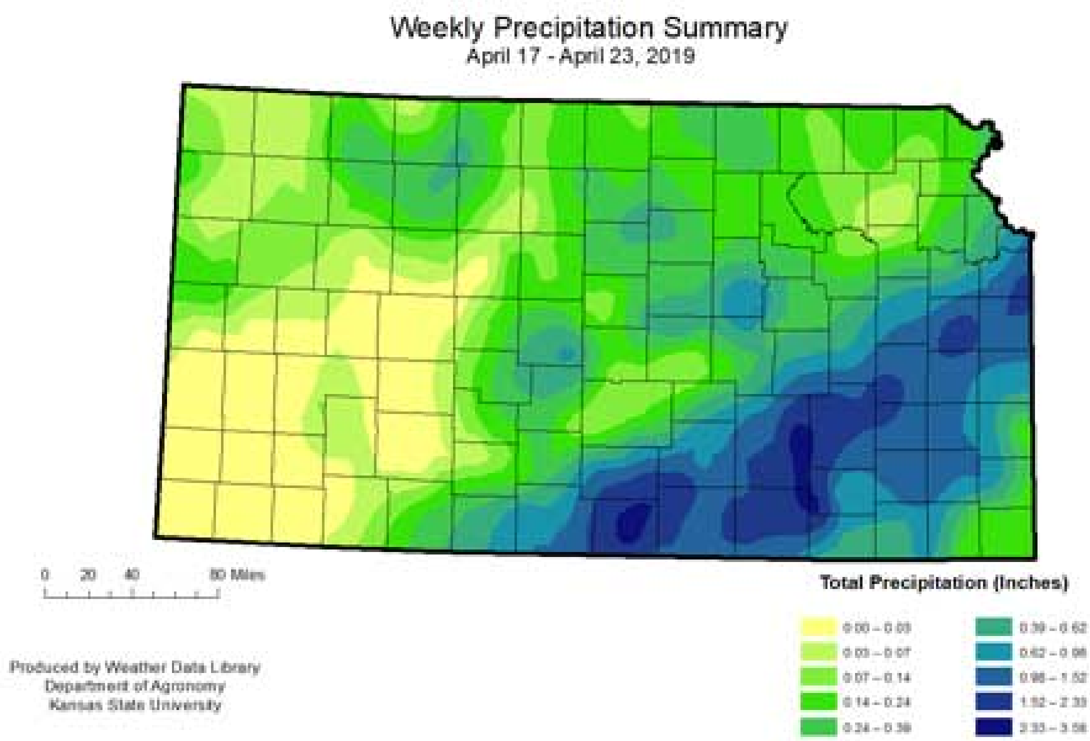
3. Wheat update for April 26, 2019: Precipitation, diseases, and overall condition

As the 2019 wheat crop progresses across Kansas, this article summarizes and highlights current conditions and potential issues.

Precipitation summary

Precipitation was light for the week ending April 23, 2019. Total precipitation during the period ranged from less than a tenth of an inch in southwest Kansas to over 3 inches in a band from south central to east central Kansas (Figure 1, upper panel). These totals ranged from less than 5 percent of normal in southwest Kansas to almost 5 times the normal in portions of south central Kansas (Figure 1, lower panel). The entire state received some amount of precipitation, which was beneficial for the winter wheat crop in some areas, while in other areas that already had enough moisture, the additional moisture likely favored disease development.



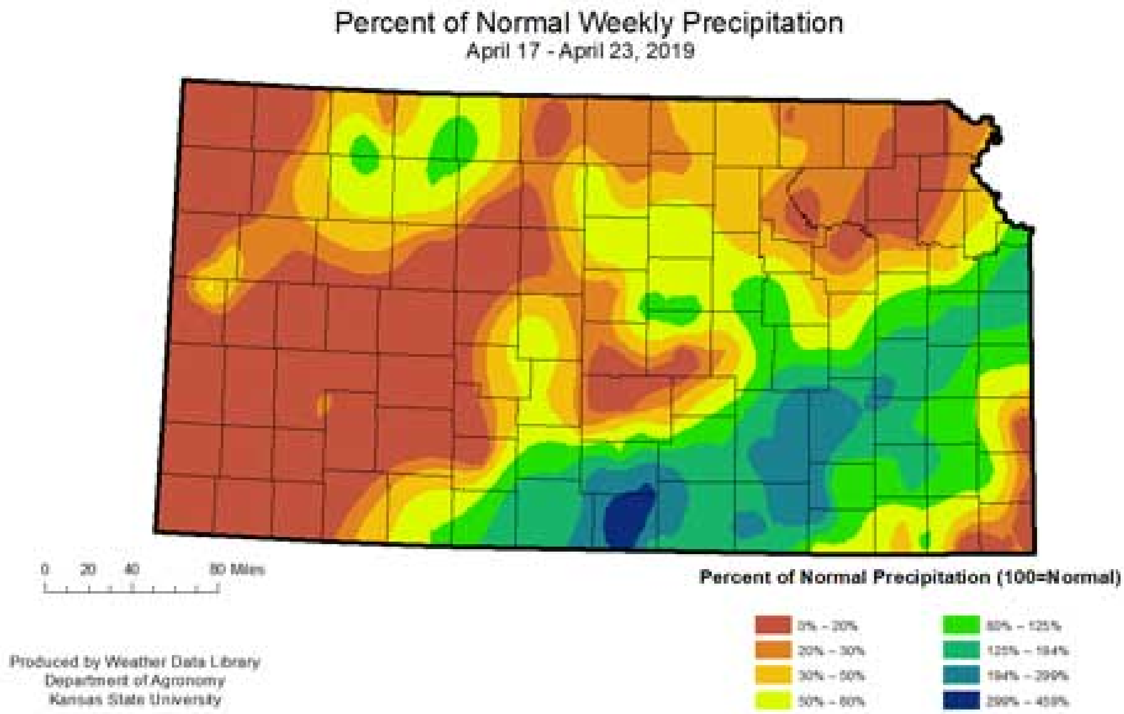


Figure 1. Total (upper panel) and percent of normal (lower panel) weekly precipitation for the period April 17 - April 23, 2019.

Air temperature summary

Mean air temperatures during the April 17-April 23 period ranged from approximately 56 degrees F in northwest Kansas, to close to 62 degrees F in southeast Kansas (Figure 2). This is about 5 to 6 degrees warmer-than-normal mean temperatures for the same period in the northern tier of counties and 4 to 5 degrees higher than average in the southern portions of Kansas.

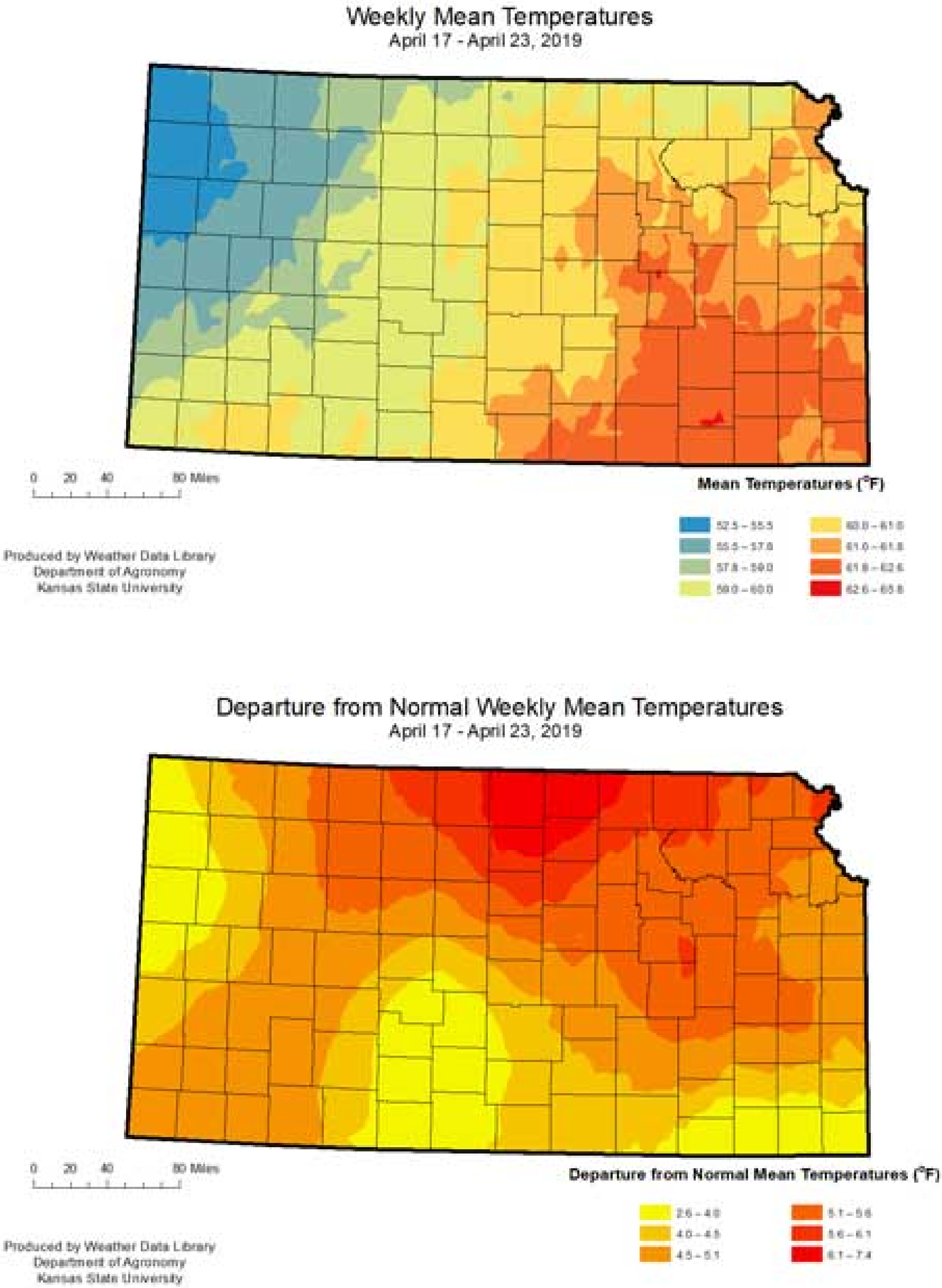


Figure 2. Mean (upper panel) and departure from normal (lower panel) weekly temperature during April 17 - April 23, 2019.

Crop development

Wheat development this year is very dependent on planting date. Due to excessive moisture during the month of October 2018, the Kansas wheat crop was mostly planted either before October 5th or after October 20th. The early-planted crop is moving along fairly well, and many fields in the south central portion of the state are at the flag leaf emergence stage of development. As means of comparison, late-planted fields in the same region are still at the jointing stage of development. Meanwhile, in regions that were cooler throughout the growing season, such as north central Kansas, early-planted fields are reaching the jointing stages of development, while late-planted fields have not yet jointed. The late-planted fields are behind in development, and have much smaller plants than normal. In other words, a field might look like it is still tillering from the road, but upon close inspection, a joint might already be found.

Potential consequences of a relatively late maturity are unknown. Past experience suggests that the late-maturing fields may be subject to greater moisture stress, heat stress, or disease severity during grain fill.

Crop water use

Due to the moisture that accumulated during the fall and winter, most of the state should have decent levels of subsoil moisture. However, due to the limited precipitation in the last few weeks, the topsoil might be drying out.

A dry topsoil can affect both the early- and the late-planted crops differently. For the early-planted crop, the issue relates to water use. In general, crop water use increases with biomass in the spring. Daily water use of wheat can approach 0.25 inches per day between the jointing and boot stages of development, and as much as 0.3 inches per day during anthesis and early grain fill. Thus, a crop with more biomass requires more water. For the late-planted crop, the amount of growth we see above ground often reflects what is happening with root development below the soil surface. The root system of the late-maturing fields is likely shallow and may have limited access to subsoil moisture. Even with sufficient subsoil moisture, the crop might still go through water stress because the roots simply cannot access the lower portions of the soil profile. Moisture stress during early-to-late stem elongation generally results in tiller abortion and reduced head size.

Wheat disease summary

Due to the extended cool temperatures and moist conditions last fall, there are more reports of soilborne mosaic virus across the state than normal (Figure 3). Symptoms of soilborne mosaic include areas of fields with yellow discoloration and stunting. Individual leaves appear yellow or light green with darker green islands. While the yellowing often disappears as temperatures increase, the stunting will likely remain.

Figure 3. Typical symptoms of soilborne mosaic virus in Ellis County, KS. Photos by Stacy Campbell, K-State Research and Extension.

Leaf rust and stripe rust are also present in the state. Survey work this week indicates that these diseases are more common in the south central region, which received more rainfall in early April (Figure 4). With the crop at flag leaf emergence in this region, growers should be checking fields for signs of disease. Seed production fields and fields planted with varieties susceptible to leaf rust and stripe rust are a top priority for scouting. Fields with a good yield potential and leaf rust or stripe rust established in the mid-canopy will likely benefit most from a fungicide application. Recent issues of the eUpdate have articles targeted at fungicide application.

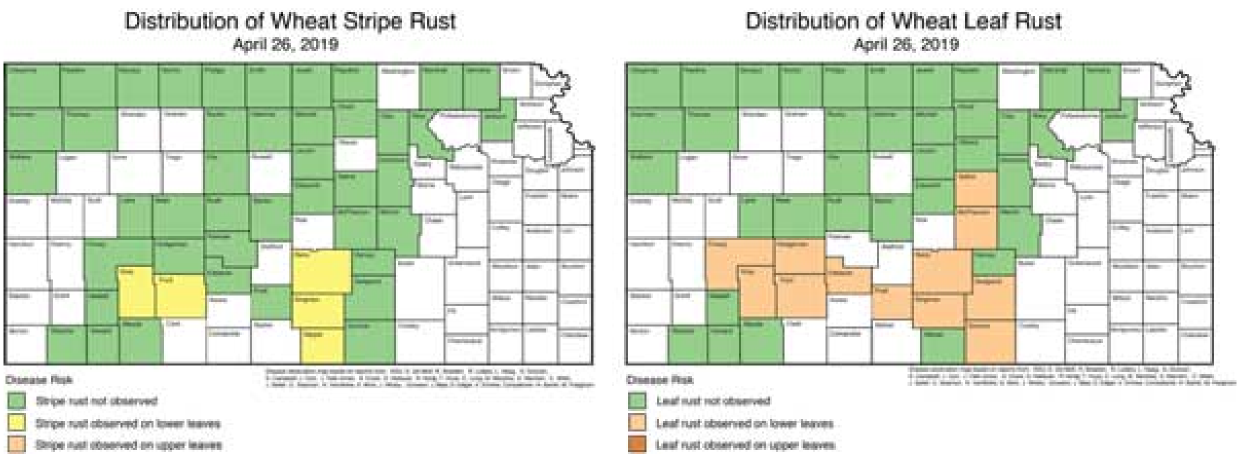


Figure 4. Distribution of leaf rust and stripe rust in wheat, April 26 2019.

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4. Alfalfa weevil update - Continue monitoring

Alfalfa weevil development is/has proceeded quite rapidly, and many fields have required an insecticide application. Pictured here is a representative sample of alfalfa plants from a non-treated field and a close-up from that field.

Using the "stem shake" bucket method of sampling, this untreated field still had an average of 8+ larvae/stem at different developmental stages. Plus, pupation had already begun in that field.

In contrast are the plants representative of a field that was treated on April 5th, which had already exceeded the 1 larva per 2 stems, or 50% infested, treatment threshold. However, larvae are still hatching and developing, and the feeding damage is starting to become apparent again.

Thus, alfalfa fields should continue to be monitored for at least another 10-14 days for the need of a 2nd insecticide application or, if possible, swathing. If insecticide applications are deemed warranted, be sure to check the label for the pre-harvest interval (PHI) requirement for the insecticide used.

For more information regarding alfalfa weevil management please refer to the K-State Alfalfa Insect Management Guide: https://www.bookstore.ksre.ksu.edu/pubs/mf809.pdf

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5. Surefire Canola - New winter canola cultivar now available to Kansas producers

Surefire is a winter canola cultivar that is tolerant to residual sulfonylurea herbicide (SURT) in the soil. This tolerance allows Surefire to be planted in the fall after a spring application of a sulfonylurea herbicide. These herbicides are commonly used in wheat production and they often have lengthy plant-back restrictions for winter canola. Planting SURT cultivars allows producers to avoid plant-back restrictions, and more wheat acres will be available for rotating to winter canola.

Surefire replaces Sumner, which was the first commercial SURT cultivar released in 2003. From 2012 through 2017, Surefire was tested as experimental, KSUR1211, in cultivar performance trials. It was released by K-State Research and Extension in 2017. Surefire is broadly adapted to the southern Great Plains and the Pacific Northwest. Foundation seed of Surefire will be available through the Kansas Foundation Seed Service. Certified seed will be available through licensed seed dealers.

Surefire possesses greater yield potential, is later to 50 percent bloom, and has slightly better winter survival than Sumner. Surefire will have the highest level of sulfonylurea herbicide residual tolerance available on the market as it replaces Sumner. For more information on the performance of Surefire across multiple environments, please follow the link https://www.agronomy.k-state.edu/services/crop-performance-tests/index.html.

The fact sheet details the agronomic characteristics, yield potential, and winter survival of Surefire. You can view and download the Surefire Canola factsheet at:
https://www.bookstore.ksre.ksu.edu/pubs/L940.pdf

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6. Pesticide recordkeeping survey - Applicator feedback requested

Private applicators are required to keep records of their restricted use pesticide (RUP) applications. The classification on several commonly used herbicides to restricted use means more private applicators are in need of an improved mechanism to keep these records.

The Kansas State Pesticide Safety program is trying to collect some data on what producers are wanting/needing to be able to keep more accurate, efficient records. The program has developed a short survey consisting of 7 questions and wants to obtain feedback from across the state. The purpose of this survey is to gather your perceptions related to the use of pesticide recordkeeping books/apps and what you would most likely use. The information you provide will aid us in determining the need and content of a newly developed pesticide recordkeeping book to assist in tracking pesticide application and/or use.

Please go to: https://kstate.qualtrics.com/jfe/form/SV_86r84ilD5huDIUZ to complete the survey and give us your feedback.

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7. Updated K-State fact sheets: "Corn rootworm management" and "Blister beetles in Kansas"

Two KSRE publications related to insect management in Kansas were recently updated and are available to the public. A brief summary of each publication can be found in this article. Full versions of each fact sheet are available online with links provided below.

Corn Rootworm Management in Kansas Field Corn

There are three species of corn rootworms commonly found in Kansas: the southern, *Diabrotica undecimpunctata howardi* Barber; the northern, *Diabrotica barberi*; and the western, *Diabrotica virgifera* LeConte. Southern corn rootworms are the most common adult rootworm found in Kansas, but the western corn rootworm does the most damage to corn because of larval feeding on the roots.

Northern and western rootworm larvae tunnel into corn roots, pruning as they feed. Damage limits uptake of soil nutrients and greatly reduces stress tolerance (Figure 1). Under favorable conditions, plants can regenerate roots with minimal yield loss, but under prolonged poor environmental conditions, losses can be severe. Significant rootworm feeding below ground, followed by strong winds may cause plants to lodge, reducing their ability to harvest sunlight.

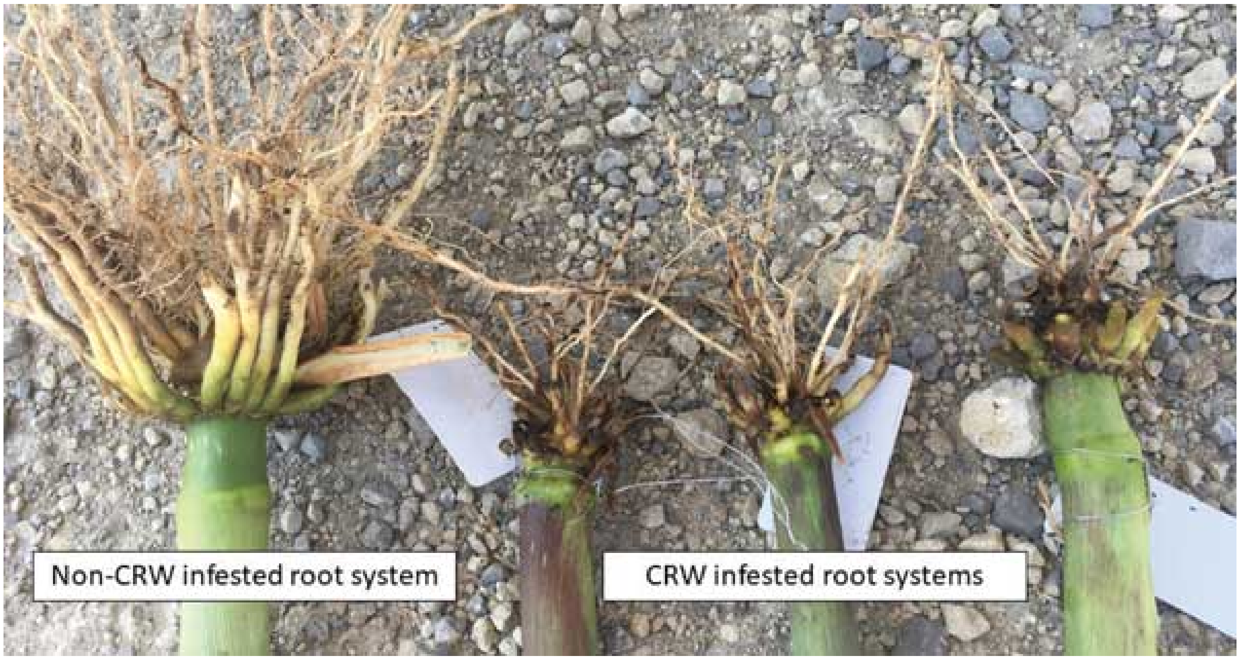

Figure 1. Healthy corn root (left) and corn rootworm (CRW) damaged roots (right). Photos from Extension Entomology, K-State Research and Extension.

For more information on the different management strategies, see the full publication at: https://www.bookstore.ksre.ksu.edu/pubs/MF845.pdf

Blister Beetles in Kansas

Blister beetles, commonly referred to as blister or oil beetles, belong to the family Meloidae. This fact sheet describes the life cycle and habits of the blister beetle, highlighting its importance to agriculture. It addresses common questions about damage associated with blister beetles, most notably adverse effects on horses and other livestock from consuming contaminated hay.

The full publication can be found at: https://www.bookstore.ksre.ksu.edu/pubs/MF959.pdf

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8. Wheat sampling and shipping recommendations for virus testing at K-State

The wheat season is well underway and some growers are concerned about viral diseases showing up in their crops. The K-State Plant Disease Diagnostic Lab is available to help with these diagnoses. Here are some helpful reminders as you prepare samples for the 2019 season.

Our Address:

K-State Plant Disease Diagnostic Lab
1712 Claflin Road
4032 Throckmorton Plant Science Center
Manhattan, KS 66506
785-532-5810
clinic@ksu.edu

1. Use a sealed plastic bag to keep your sample fresh

When collecting your sample, place the plant materials in a plastic bag. Gallon-sized, zip style bags will work for smaller plants. For larger plant samples, a trash can liner or large plastic bag will work well. Be sure for both bags that the top is sealed or tied into a knot to retain moisture. Be sure to send the entire diseased plant (Figure 1) along with healthy plant around the same area to compare. Apart from the freshness of your sample, plastic bags make it easy track and keep different samples separate (healthy vs diseased or separate field locations). Be sure to label your bags appropriately.

Figure 1. A good sample of wheat symptomatic of a viral infection. Photo from K-State Plant Disease Diagnostic Laboratory.

2. Use a second bag to keep the soil separate from the rest of the plant

If you choose not to shake off the soil from the roots, please place a plastic bag around the roots and soil separately and seal with a rubber band, string, or the seal of the bag. This will prevent wet or dry soil from covering the leaves and causing damage. The plant with the bag covering the roots should then be place in the primary bag mentioned in tip #1 (Figure 2).

Figure 2. (Left photo) A poor quality sample with only one bag for the entire sample. The plant leaves have deteriorated from exposure to the wet soil. (Right photo) A good quality sample with two bags. One for the roots of the plant and one for the entire sample. Photo from K-State Plant Disease Diagnostic Laboratory.

3. Refrigerate the sample until shipping

After plants have been take from the field and bagged accordingly, be sure to refrigerate the sample to preserve freshness. Living plants left at warm temperatures in plastic bags will decompose greatly diminishing the quality of the sample. Plants should be keep at around 40 degrees F or the temperature of a regular refrigerator. Please do not freeze the sample.

4. Use packing materials to reduce sample damage during shipping

Many samples sustain damage during shipping if not properly packed. Use extra packing peanuts, newspaper, or pieces of cardboard to prevent movement of the plant sample. When the plants are jostled around during shipping, it is common for them to become mixed with soil. Plants in contact with moist soil rapidly deteriorate making diagnosis nearly impossible.

5. Use express or overnight services for shipping

Time in transit is the enemy of quality diagnostic samples. It is best to use an express carrier or overnight shipping service. Be sure to send the sample early in the week (Monday through Wednesday). Samples sent on Friday may not arrive until mid-week and deteriorate in transit. Shipping samples via standard mail is not a good option for plant samples (Figure 3). In many cases, these samples may be in transit for 7 to 10 days. This long time in shipping often renders samples unusable.

Figure 3. (Left photo) This good quality sample was express shipped. (Right photo) This poor quality sample spent 6 days in the mail. The quality was too low to test and a new sample was requested. Photo from K-State Plant Disease Diagnostic Laboratory.

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