



## Extension Agronomy

# eUpdate

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*10/12/2018*

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](mailto:kgehl@ksu.edu), or Dalas Peterson, Extension Agronomy State Leader and Weed Management Specialist 785-532-0405 [dpeterso@ksu.edu](mailto:dpeterso@ksu.edu).

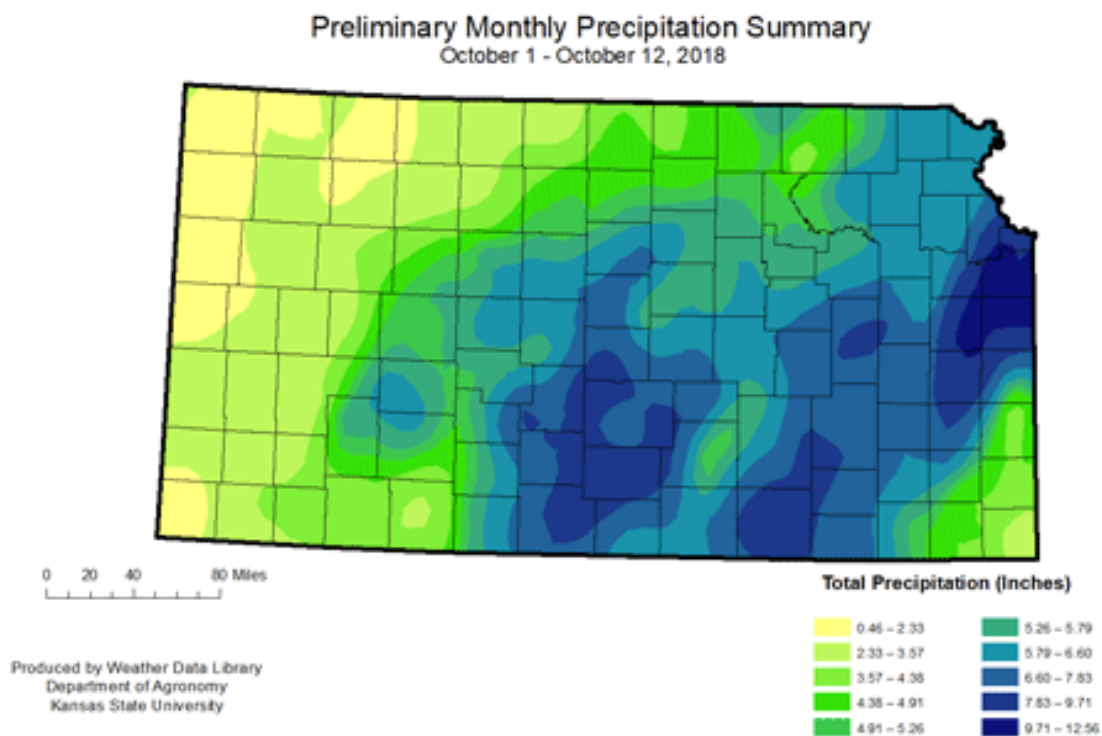
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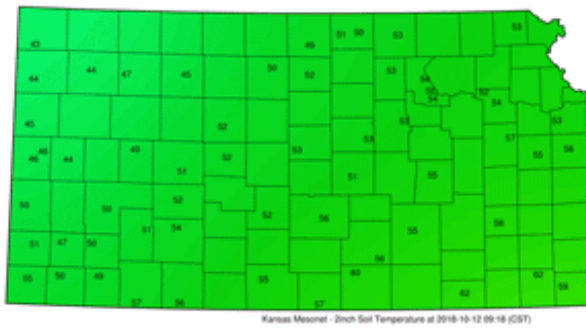
## 1. Rainfall and cold temperatures will potentially delay wheat-sowing progress in Kansas

Precipitation events during October 1 – 12 period brought to the Kansas wheat growing region anywhere from ~0.46 inch precipitation in the far northwest to as much as 9.7 - 12.6 inches in portions of south central and northeast Kansas (Figure 1). This early-October precipitation resulted in fields with a saturated profile for most of the state, but also water logged conditions that stopped fieldwork. In addition to the excessive moisture, air temperatures and soil temperatures decreased during the same period (Figure 2). The change in soil temperatures was also very rapid and some locations experienced a 20 degree F drop in soil temperatures in the last week alone (Figure 3). Decreased soil temperatures during this crucial period can delay wheat emergence and expose seed to a prolonged time of sub-optimal conditions.

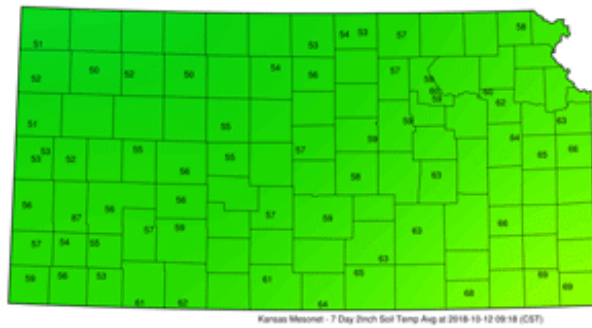


**Figure 1. Cumulative precipitation during October 1 – 12, 2018. Map by K-State Weather Data Library.**

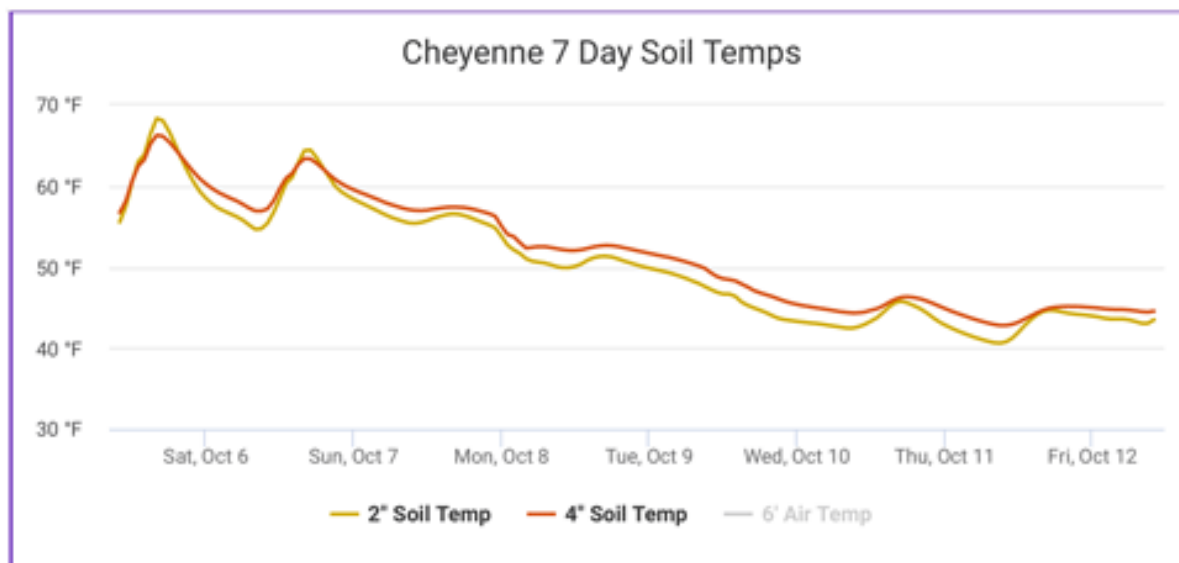
**Current 2" Soil Temperature (°F)**



**Weekly Average 2" Soil Temperature (°F)**

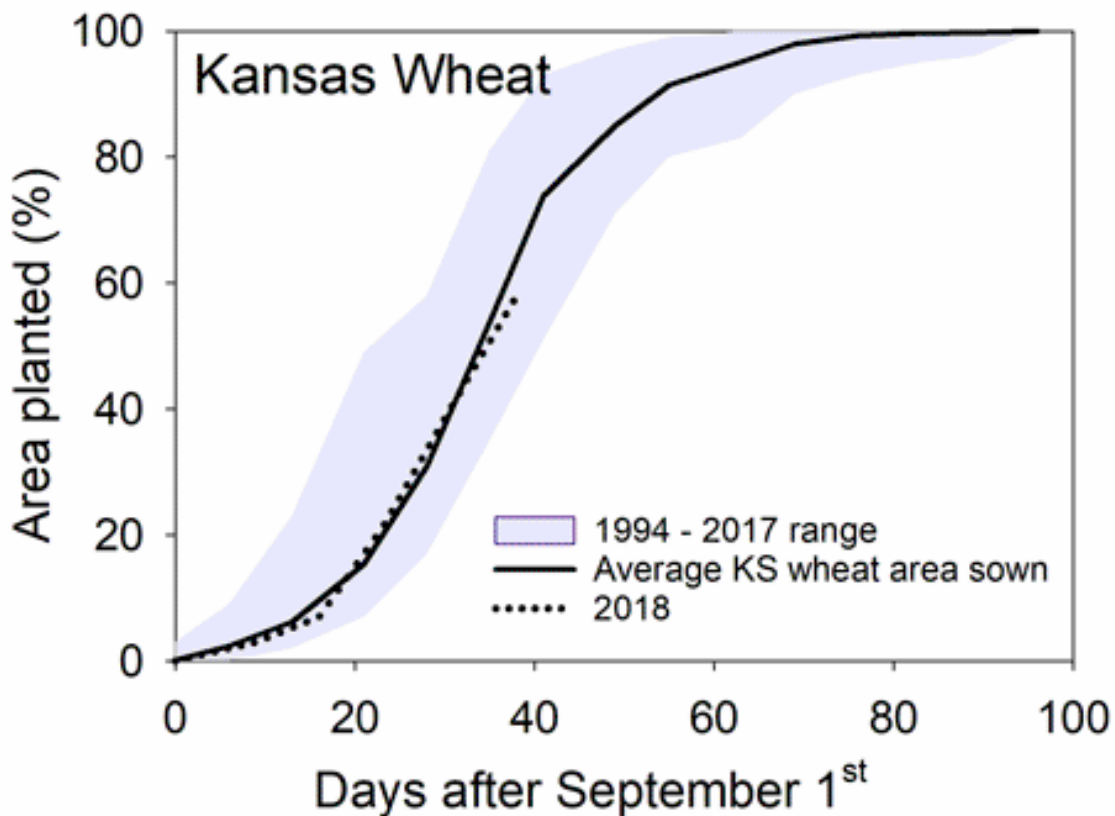


**Figure 2. Current (left panel) and weekly average (right panel) soil temperatures at the 2-inch depth for the State of Kansas. Maps by Kansas Mesonet (<http://mesonet.ksu.edu/agriculture/soiltemp/>).**



**Figure 3. Soil temperatures at Cheyenne at both the 2-inch and 4-inch depth ([mesonet.k-state.edu/agriculture/soiltemp/](http://mesonet.k-state.edu/agriculture/soiltemp/)).**

These suboptimal conditions to field work caused by the excessive rains will probably result in a delay in sowing progress in Kansas, although this delay has not yet been noted in the current USDA planting progress report as of October 9 (Figure 2). If producers are forced to delay sowing past their optimal window, wheat fall growth might be compromised due to less time to tiller, which might require some management adjustments to maximize crop productivity.



**Figure 4. Wheat sowing progress in Kansas during 2018 (dashed line) as compared to the 1994 – 2016 average (solid line) and range (purple area). Wheat area sown in the current year was on par with the long-term average as of the latest USDA report (Oct. 9), but this is likely to change in the next report due to the excessive rainfall conditions around the state. Graph based on USDA-NASS crop report of progress as of October 9, 2018.**

**Management adjustments to consider when sowing is delayed past optimum sowing window include:**

- **Increase seeding rate:** Planting late will decrease the crop's fall tillering potential. Tillering is related to temperature and moisture availability, with higher temperatures resulting in more tillers. As planting is delayed, the crop will have less time to tiller in the fall, thus relying more on the primary tillers. Therefore, we recommend increasing plant population to compensate for the reduced tillering capacity. For every week planting is delayed beyond the end of the optimal planting date range, there should be corresponding increase in seeding rates of between 150,000 – 225,000 seeds per acre (or 10 to 15 lb/acre) in western Kansas, or 225,000 – 300,000 seeds per acre (15 – 20 lb/acre) in eastern Kansas. There is a point of diminishing return, of course, and final seeding rate should not be above 90 pounds per acre in western Kansas and 120 pounds in eastern and central Kansas for grain-only wheat production.
- **Place starter phosphorus (P) fertilizer with the seed:** Phosphate-based starter fertilizer promotes early-season wheat growth and tillering, which can help plants compensate for the delayed sowing date. Additionally, P is less available under colder soil temperatures, which

can result in P deficiency under cold weather conditions. When planting late, producers should strongly consider using about 20-30 lbs/acre of P fertilizer directly with the seed, regardless of soil P levels. This placement method is more effective late in the year because the fertilizer is placed to the seed, allowing rapid access to these critical nutrients.

- **Use fungicide seed treatment or plant certified seed:** Late-planted wheat is sown into colder soils, which generally increases the time needed for germination and emergence to occur. As a consequence, there is increased potential for seed decay and soil borne diseases on seedlings plants. Fungicide seed treatment can reduce the risk of disease for about 3-4 weeks and improve the chances of getting a good stand established. It is important that the seed treatment thoroughly coat the seeds to ensure good protection. For fungicide seed treatment options, please refer K-State's fungicide seed treatment chart available at: <https://www.bookstore.ksre.ksu.edu/pubs/MF2955.pdf>
- **Wheat variety differences:** Wheat varieties with good tillering ability may offset some of the consequences of late planting, as it might still be able to produce one or two tillers during the fall whereas a low- tillering variety may produce no fall tillers. Also, late- planted wheat is typically behind in development going into the winter, which might translate into slower development in the spring. This delay can increase the risk that the crop will be exposed to moisture stress and heat stress during grain filling period that is critical for grain yields. Therefore, selecting an early-maturity variety with good yield potential may help offset the negative consequences of late planting

On a final note, a couple of positive things about the sowing progress delay are that: (i) the majority of the state have a good profile moisture, which will not only ensure good stand establishment but also possibly contribute to wheat grain yield potential; and (ii) late-planted fields are less likely to be infected with wheat streak mosaic, as the wheat curl mite populations would be more active in warmer temperatures generally observed under early planting. Thus, we are probably decreasing the risk of another wheat streak mosaic outbreak due to the delayed planting.

Romulo Lollato, Extension wheat and forage specialist  
[lolato@ksu.edu](mailto:lolato@ksu.edu)

Erick DeWolf, Extension wheat pathologist  
[dewolf@ksu.edu](mailto:dewolf@ksu.edu)

Mary Knapp, Weather Data Library  
[mknapp@ksu.edu](mailto:mknapp@ksu.edu)

Christopher Redmond, Kansas Mesonet  
[christopherredmond@ksu.edu](mailto:christopherredmond@ksu.edu)

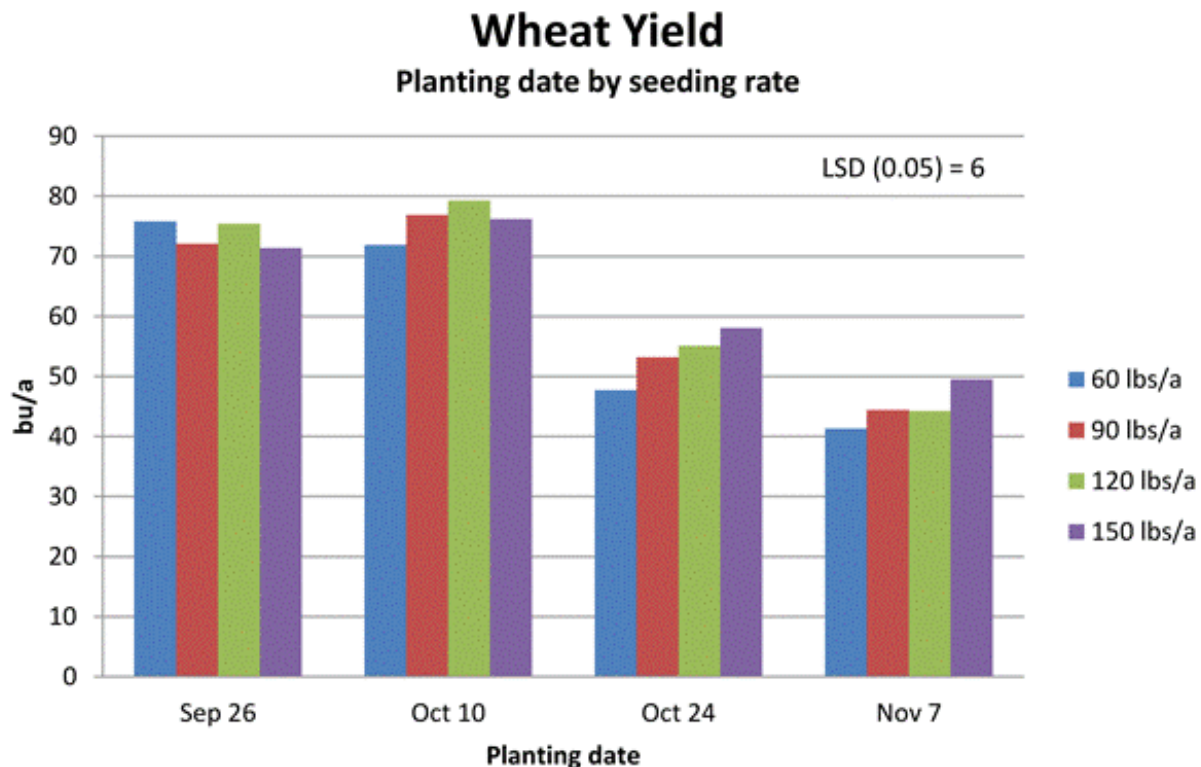
## 2. Wheat planting date and seeding rate research in northwest Kansas

There remain some acres of wheat to be planted across the state due to the recent precipitation. We are past the optimal planting window for many areas of the state, such as northwest Kansas, and are approaching the end of the optimal window in many other areas. What is the effect on yield potential? Can increased seeding rates be used to compensate in the event wheat planting is delayed beyond the optimal window?

It is important to recall that we rely heavily on fall-initiated tillers to contribute to grain yield. Fall tillers are generally more productive than spring tillers and are less prone to abandonment by the plant in the spring if stress conditions occur. Fall tiller initiation is driven by resource availability (namely water and fertility) and temperature. As planting is moved later into the fall the window of opportunity for initiating fall tillers becomes much smaller. In the event of reduced fall tillering the question becomes: Could the use of increased seeding rates maintain yield potential?

To answer these questions, a four-year study was initiated in 2009 at the Northwest Research-Extension Center in Colby and completed in 2012. The results in 2011 were not used due to the dry spring conditions that reduced yields across all treatments. TAM 111 was seeded at four rates (60, 90, 120, and 150 lbs/acre) and at the four planting dates of September 26, October 9, October 28, and November 7. The actual planting date for a particular year was within three days of these planned planting dates. For the Colby area, September 26 would be considered an optimal planting date in most years, and October 10 would be to the latter end of optimal timeframe. October 28 is late for this area while November 7 is very late.

The four-year average yields for each treatment in the study are shown in Figure 1.



**Figure 1. Average 4-year dryland wheat yields for a study conducted in northwest Kansas evaluating planting date and seeding rates.**

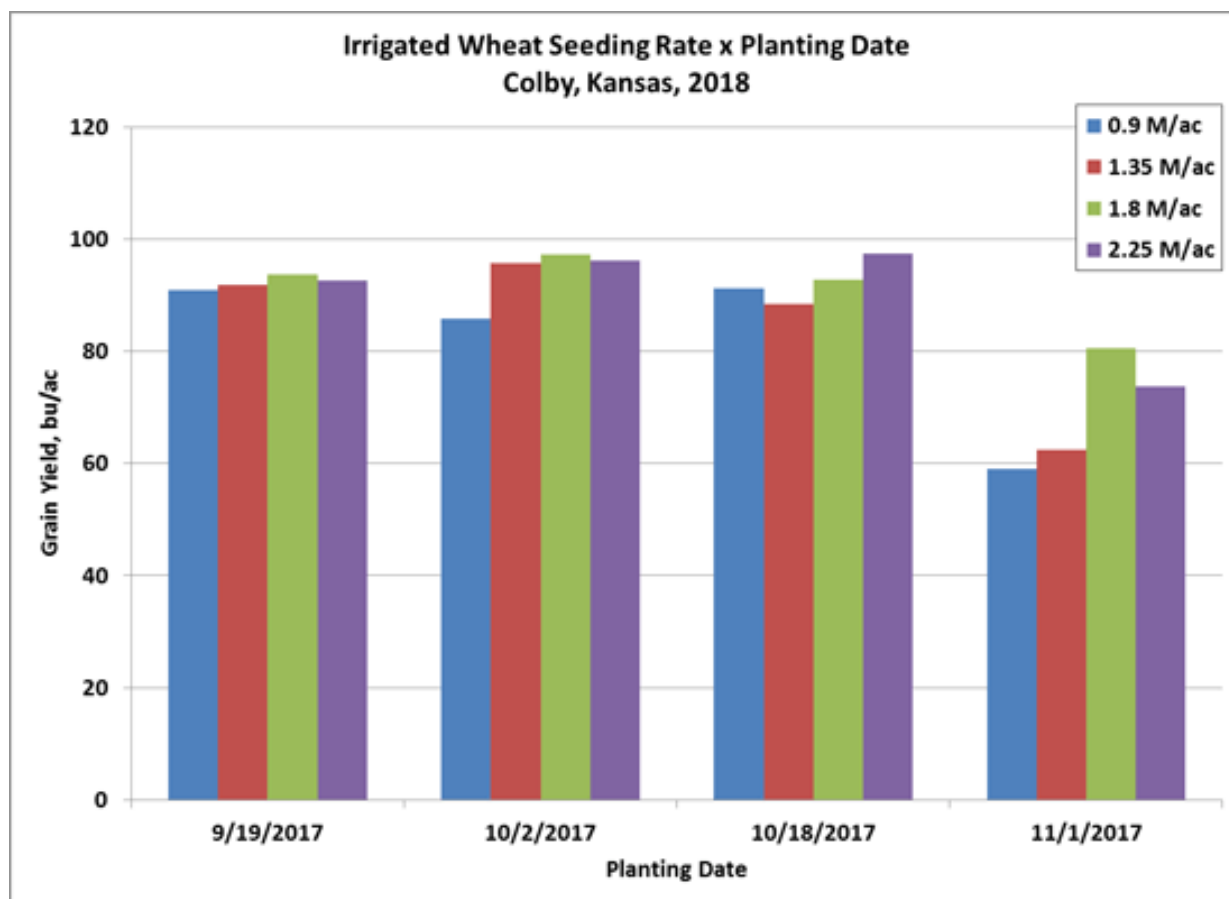
The following conclusions can be made from this study:

- Wheat yields were much higher when planted at the optimal time: Sept. 26 or Oct. 10.
- At the earliest planting date, seeding rate had no effect on grain yield. This is because the plants have plenty of time to tiller, especially at the lower seeding rates.
- At the Oct. 10 planting date, seeding rate did impact yield with the 120 lbs/acre seeding rate yielding more than the 60 lbs/acre rate.
- When planting dates were later than optimal, increasing the seeding rate improved yields significantly. However, the higher seeding rates did not fully compensate for the effect of delayed planting. Even with increased seeding rate, the combined effect of reduced tillering and lack of time for development of the crown resulted in lower yield potential.
- Increasing the seeding rate at late planting dates has the potential to compensate for the decreased tillering potential of wheat planted late, and increases yields compared to the lower seeding rates – although no amount of seed at a late planting date can overcome the overall effects of late planting.

In addition to the dryland study, beginning with the 2017-2018 wheat crop, seeding rate x planting date studies for irrigated wheat were started at Colby (Figure 2). Seeding rates ranged from 900,000 seeds per acre to 2.25 million seeds per acre while planting dates ranged from September 19 to November 1. While only one site-year of data has been collected, it is worth noting that the apparent response to seeding rate with delayed planting appears to be similar for irrigated wheat as was



observed in the dryland study.



**Figure 2. Irrigated wheat yields from 2017 for a study conducted in northwest Kansas evaluating planting dates and seeding rates.**

Brian Olson, Adjunct Professor, former Northwest Area Crops and Soils Specialist  
[brian.olson@monsanto.com](mailto:brian.olson@monsanto.com)

Rob Aiken, Cropping Systems Agronomist, Northwest Research-Extension Center  
[raiken@ksu.edu](mailto:raiken@ksu.edu)

Lucas Haag, Northwest Area Agronomist, Northwest Research-Extension Center  
[lhaag@ksu.edu](mailto:lhaag@ksu.edu)

### 3. Soybean conditions before harvest - Pod shattering

Soybean harvest is moving slow across the state (less than 20% completed, according to the USDA Kansas Agricultural Statistics). Soybean grain-filling conditions were close to optimal in many areas but precipitation and wet weather conditions during the last week can produce harvest delays.

In addition to the delay on harvesting time, a potential for soybean pod shattering can occur before harvest when dry pods are rehydrated under wet conditions and mild temperatures. Alternation of dry and wet periods cause swelling and shrinking that can break the pod (Figure 1). If moisture is reaching the seeds, then there is a high probability of those seeds to sprout. In the case of pod shattering, those seeds that they are fall to the ground represent a yield loss before harvest. A loss of four seeds per square foot on the soil surface represents around one bushel per acre yield loss (Figure 2).



**Figure 1. Soybeans in eastern Kansas exhibiting pod shattering due to excessive moisture and mild temperatures. Photo submitted and used by permission.**





**Figure 2. Example of four soybean seeds on the soil surface in one square foot. This correlates to around 1 bushel per acre of yield loss. Photo provided by Bill Schapaugh, K-State Research and Extension.**

Whenever conditions allow a return to harvest, it would be best to harvest fields presenting potential issues on shattering sooner to reduce this problem and the potential loss in seed quality. Early sprouting reduces overall seed quality.

There are several factors that influence pod shattering including: fertility (lack of it), insect or hail damage to the plants, and weather conditions (the major factor this harvest season). As a management consideration, early harvest and combine adjustments may help reduce potential yield losses on soybeans.

Harvesting beans before the leaves have dropped can be messy and gum up the combine, but at least the yield level will be maintained. Make sure harvesting equipment is sharp and in top condition. Taking it slow in the field can also reduce shatter losses.

Ignacio Ciampitti, Crop Production and Cropping Systems Specialist  
[ciampitti@ksu.edu](mailto:ciampitti@ksu.edu)

Stu Duncan, Northeast Area Crops and Soils Specialist  
[sduncan@ksu.edu](mailto:sduncan@ksu.edu)

Bill Schapaugh, Soybean Breeder  
[wts@ksu.edu](mailto:wts@ksu.edu)

## 4. Sorghum development and potential freeze injury

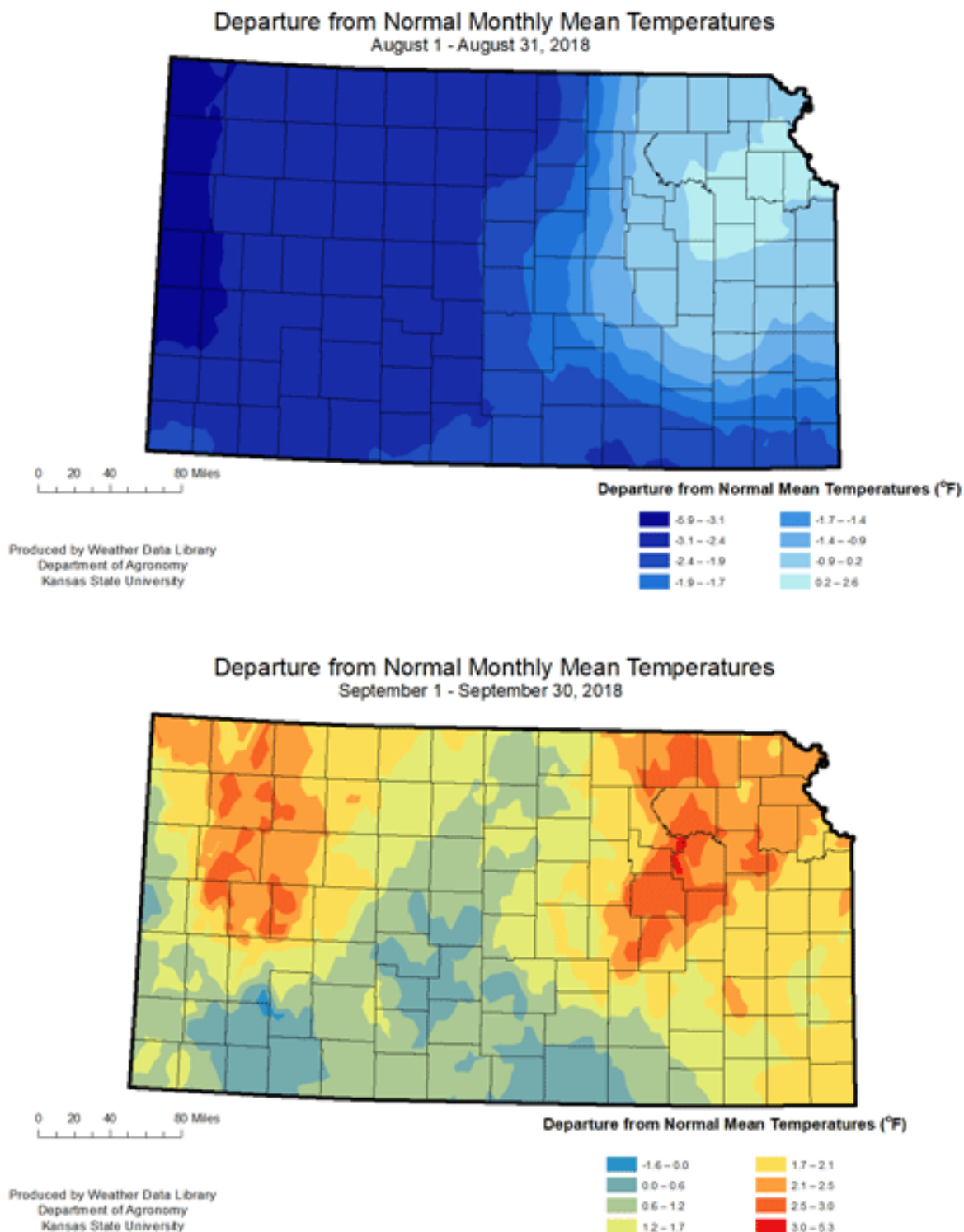
The latest “Crop Progress and Condition” report from Kansas Agricultural Statistics, on October 7, stated that grain sorghum maturity was 70%, ahead of last year and the average. Harvest was also ahead of last year, 16% for this year compared to only 9% in 2017. Nonetheless, wet conditions and mild temperatures will delay harvest in several regions across the state.

Will the remaining sorghum reach maturity before first freeze? The answer is, “it depends.” There are two main factors involved: 1) weather conditions and how they affected the development of sorghum during the season, and 2) crop phenology -- when the crop was planted, hybrid maturity, and the date of half-bloom. Further details on sorghum growth and development can be found at: <https://www.bookstore.ksre.ksu.edu/pubs/MF3234.pdf>

### **Weather component**

Wet conditions at planting time delayed sorghum planting in some areas of the state, delaying heading. During August, cooler-than-normal temperatures dominated the state, with the greatest departure in the northwest at 3 to 6 degrees below normal. The warmest conditions were in the eastern divisions but only a few pockets reached above normal temperatures (Figure 1, upper panel). In contrast, September mean temperatures were above normal across most of the state. Normal to below normal temperatures were concentrated in the central and southern divisions with the coolest areas having a departure of only 2.0 degrees below normal. In contrast, the eastern divisions had departures ranging from 3.5 to almost 5 degrees warmer than normal (Figure 1, lower panel).

A delay in flowering time could jeopardize yields if the crop is exposed to heat around blooming or if low temperatures occur during grain fill. Recent K-State research published by Prasad, Djanaguiraman, Perumal, and Ciampitti found that high temperature stress around flowering time (5-days before and after flowering) could impact sorghum’s final grain number. Also, K-State researcher Vara Prasad and others found that high temperature stress after growing point differentiation (approximately 30 days after emergence) delayed heading and decreased seed set (number and size), affecting final yields.



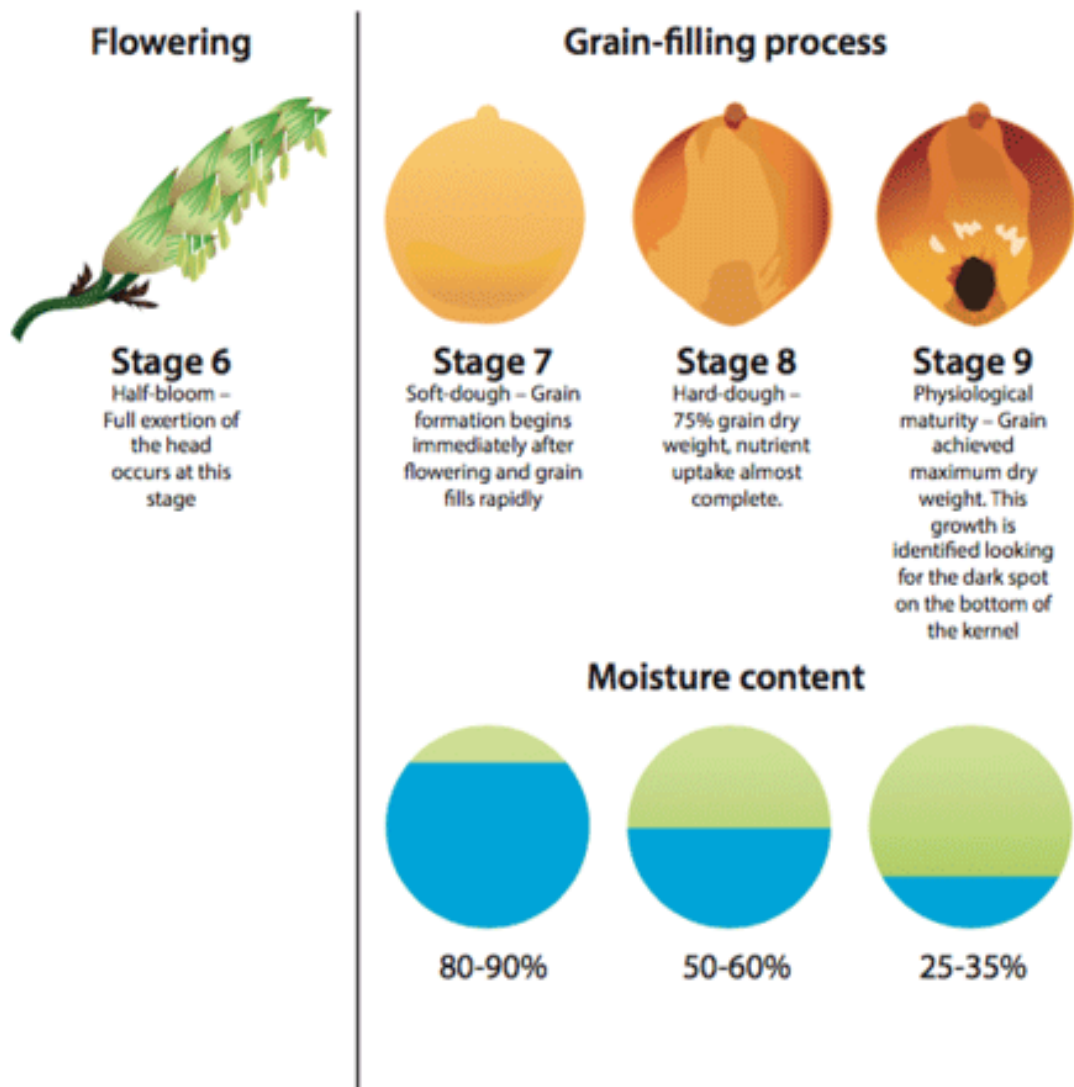
**Figure 1. Departure from monthly mean temperature for the August and September 2018.**

Sorghum is also sensitive to cold temperatures during most of its growth period. Temperatures below 40 degrees F will inhibit sorghum growth. Previous K-State research by Staggenborg and

Vanderlip documented the impact on the grain weight early during the grain-filling period when temperatures were below 30 degrees F. The low temperatures at this time caused lower photosynthetic rates and the inability of the plant to translocate carbohydrates to the developing grains. From mid-August until this current week (Oct. 12, 2018), the lowest minimum were below 30 degrees F in a small area of the western section of the state but temperatures below 35 degrees F for the rest of the counties across the state.

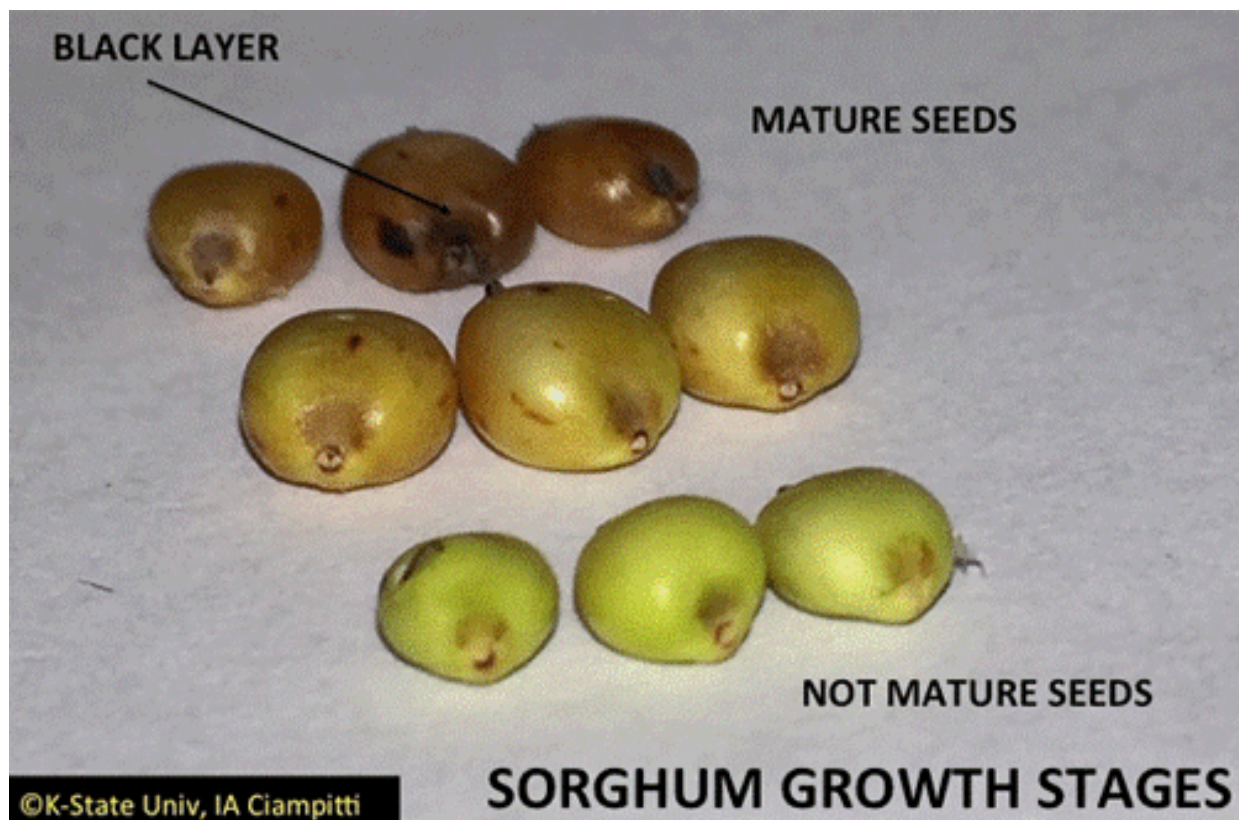
### **Grain sorghum life cycle progression**

The amount of time between emergence and half-bloom will depend on the planting date and the temperatures (cumulative growing degree days) during this period. There are also hybrid differences in the amount of time it takes to go from emergence to flowering. Short-season hybrids have a shorter time from emergence to blooming; while full-season hybrids will need more degree days to reach flowering. The overall cumulative GDD from flowering to maturity is about 800-1200 (based on 50 degrees F as base temperature), with the shortest requirement in GDD for short-season hybrids. Before maturity, from beginning of grain filling (soft dough until maturity), grain moisture content within a grain will go from 80-90% to 25-35% where black layer is usually formed (Figure 2). From maturity (seen as a "black-layer" near the seed base; Figure 3) to harvest time, sorghum grain will dry down from about 35 to 20 percent moisture, but the final maximum dry mass accumulation and final nutrient content will have already been attained at maturity.



**Figure 2. Sorghum growth stages from half-bloom and grain filling (including soft dough, hard dough, and physiological maturity). Infographic representing changes in grain coloration and moisture content during grain filling period until black layer formation, maturity. (K-State Research and Extension)**





**Figure 3. Black-layer identification in sorghum. Photo by Ignacio Ciampitti, K-State Research and Extension.**

The likelihood of sorghum maturing before a freeze is related to all of these factors. When the crop flowers in late August or early September, it may not reach maturity before the first fall freeze in some parts of the state.

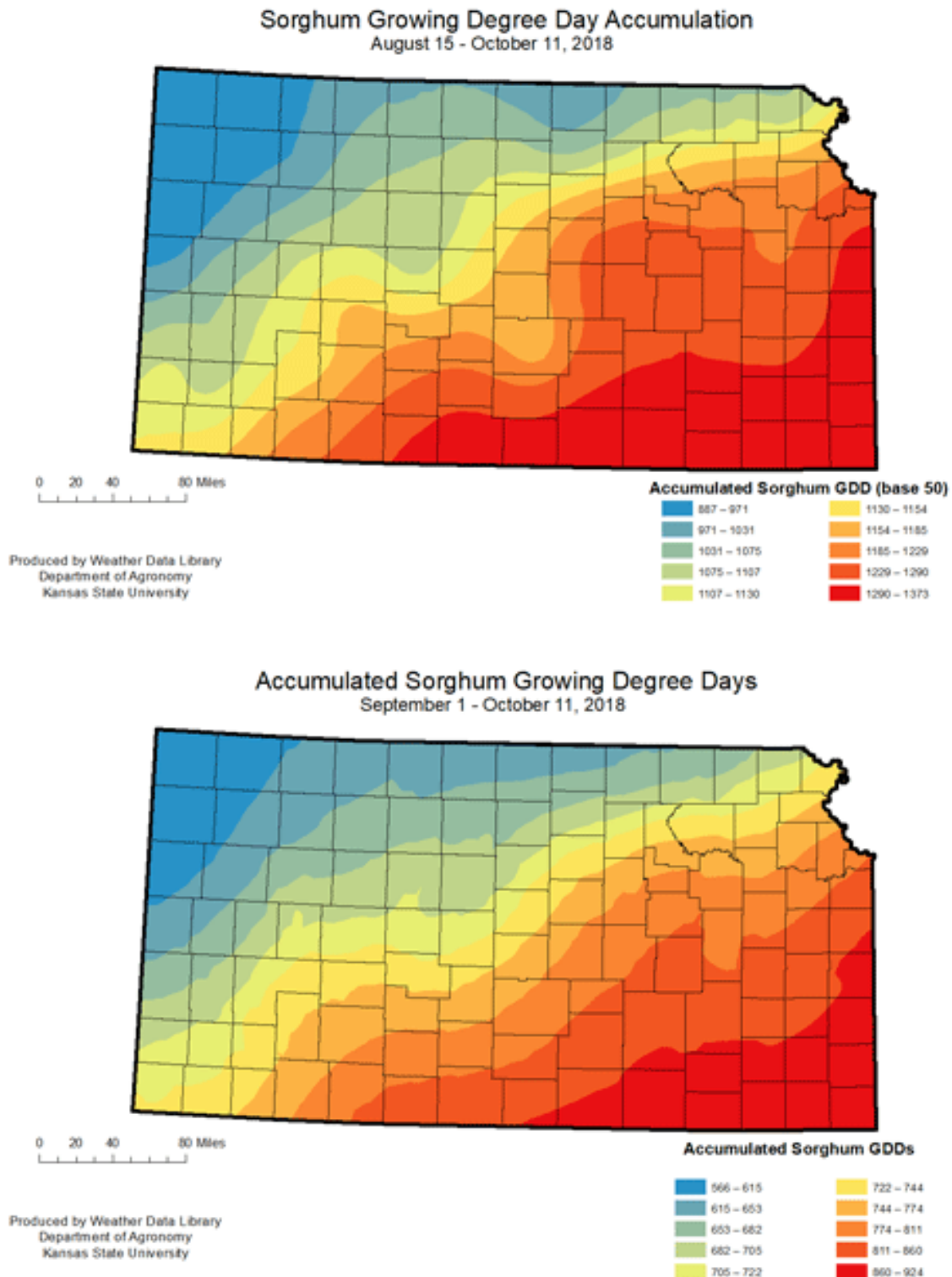
#### **Probability of sorghum maturing before freeze for different flowering dates**

The maps in Figure 4 show accumulated GDDs up to October 11 for the current growing season, starting at two different points: mid-August and early September. Lower GDDs are depicted with blue colors, while higher GDDs are represented in red colors.

If blooming occurred during mid-August, the likelihood for maturing before freeze is high in most of the areas of the state that have accumulated 1100 GDDs (Figure 4). There are some areas of the state where sorghum GDDs accumulation was below 1100 (primarily related to light blue colors in Figure 4). Those areas will have a slight lower chance of maturing (having accumulated less than 1200 GDDs) before the first freeze. A worse picture is projected for the extreme northwestern area of the state (dark blue colors in Figure 4). In this case, there is a lower probability of maturing before the first freeze (low GDDs, <1000) but it will depend also on the hybrid maturity.

If blooming occurred during early-September, the likelihood for sorghum maturing before freeze is low for the southern part of the state (red color in Figure 4), presenting a cumulative GDD from early-September to early-October over 800 units; while the probability is extremely reduced for the

northwestern section of the state, with a cumulative GDD below 650 units.



**Figure 4. Accumulated Growing Degree Days (expressed in degrees F) for August 15-October 11 and September 1- October 11. The maps show that for sorghum that reached half-bloom on September 1, prospects are less certain especially in northwest Kansas. The darker the red, the**

**higher the number of accumulated GDDs.**

### **Management considerations**

From a management perspective, the best way to mitigate this issue is to plan in advance. Recommended practices are just related to improve the use of different hybrid maturity and a different planting date:

- Use early planting dates for full-season hybrids, or
- When planting later, use medium- to short-season hybrids

If the sorghum is killed by a freeze before maturity, producers should first analyze the crop for the test weight and yield potential before deciding whether to graze or harvest the grain sorghum for silage.

For more information see:

“Harvesting Grain from Freeze-damaged Sorghum,” K-State publication MF-1081:

<http://www.ksre.ksu.edu/bookstore/pubs/mf1081.pdf>

“Fall freeze damage in summer grain crops”, K-State publication MF-2234:

<https://www.bookstore.ksre.ksu.edu/pubs/MF2234.pdf>

Ignacio Ciampitti, Crop Production and Cropping Systems Specialist

[ciampitti@ksu.edu](mailto:ciampitti@ksu.edu)

Mary Knapp, Weather Data Library

[mknapp@ksu.edu](mailto:mknapp@ksu.edu)

## 5. Prussic acid in sorghum following a hard freeze

*The following article was written by Brent Bean, Ph.D., Director of Agronomy at the United Sorghum Checkoff Program and is reprinted here with his permission. – Kathy Gehl, eUpdate Editor*

You will likely be getting some questions regarding prussic acid or hydrogen cyanide (HCN) in sorghum following what will unfortunately be a hard freeze in many regions at the start of this week in October.

### **Below are some key considerations:**

1. Prussic acid (HCN) poisoning is more of a concern when grazing sorghum than when harvested for hay or silage because HCN will dissipate in harvested forages if properly ensiled/cured. For **grazing** it is best to wait approximately seven days after the hard freeze to graze.
2. **Sorghum silage** - Most of the HCN will dissipate within 72 hours following warm weather after a hard freeze. However, if HCN levels are high at the time of harvest, wait at least four weeks before feeding the forage. The HCN will volatilize during the fermentation and feed mixing process.
3. **Hay** - The curing process for hay will allow the HCN to dissipate as a gas, reducing the HCN content to safe levels.

### **Testing for Prussic Acid**

1. If high prussic acid concentrations are suspected prior to grazing or at harvest, forage should be tested before grazing or feeding. There are quantitative and qualitative tests available to learn more about the potential for prussic acid poisoning in a particular forage.
2. If HCN levels exceed 200 ppm on an 'as-is' basis or 500 ppm on a dry basis, the forage should be considered potentially toxic and should not be fed as the only source of feed to animals.
3. Contact the forage lab that will conduct the HCN analysis prior to sending in samples so that proper handling procedures can be followed. There are commercial labs available to producers in Kansas to handle this type of testing.

For a more complete discussion, see the Sorghum Checkoff and other links below:

[USCP - Avoiding Prussic Acid](#)

[University of Nebraska - Cyanide Poisoning](#)

[Texas AgriLife - Nitrate and Prussic Acid Poisoning](#)

To monitor the freeze conditions in Kansas, go to the Kansas Mesonet Freeze Monitor tool:

<http://mesonet.k-state.edu/weather/freeze/>

For more information on how to use the Freeze Monitor, please read the recent eUpdate article, "[Fall has arrived and the Mesonet freeze monitor returns](#)", in Issue 712.



## 6. Fall musk thistle control

Musk thistle (*Carduus nutans*) continues to be a common and widespread noxious weed in Kansas. Musk thistle is primarily a biennial or winter annual species. Biennials take two growing seasons to complete their life cycle. Thistles that germinate in the spring will spend the entire summer as a rosette, live through the winter, and bolt the next year in May and June. Winter annual plants will germinate with moisture and warm temperatures in the fall, live through the winter, and bolt the following year.

Most people recognize musk thistle during the early summer when the plants are actively blooming (Figure 1, top photo). However, musk thistle control is easiest as a rosette (Figure 1, bottom photo).



**Figure 1. Musk thistle in flowering and rosette stages of growth. Photo courtesy of Walt Fick, K-State Research and Extension.**

Fall is an excellent time to spray musk thistle as all are in the rosette stage of growth. Another

advantage for treatment in the fall is reduced risk of off-target drift. Waiting until most deciduous trees have lost their leaves and most crops are harvested will greatly reduce the likelihood of damage from herbicide drift. A wider window of opportunity for treating musk thistle also exists in the fall. The spraying window in the fall probably extends until the ground is frozen and the musk thistle plants have shut down activity until warmer temperatures in the spring. Freezing temperatures will start to damage musk thistle plants, with some yellowing and curling of leaves. However, the plants are susceptible to herbicides as long as green tissue exists.

Studies in Kansas indicated that a fall application of 2,4-D LVE at 2 lbs per acre was more effective (80% control) than a similar rate of 2,4-D amine (49% control). Dicamba + 2,4-D amine at 0.25 + 0.75 lbs per acre and picloram at 0.125 lbs per acre were also effective (>90% control) on musk thistle treated in the fall.

Data presented in Table 1 were collected in July 2013 following treatment on December 6, 2012. Conditions at the time of treatment were 50 degrees F air temperature, 66% relative humidity, and 6-8 mph wind speed. Skies were overcast and cloudy. All treatments provided excellent control of rosettes present at the time of spraying (data not shown).

The data in this table reflect residual control of rosettes that germinated during spring 2013. The number of rosettes on untreated plots increased 92% between December 2012 and July 2013, indicating spring germination. The only treatment not providing nearly 100% residual control was 2,4-D LVE applied at 64 fl oz per acre. The active ingredient in Milestone is aminopyralid. Tordon 22K contains 2 lbs per gallon picloram. Chaparral contains aminopyralid and metsulfuron. These products are all labelled for use on range and pasture. Milestone, 2,4-D, and Tordon 22K are also labeled for use on non-cropland sites including roadsides, right-of-ways, and industrial sites. Opensight was not included in this test, but is a product similar to Chaparral that can be used on non-cropland sites.

**Table 1. Musk thistle control with herbicides applied on December 6, 2012.**

<b>Herbicide</b>	<b>Rate</b>	<b>% control, July 5, 2013</b>
Milestone	3 fl oz	99
Milestone	4 fl oz	100
Milestone	5 fl oz	100
Tordon 22K	10 fl oz	100
2,4-D LVE	64 fl oz	43
Chaparral	1.5 oz	100
Untreated	---	0

If you need to treat musk thistle this fall, herbicides exist that will not only control the rosettes at the time of application, but will carryover and control new emerging rosettes next spring. If possible, select a warm, sunny day when spraying musk thistle this fall.

Walt Fick, Rangeland Management Specialist  
[whfick@ksu.edu](mailto:whfick@ksu.edu)



## 7. 2018 corn hybrid performance available online at myFields.info

Each year, the K-State Agricultural Experiment Station and Cooperative Extension Services release corn performance [data from replicated trials](#) as part of the publication, "Report of Progress: Kansas Performance Tests with Corn Hybrids". For 2018, the publication authors have generously shared data with the K-State myFields project team prior to the publication release.

The hybrid data can be viewed on the [Demonstration Plot tool](#) at [myfields.info](#). Choose a plot location from the map to view a table view of top yielding hybrids, county average comparison, and charts of hybrid yield across locations. For more instruction on tool use, visit the myFields features page [here](#), or refer to the infographic below.

myFields

## How to use the Demonstration Plot tool



### 1 Visit [myFields.info](http://myFields.info) to view tool options on the homepage, click on Demonstration Plot tool

This tool displays Kansas State University corn performance data by year and location.



### 2 Click on a plot location of interest to see corn data

Hover over a red point to get the link to view this location's hybrid data. You can compare a hybrid across locations in the next step.

### 3 Compare/explore hybrid yields

See the county average (blue) and top yielding hybrids (orange) at the top of the table. Click on hybrids to view yields across locations within a rating year.

State	County	Hybrid	Year	Rating	Yield	Location	Selection
KS	Johnson	Argonne	2015	Top 100	100.0	2015-10-10	100.0
KS	Johnson	Argonne	2015	Top 100	97.0	2015-10-10	97.0
KS	Johnson	Argonne	2015	Top 100	95.0	2015-10-10	95.0
KS	Johnson	Argonne	2015	Top 100	93.0	2015-10-10	93.0
KS	Johnson	Argonne	2015	Top 100	91.0	2015-10-10	91.0
KS	Johnson	Argonne	2015	Top 100	89.0	2015-10-10	89.0
KS	Johnson	Argonne	2015	Top 100	87.0	2015-10-10	87.0
KS	Johnson	Argonne	2015	Top 100	85.0	2015-10-10	85.0
KS	Johnson	Argonne	2015	Top 100	83.0	2015-10-10	83.0
KS	Johnson	Argonne	2015	Top 100	81.0	2015-10-10	81.0



KANSAS  
CORN

Drs. Ignacio Ciampitti (Agronomy) and Brian McCornack and Wendy Johnson (Entomology) lead this project. We have also collaborated with Jane Lingenfelser, Agronomist, Crop Performance Testing (Agronomy).

Kansas State University Department of Agronomy

2004 Throckmorton Plant Sciences Center | Manhattan, KS 66506

[www.agronomy.ksu.edu](http://www.agronomy.ksu.edu) | [www.facebook.com/KState.Agron](https://www.facebook.com/KState.Agron) | [www.twitter.com/KStateAgron](https://www.twitter.com/KStateAgron)

Brian McCornack, Extension Entomologist  
[mccronac@ksu.edu](mailto:mccronac@ksu.edu)

Ignacio Ciampitti, Crop Production and Cropping Systems Specialist  
[ciampitti@ksu.edu](mailto:ciampitti@ksu.edu)

## 8. Agronomy seminar on using industrial hemp as a commodity crop, October 16

The Department of Agronomy at K-State is hosting a special seminar on industrial hemp production and all are invited to attend this free event. Dr. David Williams will present **“Industrial Hemp as a Modern U.S. Commodity Crop”** on **Tuesday, October 16 at 3:30 pm** in room 1018 in Throckmorton Plant Sciences Center, Manhattan. Refreshments, provided by the Kansas Department of Agriculture, will be served prior to the seminar at 3:00 pm.

Dr. Williams, professor of agronomy, is also the Director of the Robinson Center for Appalachian Resource Sustainability at the University of Kentucky. He has lead the industrial hemp agronomic research efforts at UK since 2014. Research at the Robinson Center has included agronomic and production management for fiber, oil, and CBD production. He will share their experiences and his view of current knowledge gaps.

# Industrial Hemp as a Modern U.S. Commodity Crop

**October 16th**  
**3:30 pm**

Kansas State University  
Throckmorton Plant Sciences Center  
Room 1018



**Speaker: David W. Williams, Ph.D.**  
Professor of Agronomy and Director  
University of Kentucky Robinson Center for Appalachian  
Resource Sustainability

Dr. Williams has lead the industrial hemp agronomic research efforts at UK since 2014. Research at the Robinson Center has included agronomic and production management for fiber, oil, and CBD production. He will share their experiences and his view of current knowledge gaps.

**Refreshments will be  
served in the lobby  
at 3:00 pm,  
sponsored by the  
Kansas Department  
of Agriculture**



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Kansas State University Agricultural Experiment Station and Cooperative Extension Service  
K-State Research and Extension is an equal opportunity provider and employer.

## 9. 2018 Kansas Soybean Yield and Value Contest

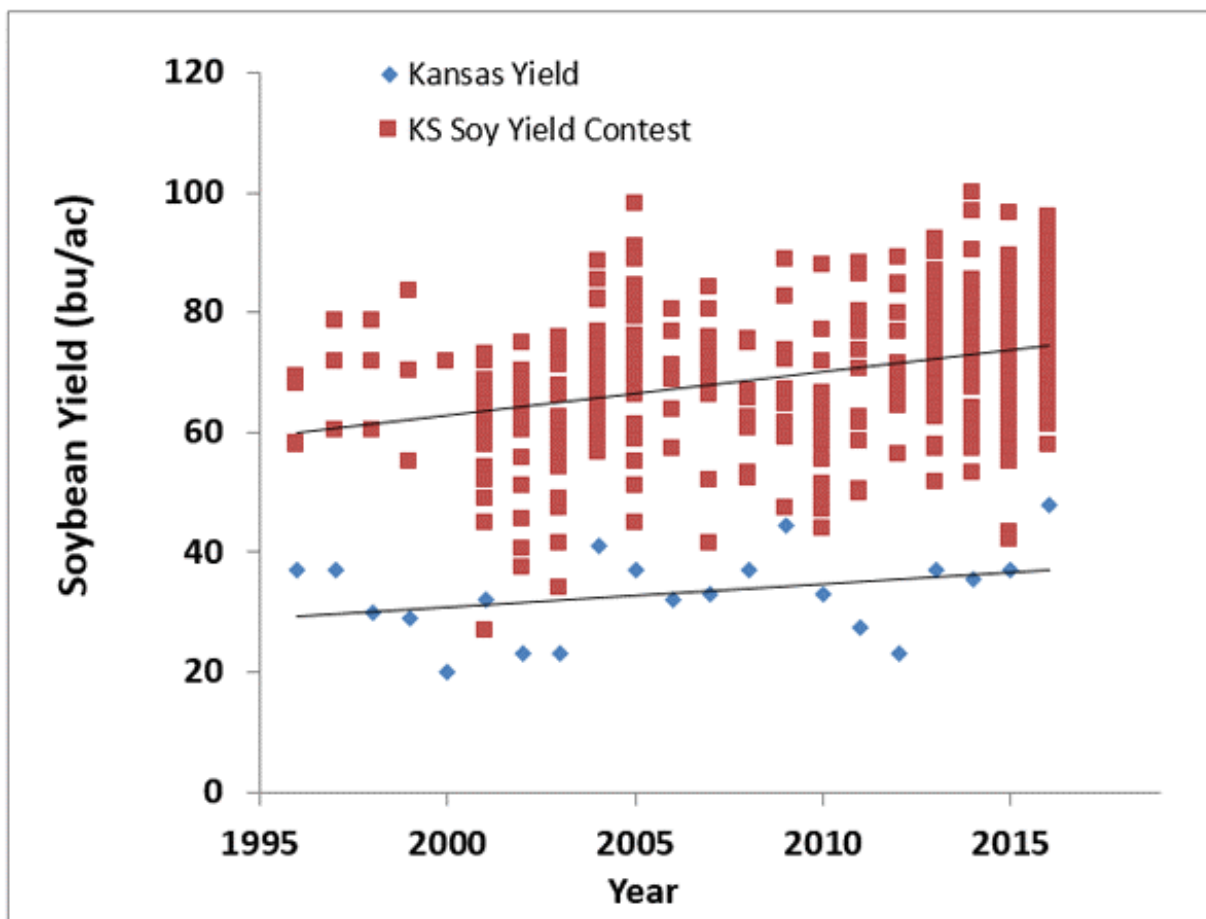
Soybean harvest is just beginning in Kansas. It is a good idea for producers to keep in mind the Kansas Soybean Yield and Value contest as they fire up the combines.

Each year the Kansas Soybean Association, with help from K-State Research and Extension, and sponsorship from the Kansas Soybean Commission, conducts the Kansas Soybean Yield and Value Contest. The contest is a fun way for producers to showcase their high yielding and high quality soybean with other growers in Kansas and to provide information on what production practices they did to achieve those excellent yields. In addition to grower recognition, cash prizes are awarded to the 1st, 2nd, and 3rd place winners for the 9 districts across Kansas and the top three finishers in the quality contest. Contest rules and entry forms are found online at:

<http://kansassoybeans.org/association/contests/>

The yield contest first began in the early 1980's but more detailed historical data began in the early 2000's. When growers submit entry forms for the contest, they are asked to share some of their production practices that they used on the soybean crop. Using this information, we can identify shifts in producer practices over the last two decades from high yielding soybean growers.

When comparing yields over the last 20 years, state soybean yields have improved almost 8 bushels per acre (bu/acre) while contest entrants have gained nearly double that (15 bu/acre) in the same span of time (Figure 1). This indicates that soybeans are a crop that can be managed for higher yield when proper high yield practices are adopted. The 2017 state-average yield was 37.5 bu/acre versus average yield contest of 79 bu/acre, with an average yield gap between high yield and state-average close to 42 bu/acre, previous year gap was 37 bu/acre.



**Figure 1. Difference in yield between state-average as reported by Kansas Ag Statistics and the entries in the Kansas Soybean Yield Contest from 1996 to 2016.**

A few soybean production practices have changed over time as well. Over the last decade, producers in the soybean yield contest have moved to a lower seeding rate (Figure 2). In 2001, seeding rate averaged just over 165,000 seeds per acre while recently, seeding rates dropped below 150,000 seeds per acre, with an estimated annual rate of seeding rate drop of 1044 seeds/acre per year since 2000 (Figure 2). This may be a function of seed prices increasing over time and producers have more confidence in final plant stand with improved planting equipment and seed treatments. In addition to seeding rate changes, soybean row spacing has also seen a decline over time with narrower rows (<30 in) being adopted more by growers in the Kansas Soybean Yield Contest (Figure 3). This decline is likely due to reduction in use of drills and the increase use of planters to sow soybean.



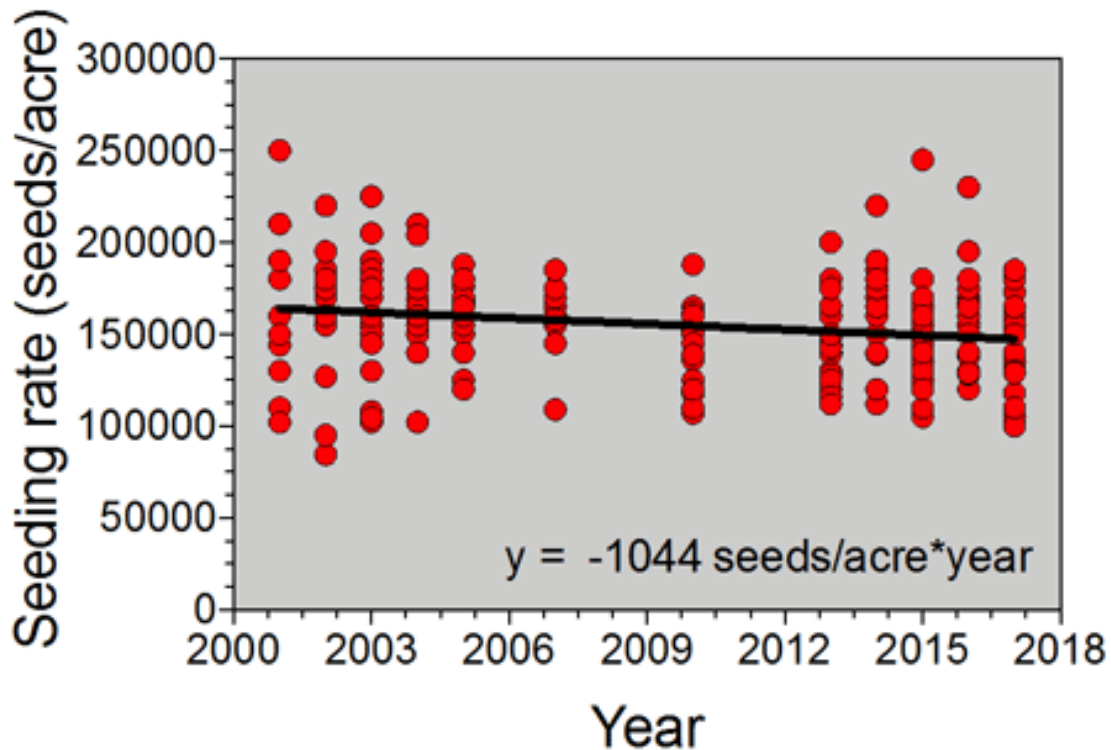
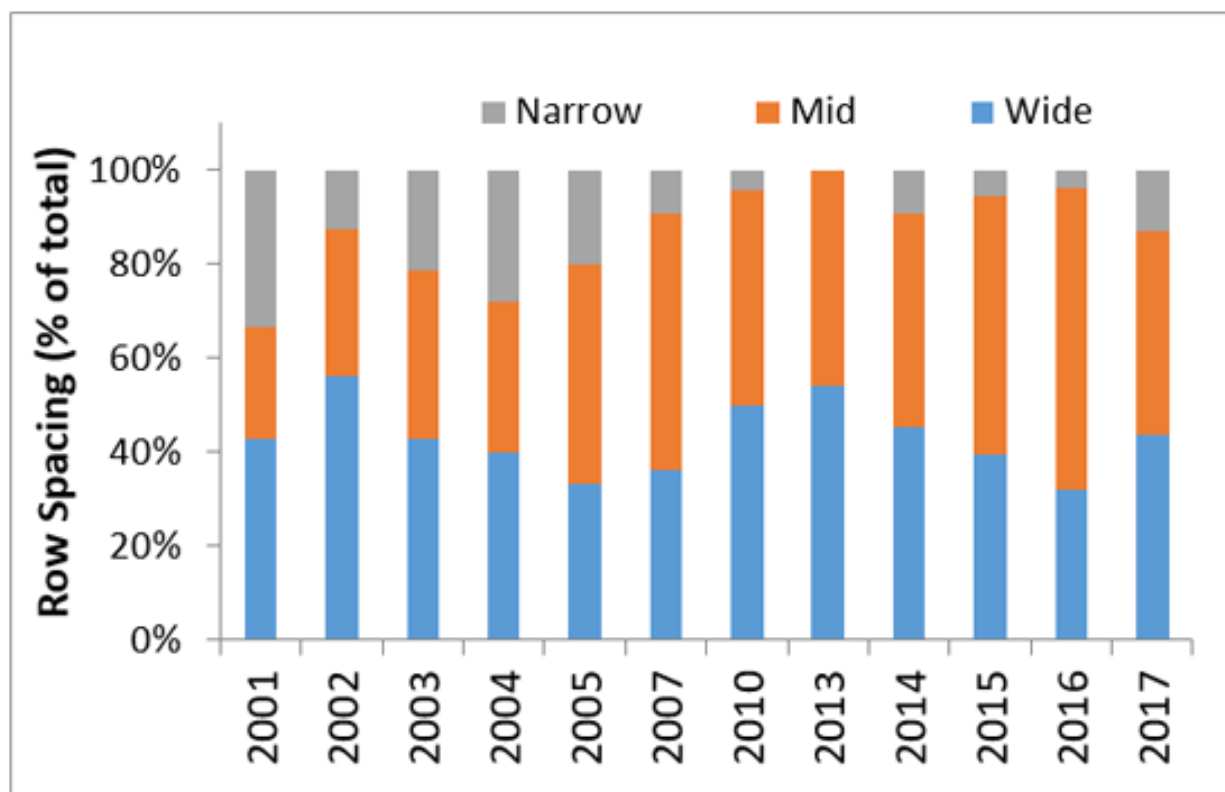


Figure 2. Seeding rate of contestants in the Kansas Soybean Yield Contest from 2001 to 2017.

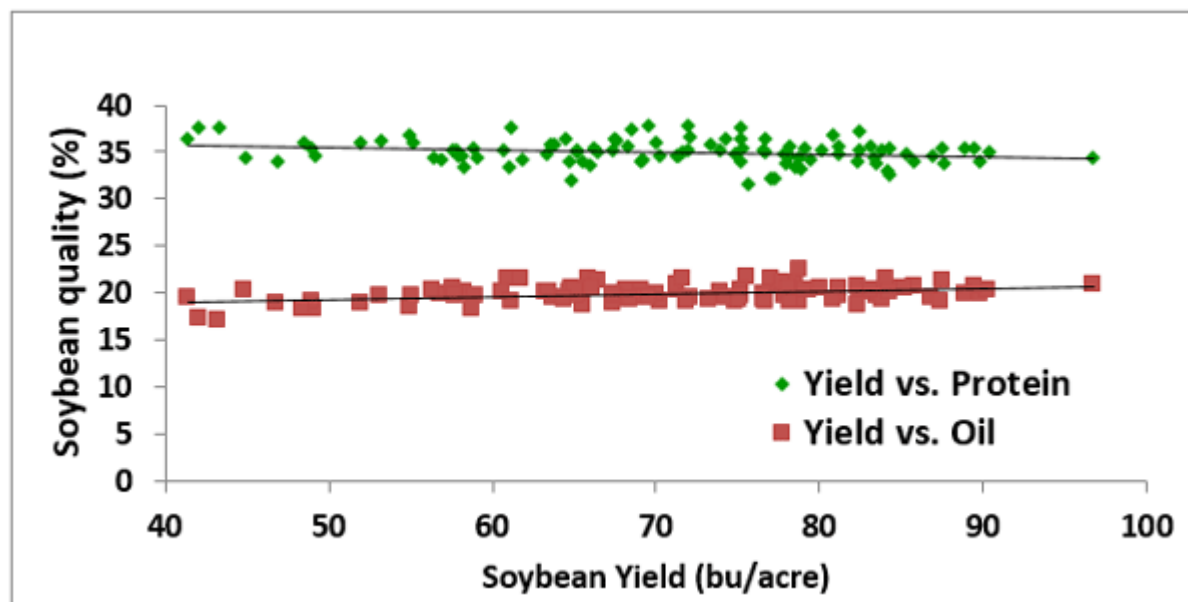




**Figure 3. Row spacing of Kansas Soybean Yield Contest entrants from 2001 to 2017. Narrow rows were any spacing 10-in or less. Wide rows were any spacing 30-in or greater. Mid-rows were any spacing between 10- and 30-inch.**

Since 2004, Kansas soybean producers have had the opportunity to enter their soybeans into the Value Contest. With this information, the contest is able to showcase the true end-use value of soybeans including protein, oil, and other value added products.

With many field crops, a relationship exists between yield and protein where protein decreases as yield increases. However, in the case of the Kansas soybean yield contest, there does not appear to be a strong relationship in protein (slight negative relationship) nor in oil (slight positive relationship) relative to yield (Figure 4).



**Figure 4. Relationship between soybean oil and protein vs. soybean yield for 100 entries in the Kansas Soybean Value Contest, more than 10 years data.**

If a producer has interest in submitting an entry in the Kansas Soybean Yield Contest, they need:

1. A minimum of 5 contiguous acres of soybean
2. To contact their County Extension Agent for witnessing the harvest
3. Have the entry postmarked by December 1, 2018

The Soybean Yield and Value Contest is free to producers. One does not have to enter the Yield contest to enter the Soybean Value Contest, just fill out the entry form and mail a 20-ounce soybean sample to the Kansas Soybean Office by December 1, 2018. The contest winners will be announced at the Kansas Soybean Expo on January 9, 2019 in Topeka. To find complete rules and the entry form, visit <http://kansassoybeans.org/association/contests/>

Doug Shoup, Former K-State Extension Specialist  
[dshoupksu@gmail.com](mailto:dshoupksu@gmail.com)

Ignacio A. Ciampitti, Crop Production and Cropping Systems Specialist  
[ciampitti@ksu.edu](mailto:ciampitti@ksu.edu)