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Extension Agronomy

eUpdate

08/05/2016

These e-Updates are a regular weekly item from K-State Extension Agronomy and Steve Watson, 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 Steve Watson, 785-532-7105 swatson@ksu.edu, or Curtis Thompson, Extension Agronomy State Leader and Weed Management Specialist 785-532-3444 cthompso@ksu.edu.

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1. Managing wheat for forage and grain: The dual-purpose system

Dual-purpose wheat management (wheat grown for forage and grain) spreads production risks by providing producers a second source of income in addition to the harvested grain. If wheat grazing is managed properly, its grain yield penalty can be minimized.



If cattle are removed prior to first hollow stem, the probability of grain yield reduction due to grazing decreases and in many cases no yield penalty occurs, depending on growing season weather. Still, research has demonstrated that grazing wheat during late fall, winter, and early spring reduces grain yields on average by 7% compared to wheat managed for grain only. If cattle is not removed prior to first hollow stem, greater grain yield reductions can occur. In years when early spring conditions are not favorable – such as when there is a spring freeze after some varieties have begun jointing or when the spring turns out dry – wheat that has been grazed may even outyield ungrazed wheat. That’s because moderate to heavy grazing will typically delay maturity a bit in the spring and reduce some of the lush fall growth of early-planted wheat.

Overall, wheat pasture can provide high-quality forage when other forage sources are typically low in quality and quantity, and its management requires a few distinct considerations:

Seeding date. Early-planting is essential to ensure good fall forage production as long as soil moisture and temperature allows. Wheat grown under dual-purpose management is usually sown in September, at least two to three weeks earlier than wheat sown for grain-only. Research performed in north-central Oklahoma indicates that wheat fall forage production decreases approximately 1000 pounds per acre for each two-week delay in planting in September.

Seeding rate. Dual-purpose wheat management requires seeding rates 1.5 to 2.0 times greater than that for grain-only management. Research has shown that the increase in fall forage yield associated

with increasing seeding rate from 90 to 120 lbs / acre pays for the increased seed cost in regions with approximately 30 inches annual precipitation or more, especially when planting is done early- to mid-September.

Basic Recommended Seeding Rates for Kansas		
Precipitation Zone	Grain only (lbs/acre)	Dual –purpose forage + grain production (lbs/acre)
Less than 20	40-60	60-90
20-30	50-60	75-120
More than 30	60-75	120
Irrigated	60-90	120

Seeding depth. Earlier planting date results in wheat planted into hotter soils. Increased soil temperature decreases the coleoptile length of germinating wheat, which can affect emergence of deep-planted seeds. Therefore, if moisture is not available in the top inch or inch-and-a-half of the soil profile, it is preferable to seed shallower and hope for rain (“dust the wheat in”) than to try to reach moisture deeper in the profile.

Variety selection. Wheat varieties grown under dual-purpose management should germinate well under high soil temperatures (> 85°F), should have excellent forage production and grazing potential in the fall, and recover well from grazing. Genetic resistance to barley yellow dwarf, wheat streak mosaic, and Hessian fly are also valuable traits as early planted wheat is at greater risk of damage by these diseases and pests. For more information on the first hollow stem and fall forage yield of different wheat varieties in Kansas, please click [here](#). For information regarding variety-specific resistance to pests and diseases, please click [here](#).

Nitrogen fertility. A bushel of wheat with 12.5% protein requires approximately 2 to 2.4 lbs N / acre during the growing season to be produced, regardless if management is for grain-only or dual-purpose. Additionally, approximately 30 pounds of nitrogen per acre are needed to produce 1000 pounds of wheat forage in the fall/winter in dual-purpose systems. Thus, nitrogen requirements of dual-purpose wheat are generally 60 to 90 lbs N / acre greater than that of grain-only wheat. Nitrogen removed by grazing should be accounted for by additional pre-plant nitrogen fertilizer or by a topdress application during spring to ensure proper grain formation.

Starter P fertilizer. Wheat forage yield responds remarkably well to phosphorus (P) application because of improved tillering and the typical jump-start resulting from banded P. Phosphorus deficiency reduces tillering and makes plants more susceptible to winterkill. Banded P applications at 50 to 60 pounds per acre diammonium phosphate (DAP) or the equivalent in P from other fertilizer sources at planting is more efficient than broadcasting, especially on acid soils low in available P.

Soil pH. Acidic soils are an especially important issue when growing wheat for forage and grain. Wheat forage production is more impacted by low soil pH than wheat grain yield, and extremely acidic soils can decrease forage production even in low pH tolerant varieties (Figure 1). A minimum soil pH of approximately 6 is needed to maximize wheat fall forage production for most wheat varieties. In-furrow phosphorus fertilizer can be used as a strategy to ameliorate the effects of low soil pH and increase wheat forage production in acidic soils.



pH = 4.4, forage yield 484 lb/ac



pH = 5.5, forage yield 2030 lb/ac



pH = 6.2, forage yield 2780 lb/ac

Figure 1. Duster, a variety with excellent tolerance to acidic soils, showing decreased forage production under dual-purpose management due to extremely low soil pH. Photos by Romulo Lollato, K-State Research and Extension (courtesy of Oklahoma State University).

When to start grazing. Winter wheat should not be grazed before the secondary root system has developed enough to anchor the plant, which generally occurs with a minimum of 6 to 8 inches of top growth (Figure 2). If the grazing process is started before the wheat plants are well anchored, cattle will pull up the whole wheat plant with its root system, and decrease the plant population.



Figure 2. Wheat plants showing a good secondary root development during the fall. Secondary roots are important to anchor the plants and reduce the chances of plants getting pulled out of the soil by grazing cattle. Photo by Romulo Lollato, K-State Research and Extension.

Stocking rates. Climatic conditions such as precipitation and temperature will influence the optimum stocking rate, which will vary from year to year. Generally for fall grazing, the recommendation is 250 to 500 pounds of animal per acre (1 to 2 acres per stocker, depending on

weight). Spring stocking rates are 1.5 to 2.0 times greater than that for fall due to the lush vegetative growth. Usually 0.75 to 1.3 acres per stocker, although rates as high as 1,400 pounds of animal per acre (2.5 stockers/acre) have been noted in some research trials during late spring graze out.

When to terminate grazing. Winter wheat should not be grazed past first hollow stem, otherwise developing wheat heads will be removed by cattle. Grazing past first hollow stem in the spring may reduce grain yields in as much as 5% per day depending on weather conditions.

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2. Factors to consider when selecting a wheat variety

In recent years, wheat producers are faced with a blessing, which some may also consider a curse: too many varieties from which to choose. One of the reasons behind having so many available varieties is that many public institutions and private companies are in the business of wheat breeding in the Plains: Colorado State University, Kansas State University, Oklahoma State University, Texas A&M University, University of Nebraska, AgriPro/Syngenta, Limagrain, and WestBred/Monsanto.

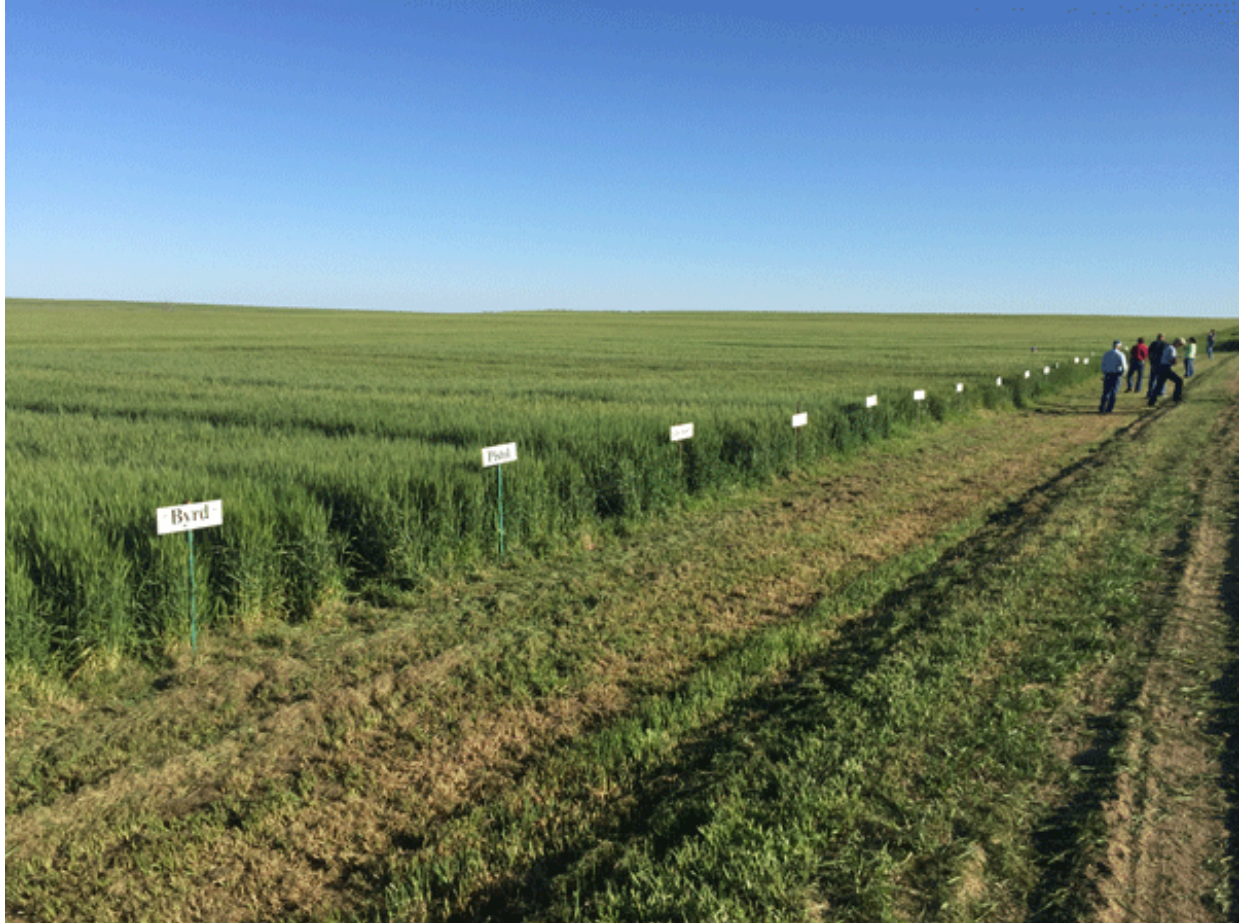


Figure 1. Producers have many wheat varieties to evaluate at 2016 wheat tours in Kansas. Photo by Romulo Lollato, K-State Research and Extension.

As a result, several new varieties are released each year. And this is a reality that not only has come to stay but will intensify in the near future. With the double haploid technology being used by many breeding programs now, varieties will tend to be released at a faster pace. This technology can reduce the time needed to release a wheat variety from 10-12 years to as few as 6 years from the time of the first cross. We are just now starting to see the first commercially available varieties resulting from the use of double haploid technology.

Having so many varieties to choose from is a blessing, and the advantages are countless. Producers can use different tools and publications to study each variety's strengths and weaknesses, selecting varieties that best match their needs. Some of these tools are listed later in this article.

Having many varieties to choose from also gives producers the luxury of being able to avoid planting a given variety because of very specific concerns that may have arisen in certain locations in previous years. One example is the unusual temperature drop in November 2014, when temperatures fell from 80's °F to 10's °F overnight, and remained very cold for the following few days. That was an odd event that did not give varieties the chance to acclimate to cold conditions and become winter-hardy. Still, while some varieties showed leaf burn and normal levels of winter injury, others did not survive the event and entire fields were almost wiped out. Producers can choose not to plant those varieties for that one specific reason, and still have several excellent options to choose from.

The downside of having so many varieties are few, but some may argue that they exist. The curse of the rapid pace of variety release resulting from double haploid technology is that a newly released variety is evaluated over fewer growing seasons before it is released. As a result, some weakness that may only be expressed in one given growing season, and which would otherwise preclude the release of that variety, may be missed.

One example was a K-State line slated to be released many years ago as a variety named Sumner. This line was not released because of its stem rust susceptibility, which showed up on its very last growing season before its release as a variety. If that line had not been tested in that specific growing season, it would have been released before that weaknesses was known and it could have been a disaster.

A fast variety release process gives researchers and Extension specialists less time to understand a variety's agronomic characteristics prior to its release. From the producer's perspective, it takes longer to walk through all the available options and weigh the possibilities. Producers are generally busy and may not have the time to understand each variety and make a good, informed selections. Having too many options also makes selecting one or a few varieties more complicated, for the simple fact that no variety is perfect and all have different strengths and weaknesses.

Overall, the "curses" of having such a large number of available varieties are very few, but it does mean that it might take longer to select a variety nowadays than it did in the past.

Making a better decision: steps to select a wheat variety

The following information provides a step-by-step guideline, as well as relevant resources, to help producers make a better decision when selecting one or a few varieties to plant in their operation.

1. Select several varieties that are adapted to your region of the state.

Regardless whether you intend to plant one variety or several on your farm, it is important to start out with a list of several good candidate varieties. The final product of interest is grain yield and therefore, it is crucial to select varieties that have shown consistent performance in the region. Varieties that worked well for you and your neighbors in the past should be considered, but also make sure and check yield results from nearby K-State variety performance tests and demonstration

plots. When looking at these results is very important that results from more than a single year, and possibly more than a single nearby location, are taken into consideration.

A few great resources to consult are:

- a. [K-State variety performance test](#): Start searching by year, narrow down your search by region and finally by site. Choose the site(s) nearest to you and look for varieties that are consistently toward the top. Repeat the procedure for different years to check the consistency of the variety performance. Click the link above to access the K-State variety performance test results.
- b. [OSU variety performance tests](#): If you are in southern Kansas or in Oklahoma, this is also an excellent resource. Click “Variety Testing” in the link above and then “Grain Yield” to have access to similar information to the one offered by K-State, but for variety performance tests from Oklahoma. Follow the steps described above. Click the link above to access the OSU variety performance test results.
- c. [Colorado Wheat Variety Database](#): This database encompasses replicated trial results from Colorado, Kansas, Oklahoma, and several other public state trials, so producers throughout the Plains can benefit. It is an excellent, easy-to-use resource that allows you to dig into data from single location, multiple locations, multiple years, and also allows for head-to-head variety comparisons. We suggest to start looking at “Single Location Trial Data”, selecting the location nearest to you, and repeating this step for several years of data for that location. Check for varieties that tend to be consistently toward the top. Afterwards, look at “Multiple Location Trial Data,” which will allow you to look at yields spanning a wider geographical region instead of a single location for one, two, three, or four years combined. Depending on region and number of years selected, you might be looking at more than 15 replicated trials combined. Thus, if a given variety remains a top yielding variety across all these replicated trials, it is a pretty good argument that you should at least look at that variety’s characteristics and consider it in your farming operation. Click the link above to access the Colorado database.

1. Narrow down the number of varieties in your list to a few solid candidates.

After selecting several varieties that have shown good adaptability and stability in your region, the list needs to be narrowed down to the number of varieties you intend to plant. Ideally, at least two or three varieties (or a blend of two or more varieties) should be planted to spread the risk on your acres. Select varieties that are adapted and resistant/tolerant to the major concerns in your operation, but that have contrasting characteristics such as different maturities or disease resistance characteristics. This will help buffer the risk of a single event compromising production of the whole operation. Some factors to consider include:

- a. *Production system*: For producers who graze their wheat before taking it for grain (dual-purpose producers), selecting a variety with good forage yield: medium to late first hollow stem: Hessian fly, barley yellow dwarf, and wheat streak mosaic resistance; and good recovery from grazing is very important. Another consideration is whether the crop will be irrigated or dryland. Wheat varieties differ in their straw strength. There are a few varieties that should be

restricted to dryland use, due to their high lodging potential. A history of feral rye in the field would dictate the need for a Clearfield variety and this also plays an important role in variety selection. Double-cropping wheat following soybeans may require varieties with excellent tillering potential and possibly early- to medium-early maturity to compensate for the delayed development due to late planting. No-till producers in western Kansas might be looking for tall varieties with good straw production potential to help improve water retention in the soil, so this could also play a role in selecting a variety.

- b. Tolerance to abiotic factors: Depending on the region of the state where your farm is located, it will be subjected to different abiotic stresses. Acid soils are a major concern in south central, central, and north central Kansas, and varieties that have good low soil pH tolerance are warranted. Meanwhile, drought is a dominant factor in western Kansas, and varieties with better drought tolerance should be favored there. Varieties differ in their tolerance to abiotic stresses, and selecting a variety with better tolerance to the major limiting factor in your operation will allow the variety's potential to be more easily achieved.
- c. Disease resistance: Producers who are willing to spray a foliar fungicide have more variety options to choose from than those who are not. Some varieties have many very good characteristics and yield potential, but may have lost their resistance to some major fungal diseases and thus require a fungicide. For example, Everest has many good characteristics, such as intermediate head scab resistance, some of the best barley yellow dwarf resistance available, and acid soil and Hessian fly tolerance; however, it is very susceptible to stripe rust. If a producer is willing to spray a foliar fungicide, Everest is still an excellent option. This is also true for varieties such as Byrd, TAM 111, TAM 112, Avery, etc. Diseases such as leaf or stripe rust can be controlled with a foliar fungicide and producers have the option to budget for it in their operation. Meanwhile, other diseases require more of a systems management approach and cannot be controlled after they are established. These include virus diseases such as wheat streak mosaic and barley yellow dwarf, and can also include a fungal disease such as Fusarium head blight, which is not always successfully controlled with fungicide spraying. If these diseases are common concerns in your region, evaluate each variety's ratings against these constraints and selecting the ones that provide better levels of resistance.
- d. Maturity: Selecting several varieties with differing maturities is a great tool to spread risk as well as to optimize harvest timing. You don't want to have too many acres ready for harvest at once and then have to wait for harvest for lack of combine capacity. Early-maturing varieties will most likely have a yield advantage over later-maturing varieties in years such as 2012 when the grain filling period turns hot and dry. Also, from a historical perspective, early-maturing varieties have been more successful in the southern portion of the state, especially south central Kansas, due to the typical hot weather pattern toward the end of the growing season. On the other hand, medium-late maturing varieties will benefit from growing seasons with an extended grain filling period, such as 2015 and 2016. It is important to keep in mind that recent years favored later-maturing varieties throughout the state. If we only look at the most recent years it will be tempting to plant later-maturing varieties, even in south central Kansas. However, nothing guarantees that the next growing season will be similar. At planting time, we don't know how the weather will turn out during grain fill. Therefore, spreading the risk in your operation by selecting varieties with differing maturities is always a good idea. In other words, you can plant a medium or medium-late maturing variety in south central Kansas, but keep it to a fraction of your acres.

Resources

A few great resources to help you walk through each variety's characteristics as far as maturity, disease ratings, drought and soil pH tolerance, date of first hollow stem, and other agronomic characteristics are:

- a. [*K-State Wheat variety Disease and Insect Ratings 2016*](#): This comprehensive guide to wheat varieties will allow you to compare different varieties in their agronomic and disease resistance characteristics in detail. Many varieties are individually described, others are shown in a table format which allows for easy and fast comparison. It is available online on the link above or in your county Extension office in Kansas.
- b. [*Wheat Varieties for Kansas and the Great Plains by Layton Ehmke*](#): This private-sector book is also an excellent, comprehensive source of information regarding different varieties and their characteristics. It provides detailed ranking of varieties by traits of interest, making it easy to use. It also has a good summary of several variety performance tests in the Great Plains. While not available online, producers can purchase it in the link above if interested.
- c. [*K-State Wheat Variety Date of First Hollow Stem, Fall Forage Yield, and Grain Yield 2016*](#): This new K-State publication compare several varieties in their fall forage production, date of first hollow stem, and grain yield under dual-purpose versus grain-only management in south central Kansas. It is a good resource for producers who graze their wheat before taking it for yield. It is available online at the link above or in your county Extension office in Kansas.
- d. [*OSU Fall forage production and date of first hollow stem in winter wheat varieties during the 2015-2016 crop year*](#): similarly to the publication above, this OSU publication compares varieties' forage yield and date of first hollow stem for north central and central Oklahoma. Available online at the link above or in your county Extension office in Oklahoma.

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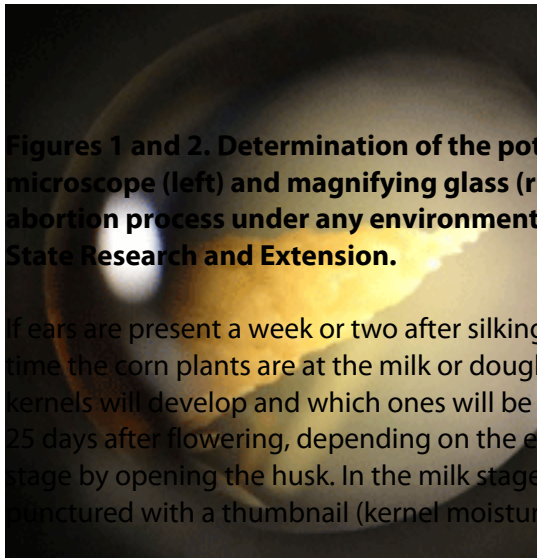
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3. Estimating corn yield potential

The majority of the corn in Kansas is currently in the reproductive period. From this point until harvest, farmers and consultants can begin to make reasonable estimates of corn yield potential. If no ear was formed within a week or two after pollination, then that specific corn plant will remain “barren” until the end of the season. In that unfortunate situation, you need to choose whether to harvest it for silage or leave it in place for grazing the residue.

The number of potential kernels per ear can be adversely affected either before silking time (Figures 1 and 2), if no potential ovule develops, or after silking. After silking, kernel numbers are reduced under any or all of the following conditions:

- If the fertilization was not effective (unpollinated ovules).
- If there is abortion of the fertilized ovules.
- If there is early abortion of developing kernels (before or at milk stage, R3 stage) (Figure 3).



Figures 1 and 2. Determination of the potential kernel number in corn ears as seen under a microscope (left) and magnifying glass (right). The tip kernels are the first one to start the abortion process under any environmental (abiotic) stress. Photos by Ignacio Ciampitti, K-State Research and Extension.

If ears are present a week or two after silking, producers can get a reasonable yield estimate by the time the corn plants are at the milk or dough stages. Before the milk stage, it is difficult to tell which kernels will develop and which ones will be aborted (Figure 3). The milk stage takes place about 15 to 25 days after flowering, depending on the environmental conditions. We can easily recognize this stage by opening the husk. In the milk stage, a milky white fluid will be evident when the kernels are punctured with a thumbnail (kernel moisture is ~80%).



Figure 3. Grain abortion at the top of the ear (early abortion) and in the mid-section of the ear

(late abortion, brown coloration in right corner picture). Photos by Ignacio Ciampitti, K-State Research and Extension.



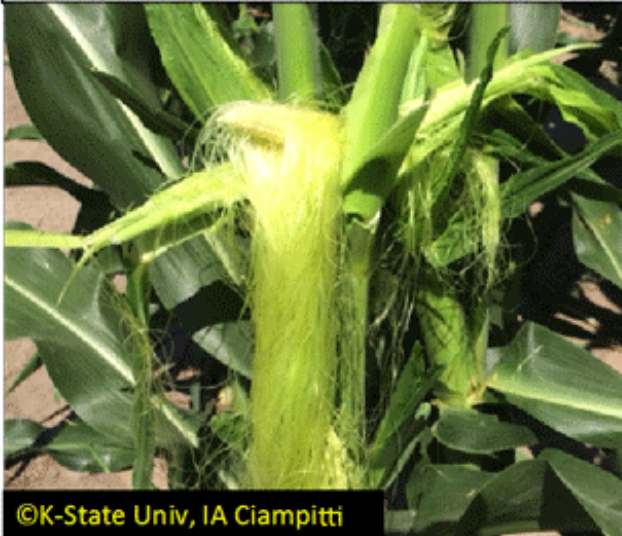
Figure 4. Corn at the milk stage (R3 growth stage), a milky white fluid is evident when the kernels are punctured with a thumbnail (kernel moisture is approximately 80%). Photo by Ignacio Ciampitti, K-State Research and Extension.

Farmers can get some estimate of the failure or success of the pollination process by examining several corn ear silks. Pollination is successful when silks turn brown (R2 stage, kernel blister stage) and when they can be easily detached from the ear structure as husks are removed. If the silks remain green and are still attached to the ear after growing several inches in length, pollination has failed (Figure 5). In this situation, the ovules will not be fertilized, and kernels will not develop.

Before estimating corn yields, few points are noteworthy. Yield estimates are more accurate as the corn is approaching maturity. Also, yield estimates can be accurate as long as the sample areas reflect the “real” variation of corn yield within the field. The precision of the method increases as the number of sample areas increases, properly reflecting the variability within the field. Yield estimations before harvest can: (1) facilitate the decision of harvest timing, (2) estimate the need for additional inputs before maturity, and (3) serve as a scouting tool since the method of yield estimation involves examining diverse areas of the field.

CORN – LONG SILKS

(floral asynchrony)



©K-State Univ, IA Ciampitti



Silks attached to the ear indicates that kernels will not develop (not fertilized).



LONG SILKS ISSUE = silks elongate approx. 1 inch/day until pollen is encountered and the ovule is fertilized. Long silks indicate that pollen was not intercepted – kernels unfertilized

Figure 5. Unpollinated silks have grown in several inches in length. Photos by Ignacio Ciampitti, K-State Research and Extension.

Estimating yields using “yield component method”

The concept of estimating yields using the “yield component method” has advantages and disadvantages. The primary advantage is that it can be used early in the growing season (milk stage, R3). It involves the assumption that the kernel weight is constant. The method only estimates the “potential” yield because the kernel weight component is still unknown until the crop reaches final maturity (R6 stage).

Estimating potential corn yield with this method uses the following elements:

1) Total number of ears (ears per acre): This is determined by counting the number of ears in a

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www.agronomy.ksu.edu | www.facebook.com/KState.Agron | www.twitter.com/KStateAgron

known area (Figure 6). With 30-inch rows, 17.4 feet of row = one-thousandth of an acre. This is probably the minimum area that should be used. The number of ears in 17.4 feet of row x 1,000 = the number of ears per acre. Counting a longer length of row is fine, just be sure to convert it to the correct portion of an acre. Make ear counts in 10 to 15 representative parts of the field or management zone to get a good average estimate which fairly represents the field variation. The more ear counts you make, if they are representative of the rest of the field, the more confidence you have in your yield estimate.



Figure 6. Total number of corn ears per unit area. Photo by Ignacio Ciampitti, K-State Research and Extension.

2) Final kernel number per ear: Count the number of rows within each ear and the number of kernels in each row (Figure 7). The final number of kernels per ear is calculated by multiplying the number of rows by the number of kernels within each row. This is just a quick estimation of the potential yield.

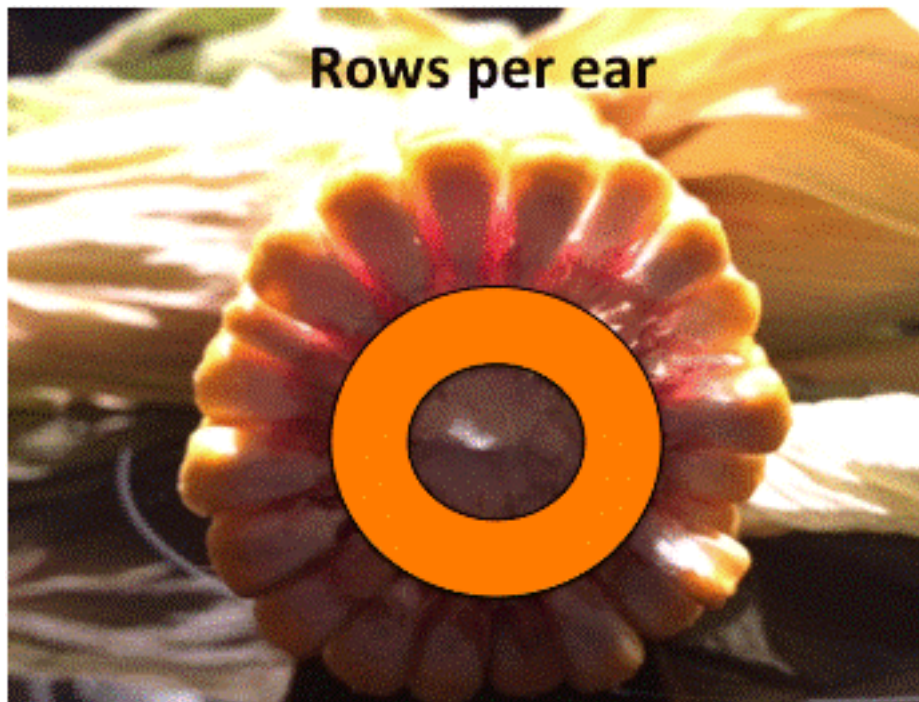
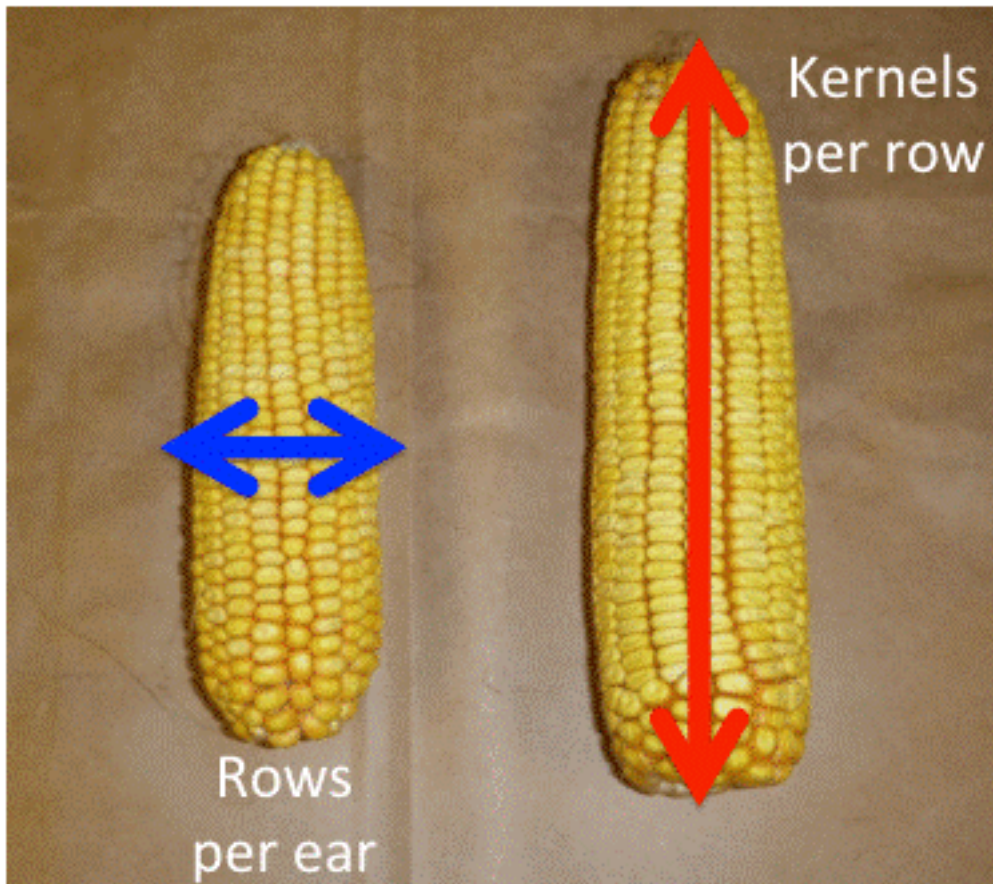


Figure 7. Two different size of ears with similar number of rows (16 rows in total) but different kernel number per row and kernel sizes (left). The photo at right shows the determination of

rows per ear from a vertical position (20 rows in total). The final number of rows per ear is defined earlier in the season than the number of kernels per row, and can be a function of the hybrid and growing conditions. Photos by Ignacio Ciampitti, K-State Research and Extension.

The number of kernels within each row is not standard and can vary from row to row, depending in part on the number of kernels aborted (“abnormal ears”). Do not count aborted kernels or the kernels on the tip of the ear; count only kernels that are in complete rings around the ear. Do this for every 5th or 6th plant in each of your ear count areas. The more you can count, the more precise will be the estimation. Avoid odd, non-representative ears.

Finally the number of kernels per acre is estimated by multiplying the first and second components.

Kernels per acre = Ears per acre x Kernels per ear

Kernels per bushel: This will be more precisely defined at maturity. For this case, common values range from 75,000 to 80,000 for excellent grain filling conditions, 85,000 to 90,000 for average, and 95,000 to 105,000 for poor conditions. The best you can do at this point is estimate a range of potential yields depending on expectations for the rest of the season.

Example:

For corn in 30-inch rows with an average total number of ears in 12 areas of the field (17.4-foot lengths of row) of:

Number of ears = $[(25 + 24 + 22 + 21 + 24 + 26 + 20 + 21 + 22 + 20 + 25 + 26)]/12 = \mathbf{23 (a)}$

An average of 23 ears were counted within the 17.4-foot lengths. This can be scaling up to an acre basis by multiplying the number of ears by 1,000 (constant factor if the counts were taken in a 17.4-foot length).

Ears per acre = $23 \times 1000 = \mathbf{23,000 (b)}$

From those 23 ears, we will take between 2 and 5 ears to calculate the rows per ear and the kernels per row. The average number of rows was 14 with 27 kernels per row.

Kernel number per ear = $14 \text{ rows per ear} \times 27 \text{ kernels per row} = \mathbf{378 (c)}$

The final number of kernels per acre is the outcome of the multiplication of (b) ears per acre and (c) kernel number per ear.

Kernels per acre = $23,000 \text{ ears per acre} \times 378 \text{ kernels per ear} = \mathbf{8,694,000 (d)}$

Kernels per bushel

Under hot, dry conditions, grain filling duration and biomass translocation from the whole plant to the ear (kernels) can be severely affected. Otherwise, a reasonable value to use is about **105,000 kernels per bushel (e)**.

The final number of kernels per bushel is affected by diverse factors such as genotype, management practices (for example, plant density), and the environment. Plant density can strongly affect the kernel weight and the number of kernels per bushel. Lower plant densities (if growing conditions are optimum) will result in lower values for kernel number per bushel. Also, expect a lower kernel number per bushel as N is more deficient. More information regarding the influence of these management practices on the kernel weight and the number of kernels per bushel is available from an article titled "Corn Grain Yield Estimation: The Kernel Weight Factor" from Dr. Tony Vyn, Purdue University, at: <http://extension.entm.purdue.edu/pestcrop/2010/issue22/index.html#corn>

Final yield: Calculation of bushels per acre

The final calculation of the potential yield to be obtained at the end of the season is simply the outcome of dividing the component (d) by (e).

Bushels per acre = 8,694,000 kernels per acre ÷ 105,000 kernels per bushel = **~83**

In this example, if projected conditions prove to be accurate, the corn should obviously be kept and harvested for grain. From previous experiences, the yield component method of estimating yields often seems to provide optimistic outcomes (slightly overestimation). If the conditions during the reproductive period are predicted to worsen (severe heat stress and lack of precipitation); then the kernel weight can be reduced, and the number estimated for component (e), kernels per bushel, should be higher. That will reduce the yield expectations.

New technologies for estimating corn yields: App

If you have smartphone or tablet devices, there is a "free" app that can provide assistance in estimating corn yield at on-farm scale. The app, developed by the University of Wisconsin, is named "Crop Calculators for Corn" and can be downloaded at:

<https://play.google.com/store/apps/details?id=ipcm.calc.cropmanager>

The Crop Calculators app has a section for estimating yields: "Grain Yield Estimator." In that section only four inputs are needed for predicting the final yield: (1) plants per 1000th acre (17.4-foot length of row); (2) rows per ear; (3) kernels per row; and (4) kernel weight, or mass. The last factor refers to the individual kernel weight for corn and it is expressed in mg per kernel. This factor normally varies from 150 to 400 mg per kernel. If conditions will be favorable until harvest, then the "kernel mass" should be higher (e.g., 300 mg per kernel). On the opposite end, unfavorable conditions with a short-grain filling period will produce a lower value (e.g., 180 mg per kernel). This factor will ultimately be defined at maturity, but a projection can be used based on forecasted weather conditions for the remainder of the season.

Links with further discussions on the yield estimation can be found at:

<http://corn.osu.edu/newsletters/2010/2010-25/201cpredicting201d-corn-yields-prior-to-harvest>

The Ohio State University

<http://www.ca.uky.edu/agc/pubs/agr/agr187/agr187.pdf>

University of Kentucky

<http://www.agry.purdue.edu/ext/corn/news/timeless/yldestmethod.html>

Purdue University

<http://corn.agronomy.wisc.edu/AA/pdfs/A033.pdf>

University of Wisconsin

Further details on corn growth and development can be found at:

<http://www.bookstore.ksre.ksu.edu/pubs/MF3305.pdf>

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4. Sugarcane aphid update

(Note: The following is from the K-State Department of Entomology blog site, dated August 2, 2016.

See:

<http://blogs.k-state.edu/kansasbugs/2016/08/02/sugarcane-aphid-expanding-to-other-counties-in-kansas/> – Steve Watson, Agronomy eUpdate Editor)

Sugarcane aphid has been confirmed in the following counties in Kansas: Marion, Sedgwick, Sumner, Cowley, Labette, Meade, Haskell, and Ford. Populations first reported in Sumner and Cowley counties have reached threshold levels (30% of plants infested with visible signs of honeydew on leaves) and are being treated with insecticides. Scouting fields early will help determine the need for an insecticide application before losses occur. Treating too soon may increase the need for additional insecticide treatments later, as populations can rebound based on immigration events. Scout often, as densities can change quickly. Report any infestations in new counties to your local agent or by using <http://myFields.info>.

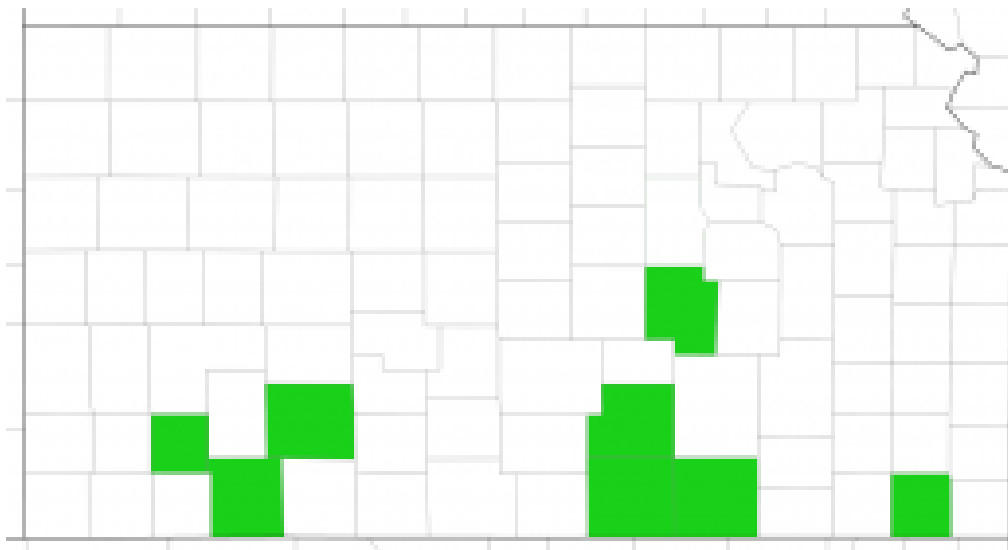


Figure 1. Counties in Kansas confirmed with sugarcane aphid in green, as of August 2.

Recommended treatment options for SCA control are either Transform (Dow AgroSciences) at 1 oz per acre, or Sivanto prime (Bayer CropScience) at 4 oz per acre, applied in 15 – 20 gal of water from a ground rig. Application from the air will be more costly and less effective, as it will not permit application of these materials in sufficient volume to obtain the coverage necessary for good efficacy. The cost per acre is lower for Transform, and this material is also the least toxic alternative for aphid natural enemies.

If headworms are present in damaging numbers (1-2 per head or more, the majority still less than 1 inch long), Blackhawk (Dow AgroSciences), Prevathon (Dupont) or Belt (Bayer CropScience) are alternatives that can be considered for controlling them. Note that Belt registration has just been revoked by the EPA, but existing stores may be used. Of the materials labelled for headworm control, these are the ones likely to have the lowest impact on beneficial species assisting with aphid control.

We have found Prevathon to be compatible with Transform in a tank mix; all other combinations should be tested first for compatibility by mixing small amounts in a jar to ensure no precipitate

forms. Read the label carefully before you spray.

For more information, see "[Sugarcane aphid scouting and management on sorghum for 2016](#)" in the July 22, 2016 issue of the Agronomy eUpdate, No. 581.

Brian McCornack, Extension Entomologist
mccronac@ksu.edu

Sarah Zukoff, Entomologist, Southwest Research and Extension Center
snzukoff@ksu.edu

Jeff Whitworth, Extension Entomologist
jwhitwor@ksu.edu

J.P. Michaud, Entomologist, K-State Agricultural Research Center-Hays
jpmi@ksu.edu

5. Kansas River Valley Experiment Field fall field day, August 9

The Kansas River Valley Experiment Field near Rossville will host its fall field day on Tuesday, August

9. The field day begins at 6 p.m. sharp.

Field day topics and K-State presenters include:

- Seed treatments update and current disease issues – Doug Jardine, Extension Plant Pathologist
- Update on planter research at K-State – Ajay Sharda, Extension Biological and Agricultural Engineering
- When does it pay to apply foliar fungicides in the Kaw River Valley? – Stu Duncan, Northeast Area Crops and Soils Specialist
- Tip dieback on corn: Cause and cure – Eric Adee, Agronomist-in-Charge, Kansas River Valley and East Central Experiment Fields

The field is located 1 mile east of Rossville on U.S. Hwy 24, on the south side of the road.

A BBQ meal will be provided after the field day, sponsored by Wilbur-Ellis. To pre-register, call Joanne Domme at the Shawnee County Extension office at 785-232-0062, ext. 100 by 5 p.m. on Monday, August 8. Commercial pesticide applicator continuing education credits have been applied for.

6. Winter canola preplant school, August 11 in Concordia

On August 11, producers in north central Kansas can learn more about what it takes to raise a successful canola crop. The school will be held in Concordia at Heavy's Steakhouse & BBQ, 103 W. 7th Street, beginning with lunch at 11:30 a.m. The event is free but those interested in attending should RSVP by calling 785-243-8185 before August 8. Sponsors include Wilbur-Ellis and LeClair Seeds.

Winter canola has many potential advantages in cropping systems of north central Kansas, according to ongoing K-State research. We have been working diligently to introduce winter canola as an alternative broadleaf crop in north central Kansas. This includes growing variety trials at the North Central Kansas Experiment Field near Belleville and working with local producers.

There have been some ups and downs, but through these experiences we have come to understand a great deal about what kind of yields we can expect and what it is going to take to grow the crop successfully in this part of the state.

Topics for discussion at the preplant school include what to do -- and what not to do -- in canola production, planting date and establishment methods, variety and hybrid performance, winter survival, and soil fertility and insect management. Information on crop insurance and marketing of the crop will also be available.

Mike Stamm, Canola Breeder
mjstamm@ksu.edu

7. Preplant wheat schools to be held in northwest and north central Kansas

A series of preplant wheat schools will be held across northwest and north central Kansas in the coming weeks. Particular topics and speakers will vary by location but may include production practices, yield results and variety selection, disease management and seed treatments, fertility, and weed control. For more details on a particular school contact the local extension agent host.

August 11th, Sharon Springs, CAB Building, 9:00 am - Noon MT
Contact Jeanne Falk Jones 785-443-4806, jfalkjones@ksu.edu

August 11th, Atwood, Fairgrounds, 6:00 pm CT
Contact Jo Ellyn Argabright, 785-626-3192, joargabright@ksu.edu

August 12th, Oberlin, Gateway Center, 10:00 am - Noon CT
Contact Keith VanSike, 785-475-8121, kvan@ksu.edu

August 12th, Hoxie, Bowen Scout House, 2:00 – 4:00 pm CT
Contact Keith VanSike, 785-675-3268, kvan@ksu.edu

August 24th, Osborne, United Christian Church, 9:30 am – Noon CT, lunch served, register by August 19th
Contact Sandra Wick, 785-334-6252, swick@ksu.edu

August 24th, Mankato, Community Bldg., 3:00 pm – 5:30 PM CT, supper served, register by August 19th, Contact Sandra Wick, 785-378-3174, swick@ksu.edu

August 25th, Phillipsburg, Fairgrounds, 9:30 am - Noon CT
Contact Cody Miller, 785-543-6845, codym@ksu.edu

August 26th, Grainfield, American Legion, 9:00 AM – Noon CT, lunch served
Contact Candice Fitch-Deitz, 785-938-4480, cfitchdeitz@ksu.edu

August 30th, Wilson, Made from Scratch Café, 10:00 AM – Noon CT, lunch served, register by August 26th
Contact Michelle Buchanan, 785-472-4442, mbuchanan@ksu.edu

August 30th, Great Bend, American Ag Credit, 2:30 pm CT
Contact Alicia Boor, 620-793-1910, aboor@ksu.edu

Lucas Haag, Northwest Area Crops and Soils Specialist

lhaag@ksu.edu

8. Planter School at K-State, August 15

A Planter School will be held August 15 at K-State's Stanley Stout Center, 2200 Denison, Manhattan.

The school will run from 8:30 a.m. until 2:00 p.m.

Speakers include:

Paul Jasa, Extension Engineer, University of Nebraska-Lincoln

Mitch Ostgren, Precision Planting

Justin Atwood, LandMark Implements

Matt Wolters, SureFire Ag Systems

Dietrich Kastens, Kastens Farms, Inc.

Brian Sutton, Air Scout

Joe Luck, Extension Engineer, University of Nebraska-Lincoln

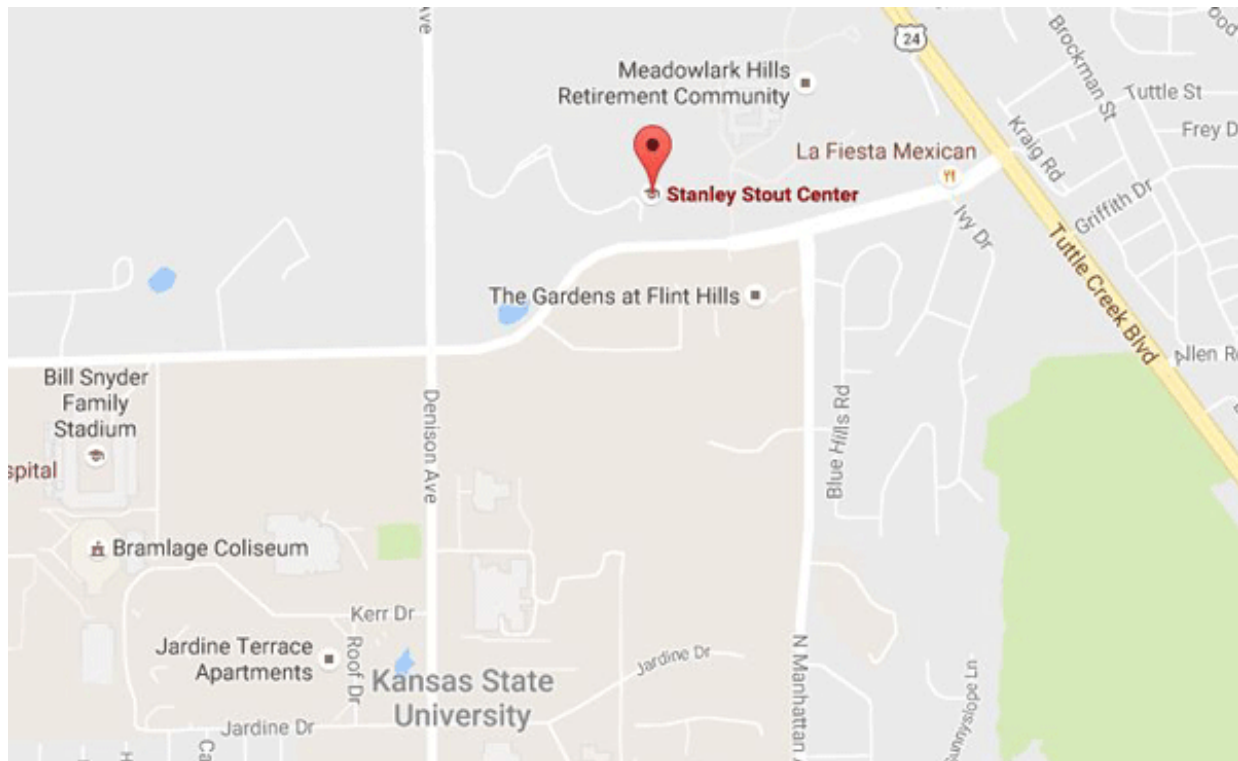
K-State Research and Extension Precision Ag team

Registration is free for members of Kansas Ag Research and Technology Association (KARTA) and for K-State Extension agents; and is \$25 for all others. Lunch and refreshments are provided.

For more information or to register, contact one of the following:

Ajay Sharda, Biological and Agricultural Engineering, asharda@ksu.edu

Ignacio Ciampitti, ciampitti@ksu.edu



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9. East Central Experiment Field fall field day, August 17

The East Central Experiment Field in Ottawa will host its fall field day on Wednesday, August 17. The field day begins at 9 a.m. with registration, coffee and doughnuts, and the program starts at 9:30 a.m. A complimentary lunch will be served.

Field day topics and K-State presenters include:

- Row crop disease update – Doug Jardine
- Crop insect update – Jeff Whitworth
- Mapping soil variability within your field – Gretchen Sassenrath
- Satellite imagery for nitrogen recommendations – Ray Asebedo

From I-35 at the Ottawa exit, the East Central Experiment Field is south 1.7 miles on Kansas Highway 59, then east 1 mile, and south 0.75 mile.

More information, including Certified Crop Advisor Credits, is available by contacting the East Central Experiment Field at 785-242-5616.

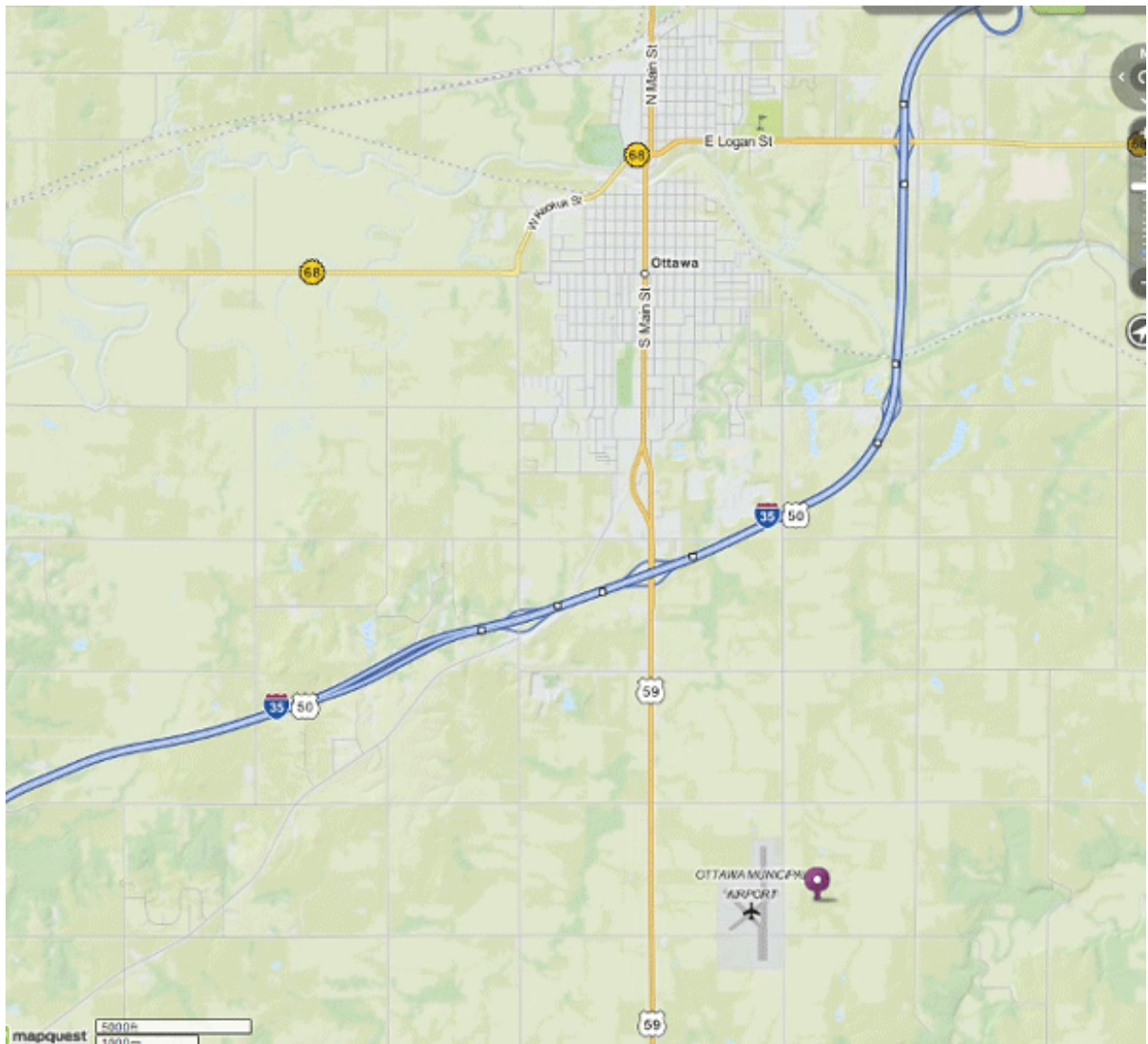


Figure 1. Location of East Central Experiment Field, south of Ottawa.

10. Northwest Research-Extension Center fall field day, August 23

Irrigation water efficiency will be featured at the Northwest Research-Extension Center fall field day Tuesday, Aug. 23 in Colby.

With the theme, "Just Add Water: Irrigation Science Today," the event starts with registration 8:30-9:00 a.m. at the American Legion, 1850 W. 4th St. Transportation will be provided from there to the research station for field tours and returning to the American Legion for presentations indoors and a complimentary lunch.

Field tour topics and indoor presentations by K-State extension agronomists, engineers and entomologists include:

- Drought-tolerant corn hybrids and timing of water deficits – Rob Aiken
- Managing irrigation of modern corn hybrids under institutional constraints – Freddie Lamm
- Soil water sensors: Lessons from the field – Jonathan Aguilar
- Ear feeding pests on corn: Is resistance on the horizon? – Sarah Zukoff
- Nitrogen and phosphorus management for irrigated corn: Sustainability and profit – Lucas Haag
- Mobile drip irrigation: Hybrid hardware for hybrid corn – Isaya Kisekka
- ET-Based irrigation scheduling – Danny Rogers

More information is available by calling 785-462-6281.

11. Agricultural Research Center-Hays fall field day, August 24

Sugarcane aphids, sorghum hybrids, summer annual forages, and economic considerations linked to inputs are among the topics at the 2016 Fall Field Day on Aug. 24, at the Agricultural Research Center-Hays.

The field day starts with registration at 9:00 a.m. and the welcome and field tour by K-State scientists at 9:30 a.m. The tour includes:

- Development of cold tolerant grain sorghum – Ramasamy Perumal, sorghum breeder
- The search for new herbicide options in grain sorghum – Phil Stahlman, weed scientist
- Tillage x Nitrogen x Sorghum hybrid: Sorting out the Mix – Augustine Obour, soil scientist
- Summer annual forage comparisons: Production and quality – John Holman, cropping systems agronomist
- Improving pearl millet for the Great Plains – Desalegn Serba, millet breeder

Following a complimentary lunch, presentations in the auditorium include:

- Sugarcane aphid: Current status and management – JP Michaud, entomologist
- Inputs, returns and breakeven production in a challenging market – Mark Wood, agricultural economist with Kansas Farm Management Association

More information about the field day is available by calling 785-625-3425. Information about the research center is available online at [K-State Research and Extension Agricultural Research Center-Hays](#).

12. Southwest Research-Extension Center fall field day, August 25

Corn and sorghum will take center stage at the Southwest Research-Extension Center's fall field day Thursday, Aug. 25. The center is located at 4500 E. Mary St. in Garden City.

Registration with time to visit exhibitor booths starts at 8 a.m. The program, followed by field tours, begins at 9:15 a.m. Lunch will be served at noon, compliments of commercial exhibitors, and seminars start at 1 p.m.

One field tour includes:

- Summer annual forages
- Iron chlorosis in grain sorghum
- Weed control in irrigated corn
- Weed control in irrigated sorghum
- Impact of increasing sorghum population and fertility on weed control of ultra-low herbicide inputs

Another field tour includes:

- Mobile drip irrigation for corn production
- Soil water sensors and plant canopy temperature sensors for irrigation scheduling
- Corn and sorghum insect update

The topics of the afternoon seminars are:

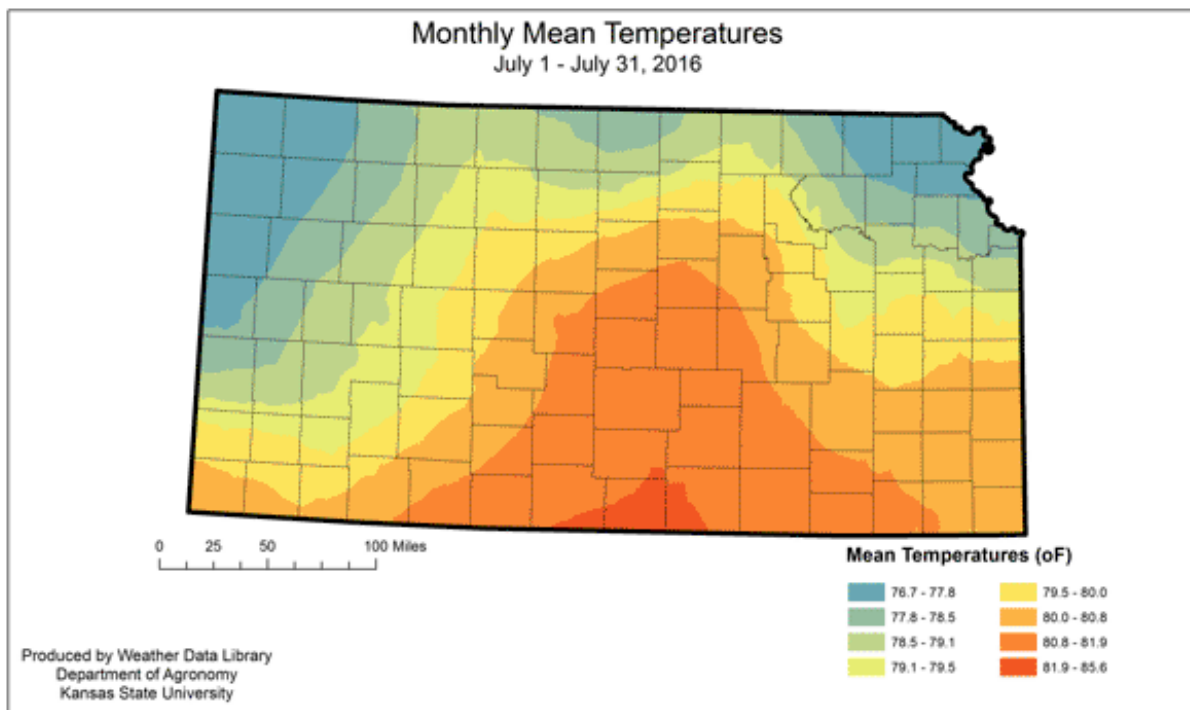
- Limited irrigation research update
- Beneficial Insect Blitz (including information on laws, safety labels and environmental concerns)
- Occasional tillage in wheat-sorghum-fallow

Continuing education credits are available for attendees.

More information is available by contacting the K-State Southwest Research-Extension Center at 620-276-8286.

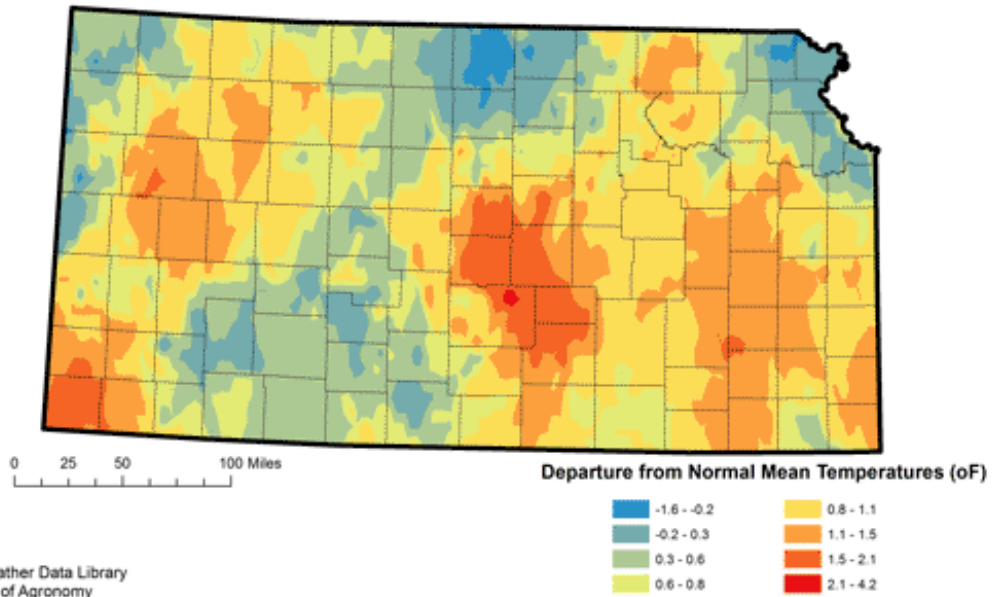
13. Kansas weather summary for July: Hot and muggy

Warm humid weather was the rule for Kansas this July, although the departures from normal weren't as great as in June. On the temperature side, this was the 47th warmest July since 1896, which places it in the middle range of the distribution. The statewide average temperature was 79.4 degrees F, or 0.8 degrees F warmer than normal. The North Central Division was closest to normal for the month. Its average was 79.2 degrees F, or just 0.2 degrees warmer than normal. The warmest division was the Southwest Division where average temperature was 80.2 degrees F, or 1.3 degrees warmer than normal. There were only three events that tied daily record high temperatures. In contrast, 30 new low maximum temperature records were set. Most of the departure came in the low temperatures. There were 23 new record warm minimum (overnight low, usually) temperatures set, and 32 records tied. Of those, 2 tied record warm minimum temperatures for the month of July. The highest temperature recorded for the month was 109 degrees F, set at Salina on the 22nd. The coldest temperature recorded for the month was 41 degrees F at Horton, Brown County, on the 13th.



Departure from Normal Monthly Mean Temperatures

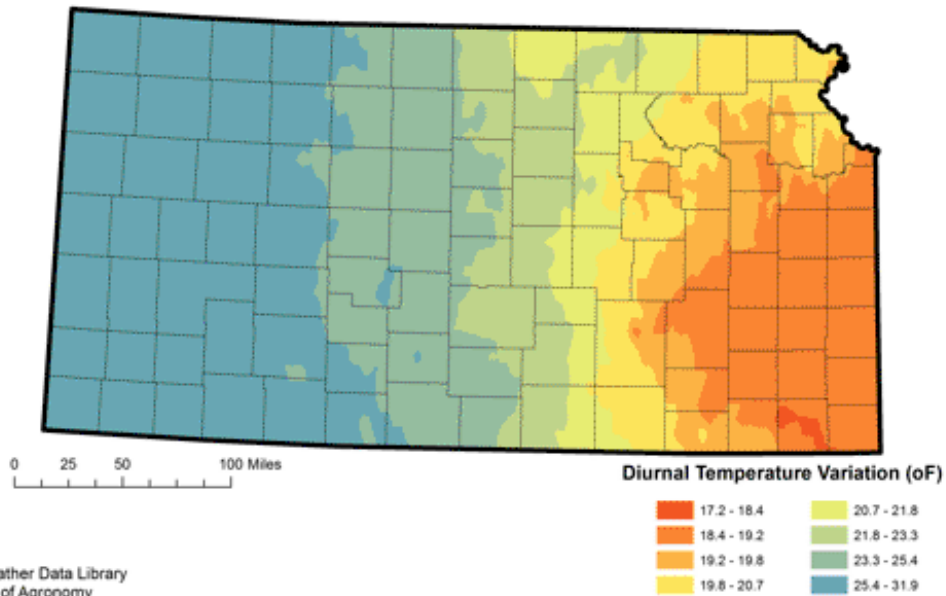
July 1 - July 31, 2016



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Kansas State University

Monthly Diurnal (Day-Night) Temperature Variation

July 1 - July 31, 2016

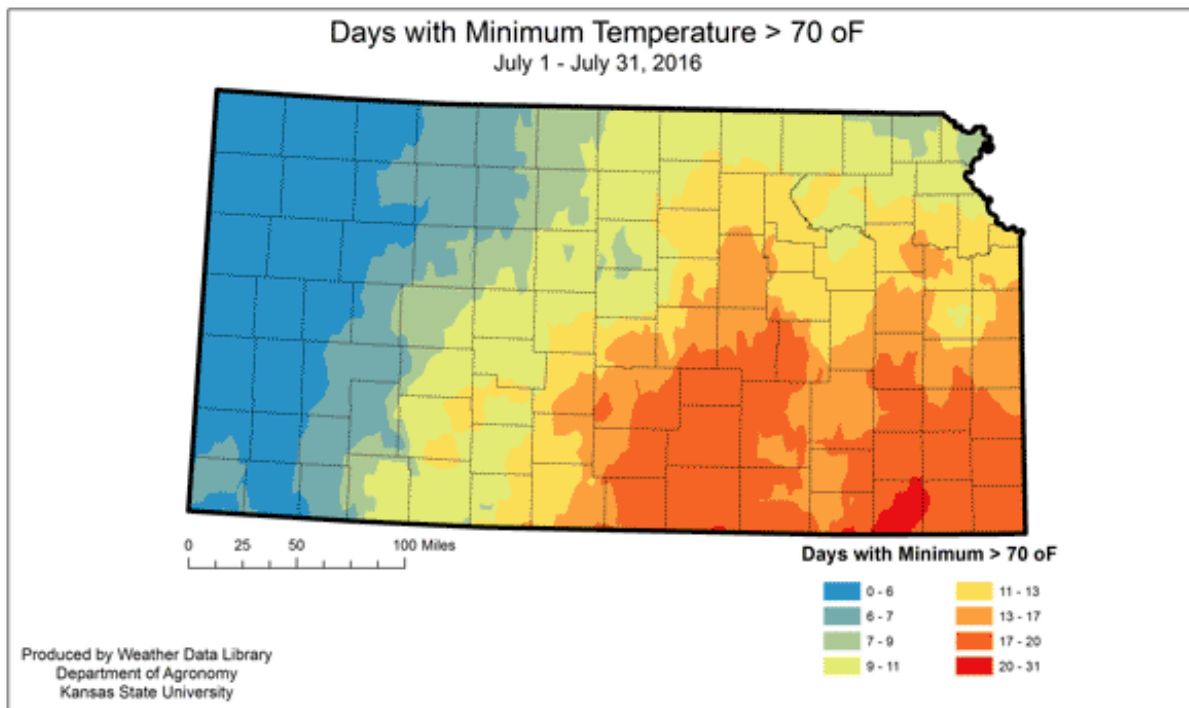


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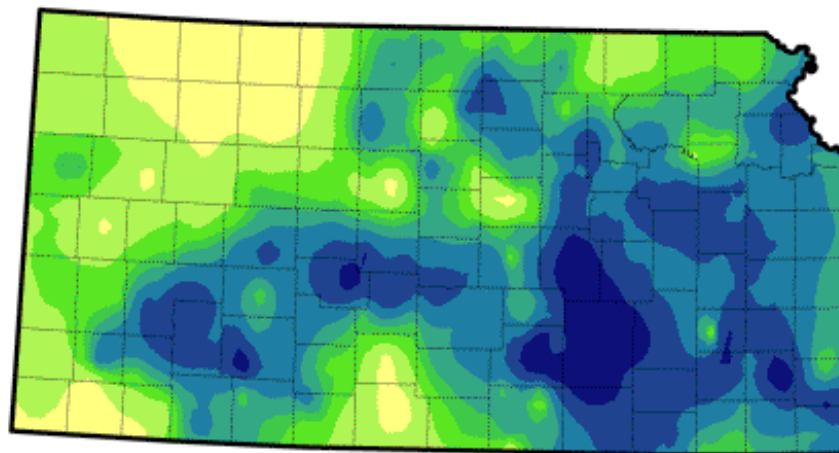
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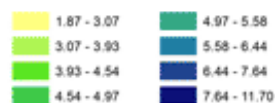
Statewide rainfall for July was above normal; however the Northwest Division missed out on the extra rainfall. The Northwest Division averaged 2.23 inches or just 66 percent of normal. In contrast, the Southeast Division average 7.57 inches or 187 percent of normal. This July ranks as the 18th wettest in the 122 years of records. The wettest July on record occurred in 1993, when the statewide average total was 9.28 inches. With the overall wet pattern, there were 107 new record daily rainfall totals. Of those, two reports, on July 2nd, set new monthly records as well: Ulysses with 2.89 inches and Wichita with 5.72 inches. The greatest 24-hour total for a NWS station was 6.53 inches at Easton, Leavenworth County, on the 3rd. The greatest 24 hour total for a CoCoRaHS station was 8.09 inches at Bel Aire 0.5 WSW, Sedgwick County, also on the 3rd. Highest monthly totals: 11.47 inches at Virgil, Greenwood County (NWS); and 11.70 inches at Ingalls 6.2 WNW, Gray County (CoCoRaHS).

Monthly Precipitation Summary

July 1 - July 31, 2016



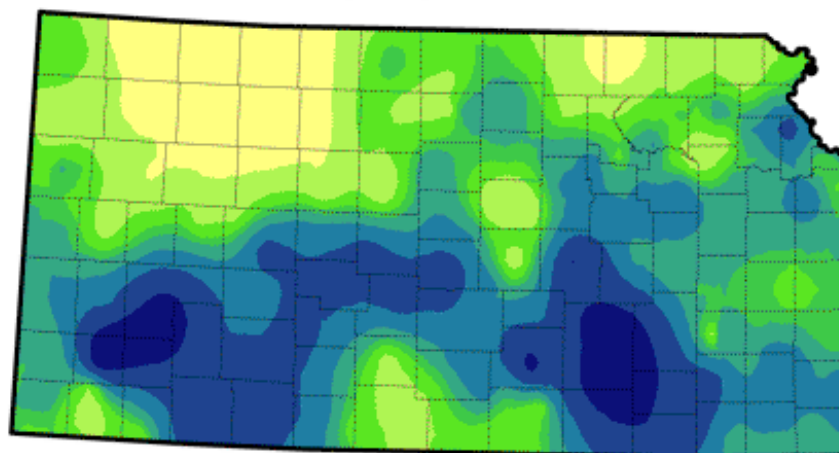
Total Precipitation (Inches)



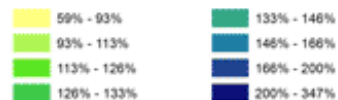
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Percent of Normal Monthly Precipitation

July 1 - July 31, 2016



Percent of Normal Precipitation (100=Normal)

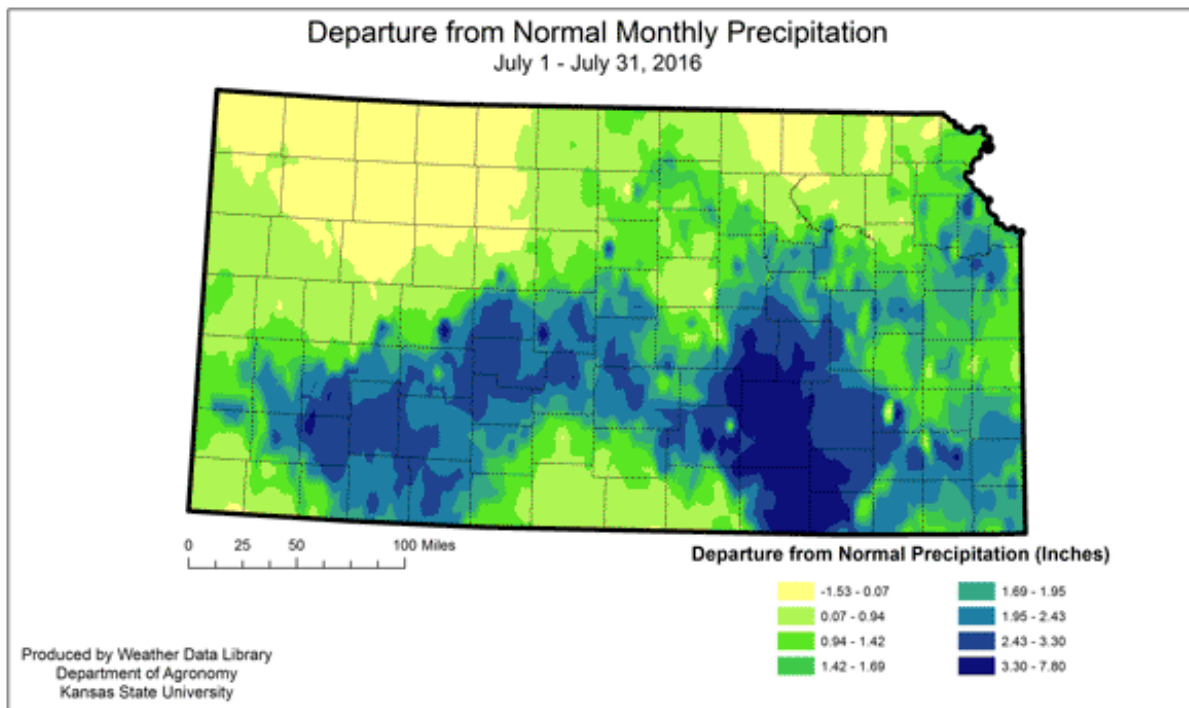


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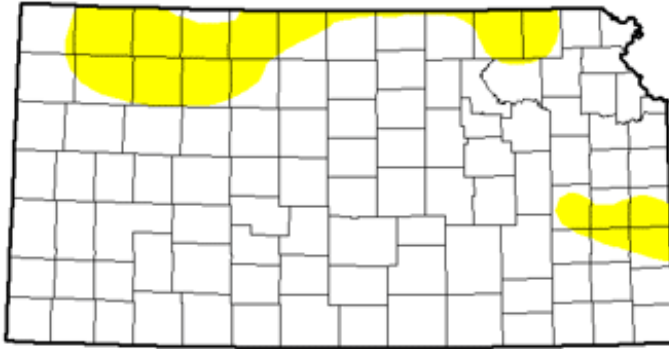


With the wetter pattern than seen in June, there were also more severe weather reports. There were eight tornadoes reported in July. The most severe of these struck Eureka on the 7th. Fortunately there were no deaths or injuries reported with the event. There was a total of 56 hail reports, which was similar to June's total of 51 events. The most common severe weather report was damaging winds. There were 180 damaging wind reports in the month.

Despite the wetter than average conditions statewide, there was an expansion of abnormally dry conditions in the northwest. This region of the state missed out on most of the precipitation events. The wetter pattern in the eastern third of the state reduced the abnormally dry conditions there. The Drought Monitor issued in June listed just over 20 percent of the state as being abnormally dry; the latest Drought Monitor places the total in abnormally dry conditions at just over 13 percent. The precipitation outlook for August is neutral, with it being equally likely to have above- or below-normal precipitation. Statewide, the outlook is for an increased chance of warmer-than-normal temperatures. This is likely to follow July's pattern, with the departure from normal consisting mostly as warmer-than-normal low temperatures.

U.S. Drought Monitor Kansas

August 2, 2016
(Released Thursday, Aug. 4, 2016)
Valid 8 a.m. EDT



Drought Conditions (Percent Area)

	None	D0	D1	D2	D3	D4
Current	86.67	13.33	0.00	0.00	0.00	0.00
Last Week 7/26/2016	93.53	6.47	0.00	0.00	0.00	0.00
3 Months Ago 5/2/2016	86.07	13.93	0.00	0.00	0.00	0.00
Start of Calendar Year 1/2/2015	97.84	2.16	0.00	0.00	0.00	0.00
Start of Water Year 9/26/2015	80.79	14.72	4.48	0.00	0.00	0.00
One Year Ago 8/2/2015	68.33	28.19	3.49	0.00	0.00	0.00

Author:
Richard Tinker
CPC/NOAA/NWS/NCEP

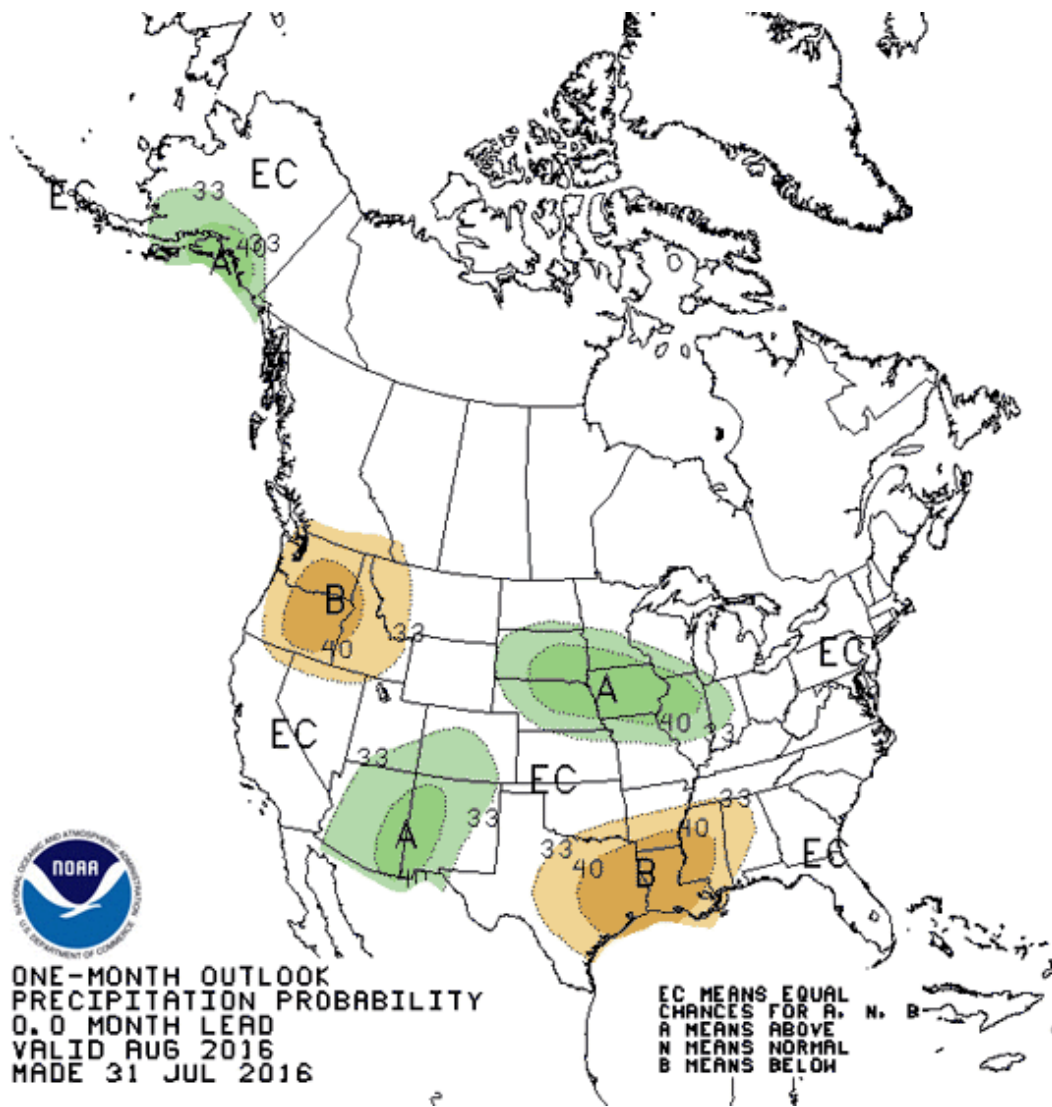


<http://droughtmonitor.unl.edu/>

Intensity:

- D0 Abnormally Dry
- D1 Moderate Drought
- D2 Severe Drought
- D3 Extreme Drought
- D4 Exceptional Drought

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.



July 16

Kansas Climate Division Summary

	Precipitation (inches)			Temperature (°F)			Monthly Extremes		
	July 16			2016 Jan through July			Max	Min	
	Division Total	Dep. ¹	% Normal	Total	Dep. ¹	% Normal			Ave
Northwest	2.33	-1.17	66	13.22	-1.05	92	77.9	106	51

West Central	3.73	0.28	109	14.19	0.39	102	78.6	1.2	107	55
Southwest	4.89	2.11	176	16.80	3.97	130	80.2	1.3	107	54
North Central	4.26	0.16	103	18.92	0.79	104	79.2	0.2	105	54
Central	5.20	1.26	132	20.06	1.03	106	80.6	0.6	109	59
South Central	5.04	1.52	143	20.36	0.21	101	81.8	1.4	106	53
Northeast	4.87	0.53	111	20.75	-1.14	94	78.1	0.3	102	41
East Central	5.72	1.44	133	21.05	-2.59	88	79.3	0.8	100	61
Southeast	7.57	3.53	187	24.30	-1.49	94	80.1	0.7	101	58
STATE	4.94	1.22	133	18.98	0.19	102	79.5	0.8	109	41

1. Departure from 1981-2010 normal value

2. State Highest temperature: 109 oF at Salina, Saline County on the 22nd.

3. State Lowest temperature: 41 oF at Horton, Brown County, on the 13th.

4. Greatest 24hr rainfall: 6.53 inches at Easton, Leavenworth County, on the 3rd (NWS); 8.09 inches at Bel Aire 0.5 WSW, Sedgwick County on the 3rd (CoCoRaHS).

Source: KSU Weather Data Library

Mary Knapp, Weather Data Library
mknapp@ksu.edu

Chip Redmond, Weather Data Library
christopherredmond@ksu.edu

The weekly Vegetation Condition Report maps below can be a valuable tool for making crop selection and marketing decisions.

The objective of these reports is to provide users with a means of assessing the relative condition of crops and grassland. The maps can be used to assess current plant growth rates, as well as comparisons to the previous year and relative to the 27-year average. The report is used by individual farmers and ranchers, the commodities market, and political leaders for assessing factors such as production potential and drought impact across their state.

The Vegetation Condition Report (VCR) maps were originally developed by Dr. Kevin Price, K-State professor emeritus of agronomy and geography. His pioneering work in this area is gratefully acknowledged.

The maps have recently been revised, using newer technology and enhanced sources of data. Dr. Nan An, Imaging Scientist, collaborated with Dr. Antonio Ray Asebedo, assistant professor and lab director of the Precision Agriculture Lab in the Department of Agronomy at Kansas State University, on the new VCR development. Multiple improvements have been made, such as new image processing algorithms with new remotely sensed data from EROS Data Center.

These improvements increase sensitivity for capturing more variability in plant biomass and photosynthetic capacity. However, the same format as the previous versions of the VCR maps was retained, thus allowing the transition to be as seamless as possible for the end user. For this spring, it was decided not to incorporate the snow cover data, which had been used in past years. However, this feature will be added back at a later date. In addition, production of the Corn Belt maps has been stopped, as the continental U.S. maps will provide the same data for these areas. Dr. Asebedo and Dr. An will continue development and improvement of the VCRs and other advanced maps.

The maps in this issue of the newsletter show the current state of photosynthetic activity in Kansas, and the continental U.S., with comments from Mary Knapp, assistant state climatologist:

Kansas Vegetation Condition

Period 31: 07/26/2016 - 08/01/2016

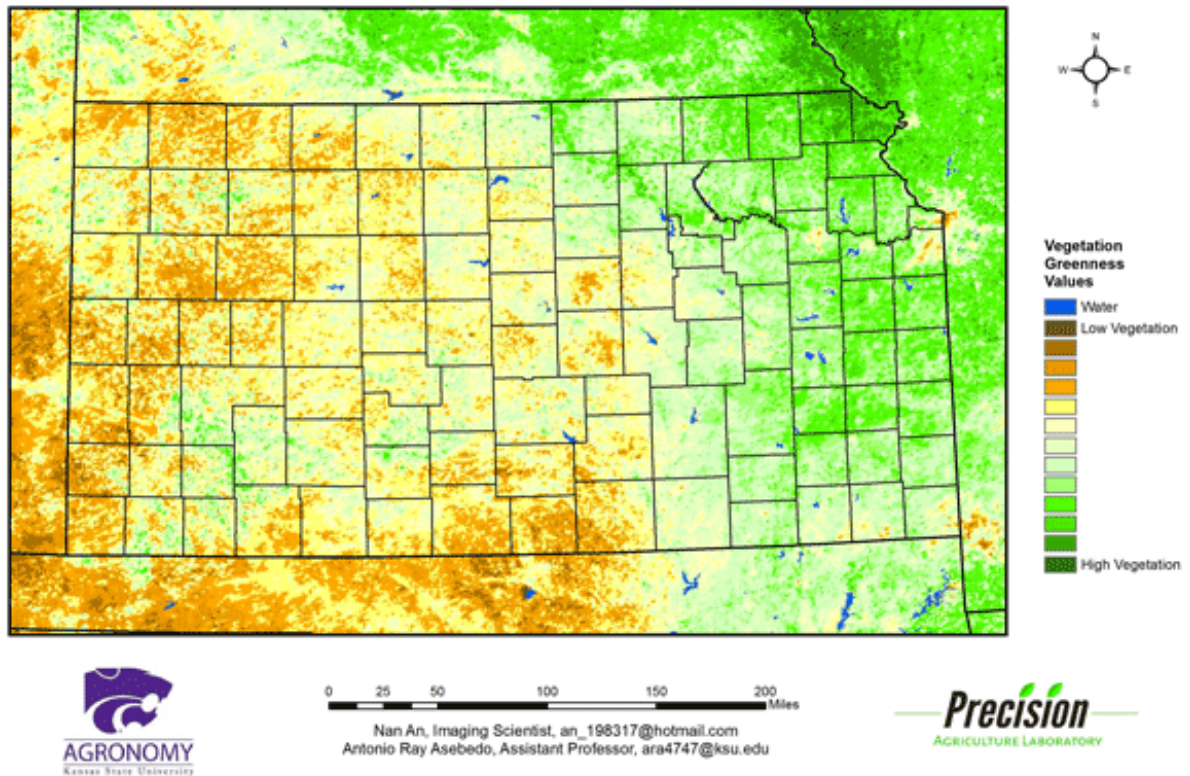


Figure 1. The Vegetation Condition Report for Kansas for July 26 – August 1, 2016 from K-State’s Precision Agriculture Laboratory continues to show high NDVI values across the eastern third of the state, as well as in pockets of central and southwest Kansas. The highest NDVI values are along the Missouri River in Brown and Doniphan counties. It is also interesting to see the higher NDVI values continue along the Republican River Basin in north central Kansas.

Kansas Vegetation Condition Comparison
Late-Jul/Early-Aug 2016 compared to the Late-Jul/Early-Aug 2015

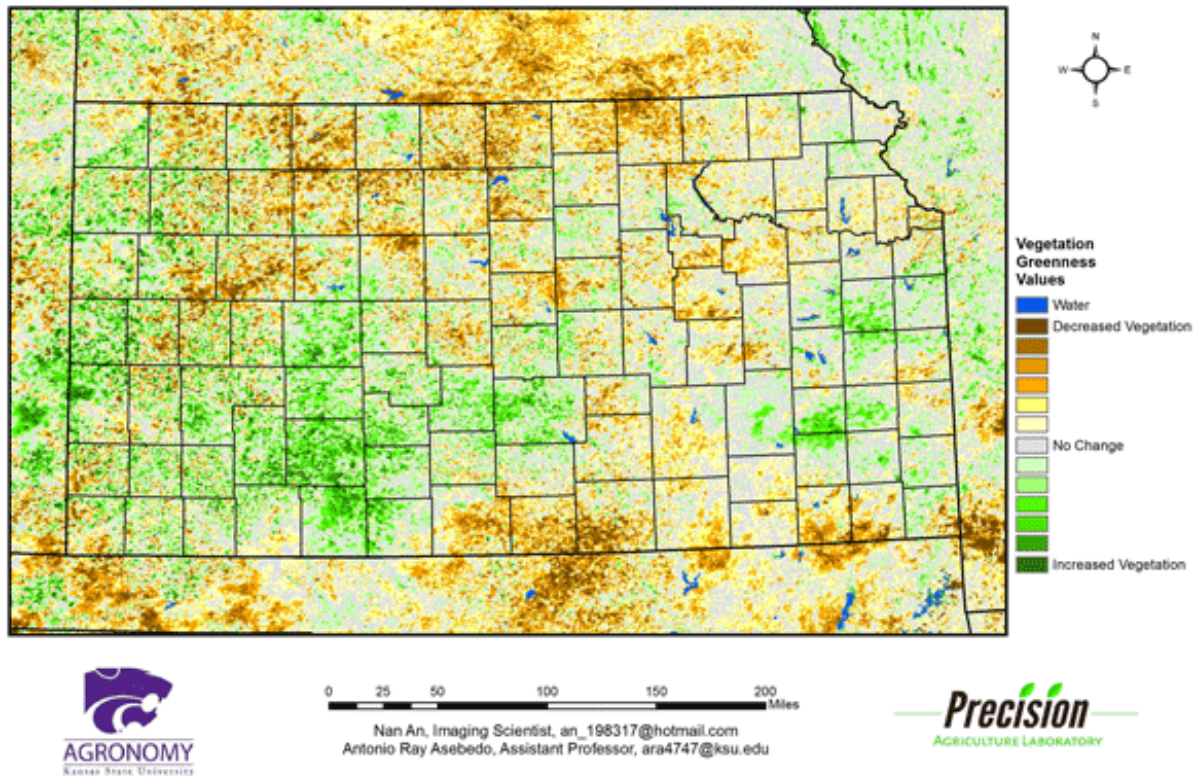


Figure 2. Compared to the previous year at this time for Kansas, the current Vegetation Condition Report for July 26- August 1, 2016 from K-State's Precision Agriculture Laboratory shows the area of much higher photosynthetic activity is mostly in the southwestern areas of the state. Overall, the greatest increase in photosynthetic activity continues to be in western Kansas. Rainfall has been well distributed in the region and crop progress continues ahead of last year at this time. In north central Kansas, rainfall hasn't been quite as well distributed as last year.

Kansas Vegetation Condition Comparison

Late-Jul/Early-Aug 2016 compared to the 27-Year Average for Late-Jul/Early-Aug

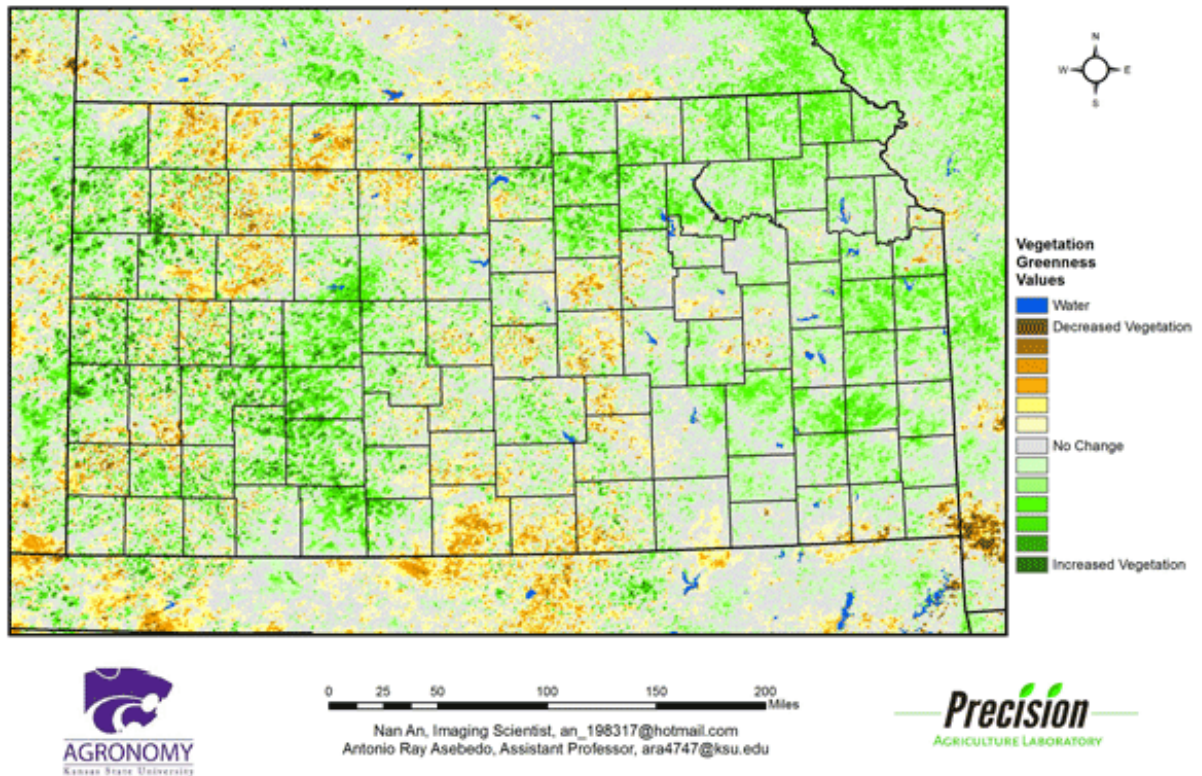
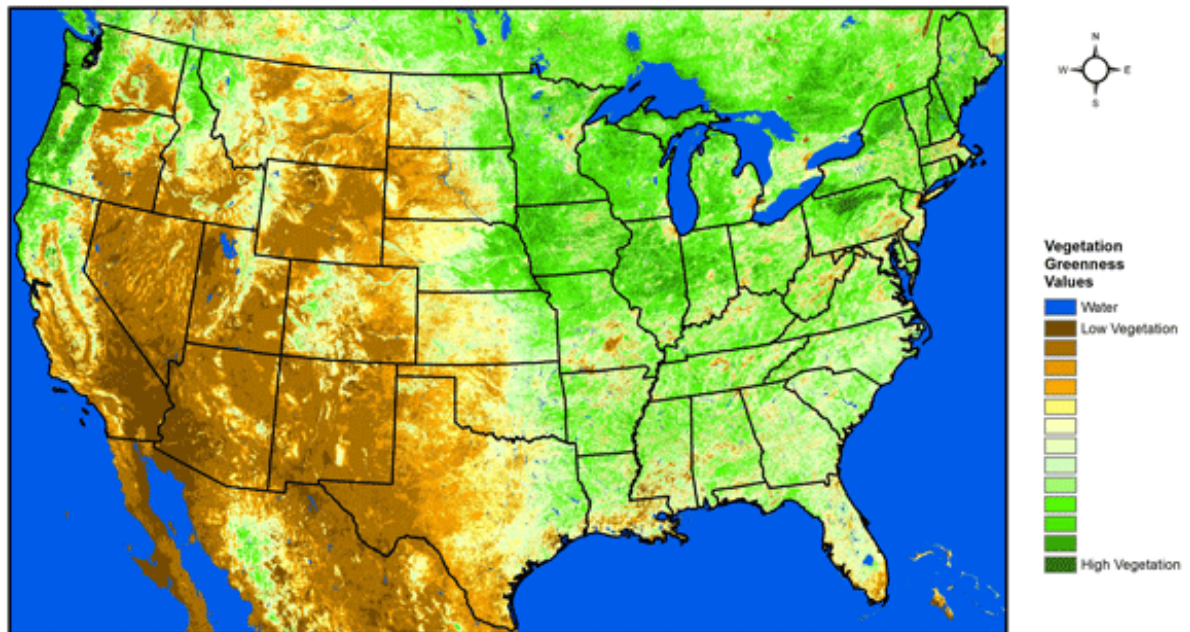


Figure 3. Compared to the 27-year average at this time for Kansas, this year's Vegetation Condition Report for July 26 – August 1, 2016 from K-State's Precision Agriculture Laboratory shows the area of below-average vegetative activity is most evident in parts of northwest Kansas. Intermittent rains and more seasonal temperatures have reduced vegetative stress in much of the state.

Continental U.S. Vegetation Condition

Period 31: 07/26/2016 - 08/01/2016



Nan An, Imaging Scientist, an_198317@hotmail.com
Antonio Ray Asebedo, Assistant Professor, ara4747@ksu.edu



Figure 4. The Vegetation Condition Report for the U.S for July 26 – August 1, 2016 from K-State’s Precision Agriculture Laboratory shows high NDVI values in the Western Corn Belt. Favorable rainfall and more seasonal temperatures favored photosynthetic activity across the region. In contrast, the western High Plains of South Dakota, eastern Montana, and eastern Wyoming continue to have reduced vegetative activity as drought intensifies in these areas. Vegetative activity is also reduced in parts of New England, where rainfall has been limited. This includes parts of Massachusetts, New Jersey, and eastern Pennsylvania.

Continental U.S. Vegetation Condition Comparison
Late-Jul/Early-Aug 2016 Compared to Late-Jul/Early-Aug 2015

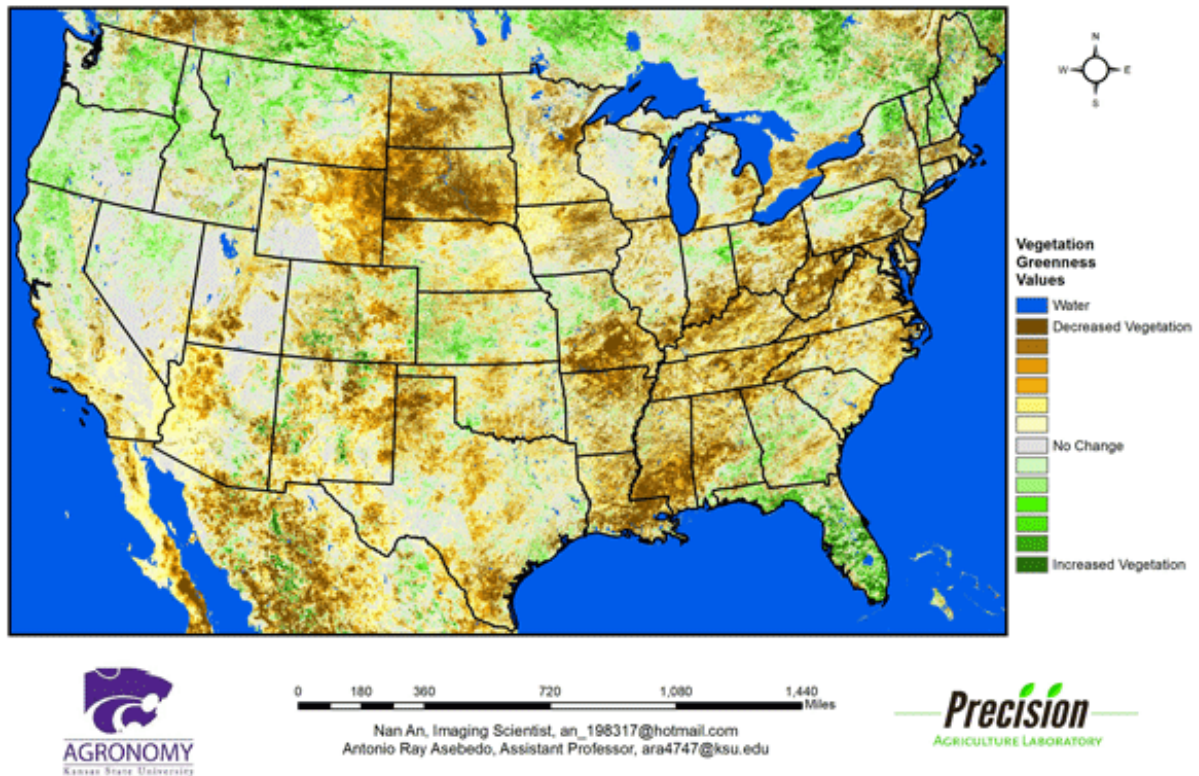


Figure 5. The U.S. comparison to last year at this time for July 26 – August 1, 2016 from K-State’s Precision Agriculture Laboratory shows that lower NDVI values are visible across much of the continental U.S. west of the Rockies. Florida and upper New England have higher NDVI values, as rainfall has been more favorable in these areas this year.

Continental U.S. Vegetation Condition Comparison
Late-Jul/Early-Aug 2016 Compared to 27-year Average for Late-Jul/Early-Aug

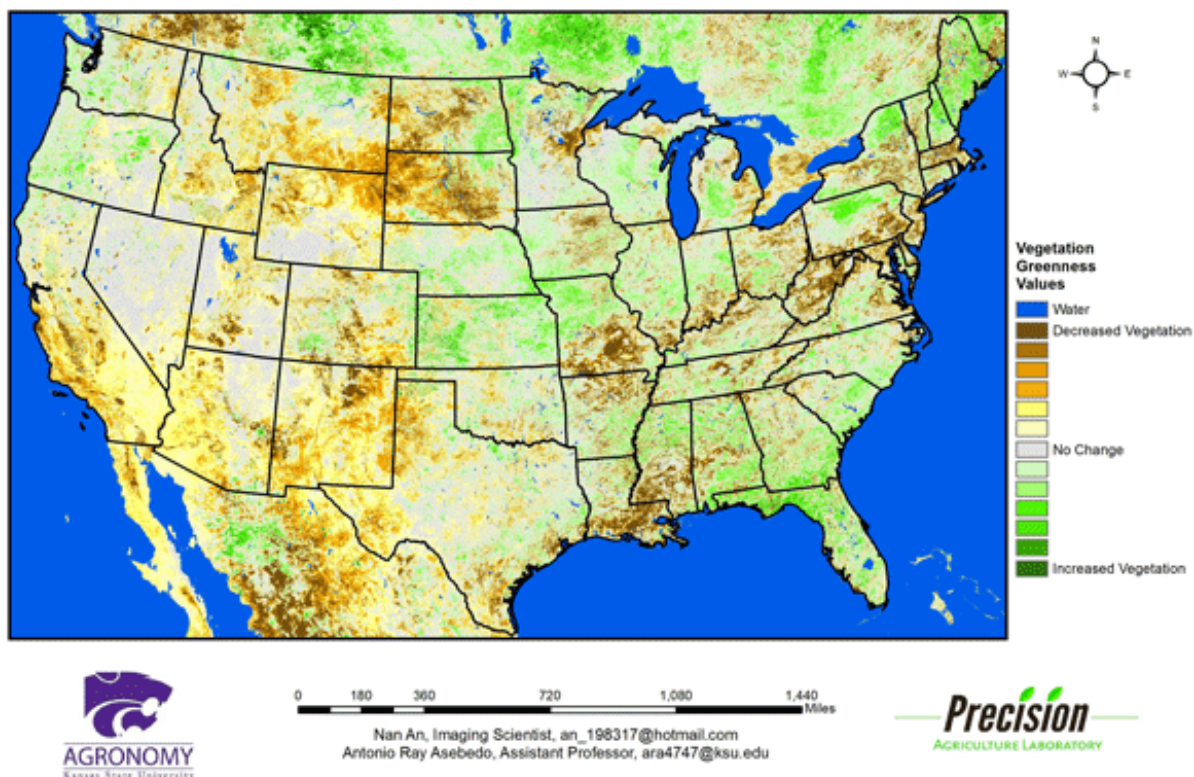


Figure 6. The U.S. comparison to the 27-year average for the period July 26 – August 1, 2016 from K-State’s Precision Agriculture Laboratory shows areas of below-average photosynthetic activity in the western High Plains and the Midwest. Drought conditions continue to expand in parts of New England with severe drought conditions reported in western New York, while below-average NDVI values from southeast Missouri through West Virginia are due to heavier-than-normal rainfall this week and the resultant cloud cover.

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