Issue 706

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These e-Updates are a regular weekly item from K-State Extension Agronomy and Kathy Gehl, Agronomy eUpdate Editor. All of the Research and Extension faculty in Agronomy will be involved as sources from time to time. If you have any questions or suggestions for topics you'd like to have us address in this weekly update, contact Kathy Gehl, 785-532-3354 kgehl@ksu.edu, or Dalas Peterson, Extension Agronomy State Leader and Weed Management Specialist 785-532-0405 dpeterso@ksu.edu.

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1. Volunteer wheat control: Protecting Kansas wheat

What measures can producers take to prevent another widespread occurrence of wheat streak mosaic virus, High Plains virus, and triticum mosaic virus in wheat this coming season?

There are several things producers can do: delay planting dates as long as feasible, control any significant stands of green foxtail and barnyard grass near fields that will be planted to wheat, and plant wheat varieties with resistance to wheat streak mosaic. However, getting good control of these virus diseases starts primarily with controlling volunteer wheat. Control volunteer wheat soon in order to protect the wheat crop planted this fall.

Volunteer wheat within a half-mile or more of a field that will be planted to wheat should be completely dead at least two weeks before wheat planting. This will help control wheat curl mites, Hessian fly, and wheat aphids (bird cherry oat aphids and greenbugs, etc.) in the fall.

Wheat streak mosaic virus

The most important threat from volunteer wheat is the wheat streak mosaic complex including *wheat streak mosaic*, *High Plains mosaic*, and *Triticum mosaic*. These diseases cause stunting and yellow streaking on the leaves. In most cases, infection can be traced to a nearby field of volunteer wheat, although there are other hosts, such as corn, millet, and many annual grasses, such as yellow foxtail and prairie cupgrass. Controlling volunteer is one of the most effective way to lower the local risk of the wheat streak mosaic virus complex.

Figure 1. Wheat streak mosaic. Photo by Erick DeWolf, K-State Research and Extension.

Wheat streak mosaic virus is carried from volunteer wheat to newly-planted wheat by the wheat curl mite. These tiny, white, cigar-shaped mites are too small to be seen with the naked eye. The curl mite is carried by wind to new hosts and can travel more than a mile from volunteer wheat. The wheat curl mite also carries the High Plains virus and triticum mosaic virus. When mite populations are large, the wheat curl mites can cause curling of leaf margins and head trapping.

Wheat streak mosaic can cause severe economic damage. Wheat curl mites, and thus wheat streak mosaic, are problematic in the western half of Kansas. Figures 2 and 3 show yield maps from Meade and Wichita Counties, respectively (courtesy of Ediger Seeds and Horton Seed Services), in which one border of the field had a severe outbreak of wheat streak mosaic virus led by lack of volunteer wheat control in the neighboring field. On Figure 2 (2015-16 growing season), the average yield in the entire section was approximately 54 bushels per acre and some portions of the field yielded as much as 77 bushels per acre; still, the area where wheat streak mosaic was more severe yielded less than 18 bushels per acre. On Figure 3 (2016-17 growing season), the entire field was affected by wheat streak mosaic virus and the field average was close to 25 bushels per acre. While spots where the disease incidence was lower yielded over 40 bushels per acre, the entire southwest corner and west border near the neighboring field hosting the volunteer wheat yielded less than 5 bushels per acre.

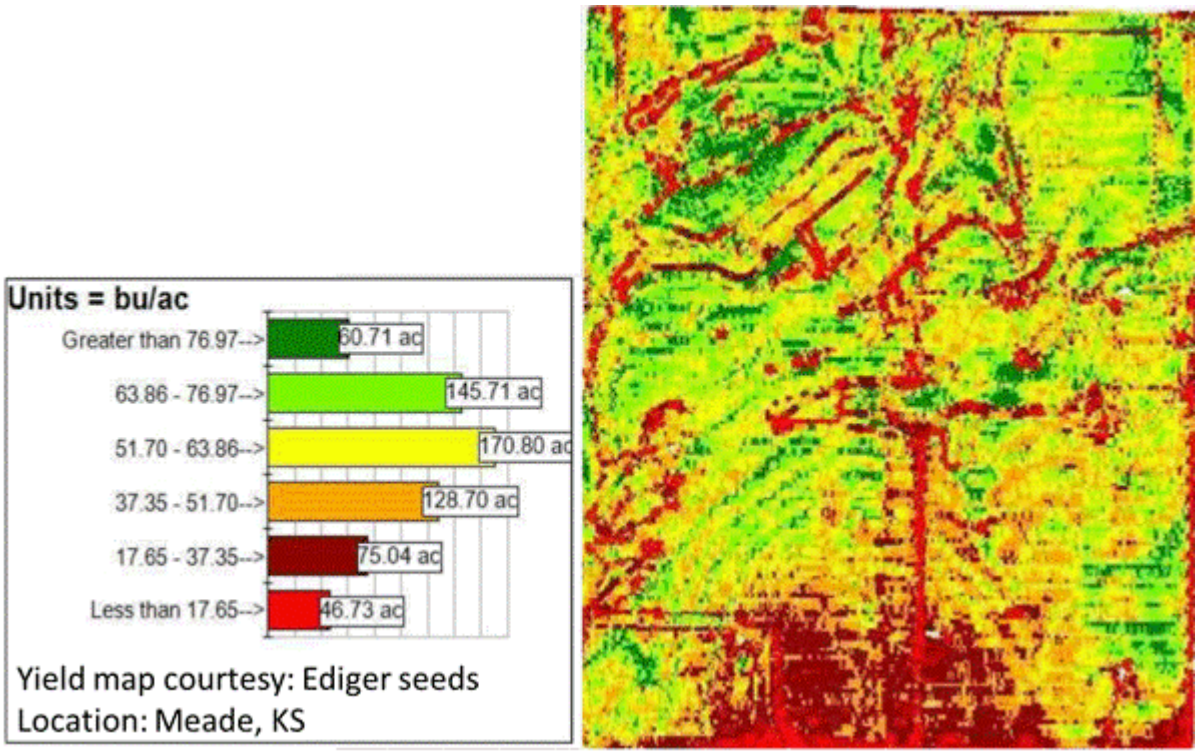


Figure 2. Yield map showing the magnitude of yield loss in a field where the south border was infected with wheat streak mosaic virus. The mean yield of the field was 54 bushels per acre whereas the affected area yielded less than 18 bushels per acre. Yield map courtesy of Tyler and Darwin Ediger, Meade, Kansas. 2015-16 harvest.

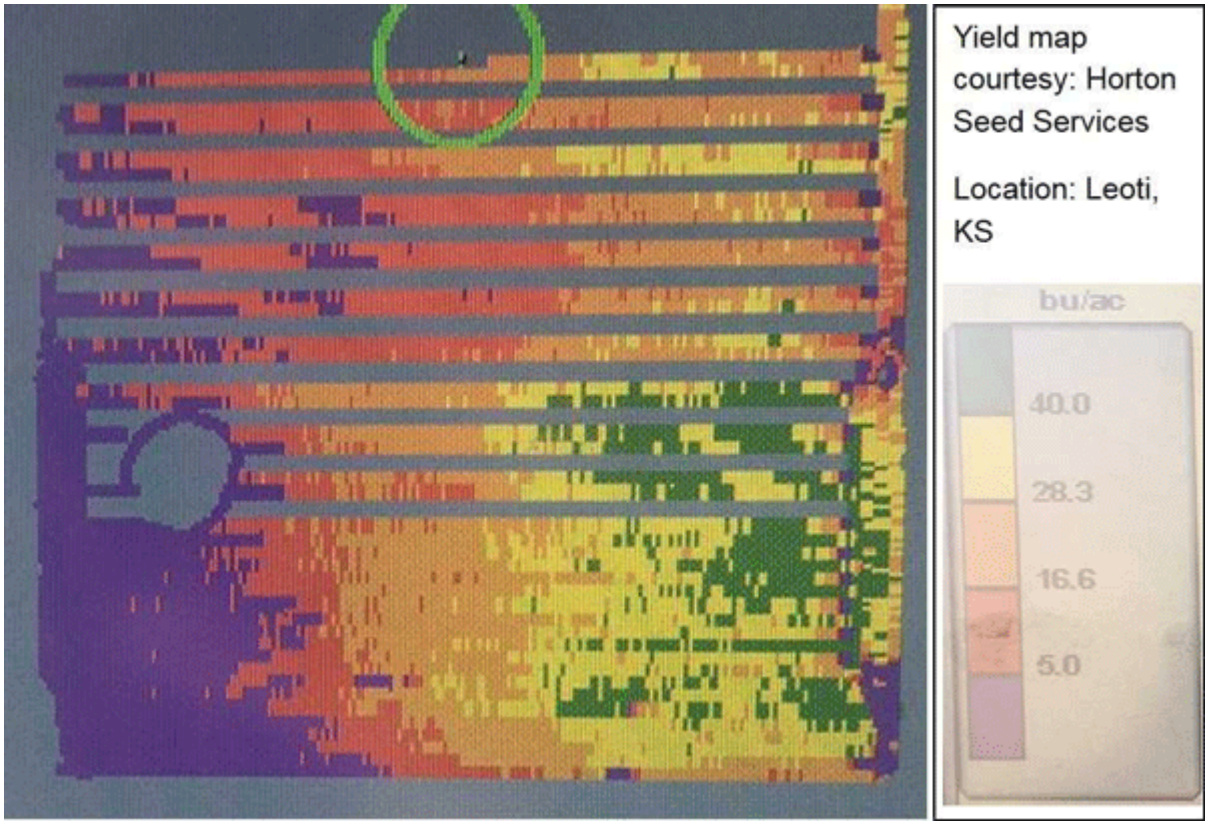


Figure 3. Yield map showing the magnitude of yield loss in a field where the entire field was infected with wheat streak mosaic virus, and the west border was zeroed out. The mean yield of the field was approximately 25 bushels per acre whereas the affected area yielded less than 5 bushels per acre. Yield map courtesy of Rick and Alec Horton, Leoti, from the 2016-17 harvest.

Hessian fly

Hessian flies survive over the summer on wheat stubble. When the adults emerge, they can infest any volunteer wheat that may be present, which will keep the Hessian fly population alive and going through the upcoming crop season. We have found that Hessian flies have an adult emergence "flush" after moisture events all summer and even into November, depending upon temperatures. Therefore, it seems it is really more of a continuous potential for infestation, making it even more critical to destroy volunteer in a timely manner. If there is no volunteer around when these adults emerge, they will not be able to oviposit on a suitable host plant. If the volunteer is destroyed while the flies are still larvae, this will help to reduce potential problems.

Hessian flies can be problematic all across Kansas, varying in different locations and years depending upon weather conditions and the amount of volunteer wheat. Hessian fly larvae attack young wheat plants near the soil line. Tillers may be stunted and later may lodge. In heavy infestations, the whole stand may be lost.

Barley yellow dwarf virus

Volunteer wheat is a host of barley yellow dwarf virus, and the greenbugs and bird cherry oat aphids that carry it. So in that respect, destroying volunteer helps reduce the reservoir for the barley yellow dwarf viruses. The aphids have to pick up the BYD virus from an infected host plant first in order to become a carrier that can transmit the disease to wheat. Host plants that can carry the disease include volunteer wheat, corn, and others. However, destroying volunteer will have little effect on aphid populations in the fall and spring since the aphids migrate into the state from southern areas.

Russian wheat aphids may also live over the summer on volunteer wheat. While this insect has wings and can be wind borne for hundreds of miles, the vast majority of fall infestations in Kansas appear to originate from nearby infested volunteer.

Various other pests

A number of other pests are also associated with the presence of volunteer wheat. An example in western Kansas is the Banks grass mite. During some years, infestations become established during late summer and early fall on volunteer wheat. Later, as the quality of the volunteer deteriorates, mites move from the volunteer into adjacent fields of planted wheat or other small grains. Occasionally mites will survive the winter and continue to spread into the planted wheat following greenup in the spring.

A concern in the eastern part of the state is the chinch bug. Occasionally, adult bugs will fly from maturing sorghum fields in late summer to nearby fields where volunteer wheat is growing. Where infested volunteer is allowed to grow right up until seedbed preparation just prior to planting, early-planted continuous wheat is likely to become infested. Similarly, volunteer that is allowed to grow through the fall and into the following spring may serve as an attractive chinch bug host.

Another reason to control volunteer is that volunteer and other weeds use up large amounts of soil moisture.

Control options for volunteer wheat

Destroying volunteer after the new wheat emerges is too late. Producers should leave enough time to have a second chance if control is incomplete. Tillage and herbicides are the two options available for volunteer wheat control.

Tillage usually works best when plants are small and conditions are relatively dry. Herbicide options depend on cropping systems and rotations. Glyphosate can be used to control emerged volunteer wheat and other weeds during the fallow period in any cropping system. However, it has no residual activity and will not control later germinating volunteer wheat or weeds.

If glyphosate is used too close to planting time, volunteer may stay green long enough to transmit diseases and insects to the new crop. It may take as long as one week following glyphosate application before the wheat will die, so that needs to be considered when timing the application to break the bridge for insects and diseases. The optimum time to treat with glyphosate is when most of the volunteer has emerged and is healthy and actively growing. Glyphosate can effectively control volunteer wheat that has tillered.

Atrazine is a relatively inexpensive treatment for volunteer wheat control that can be applied anytime in the summer or fall, if rotating to sorghum or corn. In the September to October time

period, using atrazine plus crop oil alone can often control small volunteer wheat that has not yet tillered, as well as later-emerging volunteer wheat and other weeds.

If the volunteer has tillered, most of the roots will have grown deep enough to be out of the reach of atrazine. This is when it helps to add glyphosate to the atrazine plus crop oil. Glyphosate is translocated from the leaf tissue throughout the plant. The combination of glyphosate and atrazine will provide a good combination of burndown and residual control on both volunteer that has tillered and later-emerging volunteer. Atrazine rates need to be adjusted to soil type and pH, and may not be appropriate for all areas.

In summary, the most important reasons to control volunteer wheat are:

- Wheat curl mite/wheat streak mosaic virus
- Hessian fly
- Russian wheat aphid
- Take-all
- Bird cherry oat aphid/greenbug/barley yellow dwarf virus
- Banks grass mite
- Chinch bug
- Reduces moisture loss

Erick DeWolf, Extension Plant Pathologist
dewolf1@ksu.edu

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

Dallas Peterson, Weed Management Specialist
dpeterso@ksu.edu

Jeff Whitworth, Extension Entomologist
jwhitwor@ksu.edu

2. Factors to consider when selecting a wheat variety

In recent years, wheat producers are faced with an increasing number of varieties from which to choose. One of the reasons behind having so many available varieties is that many public and private institutions are breeding wheat varieties in the Great Plains: Colorado State University, Kansas State University, Oklahoma State University, Texas A&M University, University of Nebraska, AgriPro/Syngenta, Limagrain, and WestBred/Monsanto. Additionally, several companies license varieties from existing breeding programs, such as AGSECO, Dyna-Gro, among others.

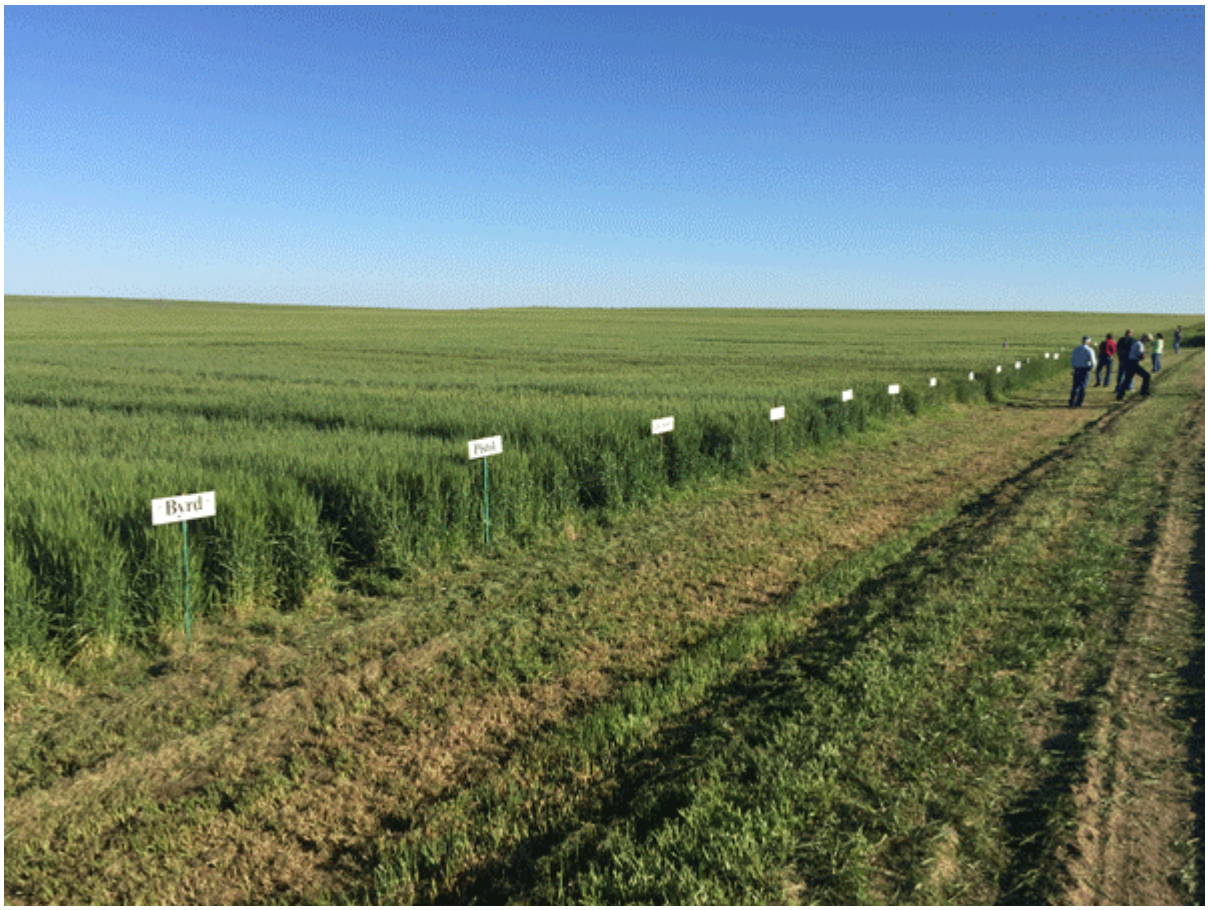


Figure 1. Producers in Kansas have many wheat varieties to evaluate. Photo by Romulo Lollato, K-State Research and Extension.

Producers can use different tools and publications to study each variety's strengths and weaknesses, selecting varieties that best match their needs.

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 and excellent yield record 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 that users start by 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. Finally, after selecting a few potential candidates based on their performance, we suggest that users click on "Head-to-head comparisons", so they can test whether those candidates performed statistically different over a wide range of environments. Click the link above to access the Colorado database.

2. **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 below-average straw strength. A history of feral rye in the field would suggest the need for a Clearfield variety and this 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:* Variety selection can help reduce the risk to many of the most common and damaging diseases in Kansas. Selecting a variety like SY Monument, Zenda, or LCS Chrome, which have good stripe rust and leaf rust resistance, can reduce the risk of severe disease problems and the need for foliar fungicide in the spring. 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 lack resistance to some major fungal diseases and thus require a fungicide to maintain their productivity. 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 TAM 111, TAM 112, 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, 2016, and 2017. 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 2018: 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 2018: 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 2017-2018 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.

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

Erick DeWolf, Extension Plant Pathologist
dewolf1@ksu.edu

3. Small grain forage options for this fall

Small grain forages can be a profitable option for producers. They can be planted in the fall and either terminated or grazed out in the early spring, allowing time to plant a summer row crop if soil moisture is adequate.

There are five common small grain options for forage: spring oats, winter wheat, winter barley, winter cereal rye, and winter triticale. Each option has strengths and weaknesses.

Spring oats. Spring oats are usually planted in late February or March in Kansas. However, spring oats can also be planted in August -- and if done so, they will produce much more fall forage compared to other small grain forages in the fall before a killing freeze. They will almost never produce grain if planted in August. Spring oats do not need to vernalize before heading. They will develop rapidly in the fall if they have enough moisture and nutrients, and may even head out before termination by the first hard freeze in the mid-20 degree F range, but in most years will not have time to produce viable grain. In very mild winters, however, much of the spring oats planted in the fall might survive the winter in southern Kansas.

Spring oats can be utilized in the fall for either hay or grazing. Spring oats can be ready to graze 6 to 8 weeks after planting with adequate moisture and after a good crown root system has developed. Under good conditions, spring oats can produce up to 1 to 2 tons of forage per acre, but as planting is delayed past early August expect less tonnage. Spring oats are not very drought-tolerant, and will not establish well or produce much forage if soils are very dry. Rye and barley are more drought-tolerant than spring oats.

Spring oats should be seeded at the rate of 2 to 3 bushels (64 to 96 pounds) per acre. About 30 to 50 pounds of nitrogen (N) per acre will be adequate depending on forage potential and if no excess N is available in the soil.

Oat pasture can generally carry 500 pounds of beef per acre. Average daily gains range from 1.5 to 2.5 pounds per head per day. Forage quality on actively growing oats is high, with protein content in the range of 20 to 25%.

Oats are fairly susceptible to atrazine, so if producers plan on planting oats this fall after corn or milo, risk of herbicide carryover that can kill seedling plants does exist.

Winter wheat. Wheat is often used for grazing and grain in so-called “dual-purpose” systems (Figure 1). These kinds of systems are usually balanced between getting good forage and good grain yields without maximizing yields on either side. Dual-purpose wheat is typically planted one to two weeks earlier than wheat planted for grain only, which can increase the risk of a wheat streak mosaic infection. In addition, producers wanting both grazing and grain should use a higher-than-normal seeding rate and increase the N rate by 30 pounds per acre for every 1,000 pounds forage yield.

Figure 1. Cattle grazing on a wheat field. Photo courtesy of Great Plains Grazing

Producers who need more pasture than normal can plant even earlier, at the likely expense of lower grain yields. Planting very early opens wheat to many risks, such as wheat streak mosaic, barley yellow dwarf, Hessian fly, and common root rot. Wheat can also be grazed out, foregoing grain yield altogether. Wheat usually produces most of its forage in late fall and early winter, and again in the spring. There are differences among varieties in how much fall forage is produced. For more information on dual-purpose wheat, please refer to the accompanying eUpdate article, "Managing wheat for forage and grain: the dual-purpose system".

Winter barley. There are now new, improved varieties of winter barley available with better winterhardiness, especially under grazing. Many of the newer varieties also produce more forage than older varieties. Barley produces palatable growth rapidly in the fall under favorable conditions. It is considered superior to other cereals for fall and early winter pasture, but wheat, triticale, and rye provide better late winter and spring grazing. Barley has excellent drought and heat tolerance. Winter barley forage is typically the most palatable of the small grain cereals and feed quality is the highest.

Winter rye. Rye establishes fall pasture quickly. It also regrows rapidly in late winter and early spring. However, rye becomes "stemmy" and unpalatable earlier in the spring than other cereals. Since rye is less palatable and higher in fiber than wheat or barley, cattle gains during grazing are normally greater on oat, wheat, triticale, and barley pasture than on rye pasture. Rye is the hardiest of the small grain cereals for overall tolerance to drought, heat, winterkill, and poor soil conditions.

Winter triticale. Triticale, a cross between wheat and rye, possesses the toughness of rye along with the quality of wheat. It can be grazed much harder than wheat and still recover to produce grain.

Triticale has longer effective spring grazing than rye, but not as long as wheat. Depending on the variety, winter triticale will head later than rye so the forage can remain higher in quality later into the spring. Heading date on all winter cereals should be a consideration if spring grazing is the goal.

Small grain pasture management

As planting dates get later in the fall, producers will get more fall forage production from triticale and rye. The later it gets, the more rye becomes the best option for fall forage needs.

When planting a small grain cereal primarily for forage, use a seeding rate about 50-100 percent higher than if the crop were grown for grain. In western Kansas and under dry soils conditions, a seeding rate of 1.5 bu/acre is recommended. In eastern Kansas or under irrigation, a seeding rate near 2 bu/acre is recommended. When planting a small grain cereal for grazing purposes, increase N rates by about 30 to 50 lbs/acre. To determine the actual amount of additional N needed, the following formula can be used:

Additional lbs N/acre = (Number of animals/acre) x (lbs of weight gain/animal) x 0.4

In a graze-out program, all the N may be applied in the fall. However, split applications will reduce the chances of having a problem with nitrate toxicity. In addition, there may be excess N in the fall from failed summer crops, so producers should use caution when putting on N without a profile N soil test.

Under good growing conditions, a well-fertilized small grain dryland pasture can carry about 500 pounds of cattle per acre. Under poor growing conditions, stocking rates should be reduced considerably. Cattle gains of 1.5 to 2.5 or more pounds per acre per day are possible during periods of good pasture production. Under irrigation, with intensive management, much higher stocking rates are attained.

Fall grazing management is critical to the success of small grain pastures. Begin grazing when the plants are well rooted and tillered, usually about 6 to 8 weeks after planting. If the foliage is too tall when the animals are introduced, or if the crop is overgrazed, the plants will be more susceptible to winterkill. Make sure some green leaves remain below the grazing level. The minimum stubble height should be about 3 to 4 inches. Rye has a more upright growth pattern than most wheat varieties, so it should not be grazed as low. Winter barley is more susceptible to winterkill than rye or wheat. However, newer varieties of barley are exhibiting increased winter hardiness.

In terms of overall forage quality of hay, barley is highest, followed by oats, wheat, triticale, and rye. During the fall and early spring periods of peak production, the crude protein content of small grain pasture is normally about 20-25 percent. Growing cattle require about 12 percent crude protein, thus no protein supplements are necessary.

Small grain pastures can cause bloat. Daily supplementation with poloxalene (Bloat Guard) is highly effective in reducing bloat and is available in many different feeding forms. Feeding high-quality grass hay, silage, and/or an ionophore such as Rumensin or Bovatec can also provide some protection against bloat. Rumensin and Bovatec have also been shown to increase stocker cattle weight gains on wheat pasture. Mineral supplements containing magnesium are necessary when grazing cattle on small grain pasture to minimize the occurrence of grass tetany.

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

Doohong Min, Forage Agronomist
dmin@ksu.edu

Jaymelynn Farney, Southeast Area Beef Specialist
jkj@ksu.edu

4. Winter canola variety options from K-State

The window for winter canola planting is rapidly approaching, and the time to select varieties is upon us. Over the past few years, the number of releases from the Canola Breeding Program at K-State has increased considerably. These varieties are licensed to seed partners who have a vested interest in growing the canola economy by encouraging rotation with canola to improve the health and profitability of our wheat-based cropping systems. The goal of the K-State Canola Breeding Program is to develop winter canola varieties that are adapted to Kansas and the southern Great Plains. This article describes the most recent releases and provides an update on what to expect from future varieties.

New commercial varieties for fall 2018

CP320 is a Roundup Ready variety that was released in 2017 and is licensed to CROPLAN by WinField United. CP320 has superb winter hardiness, early flowering, early maturity, and short plant height. The yield record of CP320 is excellent; it was the top Roundup Ready variety at four locations in the 2018 Oklahoma State University Variety Performance Tests. CP320 is a Roundup Ready option for most environments across Kansas.

Torrington is a conventional variety that was released in 2016 and is licensed to Ohlde Seed Farms in Palmer, Kans. The name Torrington was selected because it is the hometown of Dr. Charlie Rife, former canola breeder at Kansas State University. Dr. Rife's greatest contribution to canola breeding was the development of winter hardy germplasm. Winter hardiness is a significant benefit of this variety. Torrington has medium maturity and above average oil content. It is an option for planting in the most winter-challenged environments in Kansas and Oklahoma.

New commercial varieties for fall 2019

Surefire is a full maturity, conventional SURT variety. SURT varieties have tolerance to sulfonylurea (SU) herbicide residual in the soil. This tolerance allows the variety to be planted following the spring application of a SU herbicide; these herbicides often have long plant-back restrictions for canola. Surefire was released in 2017 and is licensed to Spectrum Crop Development, of Ritzville, WA. Surefire has greater yield potential and later maturity than Sumner, the first SURT variety released in 2003. Surefire possesses the highest level of SU residual tolerance of any commercial variety on the market. Surefire also has excellent tolerance to blackleg.

Star 930W is a Roundup Ready variety that was released in 2013 and is licensed to Star Specialty Seed, of Fargo, ND. Star 930W was tested for many years as a K-State experimental line before it was licensed but has been a consistent variety over the years. Star 930W has excellent winter hardiness, early maturity, and medium plant height.

Commercial varieties on the market for three or more years

HyCLASS225W is a Roundup Ready/SURT variety that was released in 2014 and is licensed to CROPLAN by WinField United. HyCLASS225W has above average winter hardiness, medium maturity,

and tall plant height. HyCLASS225W has one of the higher oil contents of the Roundup Ready varieties.

CP4525 (formerly DKW45-25) is a Roundup Ready/SURT variety that was released in 2013 and is now licensed to CROPLAN by WinField United. CP4525 was the first Roundup Ready variety released by the K-State canola breeding program. CP4525 has above average winter hardiness, medium maturity, and good blackleg tolerance.

Riley is a conventional variety that was released in 2010 and is licensed to Johnston Seed Company in Enid, Okla. Riley has been on the market for several years and remains a standard bearer for winter survival, oil content, and blackleg tolerance. Riley delivers consistency and confidence to canola producers.

The Canola Breeding Program will continue to deliver new varieties to southern Great Plains canola producers and is privileged to work with a large number of licensees and variety testing cooperators. We foresee increased availability of greater yielding and higher oil producing varieties in the future. These varieties will possess superior agronomic suitability, including improved winter survival, blackleg tolerance, and herbicide resistance. The benchmarks we use for measuring successful variety releases include yield that is a 3% increase over competitive checks, winter survival equal to or 5% greater than previous releases, and 40% or greater oil content.

Mike Stamm, Canola Breeder
mjstamm@ksu.edu

Kraig Roozeboom, Cropping Systems
kraig@ksu.edu

5. 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 are 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 is because moderate to heavy grazing will typically delay maturity in the spring and reduce 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 1,000 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 (Table 1). 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.

Table 1. 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 wait 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 1,000 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.

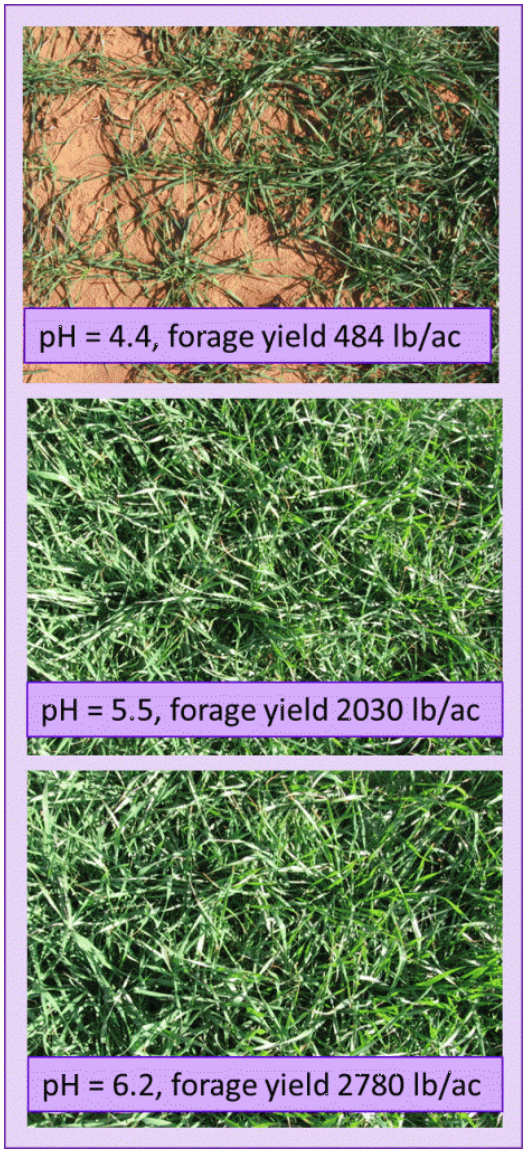


Figure 1. Duster, a variety with excellent tolerance to acidic soils, showing decreased forage production under dual-purpose management due to extremely low soil pH. Photos by Romulo Lollato, K-State Research and Extension (courtesy of Oklahoma State University).

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 1 to 5% per day depending, on weather conditions.

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

Stu Duncan, Northeast Area Crops and Soils Specialist
sduncan@ksu.edu

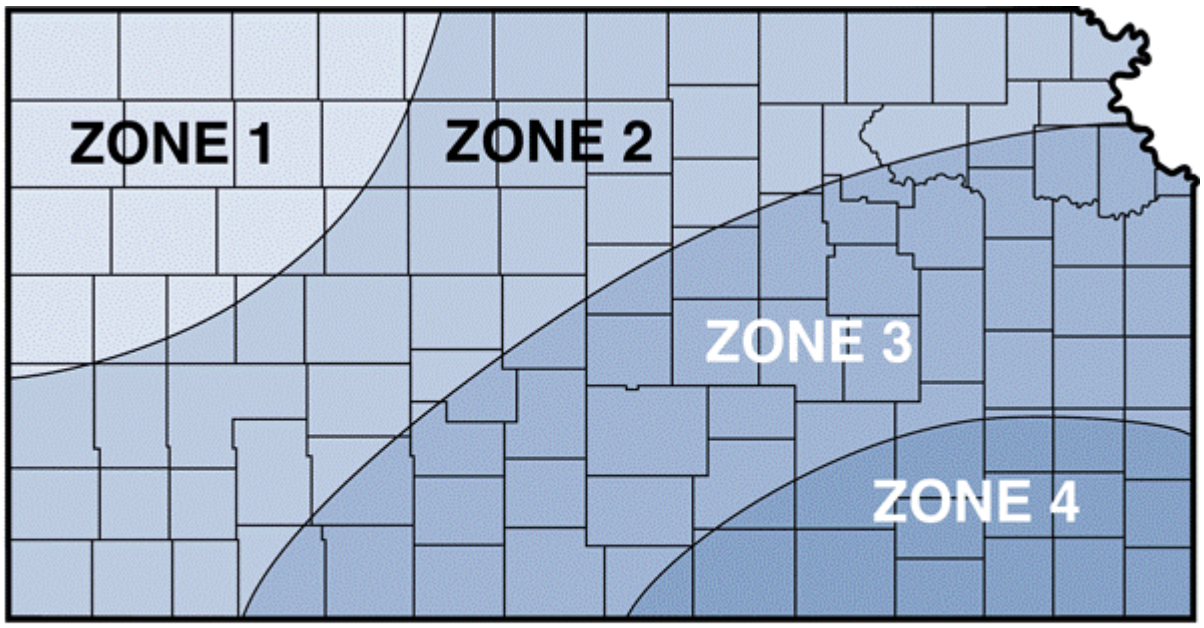
6. Fall planting of smooth bromegrass pastures

Now would be a good time of year to plan for fall seeding of smooth bromegrass pastures and/or hay meadows. If you start planning now, there is plenty of time to have the soil tested, add lime and nutrients, especially phosphorus (P) and potassium (K) if necessary, and adequately prepare the firm seedbed so that you can have many years of productive forage from your pasture/meadow.

Figure 1. Smooth bromegrass pasture. Source: Smooth Brome Production and Utilization, K-State Research and Extension publication C402,
https://www.bookstore.ksre.ksu.edu/pubs/C402.pdf

Planting dates

Smooth brome can be planted in late summer, early fall, winter, or early spring (Figure 2).



Optimum Seeding Dates for Smooth Brome

	Zone 1	Zone 2	Zone 3	Zone 4
Fall	Aug 10–Sept 15	Aug 15–Sept 20	Aug 15–Sept 20	Aug 15–Oct 1
Winter	Nov 1–Mar 1	Nov 15–Feb 15	Dec 1–Feb 15	Not recommended
Spring	Mar 1–Apr 1	Feb 15–Apr 1	Feb 15–Apr 1	Not recommended

Figure 2. Optimum seeding dates for smooth brome in Kansas. Map from K-State Research and Extension.

Winter and spring plantings are not recommended on droughty claypan soils because smooth bromegrass will not survive if a hot, dry summer follows planting. Establishment of cool-season grasses is most successful with late summer or fall plantings. Adequate time must be allowed for summer tillage (if no-till is not the plan) and soil moisture storage.

Good weed control is essential. Control germinating weeds by light tillage operations or burndown applications of glyphosate. When using tillage, it should be done no later than mid-August for a late August or early September planting. When moisture is available, several tillage operations may be needed to control weed growth and thus conserve soil moisture. Excess tillage may increase moisture loss and stand establishment failure.

No-till seeding of smooth bromegrass has emerged as a viable planting method, if you do not need to incorporate lime or phosphorus to a 6-inch depth prior to planting. With no-till seeding, nonselective herbicides such as glyphosate are heavily relied upon to control existing weeds.

Seedbed preparation

Proper seedbed preparation is essential for a good stand. The ideal seedbed is firm, moist, free of weeds, and adequately fertilized and limed. Prepare the ideal seedbed by planning and using good techniques. Seedbed preparation on land suited for cultivation is relatively simple. For best results, minimize weed competition, obtain uniform seed distribution, plant shallow, and evenly cover seed

with soil. Many smooth bromegrass pastures have been established on sites that cannot be adequately tilled because soil is too shallow and/or slopes are too steep. On these areas, little seedbed preparation is possible.

Lime. Soil testing is essential to determine lime needs, as acidic soils severely limit forage production. Smooth bromegrass will grow on moderately acid soils, but does best on near neutral pH soils. Because smooth bromegrass stands can remain productive for 20 years or longer, correcting soil pH prior to seeding is essential. Apply and thoroughly incorporate any needed lime to a soil depth of six inches as far ahead of planting as possible (6 – 12 months before planting).

Nitrogen. Nitrogen (N) recommendations for new seedings of smooth brome is shown in Table 1. Applying 30-40 pounds of N before seeding will help ensure vigorous establishment of brome. Nitrogen could be applied with needed phosphorous (P) and potassium (K) and incorporated prior to seeding or broadcast after planting.

Phosphorous and Potassium. Soils in Kansas vary in levels of P and K present. A soil test is essential to determine requirements for these nutrients. Based on the soil test, addition of P and K will help establish smooth brome stands and ensure subsequent growth. Table 1 lists recommendations for P and K when establishing new stands of smooth brome. Broadcasting and incorporating recommended rates of P and K during seedbed preparation is the most desirable practice. Applications of P and K may be also be applied with the drill at seeding, and in-furrow fertilizers significantly increase forage production due to the readily available nutrients. Avoid placing more than 20 pounds per acre of N plus potash in direct contact with the seed at planting.

Table 1. Nutrient recommendations for new seedings of smooth bromegrass. Source: C402 Smooth Brome Production and Utilization, K-State Research and Extension.

Nutrient	**Recommended rates**				
Nitrogen	30-40 lbs/acre				
Phosphorus	Soil test level (ppm P)				
	Very low (0-5)	Low (6-12)	Medium (13-25)	High (26-50)	Very high (51 or more)
	60-80 lbs/acre	40-60 lbs/acre	20-40 lbs/acre	None	None
Potassium	Soil test level (ppm K)				
	Very low (0-40)	Low (41-80)	Medium (81-120)	High (121-160)	Very high (161 or more)
	80-100 lbs/acre	60-80 lbs/acre	30-60 lbs/acre	0-30 lbs/acre	None

Seed source and rate

High-quality seed of known germination and purity is important. Seeding rate depends on seed quality and method of seeding. When planting in a well prepared seedbed, 10 – 15 pounds of pure live seed (PLS) per acre is adequate. PLS refers to the amount of live seed of the desired species in a bulk lot. As an example, 100 pounds of bulk smooth bromegrass seed that has a germination of 90

percent and a purity of 95 percent contains 85.5 pounds of pure live seed (100 x .90 x .95= 85.5). Seeding rates of 15 - 20 pounds of PLS should be adequate if planting with a good no-till drill with good furrow openers, accurate seed placement, and good press wheels.

If a poor seedbed exists, or if the seed will be broadcast with shallow incorporation with a harrow, seeding rates as high as 20 pounds PLS per acre may be required to obtain satisfactory stands. Use higher seeding rates when smooth bromegrass is broadcast on the surface and covered.

Method of seeding

Drilling smooth bromegrass seed is the preferred method of seeding. Drilling ensures uniform seed distribution, accurate seeding rates, and uniform depth of coverage. For best results, smooth bromegrass should be seeded ¼ to ½ inch deep.

Broadcasting smooth bromegrass on the surface with shallow incorporation can result in good stands of smooth bromegrass. Wheat can be used as a cover crop in establishing a stand of smooth bromegrass. Start by broadcasting 20 pounds PLS of smooth bromegrass seed on the surface of soil prior to wheat seeding. As the wheat is drilled, the smooth bromegrass seed is covered. After the wheat is harvested for hay or grain, smooth bromegrass is usually established, provided sufficient moisture is available for both crops. This is a slow establishment method, but it is desirable on soils prone to erosion or to obtain a return from the field the first year.

Grazing new stands

Protect new stands of smooth bromegrass from grazing until the grass is well established – at least three leaves with collars and crown roots establishing. If there is no crown root system established, cattle may pull the entire plant and reduce the stands. With proper management, fall seeded smooth bromegrass usually can be grazed the next year. Consider light grazing with haying at the bloom stage the first spring. Do not graze spring seedings until the following spring.

Weed control in new stands

Broadleaf weeds can be an issue in new stands of smooth bromegrass, but as with grazing, the new crop should be well established before using herbicides. Smooth bromegrass should have at least three leaves with collars and the crown root system should be established before any herbicide application is made. Weeds can be trimmed at 6-8-inches tall with a rotary mower in spring seedings until smooth bromegrass has developed the three leaves and adequate root system.

More information

For more information, see “Smooth Brome Production and Utilization”, K-State Research and Extension publication C402, http://www.ksre.ksu.edu/bookstore/pubs/c402.pdf

Stu Duncan, Northeast Area Crops and Soils Specialist
sduncan@ksu.edu

Doohong Min, Forage Agronomist
dmin@ksu.edu

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

7. Fall planting of tall fescue pastures

Tall fescue is best seeded in the fall in Kansas. Where there is adequate soil moisture, this would be a good time to establish a tall fescue pasture or hay meadow. By starting now with soil tests, variety selection, and seedbed preparation, tall fescue can be a productive pasture for many years to come.

Both tall fescue and smooth bromegrass make good cool-season permanent pasture in eastern Kansas. Tall fescue is hardier and grazing tolerant that smooth bromegrass and is much more tolerant of wet conditions. Tall fescue can be utilized for fall and winter grazing much better than smooth bromegrass.

Be sure to use either endophyte-free or nontoxic (sometimes called novel or "friendly" endophyte-infected) varieties of tall fescue when establishing a new pasture, or renovating an old pasture if improved animal performance is the main objective. Old KY-31 endophyte-infected fescue would be acceptable to plant where you know excessive grazing will occur, for example in grass traps or pens for animal receiving facilities. In this instance, ground cover and animal comfort are the main goals.

Figure 1. Tall fescue pasture near Parsons. Photo by Doohong Min, K-State Research and Extension.

Soil selection

Tall fescue will grow on almost any soil but produces best on fertile moist soils. The ability of tall fescue to withstand low fertility and wet soil is excellent. Tall fescue also can withstand submersion for a few days. It will produce on soils with pH of 5.2 to 8.0, but optimum growth occurs in the 5.8 to 7.0 pH range.

Varieties

Several new varieties are suitable for Kansas. New certified varieties are either free of the endophyte fungus or contain the "friendly" nontoxic endophyte that does not produce the ergovaline toxin detrimental to livestock. Endophyte-free seed of older varieties like Kentucky-31 are also available. Check the seed tag to be sure of the endophyte level and type. To avoid reduced animal performance resulting from toxic endophyte-infected grass that is fed or grazed, livestock producers should plant the seed free of live toxic endophyte. Plants produced from fungus-free seed remain free of the endophyte.

The Southeast Agricultural Research Center have tested tall fescue varieties in recent years. The table below is from "Evaluation of Tall Fescue Cultivars," in the SEARC's 2017 Agricultural Research report: http://newprairiepress.org/cgi/viewcontent.cgi?article=1376&context=kaesrr

All varieties in this test are endophyte-free or nontoxic ("novel") endophyte.

Table 1. Forage yield of tall fescue cultivars in 2016 at the Southeast Agricultural Research Center, Mound Valley, KS.

Cultivar	2016 total forage yield (tons/acre at 12% moisture)
NFTF 1051	9.12
PBU-B2	9.11
PBU-B7	9.11
Teton II	8.44
LE 14-86	8.41
NFTF 1411	8.40
NFTF 1044	8.37
Estancia	8.35
PBU-B5	8.31
LE 14-84	8.14
PBU-B1	8.12
GT 213	8.10
MV 14	8.02
Martin 2 ProTek	7.97
AGRFA 148	7.89
Tower ProTek	7.80
Ky 31 LE	7.78
Ky 31 HE	7.63
BarOptima PLUS E34	7.47
Bar FAF 131	7.47

Average	*8.21*
LSD (0.05)	*1.08*

*Seeded Sept. 30, 2014, harvested May 9, August 18, and December 6, 2016
Source: SEARC 2017 Agricultural Research report,
http://newprairiepress.org/cgi/viewcontent.cgi?article=1376&context=kaesrrf

Seedbed preparation

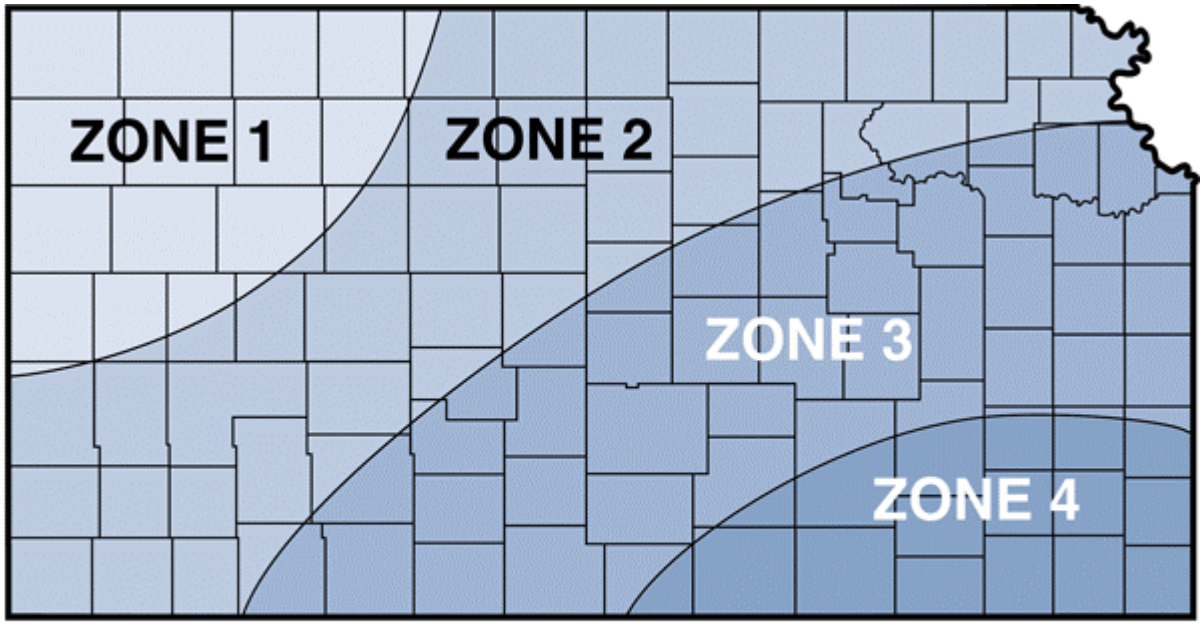
Tall fescue establishes best in a well-limed and fertilized seedbed that has been tilled 4 to 6 inches deep, leveled, and firmed before seeding. Several producers report successful stands by simply broadcasting or no-tilling the seed into existing overgrazed grass pastures in the fall. Even though the practice works on occasion, it is not recommended. A well-prepared seedbed improves chances of rapid stand establishment.

A soil test should be taken well ahead of planting to determine lime and fertilizer needs, and needed lime and phosphate should be incorporated into the seedbed before planting. About 30 - 40 pounds of N per acre should be applied at or before planting.

An existing tall fescue stand will tolerate pH as low as 5.0. On existing pastures with pH less than 6.0, 2 tons of agricultural lime per acre, topdressed, will increase life of the stand and growth of legumes if present.

Stand establishment

The proper planting dates for each area in Kansas is shown in Figure 2. On droughty, claypan soils, only fall plantings are recommended because winter and spring plantings may not survive if summers become hot and dry. However, if a moist summer persists, seedlings may establish well. Deeper soils and/or good moisture supplies will result in successful winter or spring seedings. When planting in a well-prepared seedbed, 12 - 20 pounds per acre of pure live, high-germinating seed is adequate. When seed germination is not known or the seedbed is less than desirable, a rate of 20 to 25 pounds per acre may be required for a satisfactory stand. For drilled seedings, use the lower end of that seeding rate range. For broadcast incorporation, use the higher end of the range.



Optimum Planting Dates for Cool-season Grasses

	Zone 1	Zone 2	Zone 3	Zone 4
Fall	Aug 10–Sept 10	Aug 15–Sept 15	Aug 20–Sept 20	Aug 15–Oct 1
Winter	Not recommended	Not recommended	Not recommended	Not recommended
Spring	Mar 1–Apr 1	Feb 15–Mar 15	Feb 15–Mar 15	Not recommended

Figure 2. Recommended planting dates for tall fescue for each area in Kansas. Map from K-State Research and Extension.

For best results, seed should be covered with 1⁄4 to 3⁄8 inch of soil. Seeding tall fescue with winter wheat is often desirable. The wheat seeding rate should not be much higher than 60 lb/acre. Planting a cover crop like wheat can protect the soil from erosion and furnish additional grazing or grain production income in the seeding year. If wheat is grazed, avoid grazing in fall or spring when new grass seedlings could be injured by trampling during wet weather.

Converting endophyte-infected pastures

Establishing a new tall fescue pasture on ground with existing endophyte-infected pasture requires some special care. The endophyte fungus that infects many tall fescue pastures in Kansas will survive in the seed up to 14 months. For that reason, you should prevent seed production on established endophyte pasture for 14 months before renovating with fresh seed. Otherwise, infected seed from the previous tall fescue may emerge along with the newly planted seed.

You can kill existing endophyte-infected tall fescue by applying glyphosate at the rate of 0.75 to 1.5 lb ae/acre when new growth is about 4 inches tall. It is easier to control fescue in the fall than in the spring, however excellent spring control can be achieved. After tall fescue has been killed, producers could grow an alternative crop for one year that will allow the use of herbicides to control any volunteer tall fescue that emerges.

After 14 months without seed production from the old tall fescue, replant the field with an endophyte-free variety or a nontoxic endophyte variety. There are several nontoxic endophyte varieties on the market including MaxQ, DuraMax Gold, and BarOptima Plus E34 but new nontoxic

endophytes are continually being developed so be watchful for their release.

More information

For more information, see Tall Fescue Production and Utilization, K-State Research and Extension publication C729, at: http://www.ksre.ksu.edu/bookstore/pubs/c729.pdf.

Doohong Min, Forage Management
dmin@ksu.edu

Joe Moyer, Forage Agronomist, Southeast Agriculture Research Center
jmoyer@ksu.edu

Stu Duncan, Northeast Area Crops and Soils Specialist
sduncan@ksu.edu

8. Update on drought conditions and the 3-month fall outlook

Current Status

The most recent week saw the rainfall shift to the central portions of the state. The Central Division had the greatest surplus, with an average of 1.33 inches or a surplus of 0.47 inches. That translates to 156 percent of normal. The Northwest Division averaged just 0.02 inches, which was a deficit of 0.6 inches or 8 percent of normal. The Northeast Division was the only eastern division with below-normal precipitation for the week ending on August 14. The divisional average was 0.38 inches, a deficit of 0.51 inches or 42 percent of normal. The largest weekly total for a NWS COOP station was reported at Ashland, in Clark County, at 3.77 inches.

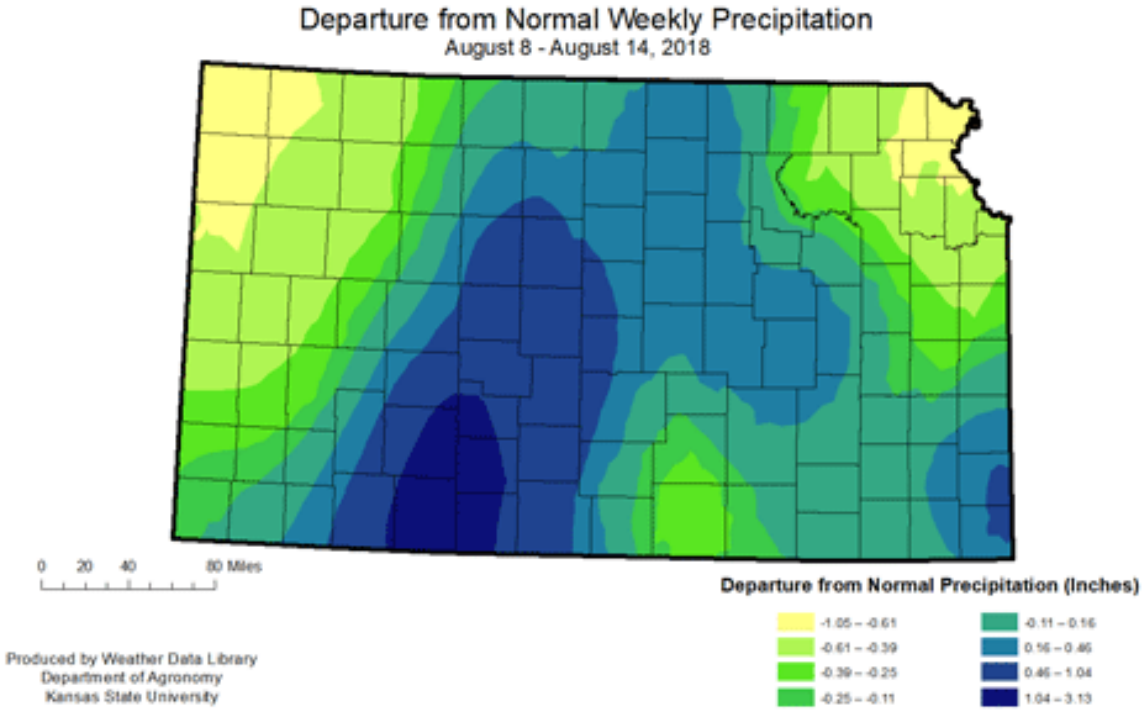


Figure 1. Departures of weekly precipitation from normal for Kansas during the week of August 8 – August 14, 2018 via Cooperative Observer (COOP), Community Collaborative Rain Hail Snow Network (CoCoRaHS) and Kansas Mesonet.

Temperatures continued to be cooler-than-normal. The statewide average temperature was 76.6 degrees F, which is 1.5 degrees cooler-than-normal. Eastern Kansas continued to be an exception to the cooler-than-normal temperatures. The Northeast and East Central divisions both had above average temperatures. The average temperature in the Northeastern Division was 78.3 degrees F, with a departure of 1.5 degrees. For the East Central Division, the average temperature was 78.7 degrees F, and the departure was 0.6 degrees. The highest maximum temperature was 101 degrees F at Ft. Scott, Bourbon County, on August 8. The lowest minimum temperature was 51 degrees F at Brewster 4W, Sherman, on August 12.

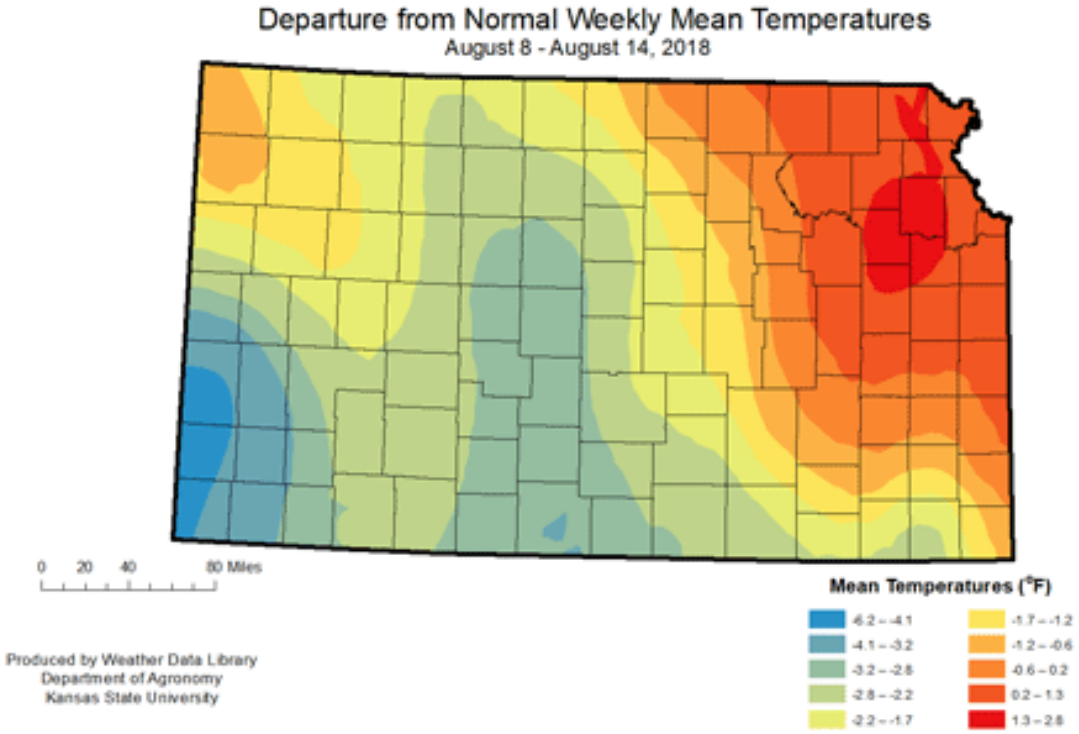


Figure 2. Departures of weekly mean temperatures for Kansas during the week of August 8 – August 14, 2018 via Cooperative Observer (COOP) and Kansas Mesonet.

Continued rainfall in the west resulted in continued improvement in drought conditions in that region. The low precipitation in the east has resulted in continued deterioration and expansion of the extreme drought in the East Central Division. (Figure 3). The change in drought categories map (Figure 4) shows where changes occurred during the week.

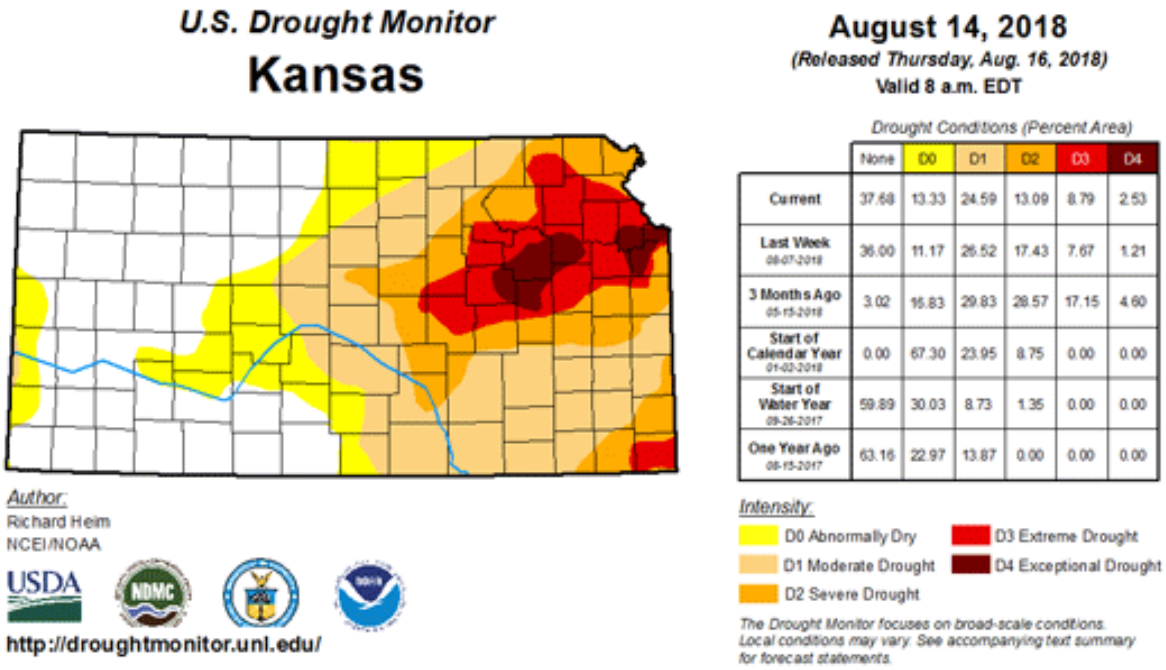


Figure 3. Current drought from the Drought Monitor.

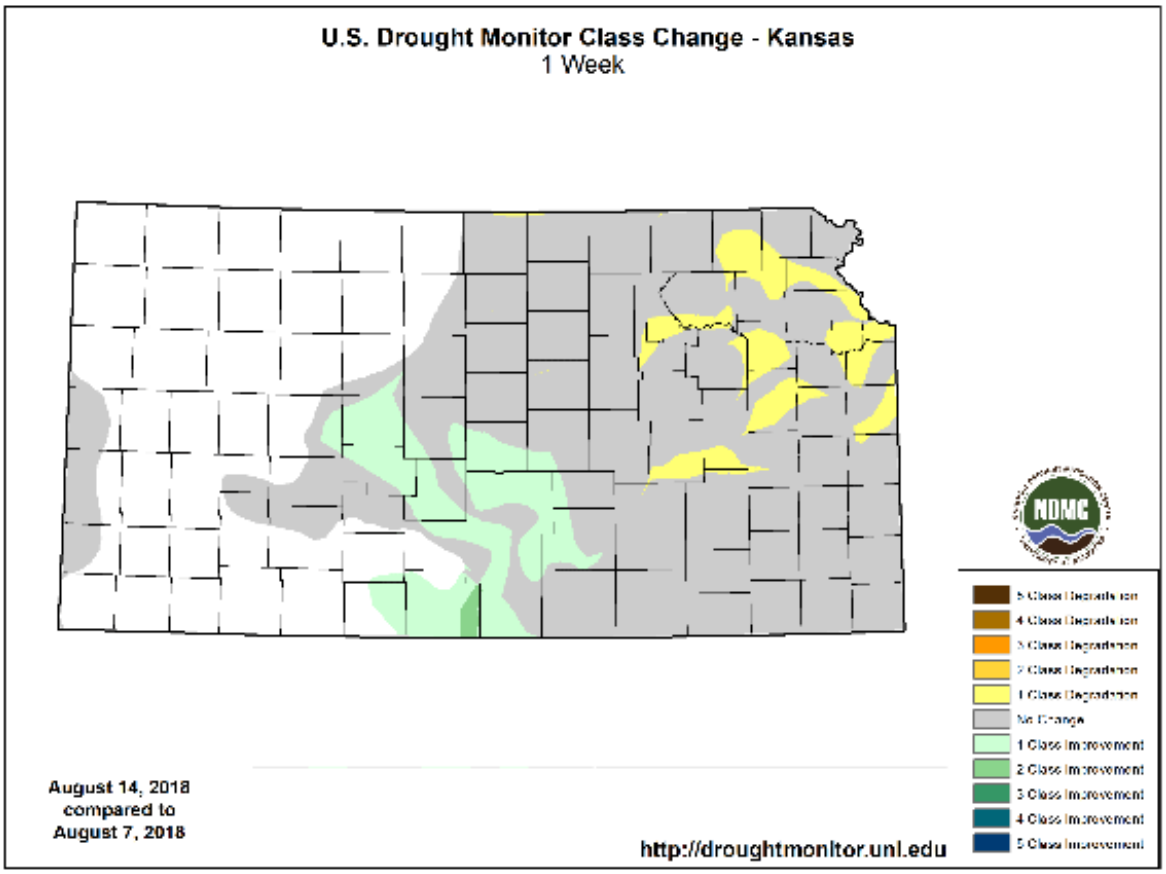


Figure 4. Difference in drought categories from August 7 to August 14, 2018 (US Drought Monitor).

The quantitative precipitation forecast for the next 7-day period, ending on August 23 shows the heaviest rainfall will be in southern areas of the state (Figure 5). The areas with heaviest amounts may see as much as three inches of precipitation. Most of the state is expected to see up to an inch. With warmer-than-normal temperatures expected, this would do little to improve drought conditions in areas most severely affected. The 8 to 14-day precipitation outlook (Figure 6) indicates near normal precipitation across much of the state. The temperature outlook favors a pattern of warmer-than-normal temperatures for the period.

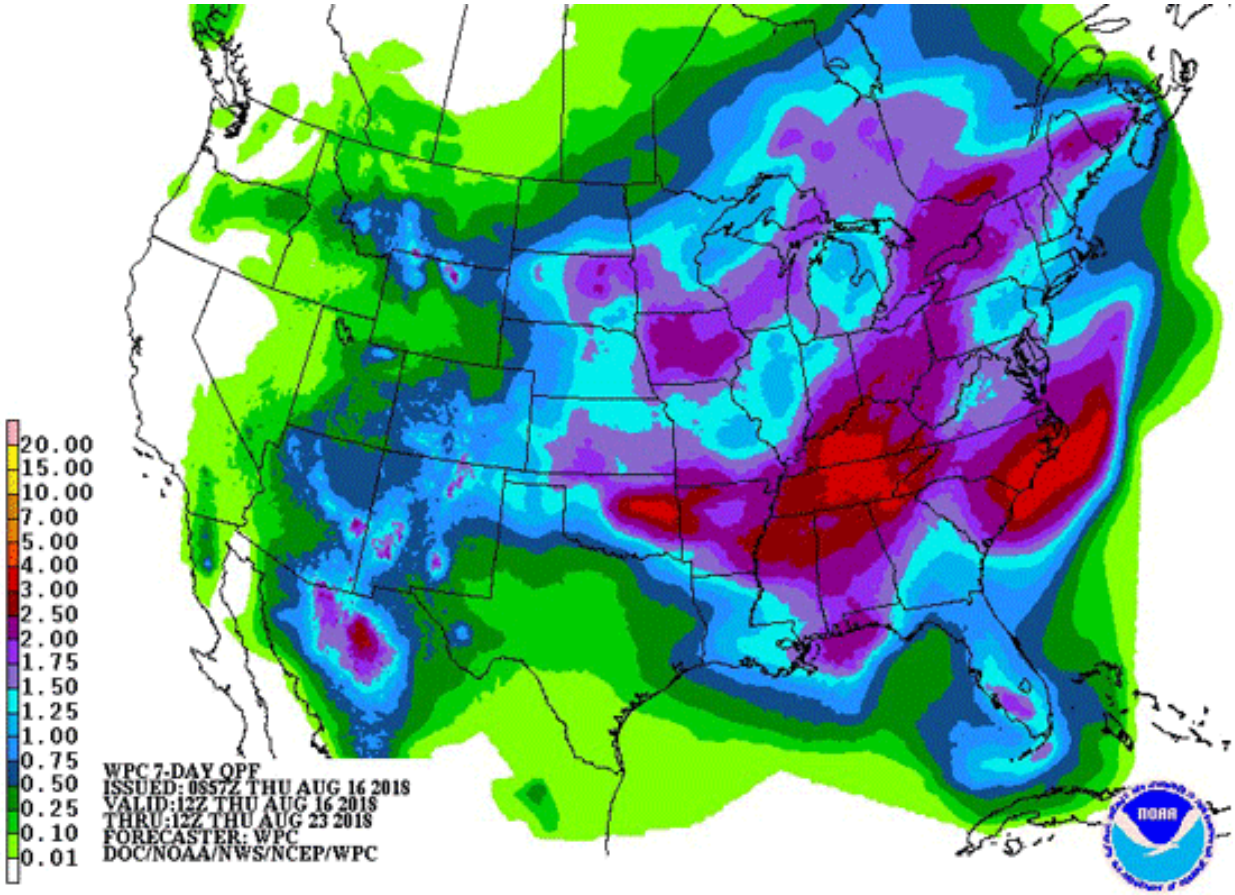


Figure 5. Quantitative Precipitation Forecast the 7-day period ending August 23, 2018 (NCEP)

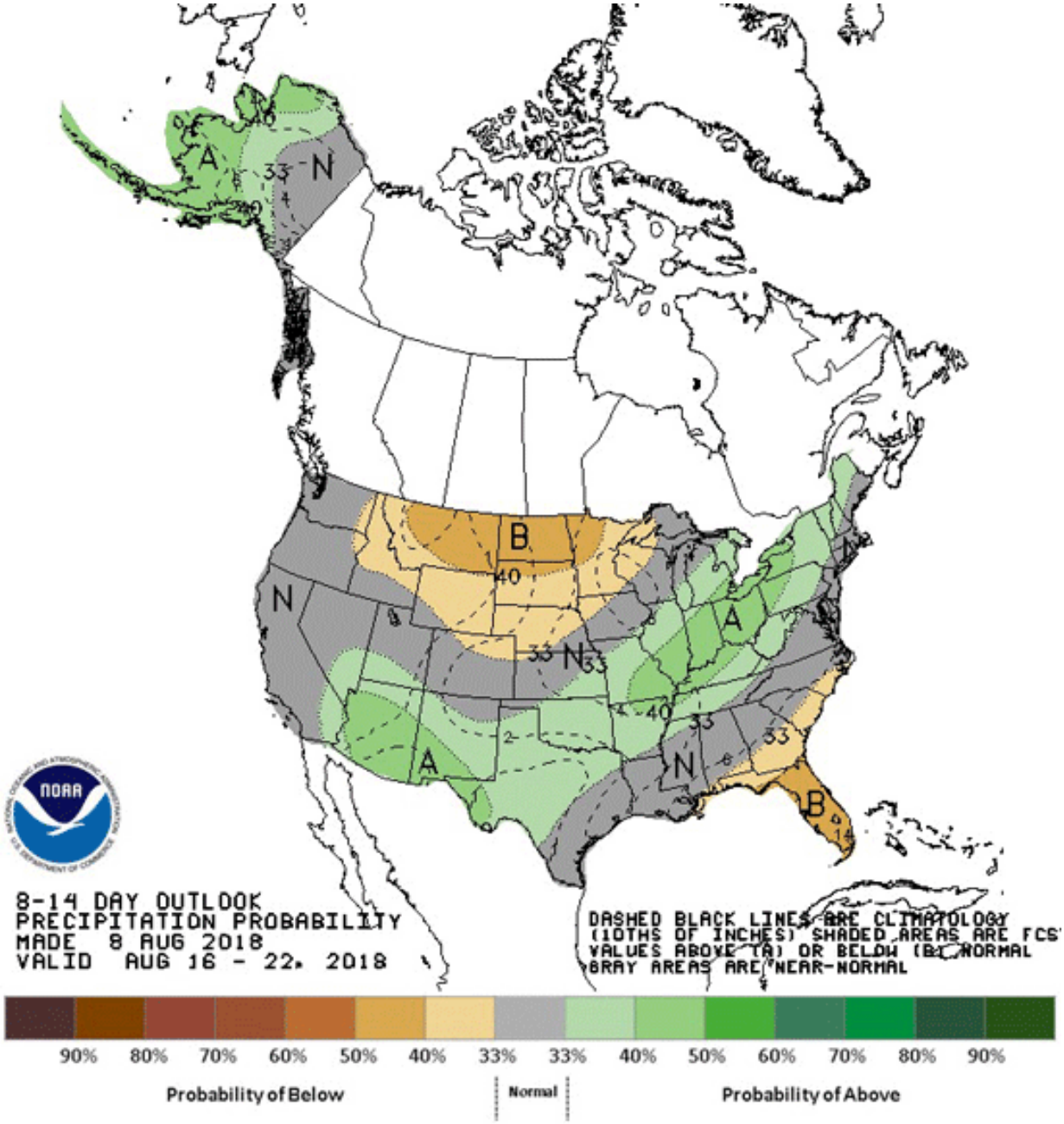
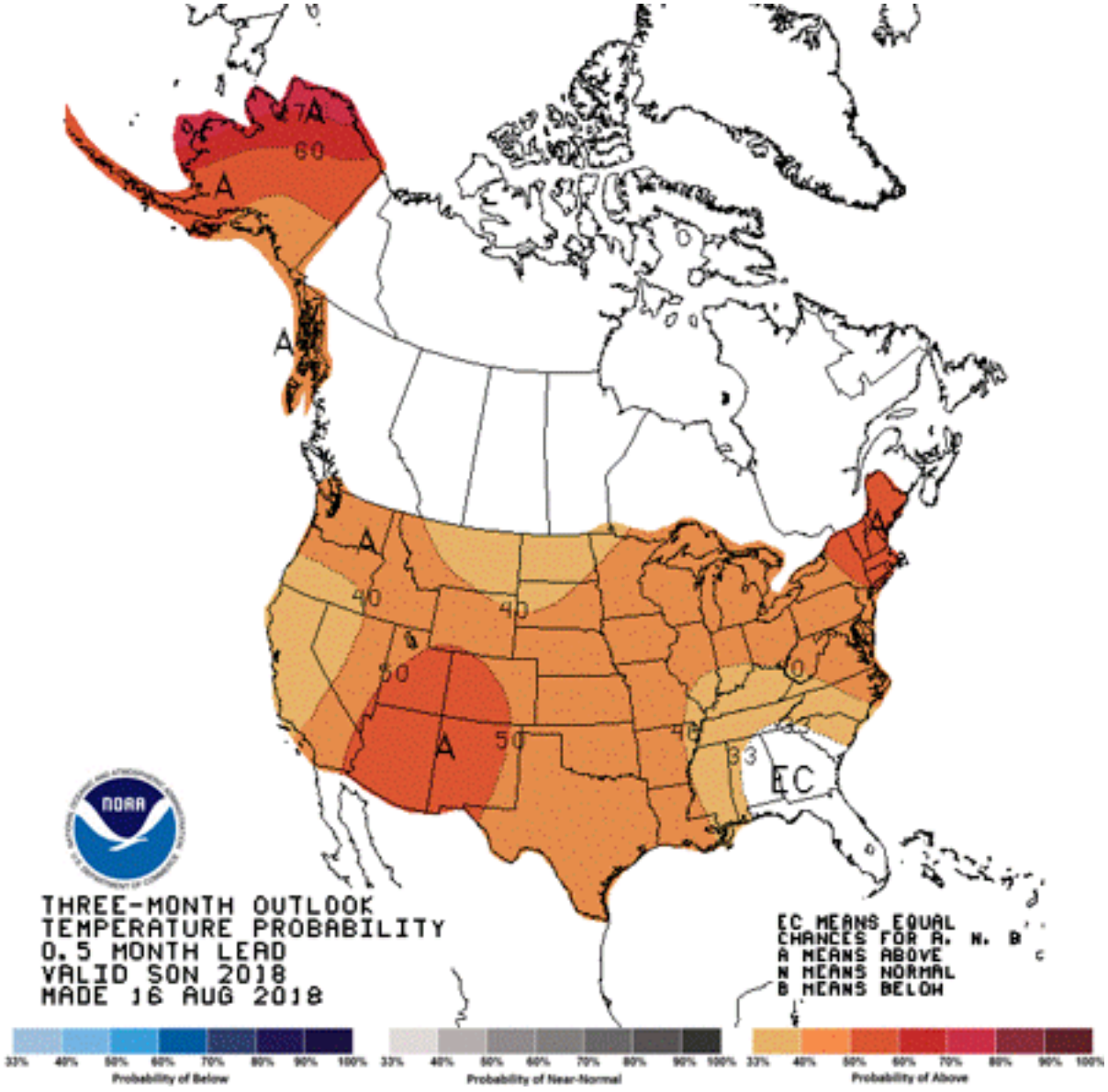


Figure 6. 8-14 day Precipitation Outlook for period ending August 22, 2018 (CPC)

Fall Outlook (September – November)

The Climate Prediction Center has released the Fall Outlook. In general, the outlook has a slightly increased chance of warmer-than-normal temperatures for the period of September through November. That is an average of the 3-month period, so a warm start does not eliminate a cool end to the season, or vice versa. Cooler-than-normal temperatures are expected to remain through the end of August. The Climate Prediction Center's one-month outlook for September calls for equal chances of above- or below-normal temperatures in Kansas.



Kansas State University Department of Agronomy
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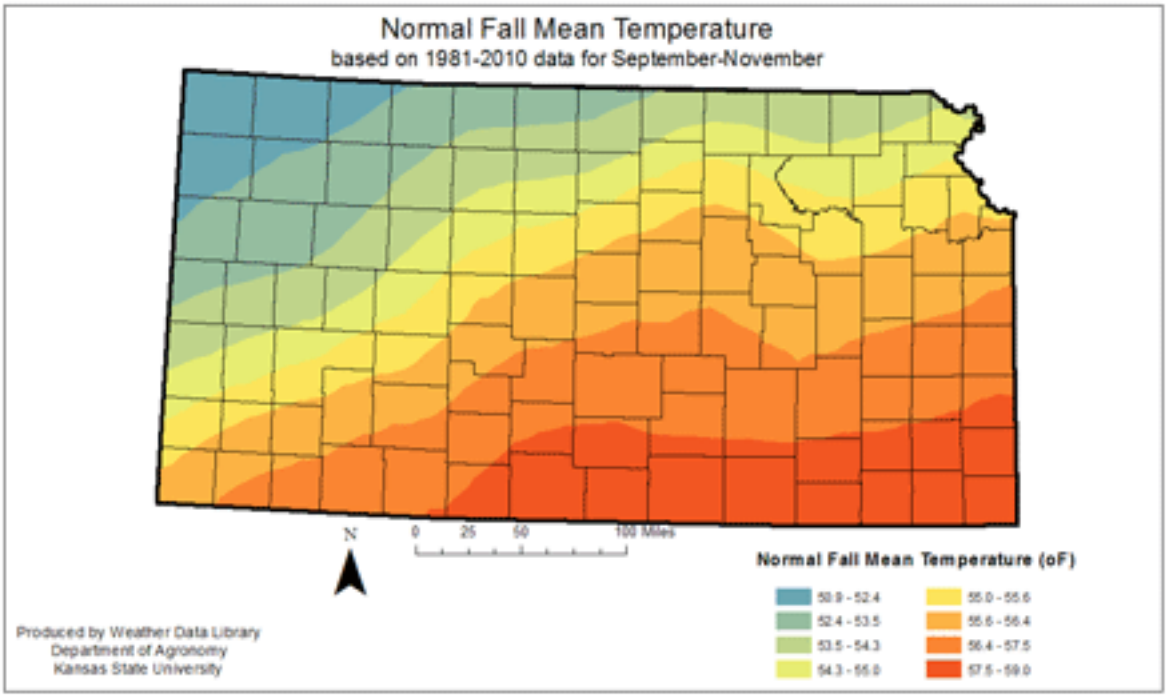
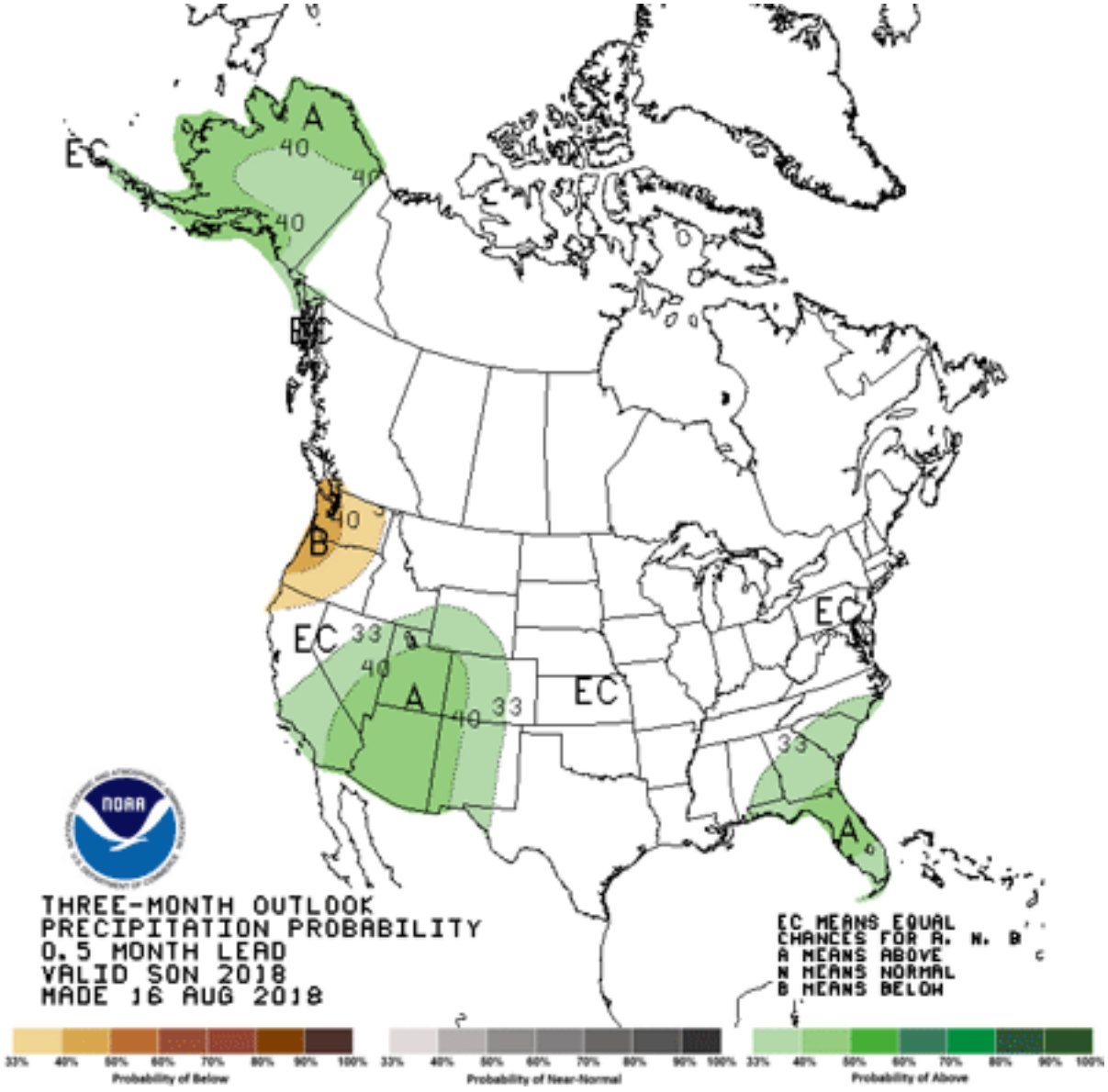


Figure 7. Fall temperature outlook (top, CPC); Kansas normal temperatures (bottom, Weather Data Library

Normal highs in the middle of October (middle of the season) range from 67 degrees F at Concordia, to 71 degrees F at Elkhart. Highs in the 80s in September would be below average but those same highs would be warmer-than-normal in October.

The precipitation outlook is less clear. There are equal chances for above- or below-normal precipitation. In western Kansas, that amount ranges from 2.52 to 4.65 inches, while in eastern Kansas, the amount ranges from 6.20 inches to over 13 inches. Below average precipitation would mean little improvement in drought conditions in the east.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MADE 16 AUG 2018
EC MEANS EQUAL
CHANCES FOR A, N, B
A MEANS ABOVE
N MEANS NORMAL
B MEANS BELOW
33% 40% 50% 60% 70% 80% 90% 100%
Probability of Below
33% 40% 50% 60% 70% 80% 90% 100%
Probability of Near-Normal
33% 40% 50% 60% 70% 80% 90% 100%
Probability of Above

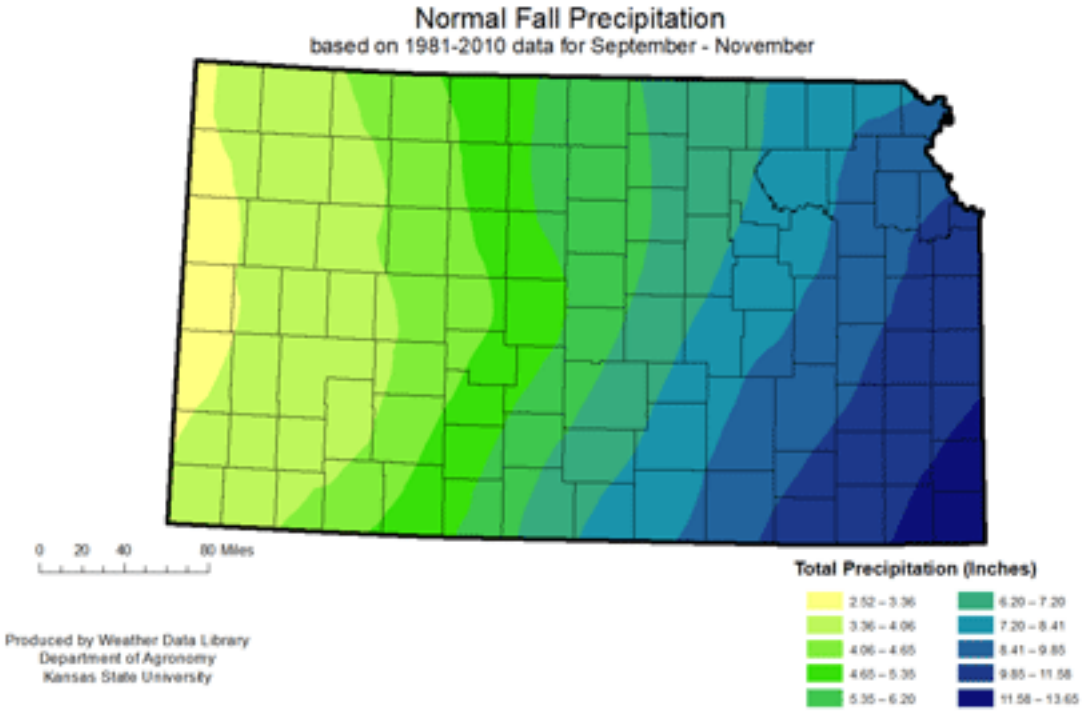

Figure 8. Fall precipitation outlook (top, CPC); Kansas normal precipitation (bottom, Weather Data Library)

The El Niño Southern Oscillation (ENSO) has an increased chance of switching to El Niño conditions during the period. El Niño conditions frequently favor higher-than-normal precipitation in the Plains, but delayed onset may result in less impact during the fall.

The warmer-than-normal temperature outlook is driven mainly by decadal patterns. This is the average of the three-month period, and does not eliminate the possibility of colder-than-normal conditions during fall. The precipitation outlook is driven mainly by the sea-surface temperature and constructed analog models. Keep in mind, the skill with both outlook products is weakest with neutral ocean temperatures, and does not account for individual events such as a heavy rainfall event. Warmer-than-normal temperatures would increase the opportunity for late-planted spring crops to mature before the first frost, but could increase the evaporative demand and have flowering/grain-fill occur under less favorable conditions.

Additional information can be found in the latest Agronomy eUpdate at https://webapp.agron.ksu.edu/agr_social/eu.throck or on the Kansas Climate website under weekly maps or drought reports:

http://climate.k-state.edu/maps/weekly and http://climate.k-state.edu/reports/weekly/2018/

Mary Knapp, Weather Data Library
mknapp@ksu.edu

Christopher “Chip” Redmond, Kansas Mesonet Manager
christopherredmond@ksu.edu

9. Pre-plant wheat schools to be held across Kansas

A series of pre-plant wheat schools will be held in various locations across 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.

Tuesday, August 21:

- 5:00 pm, McPherson Co. (McPherson). Contact: Shad Marston (smarston@ksu.edu)

Friday, August 24:

- 10:00 am, Dickinson Co. (Abilene). Contact: Ben Tipton (Servitech, 620-515-1421)

Monday, August 27th:

- 8:30 am, Thomas Co. (Colby). Contact: Madison Mackley (mmackley@ksu.edu)
- Evening (TBD), Wichita Co. (Leoti). Contact: Allen Baker (abaker@ksu.edu)

Tuesday, August 28th:

- 8:30 am, Walnut Creek District (Ness City). Contact: Chris Long (clong@ksu.edu)
- 7:00 pm, Twin Creeks District (Lenora). Contact: Keith VanSkike (kvan@ksu.edu)

Wednesday, August 29th:

- 9:00 am, Post Rock District. (Downs). Contact: Sandra Wick (swick@ksu.edu)
- 2:30 pm, Post Rock District. (Jewell). Contact: Sandra Wick (swick@ksu.edu)

Thursday, August 30th:

- 9:00 am, Phillips-Rooks District (Stockton). Contact: Cody Miller (codym@ksu.edu)
- 2:30 pm, Cottonwood District (Great Bend). Contact: Stacy Campbell (scampbel@ksu.edu)

10. Dryland Ag Day planned in Southwest Kansas, August 21

Against the backdrop of a diminishing Ogallala Aquifer, dryland farming is increasingly moving into sharper focus. A Kansas State University field day planned in Tribune will feature research related to growing dryland crops in western Kansas.

The **Dryland Ag Day** will be **August 21** at K-State's Southwest Research-Extension Center, one mile west of Tribune on Kansas Highway 96.

Registration and refreshments are available at 8:30 a.m. MDT, followed by field tours, indoor seminars, and a lunch sponsored by TBK Bank.

Field tours starting at 9 a.m. MDT include:

- Dryland corn planting date x maturity
- Tillage vs. no-till in dryland systems
- Dryland crop rotations
- Weed control in fallow and row crop

Indoor seminar topics beginning at 11:15 a.m. MDT include:

- Economics of dryland tillage systems
- Managing iron chlorosis in grain sorghum
- Production of annual forages

Presenters at the field day include:

- Lucas Haag, Northwest Area Agronomist, Colby
- John Holman, Cropping Systems Agronomist, Garden City
- Augustine Obour, Soil Scientist, Western KS Research Center, Hays
- Curtis Thompson, Weed Scientist
- Monte Vandeveer, Southwest Research-Extension Center, Garden City
- Alan Schlegel, Southwest Research-Extension Center, Tribune

More information is available by calling 620-376-4761.

11. North Central Experiment Fall Field Day, August 21 in Belleville

All crop producers are invited to attend the **2018 North Central Experiment Field Day** on **Tuesday, August 21, at 6:00 p.m**. The event will be held at the Belleville experiment field located approximately two miles west of Belleville on Hwy. 36 on the north side of the road.

This is a free event and no pre-registration is required. There will be a catered meal at the end of the program. Topics and speakers will include:

- **Mesonet 101 and the new weather station** – Christopher "Chip" Redmond, KSU Mesonet Manager
- **Re-visiting summer row crop seeding recommendations (corn, soybean, and sorghum)** – Ignacio Ciampitti, Crop Production and Cropping Systems Specialist
- **Dicamba/Round-up Ready Sentinel plot and season review** – Andrew Esser, Agronomist-in-charge, North Central Kansas Experiment Field

K-STATE Research and Extension

KSU NCK Experiment Field
Fall Field Day

August 21, 2018
KSU Experiment Field Belleville Location
2 miles west of Belleville on Hwy 36
6:00 P.M. Sharp

Tour Topics:

-Mesonet 101 and the New Weather Station at the Field
Christopher "Chip" Redmond, KSU Weather Data Library/Mesonet Manager

-Re-visiting Summer Row Crop (corn, soybean, and sorghum) Seeding Rate Recommendations
Dr. Ignacio Ciampitti, Cropping Systems Professor K-State

-Dicamba/RR Sentinal Plot and Season Review
Andrew Esser, Agronomist-in-Charge NCK-Exp. Fields

Free Event

No registration required
Catered Dinner to Follow Program
Questions Call: 785-335-2836
Andrew Esser, Agronomist-in-Charge

Meeting sponsored by: K-STATE Research and Extension

12. Winter Canola Preplant School, August 28 in Wichita

Winter canola yields in Kansas were down in 2018 yet better than expected in some areas. On August 28, producers can learn more about how canola performed in 2018 and what it takes to raise a successful crop.

A winter canola preplant school will be held in Wichita at the Sedgwick County Extension Education Center, 7001 W. 21st Street N., beginning at 10:00 a.m. The event is free but those interested in attending should RSVP by calling 316-660-0143 or jfees@ksu.edu by Friday, August 24 so that an accurate count can be made for lunch.

Ongoing research has shown ways in which producers can be more cost efficient in canola production. K-State has been working diligently to better understand seeding rate and row spacing questions. In addition, varieties continue to change rapidly and we are excited about some of the newest commercial varieties available to growers.

There have been some ups and downs in the industry recently, but through these experiences we have come to understand a great deal about why we still need canola in our rotations.

Topics for discussion at the preplant school include what to do -- and what not to do -- in canola production, seeding rates and row spacing, variety and hybrid performance, winter survival, and economics. Information on marketing the crop will also be available.

Mike Stamm, Canola Breeder
mjstamm@ksu.edu

13. Southwest Research-Extension Center Fall Field Day, August 23 in Garden City

Kansas State University's Southwest Research-Extension Center will host its Field Day 2018 on Thursday, Aug. 23 at 4500 E. Mary St. in Garden City. The day features field tours, indoor seminars, and seed, implement and farm supply company displays.

Registration and vendor exhibits open at 8 a.m. with the program highlighting K-State research updates at 9:15 a.m. A complimentary lunch will be provided.

Field tours include:

- Weed control in irrigated corn – Randall Currie
- Weed control in irrigated grain sorghum – Vipan Kumar and Randall Currie
- Update on mobile drip irrigation – Jonathan Aguilar
- Diversified annual forage crop rotations – John Holman
- Perspectives on forbs in Kansas grasslands: Who they are, what they do, and why they are important – Bob Gillen and Anthony Zukoff

Seminars include:

- Insect research update – Sarah Zukoff
- Pesticide safety update – Sarah Zukoff
- Core hour for commercial pesticide license – Shawn Rich, Kansas Dept. of Ag.

More information is available at www.southwest.k-state.edu or email rscurrie@ksu.edu.

K-STATE
Southwest Research-Extension Center
FIELD DAY 2018

Thursday, August 23, 2018
4500 E. Mary St. • Garden City, KS
Registration 8:00 a.m., Program 9:15 a.m.
Lunch Provided

Field Tours

Weed Control in Irrigated Corn
Randall Currie
Weed Control in Irrigated Grain Sorghum
Vipan Kumar and Randall Currie
Update on Mobile Drip Irrigation
Jonathan Aguilar
Diversified Annual Forage Crop Rotations
John Holman
Perspectives on Forbs in Kansas Grasslands: Who they are, what they do, and why they're important
Bob Gillen and Anthony Zukoff

Seminars

Insect Research Update
Sarah Zukoff
Pesticide Safety Update
Sarah Zukoff
Core Hour for Commercial Pesticide License
Shawn Rich with the Kansas Department of Agriculture

Displays

Local Seed, Implement, and Farm Supply Representatives

For More Information Contact
rscurrie@ksu.edu

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