



Extension Agronomy

eUpdate

10/02/2015

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, Jim Shroyer, Crop Production Specialist 785-532-0397 jshroyer@ksu.edu, or Curtis Thompson, Extension Agronomy State Leader and Weed Management Specialist 785-532-3444 cthompso@ksu.edu.

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1. Controlling annual weeds with fall-applied herbicides ahead of corn and sorghum

With row crop harvest underway, it's time to start planning your fall herbicide applications to control winter annual broadleaf weeds and grasses ahead of grain sorghum or corn. Fall applications during late October and through November can greatly assist control of difficult winter annuals and should be considered when performance of spring-applied preplant weed control has not been adequate. Henbit and marestail frequently are some of the most troublesome weeds we try to manage with these fall herbicide applications.

Fall applications have another side-benefit. While it is always important to manage herbicide drift, herbicide applications made after fall frost have less potential for drift problems onto sensitive targets.

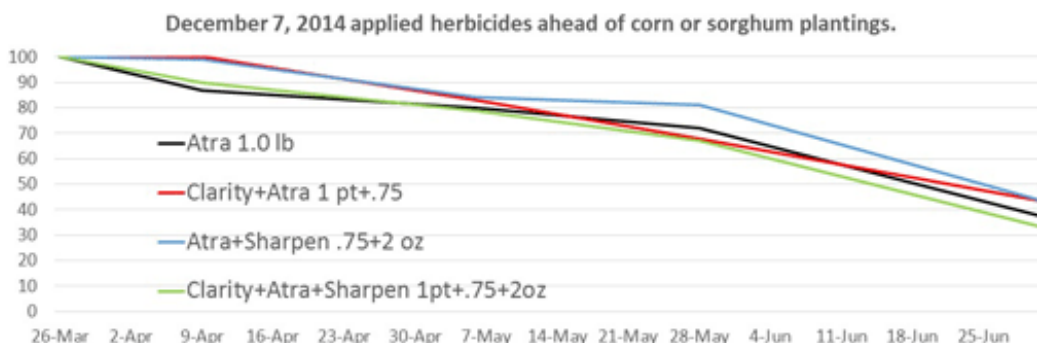
There are several herbicide options for fall application. If residual weed control is desired, atrazine is among the lowest-priced herbicides. However, if atrazine is used, that will lock the grower into planting corn or sorghum the following spring, or leave the land fallow during the summer and come back to winter wheat in the fall.

Atrazine is labeled in Kansas for fall application over wheat stubble or after fall row crop harvest anytime before December 31, as long as the ground isn't frozen. Consult the atrazine label to comply with maximum rate limits and precautionary statements when applying near wells or surface water. No more than 2.5 lbs of atrazine can be applied per acre in a calendar year on cropland.

One half to two pounds (maximum) per acre of atrazine in the fall, tankmixed with 1 to 2 pints/acre of 2,4-D LV4 or 0.67 to 1.33 pints LV6, can give good burndown of winter annual broadleaf weeds -- such as henbit, dandelion, prickly lettuce, Virginia pepperweed, field pansy, evening primrose, and marestail -- and small, non-tillered winter annual grasses. Atrazine's foliar activity is enhanced with crop oil concentrate, which should be included in the tankmix. Winter annual grass control with atrazine is discussed below.

Atrazine residual should control germinating winter annual broadleaves and grasses. When higher rates of atrazine are used, there should be enough residual effect from the fall application to control early spring-germinating summer annual broadleaf weeds such as kochia, common lambsquarters, wild buckwheat, and Pennsylvania smartweed -- unless the weed population is triazine-resistant. The two graphs below show the residual control effects of December herbicide applications on kochia ahead of corn and sorghum planting.

Kochia control with Late Fall Herbicides.



Kochia control with Late Fall Herbicides.

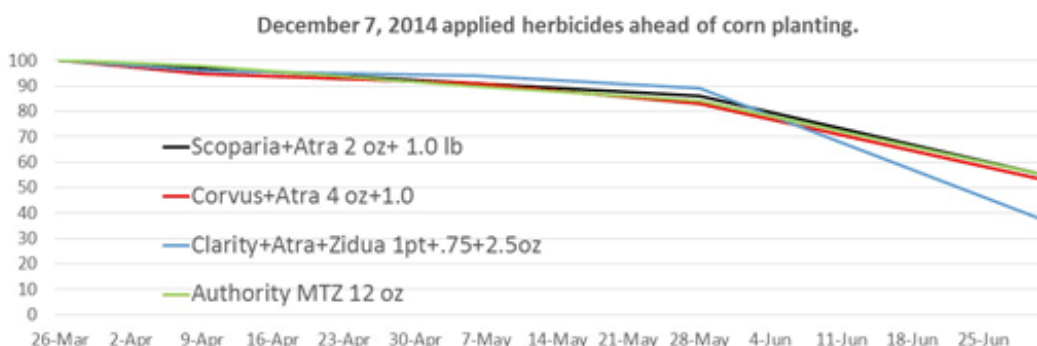


Figure 1 and 2. K-State trials measuring kochia control with late-fall herbicide applications. Source: Curtis Thompson, K-State Research and Extension.

Marestail is an increasing problem in Kansas that merits special attention. Where corn or grain sorghum will be planted next spring, fall-applied atrazine plus 2,4-D or dicamba have effectively controlled marestail rosettes, and should have enough residual activity to kill marestail as it germinates in the spring. Atrazine alone will not be nearly as effective postemergence on marestail

as the combination of atrazine plus 2,4-D. Sharpen can be very good on maretail, but should be tankmixed with 2,4-D, dicamba, atrazine, or glyphosate to prevent regrowth.

If the spring crop will be corn, other residual herbicide options include ALS herbicides such as Autumn Super or Basis Blend. ALS-resistant maretail will survive an Autumn Super or Basis Blend treatment if applied alone. For burndown, producers should mix in 2,4-D, dicamba, and/or glyphosate. Aim + 2,4-D or Rage D-Tech are additional herbicide options for fall application with only the 2,4-D component providing a very short residual.

Winter annual grasses can also be difficult to control with atrazine alone. Success depends on the stage of brome growth. For downy brome control, 2 lbs/acre of atrazine plus crop oil concentrate (COC) has given excellent control, whereas 1 lb/acre has given only fair control. Volunteer wheat and brome species that have tillered and have a secondary root system developing will likely not be controlled even with a 2-lb rate. Adding glyphosate to atrazine will ensure control of volunteer wheat, annual brome grasses, and other winter annual grassy weeds. Atrazine antagonizes glyphosate, so if the two are used together, a full rate of glyphosate (0.75 lb ae) is recommended for good control. The tankmix should include AMS as an adjuvant.

Where fall treatments control volunteer wheat, winter annuals, and early-emerging summer annuals, producers should then apply a preemergence grass-and-broadleaf herbicide with glyphosate or paraquat at corn or sorghum planting time to control newly emerged weeds. Soils will be warmer and easier to plant where winter weeds were controlled in fall.

Curtis Thompson, Extension Agronomy State Leader and Weed Management Specialist
cthompso@ksu.edu

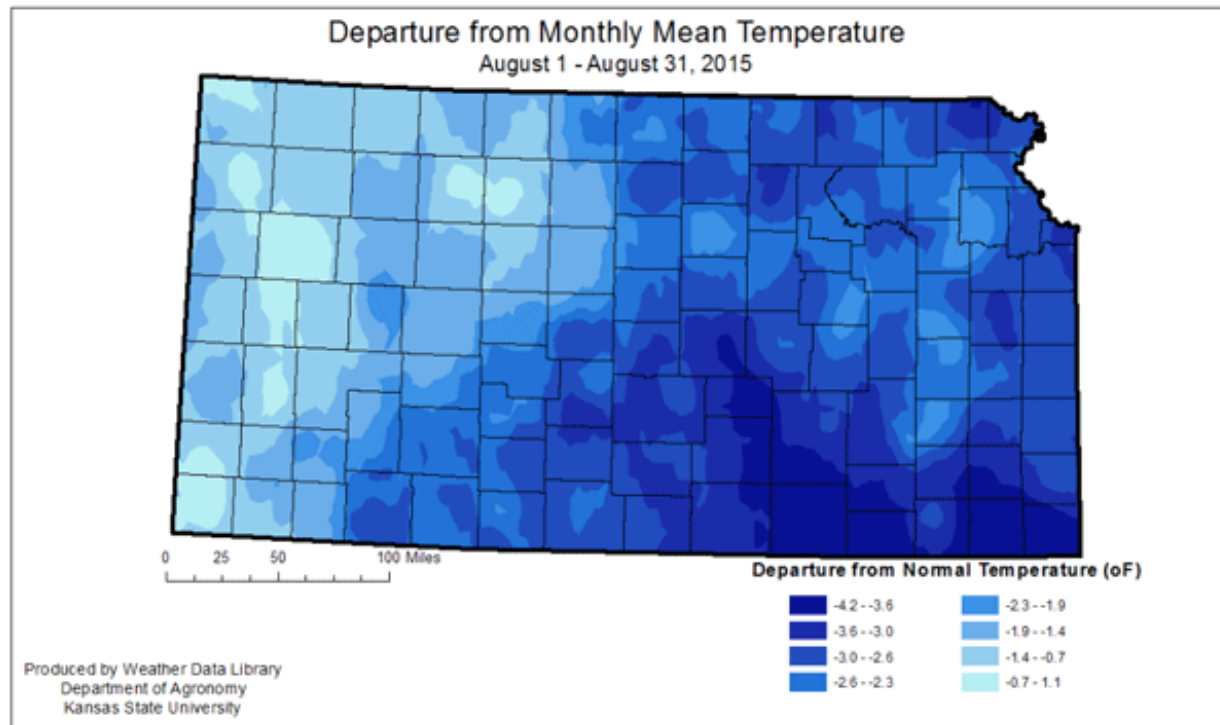
2. Sorghum development and potential freeze injury

The most recent “Crop Progress and Condition” report from Kansas Agricultural Statistics (09/28/15) documented that grain sorghum maturity and harvest is ahead of last year’s pace. Will sorghum reach maturity before first freeze? As every growing season, the answer is, “it depends.” There are two main factors involved: 1) weather conditions and how they affected the development of sorghum during the season, and 2) the crop’s life cycle progression through this season -- when the crop was planted, hybrid maturity, and the date of half-bloom.

Weather component

Wet conditions at planting time delayed sorghum planting in some areas of the state, delaying heading. The mean temperatures for August (Fig. 1) were 1 to 4 degrees cooler than normal, with the largest deviation occurring in southeast and south central Kansas. In contrast, mean temperatures were warmer than normal in September. The largest departure from the mean temperature for September was in north central and northwest Kansas.

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



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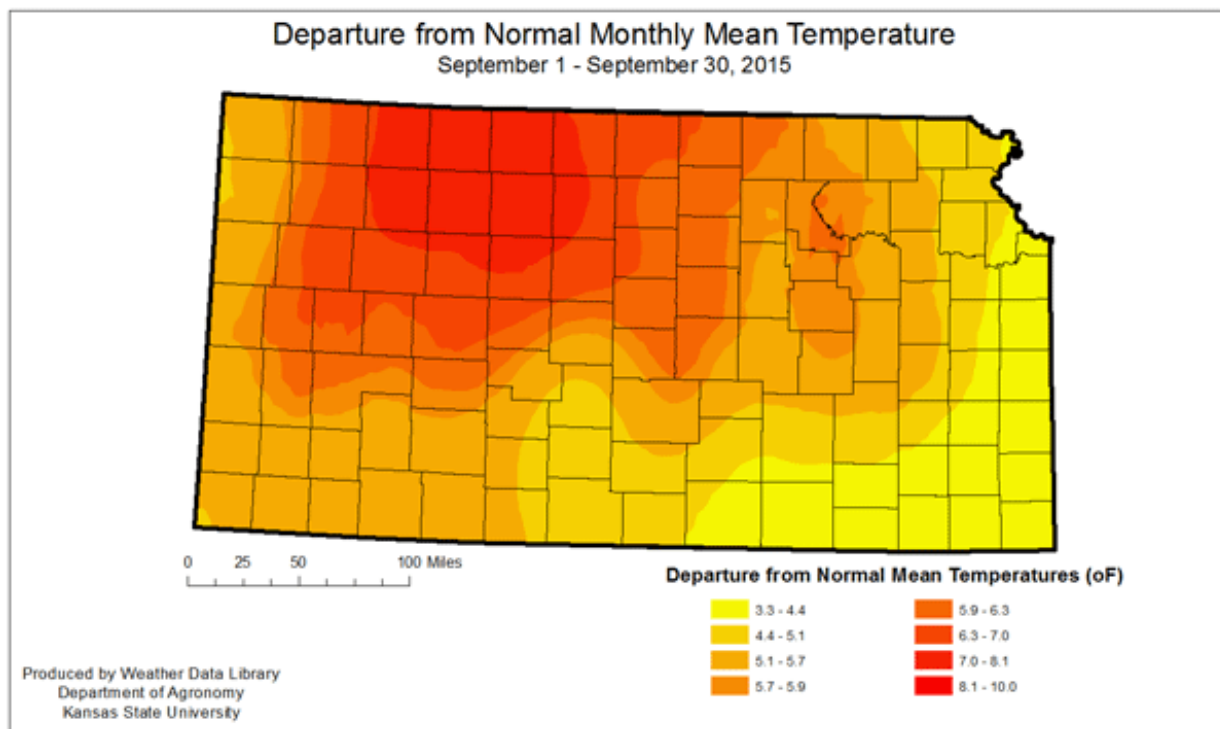


Figure 1. Departure from monthly mean temperature for August and September, 2015.

Sorghum is also sensitive to cold temperatures during most of its growth period. Temperatures below 40 degrees F will inhibit sorghum growth. Previous K-State research by Scott Staggenborg and Richard Vanderlip documented an impact on the grain weight early during the grain-filling period when temperatures were below 40 degrees F. Low temperatures at this time caused lower photosynthetic rates and the inability of the plant to translocate carbohydrates to the developing grains.

Crop's life cycle progression

The amount of time between emergence and half-bloom will depend on the planting date and the temperatures (cumulative growing degree days) during this period. There are also hybrid differences in the amount of time it takes to go from emergence to flowering. Short-season hybrids have a shorter time from emergence to blooming; while full-season hybrids will need more degree days to reach flowering. The overall cumulative GDD from flowering to maturity (seen as a "black-layer" near the seed base; Fig. 2) is about 1400-1600, with the shortest requirement in GDD for short-season hybrids. From maturity to harvest time, sorghum grain will dry down from about 35 to 20 percent moisture, but the final maximum dry mass accumulation and final nutrient content will have already been attained at maturity.

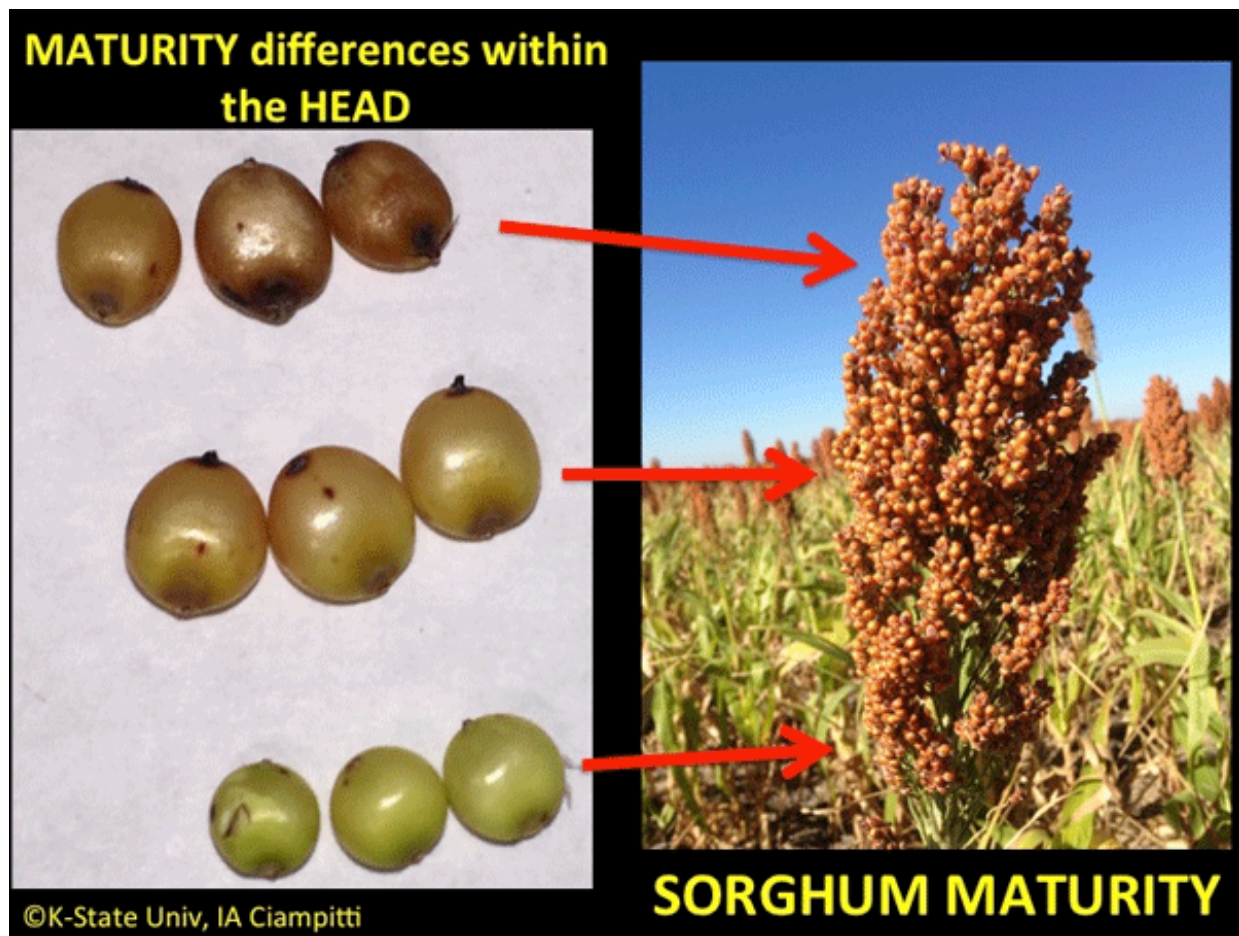
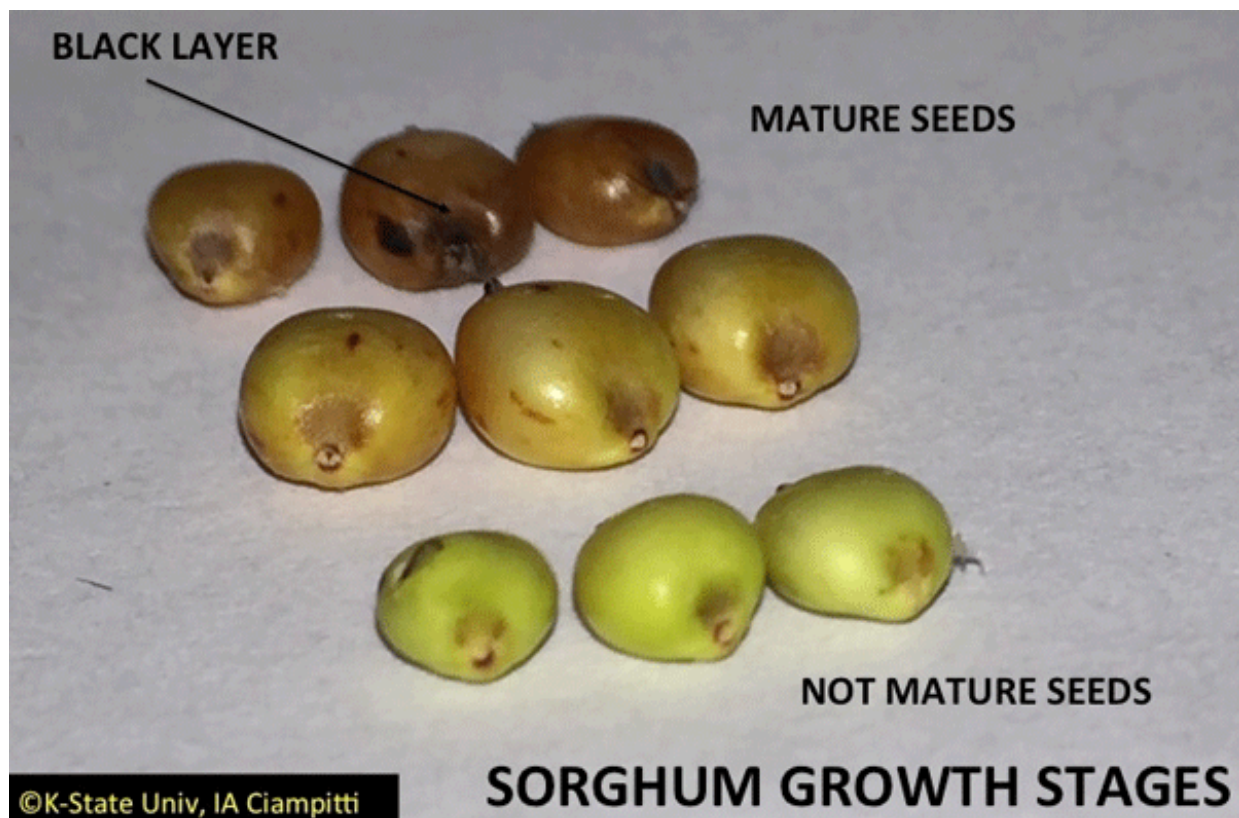


Figure 2. Black layer identification in sorghum. Differences in maturity related to the position within the same head should be expected. Pictures and infographic prepared by Ignacio Ciampitti, K-State Research and Extension.

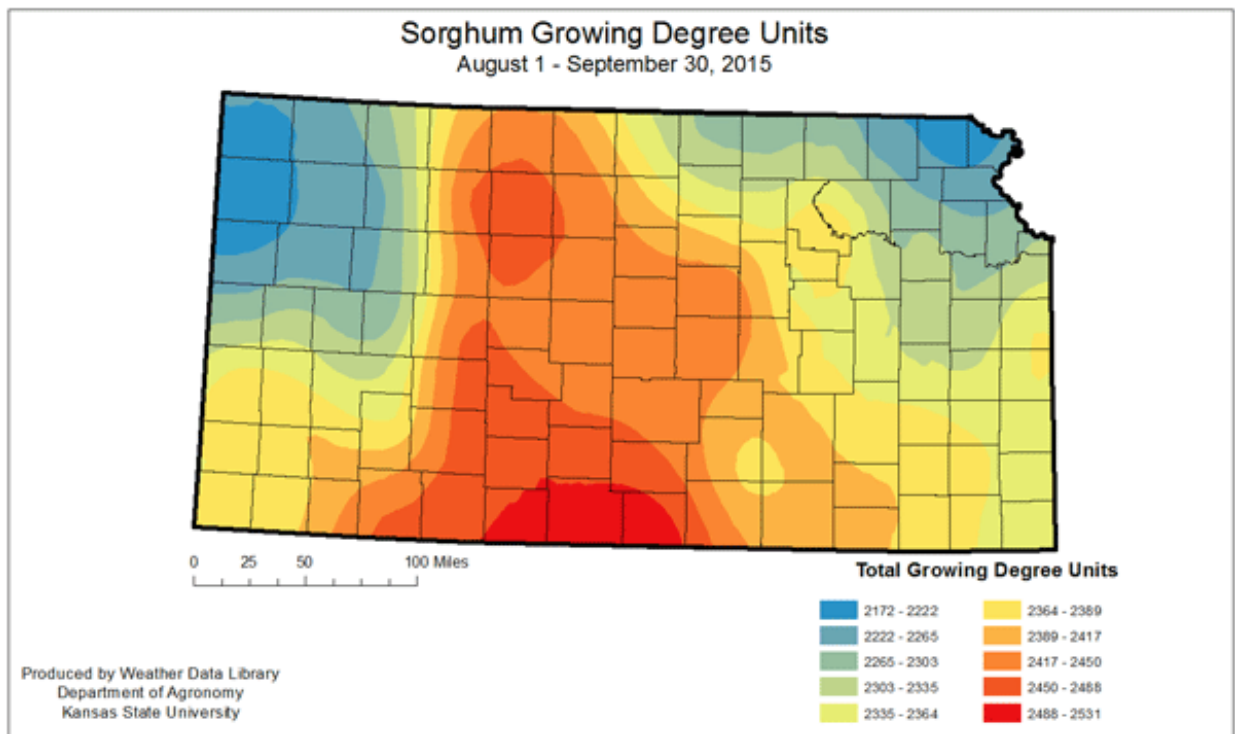
The likelihood of sorghum maturing before a freeze is related to all of these factors. When the crop flowers in late August or early September, it may not reach maturity before the first fall freeze in some parts of the state.

Probability of sorghum maturing before freeze for different flowering dates

The maps in Figure 3 below show accumulated GDDs up to September 30 for the current growing season at two different points: early August and early September. Lower GDDs are depicted with blue colors, while higher GDDs are represented in red colors.

If blooming occurred during early August the likelihood for maturing before freeze is close to 100% for the entire state. If blooming occurred during mid- to late-August, the sorghum in a small section of northwest Kansas will have a reduced chance of maturing (having accumulated less than 1400 GDDs) before the first freeze. The chances of reaching maturity before the first freeze is a bit less if sorghum was blooming around early September for the same area of Kansas (blue and light blue colors). In this case, the GDDs accumulated in September were low, less than 1100. Still, the projections for this year are much better than the previous sorghum production year.

Accumulated GDDs from early August to late September



Accumulated GDDs from early to late September

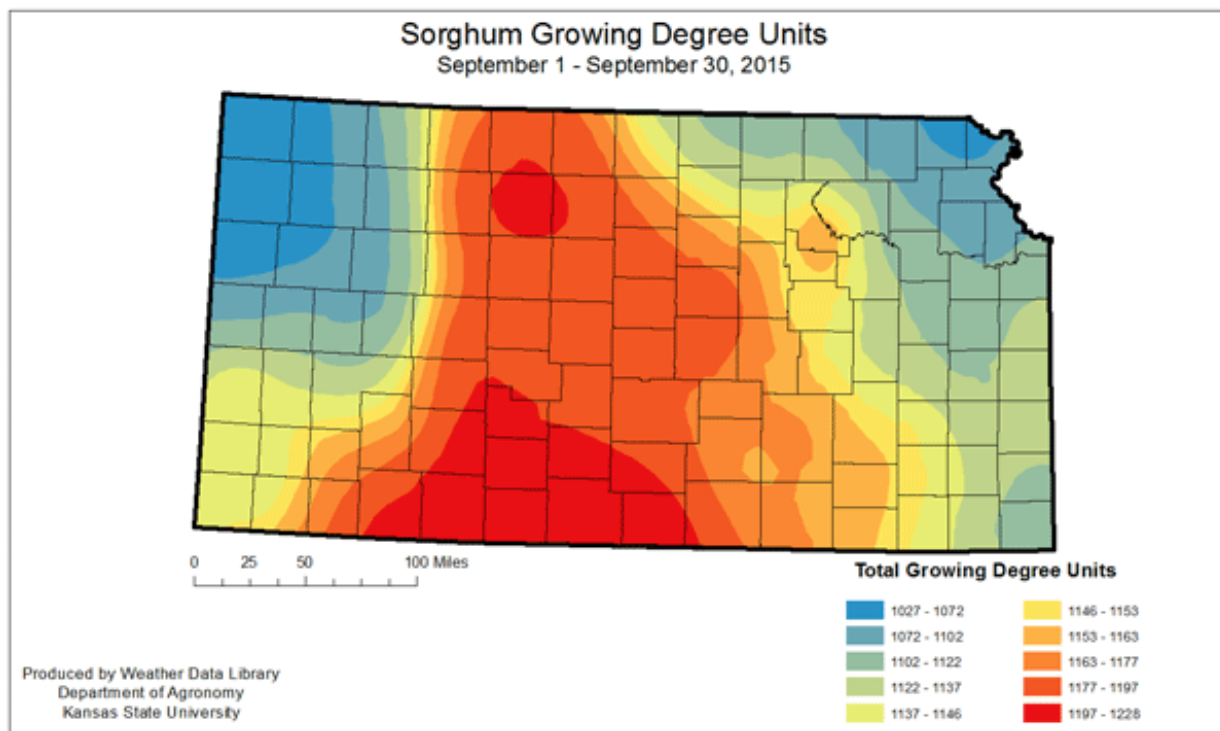


Figure 3. Accumulated Growing Degree Days (expressed in degrees F) for August 1-September 30 and September 1-30. The maps show that for sorghum that reached half-bloom on September 1, the GDD accumulation as of September 30 is lower and prospects are less certain, especially in northwest Kansas. The darker the red, the higher the number of accumulated GDDs.

The lowest temperature in September was close to 32 degrees F in northwest Kansas. Even if most of the yield potential was realized by that time, the test weight will be affected (smaller seed size as compared with a full length of grain-fill) by temperatures that cold. For the northwestern area of the state, low temperatures translate into slower grain fill with smaller rates of dry mass accumulation in the grain; affecting final yield.

After a cool weekend, the Goodland NWS Forecast Office has a forecast of highs in the 70s and lows in the 50's through Wednesday October 7. The 8-14 day outlook from the Climate Prediction Center, which extends out to October 15 calls for an increased chance of above normal temperatures across the state.

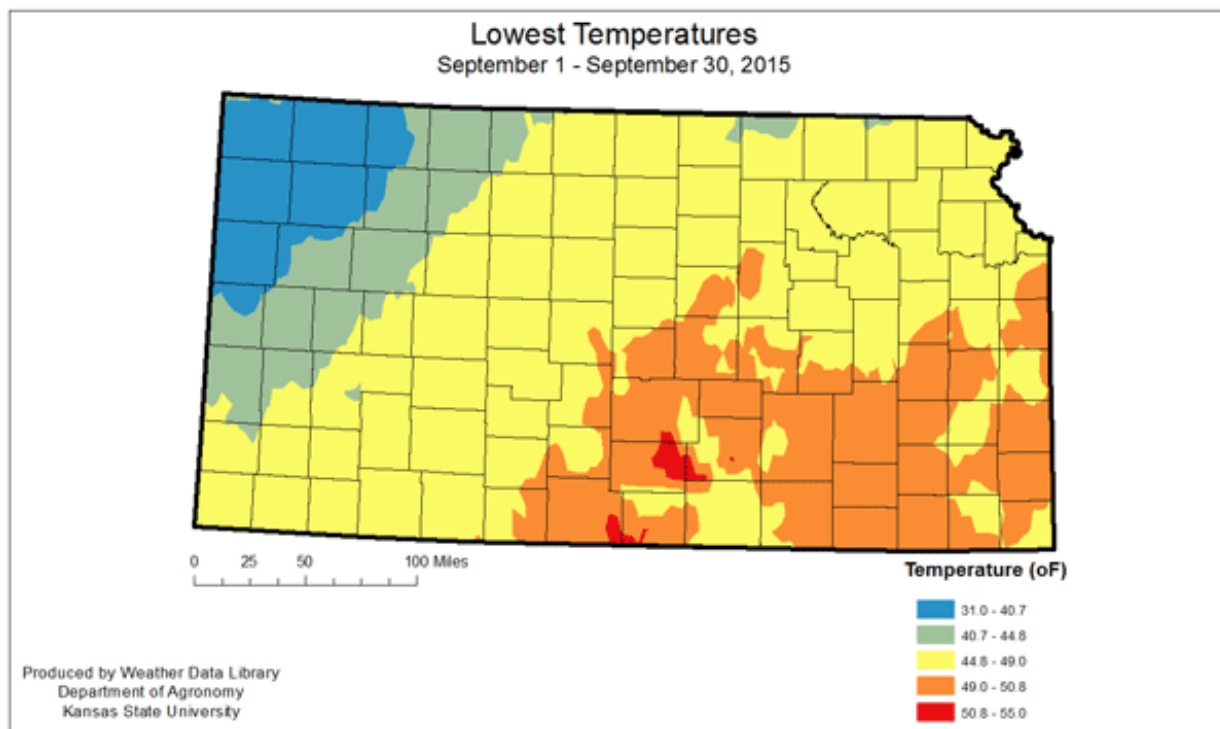


Figure 4. Map of the lowest temperatures recorded for September 2015. Dark blue refers to lower temperatures (31-41°F); dark red refers to high temperature (51-55 °F).

Management considerations

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

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

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

For more information on this, see *Harvesting Grain from Freeze-damaged Sorghum*, K-State publication MF-1081: <http://www.ksre.ksu.edu/bookstore/pubs/mf1081.pdf>

Ignacio Ciampitti, Crop Production and Cropping Systems Specialist
ciampitti@ksu.edu

Mary Knapp, Weather Data Library
mknapp@ksu.edu

3. Agronomy Field Day to feature sorghum production research, Oct. 9

Exciting advances in sorghum research will be featured at the 2015 Agronomy Field Day on October 9 at the Agronomy North Farm, 2200 Kimball Ave. in Manhattan. Topics will range from increases in yield potential to the sugarcane aphid, cover crops, and more.

The full list of topics and K-State speakers:

- Sorghum genetics and breeding – Tesfaye Tesso, Sorghum Breeder, and Geoffrey Morris, Sorghum Geneticist
- Inzen sorghum, a tool for postemergence grass control in sorghum– Curtis Thompson, Weed Management Specialist
- Heat and water stress sorghum physiology – Vara Prasad and Krishna Jagadish, Crop Physiologists
- Sorghum in Kansas cropping systems – Ignacio Ciampitti, Crop Production Specialist
- Sorghum response to cover crops in no-till systems – Kraig Roozeboom, Cropping Systems Agronomist
- Update on sugarcane aphid in Kansas – Brian McCornack, Entomologist

The field day will begin with registration at 9 a.m. and wrap up at 1 p.m. Sessions include two concurrent one-hour tours in the morning, starting at 9:30, followed by a poster session during and after lunch.

In addition, there will be displays from commercial companies and K-State researchers in the shed near the registration area, along with the crop garden, forage garden, and weed garden for browsing. Extension specialists will be available to answer questions.

There is no charge to attend, and a complimentary lunch will be available. Preregistration is requested by October 6 so that a lunch count can be made. Those interested in attending can preregister by calling Troy Lynn Eckart at 785-532-5776. To preregister online, see: <https://kstateagron2015.eventbrite.com>

On-site registration will also be available.

For more information, interested persons can contact Dorivar Ruiz Diaz at 785-532-6183 or ruizdiaz@ksu.edu

Research and new technologies for sorghum production



Agronomy Field Day 2015

*Agronomy North Farm, Manhattan
Friday, October 9
9:00 a.m.- 1:00 pm*

KANSAS STATE
UNIVERSITY

Department of Agronomy

4. Comparative Vegetation Condition Report: September 15 - 28

K-State's Ecology and Agriculture Spatial Analysis Laboratory (EASAL) produces weekly Vegetation Condition Report maps. These maps can be a valuable tool for making crop selection and marketing decisions.

Two short videos of Dr. Kevin Price explaining the development of these maps can be viewed on YouTube at:

<http://www.youtube.com/watch?v=CRP3Y5Nlggw>

<http://www.youtube.com/watch?v=tUdOK94efxc>

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 26-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.

NOTE TO READERS: The maps below represent a subset of the maps available from the EASAL group. If you'd like digital copies of the entire map series please contact Nan An at nanan@ksu.edu and we can place you on our email list to receive the entire dataset each week as they are produced. The maps are normally first available on Wednesday of each week, unless there is a delay in the posting of the data by EROS Data Center where we obtain the raw data used to make the maps. These maps are provided for free as a service of the Department of Agronomy and K-State Research and Extension.

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

Kansas Vegetation Condition

Period 39: 09/15/2015 - 09/28/2015

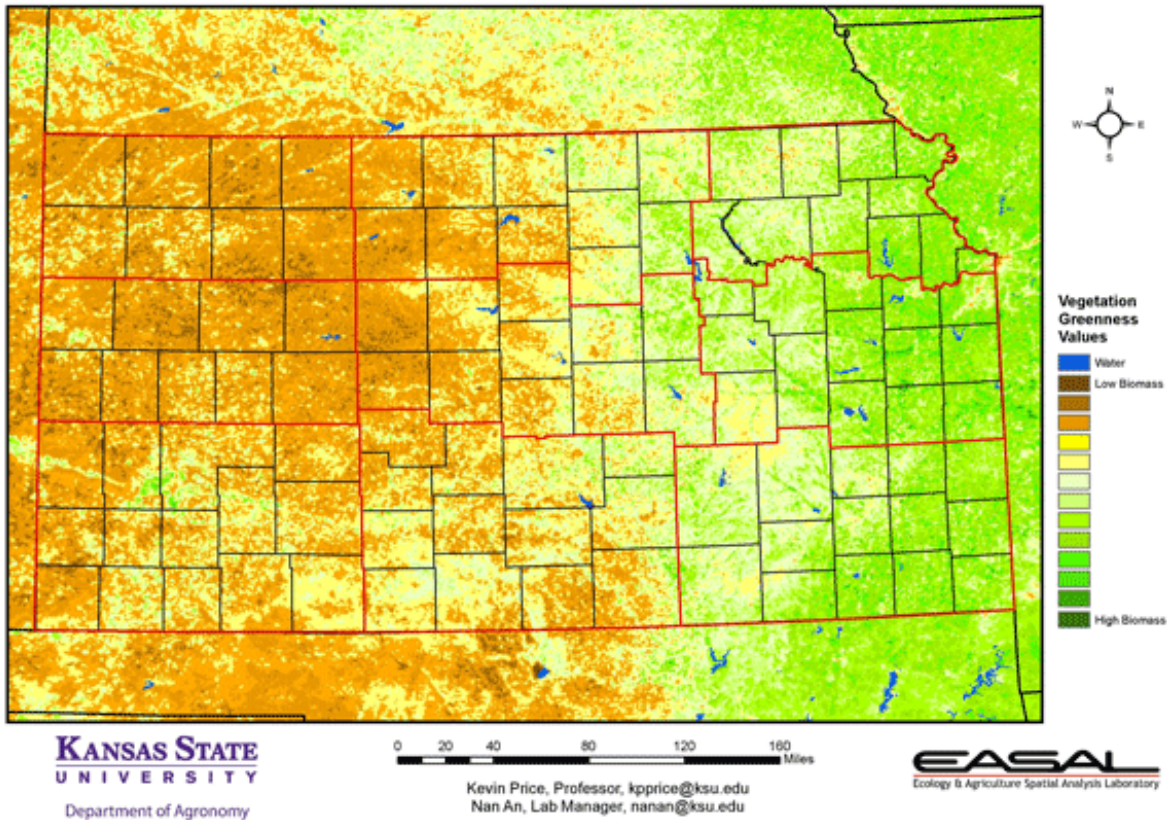


Figure 1. The Vegetation Condition Report for Kansas for September 15 – 28 from K-State’s Ecology and Agriculture Spatial Analysis Laboratory shows that the area of highest biomass production has moved farther east. There is an area of increased photosynthetic activity in southwest Kansas, where rainfall continues to be higher than average. Favorable soil moisture and moderate temperatures resulted in increased biomass production in these areas. An area of lower NDVI values is beginning to appear in Chase County.

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Kansas Vegetation Condition Comparison
Late-September 2015 compared to the Late-September 2014

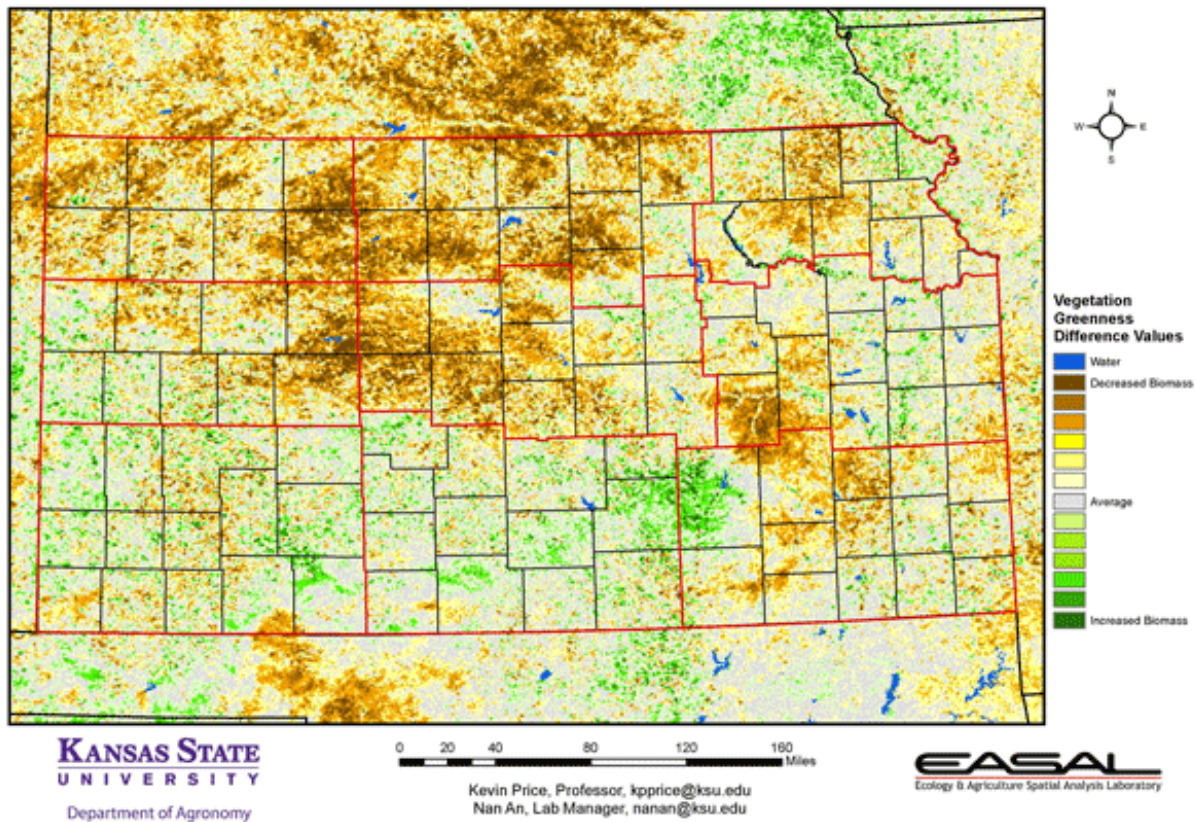


Figure 2. Compared to the previous year at this time for Kansas, the current Vegetation Condition Report for September 15 – 28 from K-State’s Ecology and Agriculture Spatial Analysis Laboratory shows parts of central and west central Kansas have lower photosynthetic activity. These areas continue to miss out on the storm systems and drought conditions have intensified. This area is now considered to be in moderate drought. Lower NDVI values are also visible in parts of east central and northeast Kansas which has seen a drier September than last year

Kansas Vegetation Condition Comparison

Late-September 2015 compared to the 26-Year Average for Late-September

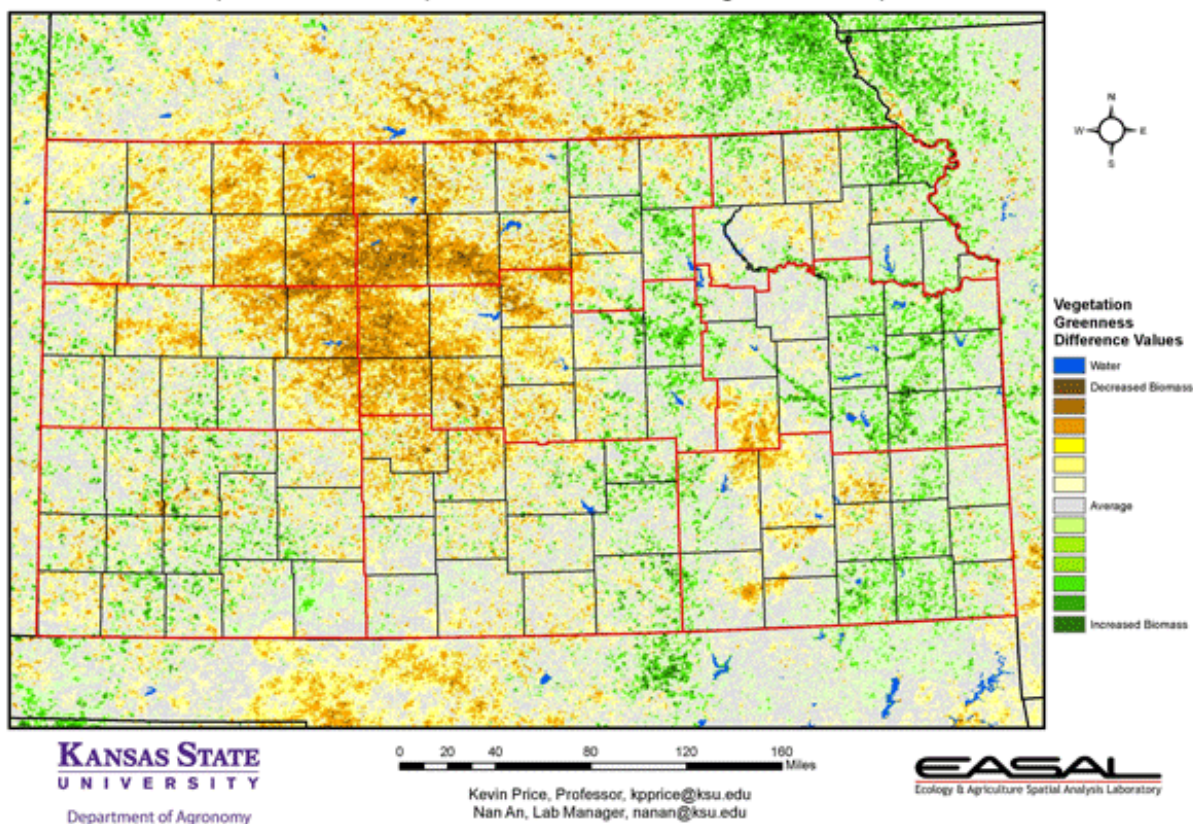


Figure 3. Compared to the 26-year average at this time for Kansas, this year's Vegetation Condition Report for September 15 – 28 from K-State's Ecology and Agriculture Spatial Analysis Laboratory shows that much of the state has average or above-average photosynthetic activity. The epicenter of below-average photosynthetic activity is centered in Graham, Rooks, Trego, and Ellis counties. These areas continue to miss most of the storm systems, and moderate drought is expanding in these areas. An area of below-average photosynthetic activity is developing in Chase County, as well.

U.S. Corn Belt Vegetation Condition

Period 39: 09/15/2015 - 09/28/2015

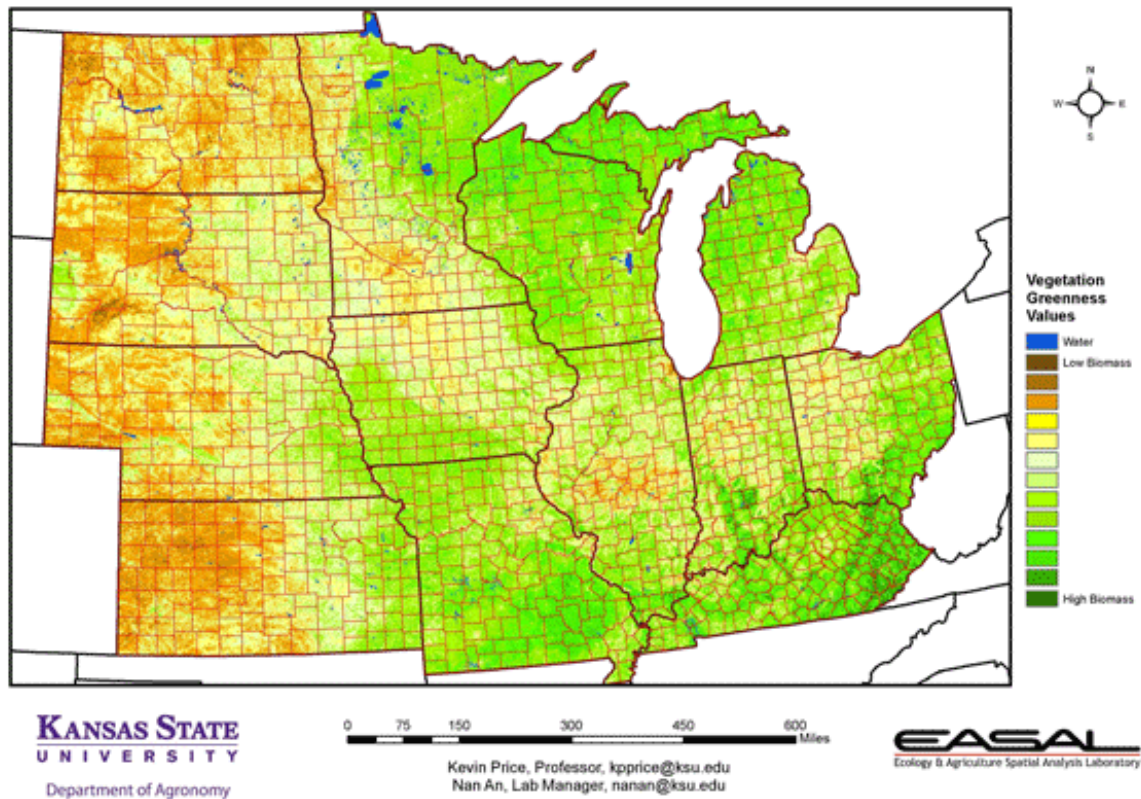


Figure 4. The Vegetation Condition Report for the Corn Belt for September 15 – 28 from K-State’s Ecology and Agriculture Spatial Analysis Laboratory shows that the area of greatest photosynthetic activity is concentrated on the northern and southern parts of the region. Favorable moisture conditions have resulted in high photosynthetic activity. As crop maturity advances, areas of lower NDVI values will increase.

U.S. Corn Belt Vegetation Condition Comparison
Late-September 2015 Compared to Late-September 2014

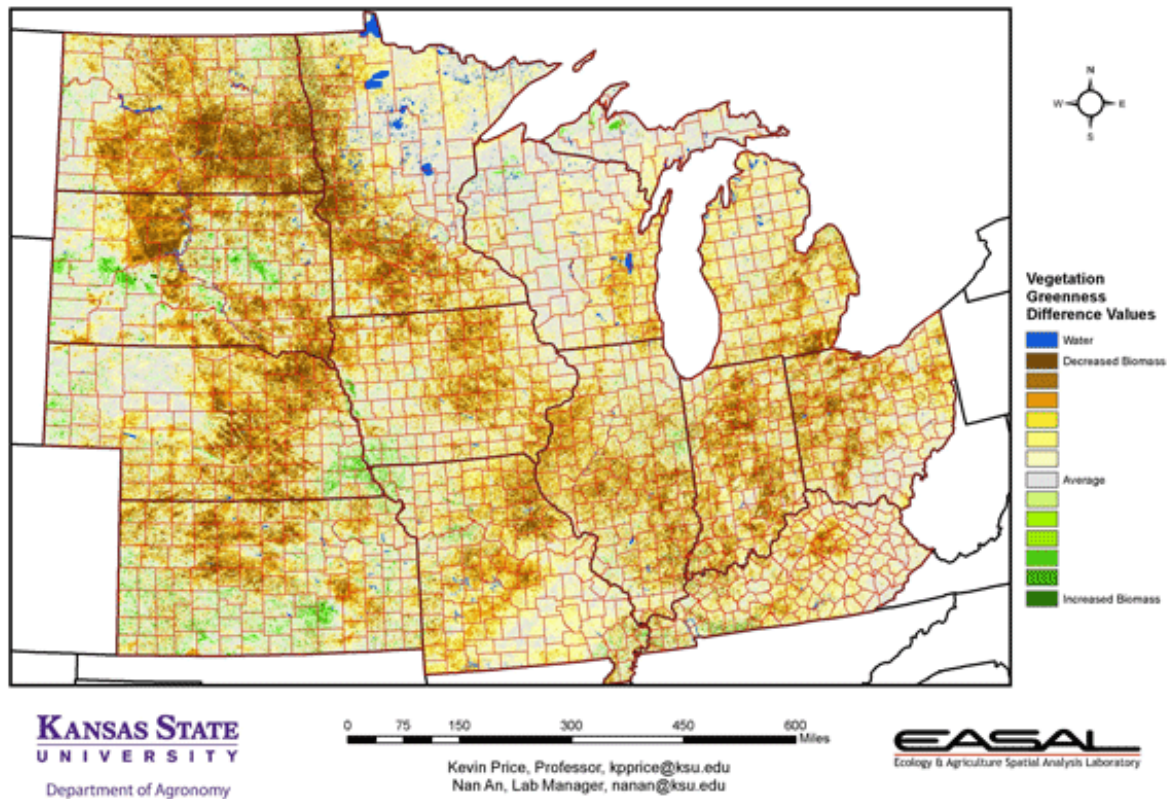


Figure 5. The comparison to last year in the Corn Belt for the period for September 15 – 28 from K-State’s Ecology and Agriculture Spatial Analysis Laboratory shows lower photosynthetic activity across most of the region. Pockets of higher NDVI values are also present -- likely due to late-planted spring crops that are slower in maturing. In North Dakota, crop progress is generally well ahead of last year’s development. For example, flaxseed harvest is 98 percent complete, compared to 68 percent last year.

U.S. Corn Belt Vegetation Condition Comparison
Late-September 2015 Compared to the 26-Year Average for Late-September

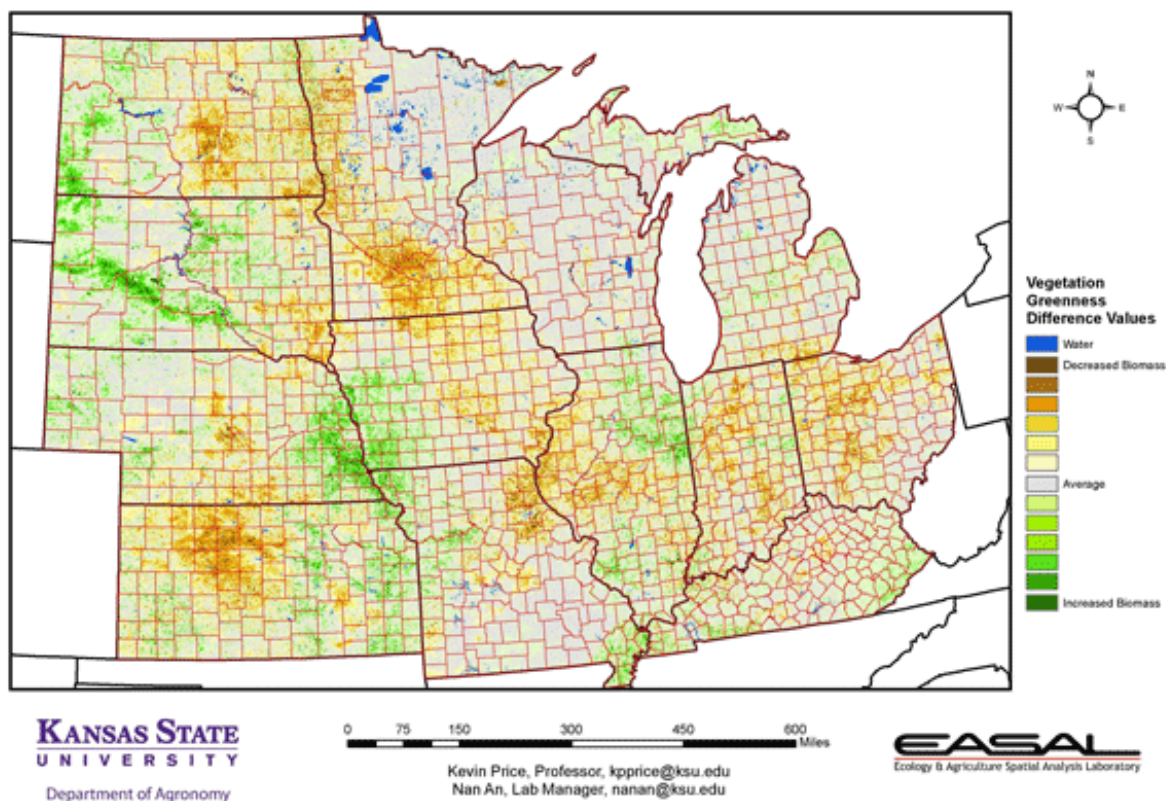


Figure 6. Compared to the 26-year average at this time for the Corn Belt, this year's Vegetation Condition Report for September 15 – 28 from K-State's Ecology and Agriculture Spatial Analysis Laboratory shows most of the region has average biomass production. From North Dakota through southern Minnesota into northeastern Missouri there are areas of below-average photosynthetic activity. Crop development is ahead of average in these regions. There is an area of below-average photosynthetic activity in western Kansas, where drought is intensifying.

Continental U.S. Vegetation Condition

Period 39: 09/15/2015 - 09/28/2015

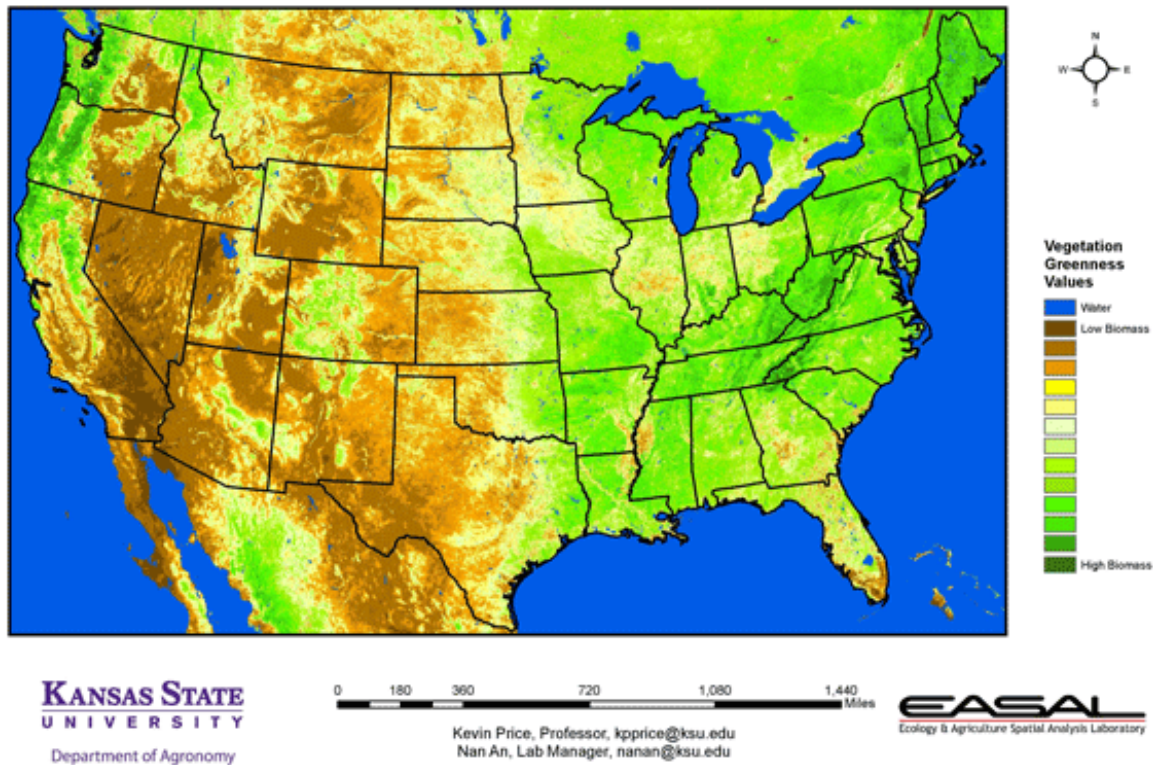


Figure 7. The Vegetation Condition Report for the U.S for September 15 - 28 from K-State's Ecology and Agriculture Spatial Analysis Laboratory shows that the highest photosynthetic activity is centered in the Appalachians of West Virginia and Tennessee. Lower NDVI values are noticeable in Florida, where drought conditions continue. While rains have been more prevalent in the area recently, they have had minimal impact. Low NDVI values are also notable along the western Cascades in Oregon, where drought and wildfires continue to affect vegetation.

Continental U.S. Vegetation Condition Comparison
Late-September 2015 Compared to Late-September 2014

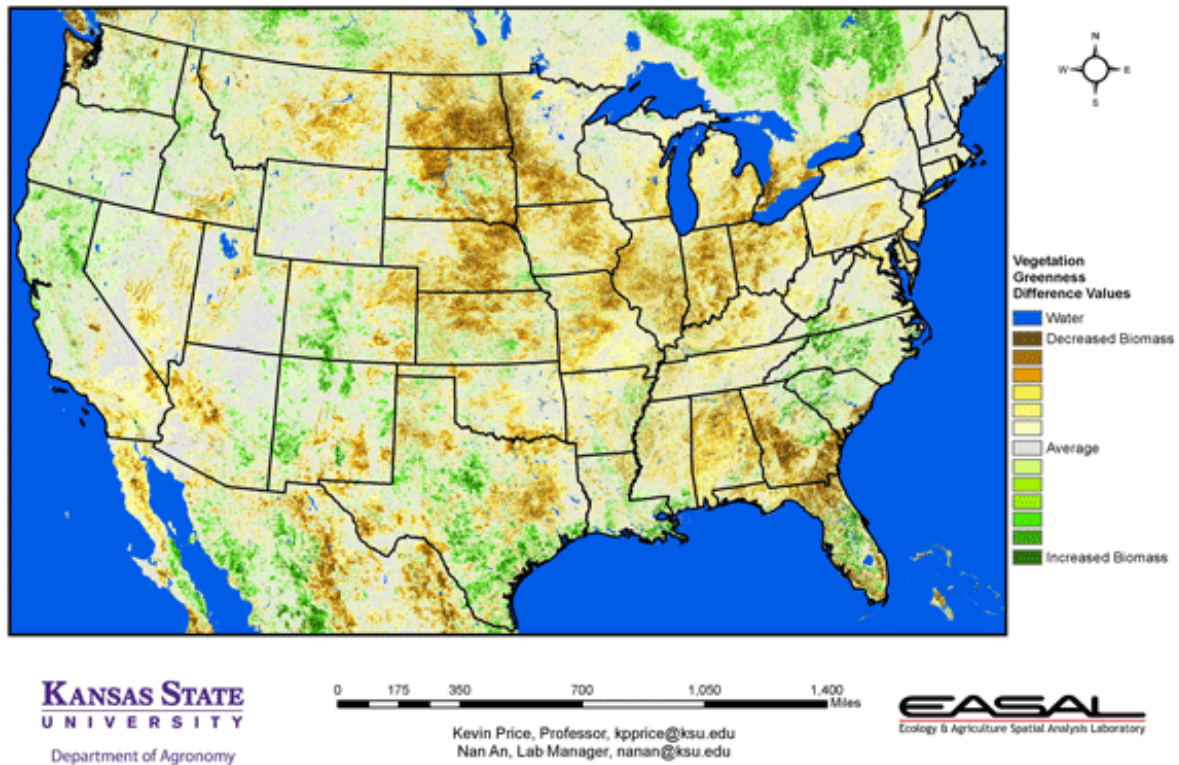


Figure 8. The U.S. comparison to last year at this time for the period September 15 – 28 from K-State’s Ecology and Agriculture Spatial Analysis Laboratory shows that lower NDVI values are most evident along the northern tier of states and through the Ohio River Valley. Crop development in much of the region is ahead of average. In the West Coast region, lower NDVI values are most evident along the Washington coast. Little change is evident in Oregon and Northern California, where drought remains unchanged from last year.

Continental U.S. Vegetation Condition Comparison
Late-September 2015 Compared to 26-year Average for Late-September

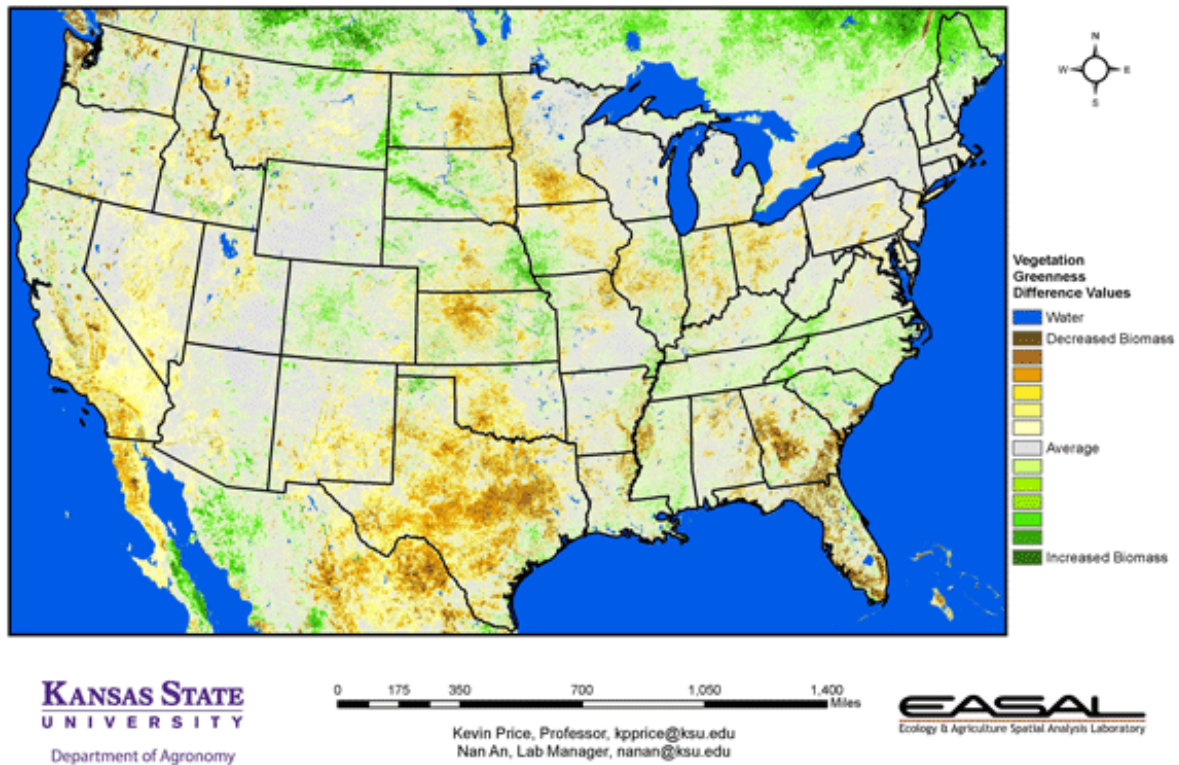


Figure 9. The U.S. comparison to the 26-year average for the period September 15 – 28 from K-State's Ecology and Agriculture Spatial Analysis Laboratory shows Texas is a center for lower-than-normal photosynthetic activity. Below-average NDVI values are also visible from Georgia through Florida. Drought continues to be an issue in these areas.

Mary Knapp, Weather Data Library
mknapp@ksu.edu

Kevin Price, Professor Emeritus, Agronomy and Geography, Remote Sensing, GIS
kpprice@ksu.edu

Nan An, Graduate Research Assistant, Ecology & Agriculture Spatial Analysis Laboratory (EASAL)
nanan@ksu.edu