



K-STATE
Research and Extension

Extension Agronomy

eUpdate

06/10/2016

These e-Updates are a regular weekly item from K-State Extension Agronomy and Steve Watson, Agronomy e-Update Editor. All of the Research and Extension faculty in Agronomy will be involved as sources from time to time. If you have any questions or suggestions for topics you'd like to have us address in this weekly update, contact Steve Watson, 785-532-7105 swatson@ksu.edu, or Curtis Thompson, Extension Agronomy State Leader and Weed Management Specialist 785-532-3444 cthompso@ksu.edu.

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1. Controlling larger weeds in Roundup Ready soybean fields

Controlling annual weeds postemergence in Roundup Ready soybeans is always easier when the weeds are small – less than 2 inches tall is preferable for good control. Once weeds get taller, they are often considerably more difficult to control. However, conditions are not always conducive to getting optimal postemergence weed control. The wet weather in many areas this spring may cause weeds in some fields to get larger than you intended. The following are some suggestions for controlling larger troublesome weeds in soybeans.

Marestail

Marestail has become one of our most troublesome weeds in no-till crop production, especially in soybeans. Marestail tend to be difficult to control even when the plants are small and in the rosette stage, but become even tougher when plants get more than 6 inches tall. That is why fall and early burndown treatments are critical to the long-term management of marestail. Unfortunately, that doesn't always happen. In addition, there are populations of marestail that have developed glyphosate resistance in many areas. However, some marestail populations are still susceptible to glyphosate, and even resistant plants are not completely immune to glyphosate.



Figure 1. Growth stages of marestail from seedling, rosette, to bolting state. Photos by Dallas Peterson, K-State Research and Extension.

The most effective herbicide treatment for controlling marestail in Roundup Ready soybeans is probably a tank-mix of glyphosate plus FirstRate. The combination of the two herbicides seems to work better than either herbicide alone, even on resistant plants. It is important to use the full labeled rates of glyphosate and recommended adjuvants, including ammonium sulfate, to optimize control and help minimize the risk of developing more resistance. Other tank-mixes to consider with glyphosate for controlling marestail would include Classic and Synchrony herbicides. Unfortunately, some marestail may also be ALS resistant, in which case FirstRate, Classic, and Synchrony would also be fairly ineffective. This just further emphasizes the importance of early spring weed control. Liberty 280 herbicide has provided fairly good control of large marestail as a burndown treatment or postemergence in Liberty Link soybeans.

Waterhemp and Palmer amaranth

These pigweed species used to be some of the most common weeds in soybean fields prior to Roundup Ready soybeans. Glyphosate applied early, and possibly again as a follow-up treatment, was effective for many years, but because of the heavy reliance on glyphosate for weed control, glyphosate-resistant waterhemp has become fairly common in eastern Kansas and glyphosate-resistant Palmer amaranth is now common throughout much of central and western Kansas.



Figure 2. Glyphosate-resistant Palmer amaranth escapes in soybeans. Photo by Dallas Peterson, K-State Research and Extension.

The best way to manage these pigweeds in soybeans is to use effective preemergence herbicides followed by postemergence treatment. However, if the preemergence herbicides weren't applied or didn't get activated in a timely manner, early-emerging pigweeds may not have been controlled and can grow rapidly. Flexstar, Cobra, Marvel, and Ultra Blazer can be fairly effective for controlling small pigweed, but are less effective as the pigweed gets larger, especially Palmer amaranth. These herbicides also provide some residual weed control, so tank-mixes of these herbicides with glyphosate should be applied within 3 to 4 weeks after planting to optimize performance. Producers often try to cut the rates of these herbicides to reduce soybean injury. However, lower rates of these burner herbicides still cause similar soybean burn symptoms and weed control is often reduced.

Pursuit and Harmony were once fairly effective for pigweed control and can still provide good control of susceptible populations, but many fields now have ALS-resistant waterhemp and Palmer amaranth.

Velvetleaf

Velvetleaf has sometimes been difficult to control with glyphosate. There are no confirmed cases of glyphosate-resistant velvetleaf, but it is not extremely susceptible to glyphosate. Several application factors can affect control, including time of day, hard water, ammonium sulfate, and environmental conditions. Velvetleaf control with glyphosate can be optimized by using full rates of glyphosate and ammonium sulfate (17 lb/100 gal of spray), spraying during the daylight hours, and spraying when the plants are under minimal drought stress. Herbicide tank-mix partners with glyphosate that may enhance velvetleaf control would include Resource, Cadet, Marvel, FirstRate, Harmony, and Synchrony.

Sunflower and Cocklebur

Fortunately, sunflowers and cocklebur are still quite susceptible to glyphosate. However, these weeds are fast growing and often have multiple flushes of germination. It is important to use the full rate of glyphosate and get good spray coverage when trying to control larger sunflower and cocklebur. Tank-mixing Scepter or Classic herbicide with glyphosate may improve control and help provide residual control of later-emerging plants.

Conclusion

If weeds have gotten large, it's always best to start with the highest labeled rate of glyphosate, with the proper adjuvants, and add other herbicides as needed, depending on the weed species present. In most fields, there will be a combination of one or more of the weeds listed above, so producers will have to see how the herbicide options match up and select the best combination.

Dallas Peterson, Weed Management Specialist
dpeterso@ksu.edu

Doug Shoup, Southeast Crops and Soils Specialist
dshoup@ksu.edu

Wet conditions recently could lead to some issues in corn that may start showing up over the next few weeks. For example, producers may be seeing corn that is falling over or flopping in the wind this year. Occasionally plants are standing, but exhibit wilting or stunting symptoms. To diagnose the problem, start by digging up some plants and examining the root system. Corn in the V4 to V6 stages and beyond should have a well-established secondary root system. These are larger and thicker than the primary roots. If the corn plants have not established a viable secondary, or nodal, root system, the problem is often termed “rootless” or “floppy” corn.



Figure 1. Plant with poorly developed secondary root system. Crown was exposed above soil surface. Photo by K-State Research and Extension.



Figure 2. Plants with adequate (left) and poor root development (right) systems. Photo by Ignacio Ciampitti, K-State Research and Extension.

When corn germinates, the first roots to emerge from the seed are the primary, seminal, or seed roots. These roots support the plant through emergence and the appearance of the first few leaves. At emergence, exposure of the coleoptile to light will cause it and the mesocotyl to stop growth and will position the crown at $\frac{3}{4}$ " to 1" or more below the soil surface. As the plant grows, the first four or five nodes do not elongate, keeping the growing point below the soil surface until V6 when the stem begins to elongate rapidly.

The roots that develop from these compressed nodes at the crown form the secondary root system. This is a bit confusing because this "secondary" root system is of primary importance for the rest of the life of the corn plant. It is called secondary because it is the second to appear chronologically. These secondary roots rapidly take over water and nutrient uptake and are important for anchoring the plant as it moves through the V4 to V6 growth stages and beyond. If something prevents establishment of these secondary roots, the plants can fall over or flop in the wind or the plants may be stunted or wilted.

Several situations may cause poor secondary root development:

- Saturated soils may prevent adequate root development.
- If the surface soil dries rapidly just as the secondary roots begin to grow, the roots desiccate and the tips die before they reach more moist soil below.
- If the crown becomes exposed for any reason, the secondary roots can dry out and die before they grow into the soil. Crowns can be exposed if heavy rains have compacted the seedbed or washed away the soil (erosion) from around the developing crown.
- Occasionally the mesocotyl (the connection between the seed and the crown) will continue to grow after the coleoptile emerges from the soil, causing the crown to be positioned close to or at the soil surface. The reasons for continued growth of the mesocotyl and the resulting

exposed position of the crown are poorly understood. Some believe it could be due to growth-regulating herbicides (e.g., 2,4-D, dicamba) or cloudy conditions, but cause-effect relationships have not been well established. Several instances of exposed crowns have been documented with no application of growth-regulating herbicides.

- Shallow planting could be the cause of the problem in a few cases. Although shallow planting can cause exposed crowns and poor secondary root development, most fields observed this spring with “rootless” corn have been planted at an adequate depth.

Is there any hope for “rootless” or “floppy” corn? Possibly, depending on whether soils are able to dry out enough to provide good aeration for the roots. Even if plants have fallen over, new secondary roots can continue to form and establish a viable root system if soil aeration and moisture conditions are adequate. Inter-row lay-by cultivation to move soil around the exposed crowns can help if not too many plants have fallen over.

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

3. Kansas climate basics: Pt. 4 -- Changes in frost dates from 1901 to 2014

(Editor's note: The following article is one in a series of articles in the Agronomy eUpdate that examines the historical climate observations in Kansas. The methods used to do this analysis is explained in the [introductory article](#) in this series, from eUpdate No. 571, May 20, 2016. – Steve Watson)

Changes in frost dates and frost-free season length in Kansas

A change in the number of days when the minimum daily temperature falls below freezing (frost days, using 32 degrees F as a threshold) is an extreme signal in climate perspective. The length of the frost-free season and the changing trend in the length of that season, if any, have direct implications for crop production in Kansas. Figure 1 provides a comparison of the first frost dates in the fall, using two recent 30-year periods of time, 1951-1980 and 1981-2010. On average, changes in first fall frost dates between those two periods of time were greatest in eastern Kansas. In that region, the first frost dates of 1951-1980 (30 years) were earlier than in 1981-2010 (30 years). However, northwestern areas in Kansas showed an earlier first frost date in the 1981-2010 period.

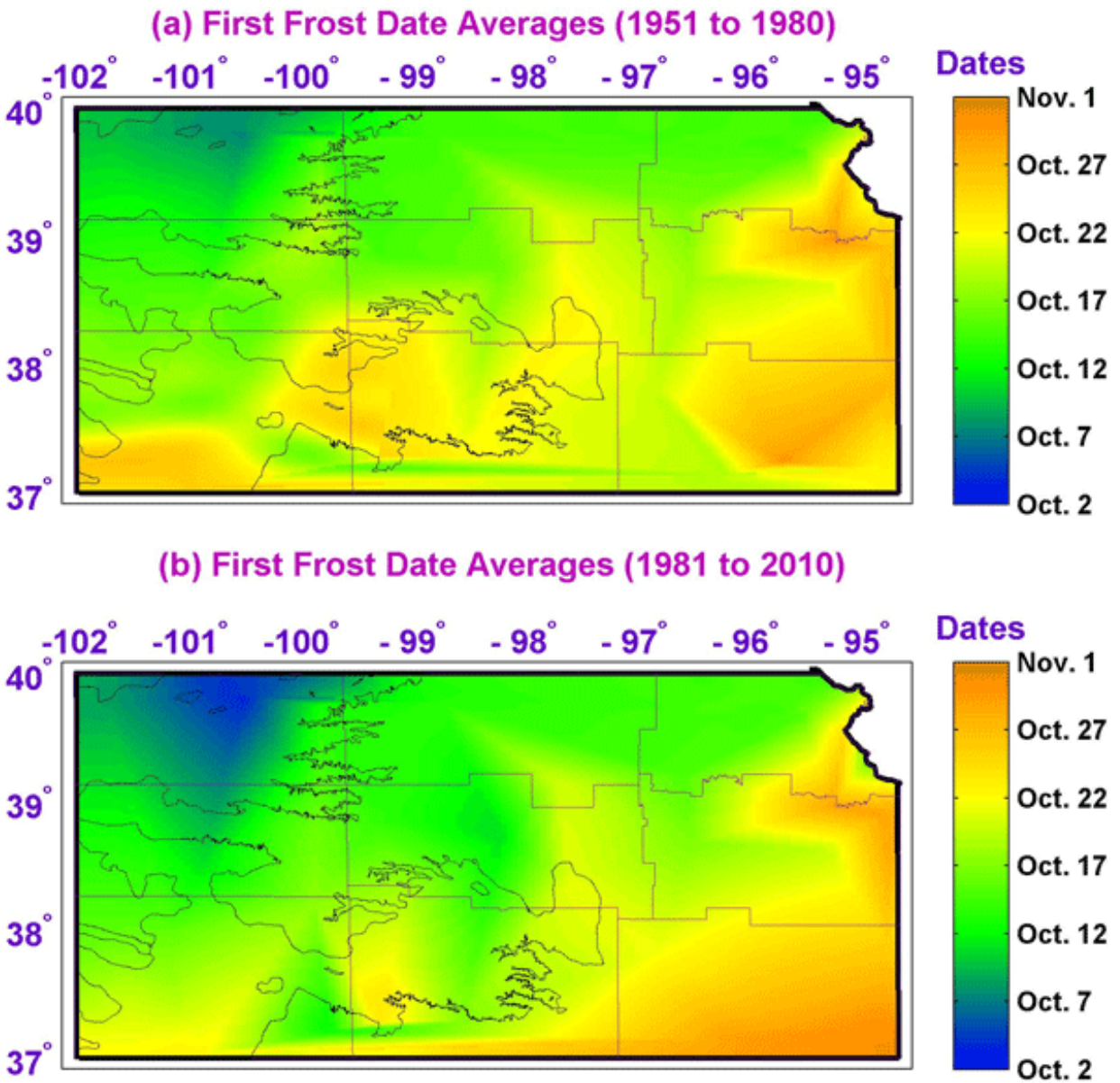


Figure 1. Average first frost dates in Kansas from (a) 1951-1980 and (b) 1981-2010.

For the last frost date in spring in Kansas, the changing pattern across the state is consistent with the changing pattern of the first frost date due to climate change. That is, eastern Kansas had earlier last

frost dates and southeast Kansas had later dates in the 1951-1980 period than in the 1981-2010 period (Fig. 2). Trends of frost dates (both first frost date and last frost date) are highly varied when different temporal scales were selected.

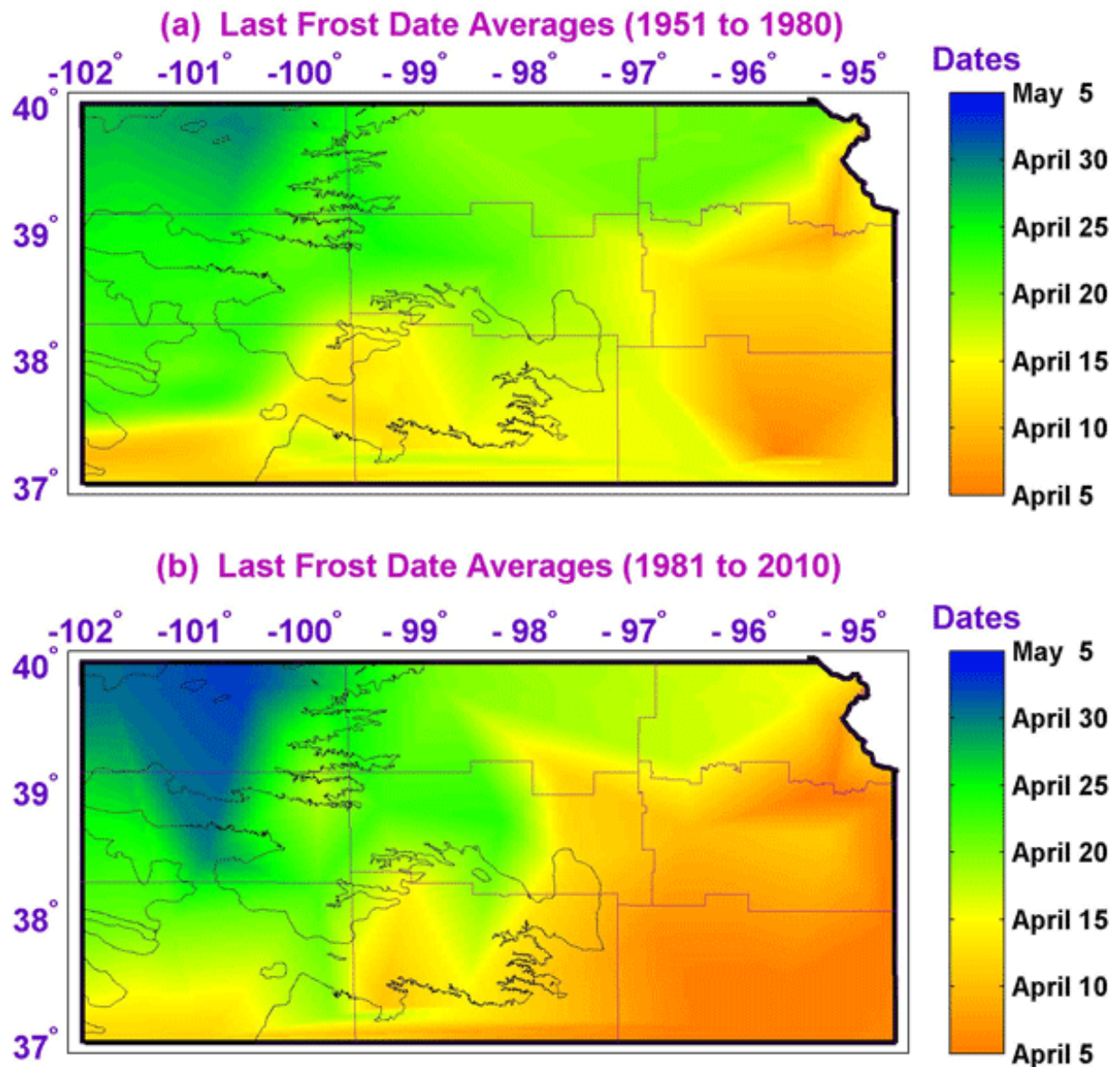


Figure 2. Average last frost dates in Kansas from (a) 1951-1980 and (b) 1981-2010.

Such a distinct spatial pattern of frost dates resulted in a significant change in the number of frost-free days (i.e., first frost date minus last frost date, or frost-free season length) over time. The frost-free season length in all three regions of Kansas showed a statistically significant increase from 1901 to 2014 at a rate of 0.99 ± 0.79 days per decade in western Kansas, 0.94 ± 0.90 days per decade in central Kansas, and 1.47 ± 0.74 days per decade in eastern Kansas (Fig. 3).

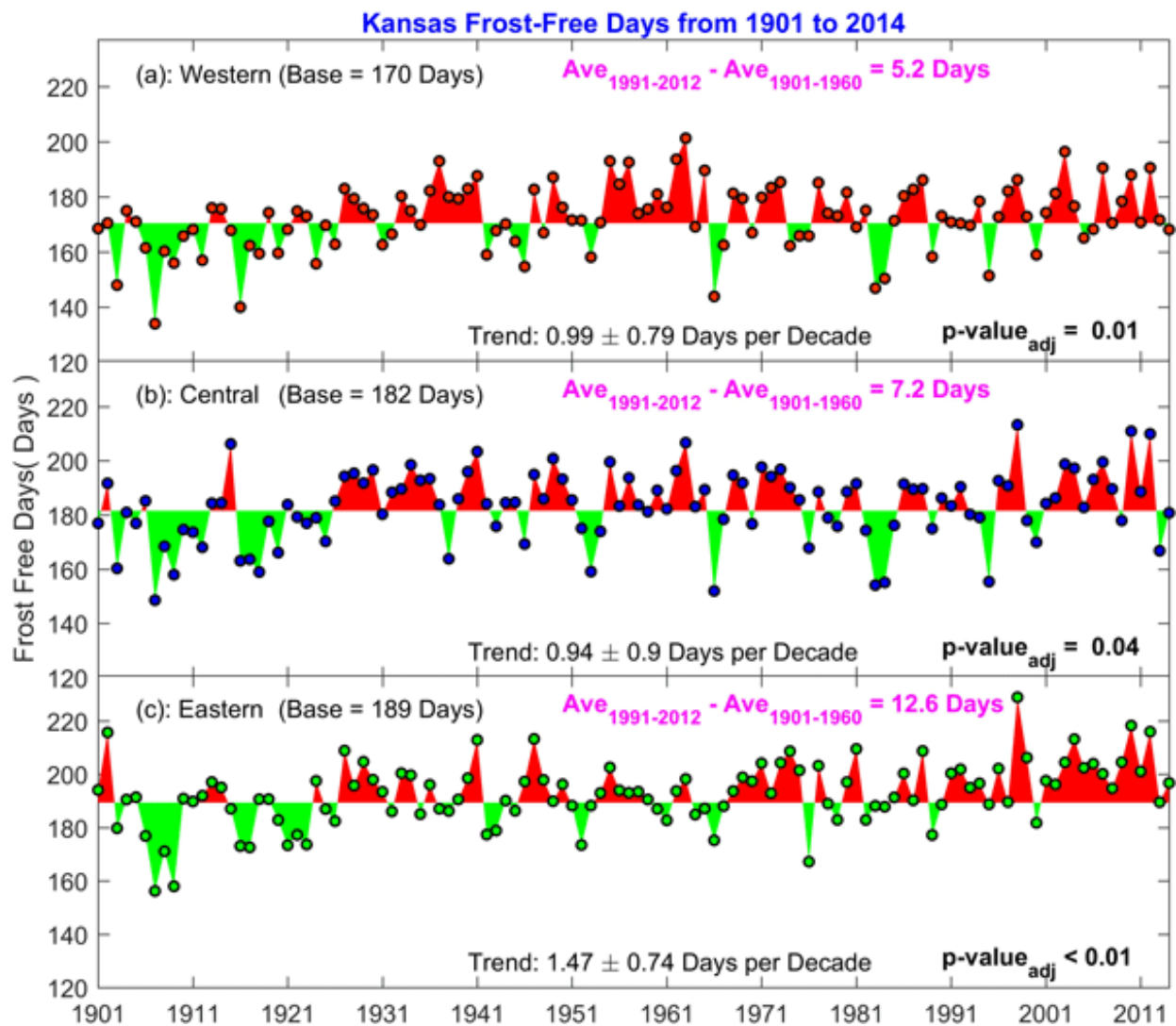


Figure 3. Time series of frost-free season length in Kansas from 1901 to 2014: (a) Western, (b) Central, and (c) Eastern Kansas (see Fig. 1 or 2 for these three regions of Kansas). The base indicates average frost-free days calculated from 1901 to 1960 (60-year period as a base period). The $Ave_{1991-2012} - Ave_{1901-1960}$ is the difference of frost-free season length between 1991-2012 and 1901-1960. When trends are statistically significant the trend rates are displayed. The \pm values are the trends' confidence intervals at 95% confidence levels. All adjusted p values are shown.

Xiaomao Lin, State Climatologist, Department of Agronomy
xlin@ksu.edu

John Harrington Jr., Department of Geography
jharrin@ksu.edu

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

4. Dryland Ag Day, June 15, Tribune

Dryland Ag Day is scheduled for June 15 at the Southwest Research-Extension Center Tribune location, 1 mile west of Tribune on Highway 96. Registration is at 8:30 a.m. (MDT) and the field tours begin at 9 a.m.

Field tours will feature:

- Wheat Varieties
- In-furrow Nitrogen on Wheat
- Update on Solid Stem Wheat Varieties
- Wheat Seeding Rates
- Tillage in Dryland Systems
- Dryland Crop Rotations (wheat, corn, and grain sorghum)
- Rainfall Simulator Demonstration

Indoor seminars will start at 11:15 a.m., and feature:

- Soil Test Trends in Western Kansas
- Weed Management Update

Presenters include:

Lucas Haag, K-State Northwest Area Crops and Soils Specialist
Curtis Thompson, K-State Weed Management Specialist
Fred Vocasek, Servi-Tech Laboratory, Dodge City
Dale Younker, USDA-NRCS, Garden City
Alan Schlegel, Agronomist, Southwest Research-Extension Center, Tribune

A complimentary lunch will be served at noon. There will be an optional tour of irrigated weed management trials after lunch.

5. K-State field pea plot tour, June 17

K-State Research and Extension will be hosting two field pea plot tours on June 17. Topics will include variety selection, herbicide options, production practices, producer experiences, and pea plant growth and development.

Rawlins County, Friday, June 17 at 8 a.m.

- Field pea seeding rate study and variety performance test with 18 entries
- Lentil variety and seeding rate study
- Demonstration strips of flax, Austrian winter pea, faba beans, and spring forage pea

Directions: From the intersection of Hwy US 36 and K-25 in Atwood go 6 miles north on K-25, 1 ½ miles east on Road X, South 1 ¼ miles on Road 22. Refreshments provided.

K-State Northwest Research-Extension Center, Friday, June 17 at 10:30 a.m.

- Field pea variety performance test with 22 entries, seeding rate study, and in-furrow fertilizer study
- Lentil seeding rate, variety, and date of planting study

Directions: 105 Experiment Farm Road, Colby, KS. Come in the main drive and follow the signs.

For questions or more information please contact:

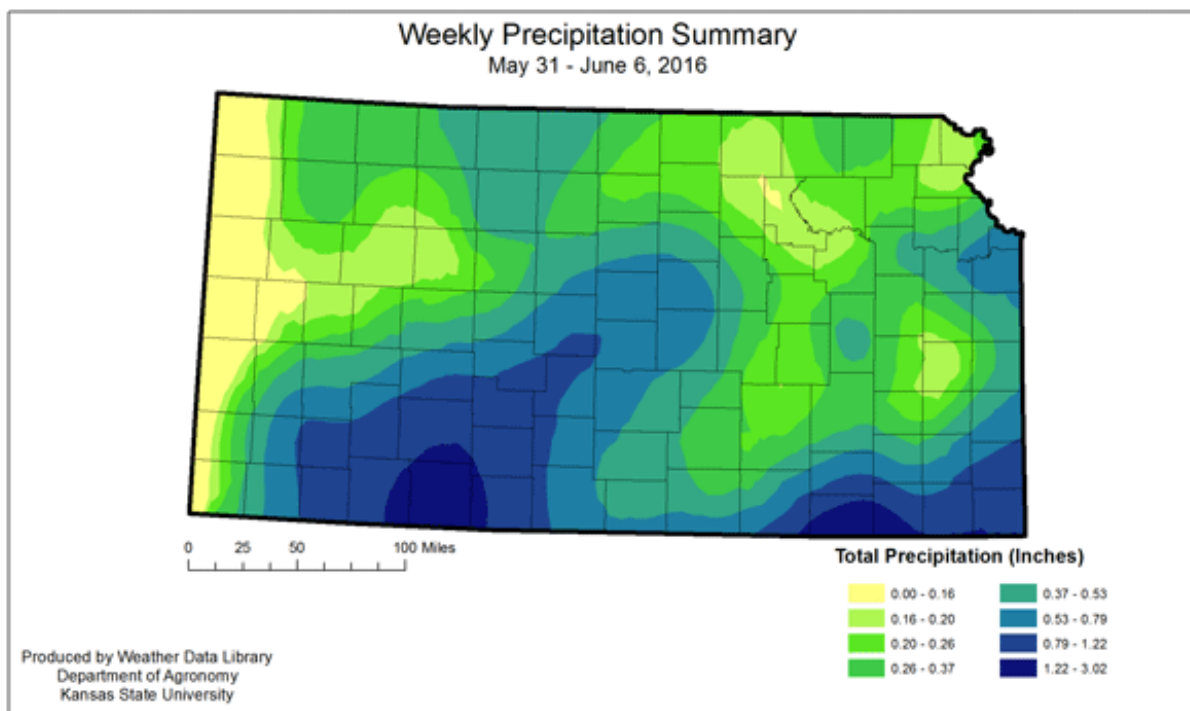
Lucas Haag, K-State Northwest Area Agronomist (785) 462-6281, LHaag@ksu.edu

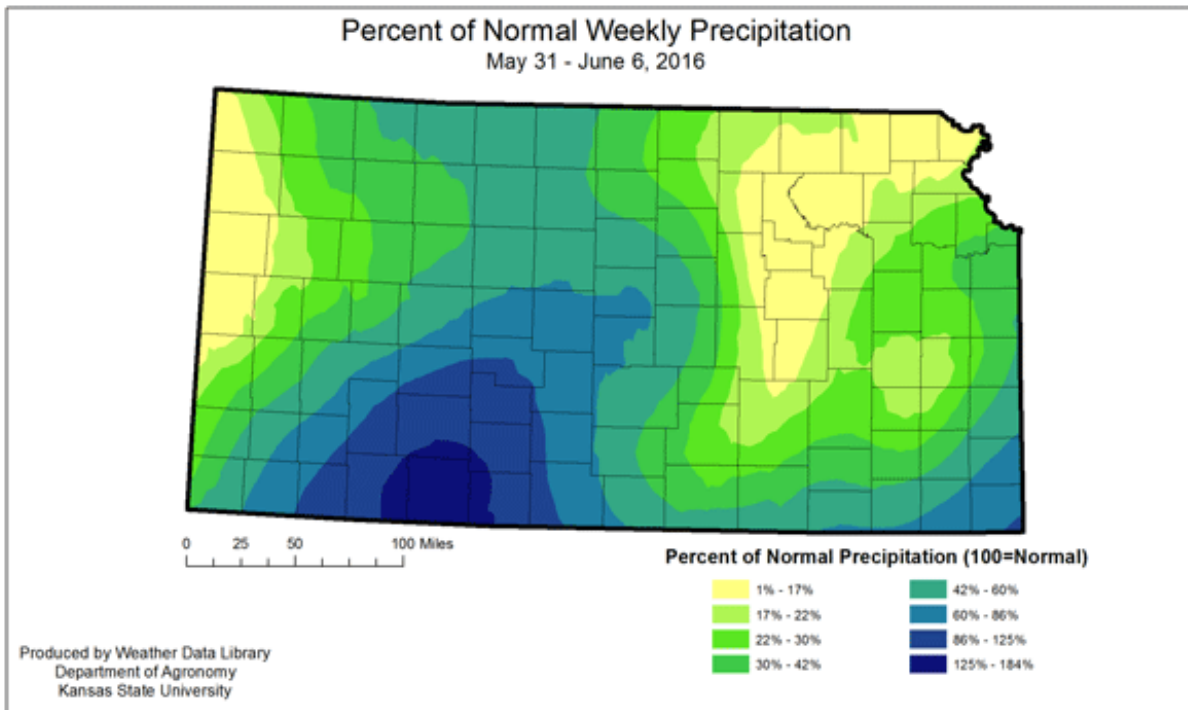
Rawlins County Extension office (785) 626-3192

Golden Prairie Extension District office (785) 938-4480

6. Drought update, June 9, 2016

Kansas continues to be drought-free, but the pattern has shifted. There was rain during the week of May 31 – June 6, but much less than the previous week. The heaviest rainfall occurred in two pockets in the southern part of the state. One area was in southwest Kansas, centering on Clark County and edging into Meade and Comanche counties. The second was in the Southeastern Division, centering in Chautauqua County. The greatest weekly total for the week ending on June 6 was 2.36 inches reported at the NWS Coop Station at Hale, in Chautauqua County. The greatest weekly total in the CoCoRaHS network was 2.30 inches at Kismet 0.1 W in Seward County. The statewide average precipitation for the week was 0.41 inches which was 41 percent of normal or 0.61 inches short for the week. This dry pattern has resulted in much needed drying of the soil surface and allowed for resumption of field work.



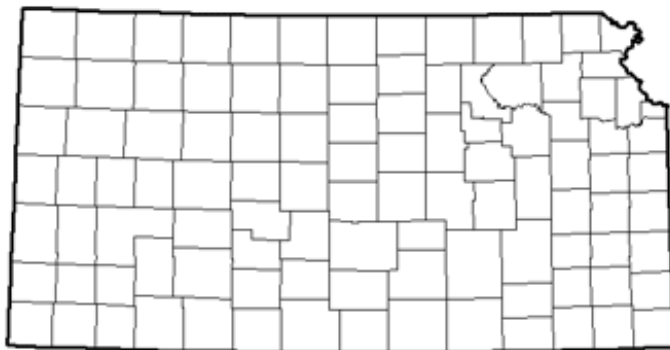


U.S. Drought Monitor Kansas

June 7, 2016

(Released Thursday, Jun. 9, 2016)

Valid 8 a.m. EDT



Drought Conditions (Percent Area)

	None	D0	D1	D2	D3	D4
Current	100.00	0.00	0.00	0.00	0.00	0.00
Last Week 5/31/2016	100.00	0.00	0.00	0.00	0.00	0.00
3 Months Ago 3/6/2016	83.85	16.15	0.00	0.00	0.00	0.00
Start of Calendar Year 1/1/2016	97.84	2.16	0.00	0.00	0.00	0.00
Start of Water Year 9/26/2015	80.79	14.72	4.48	0.00	0.00	0.00
One Year Ago 6/6/2015	76.89	18.81	4.30	0.00	0.00	0.00

Intensity:

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

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

Author:
Deborah Bathke
National Drought Mitigation Center



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

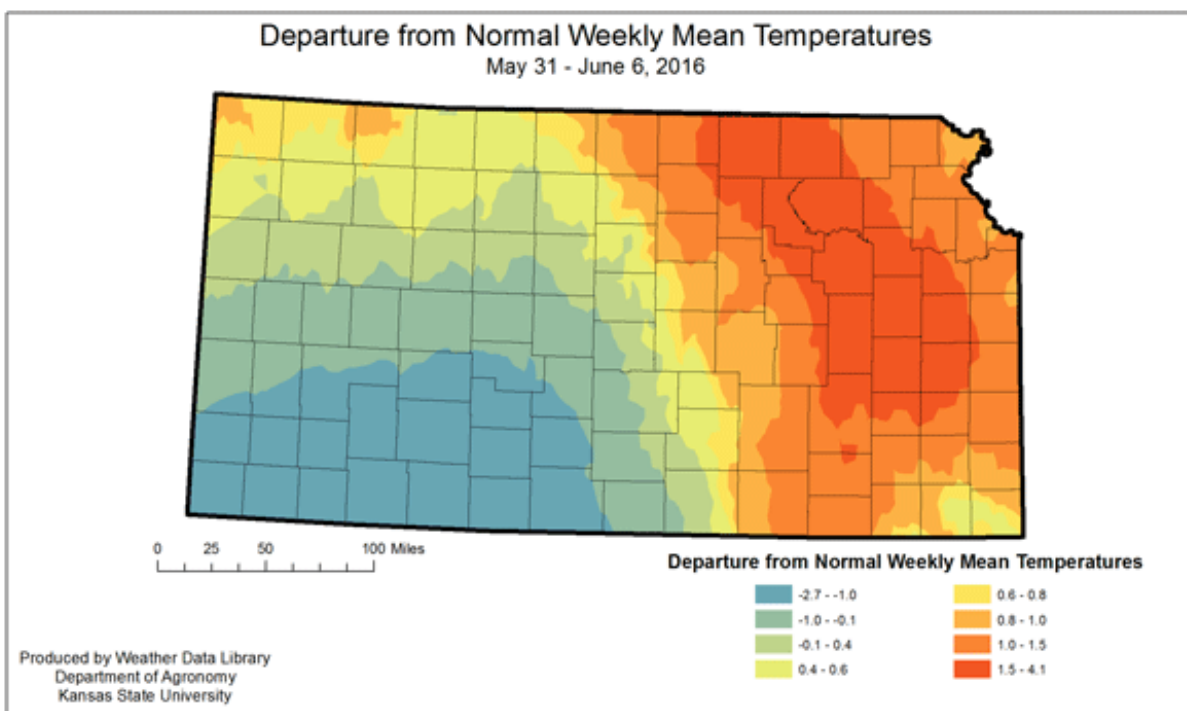
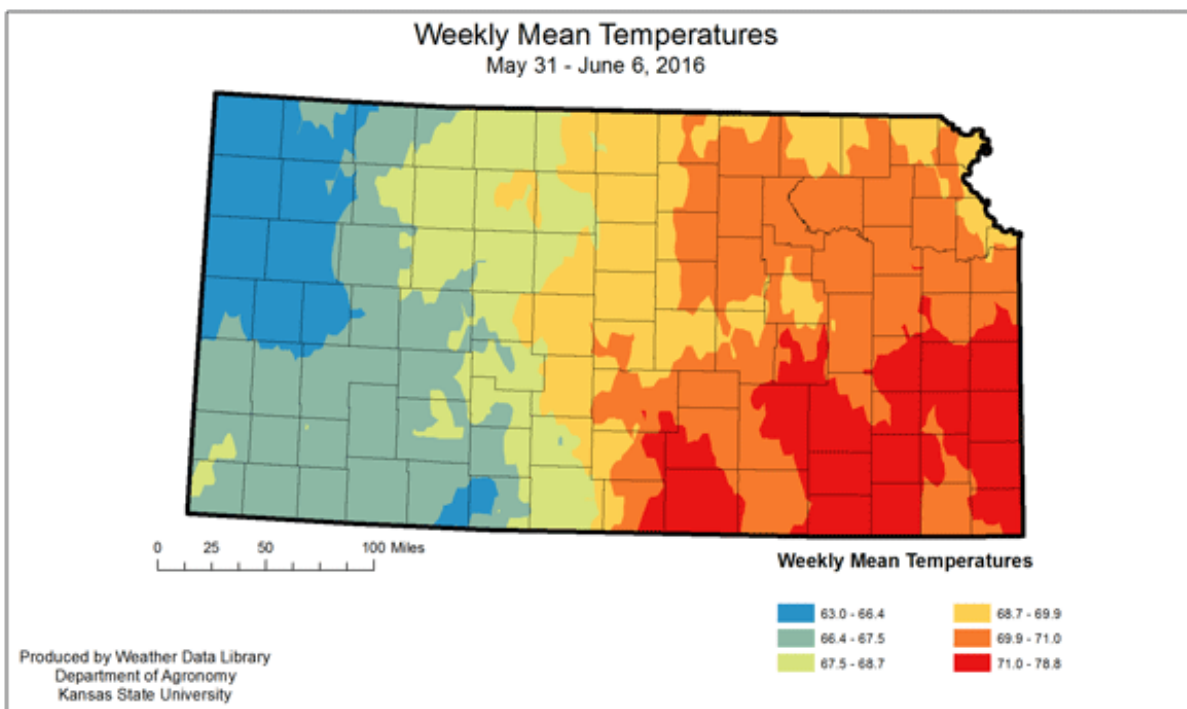
Temperatures during the week of May 31 – June 6 started on a cool note, but gave way to warmer-than-normal conditions, with high humidity. The weekly statewide average temperature was -0.6 degrees cooler than normal. The greatest average negative departure from normal was in the North Central Division where temperatures average 68.4 degrees F, or 3.1 degrees cooler than normal. The greatest average positive departure was in the Northeast Division where temperatures averaged 70.3

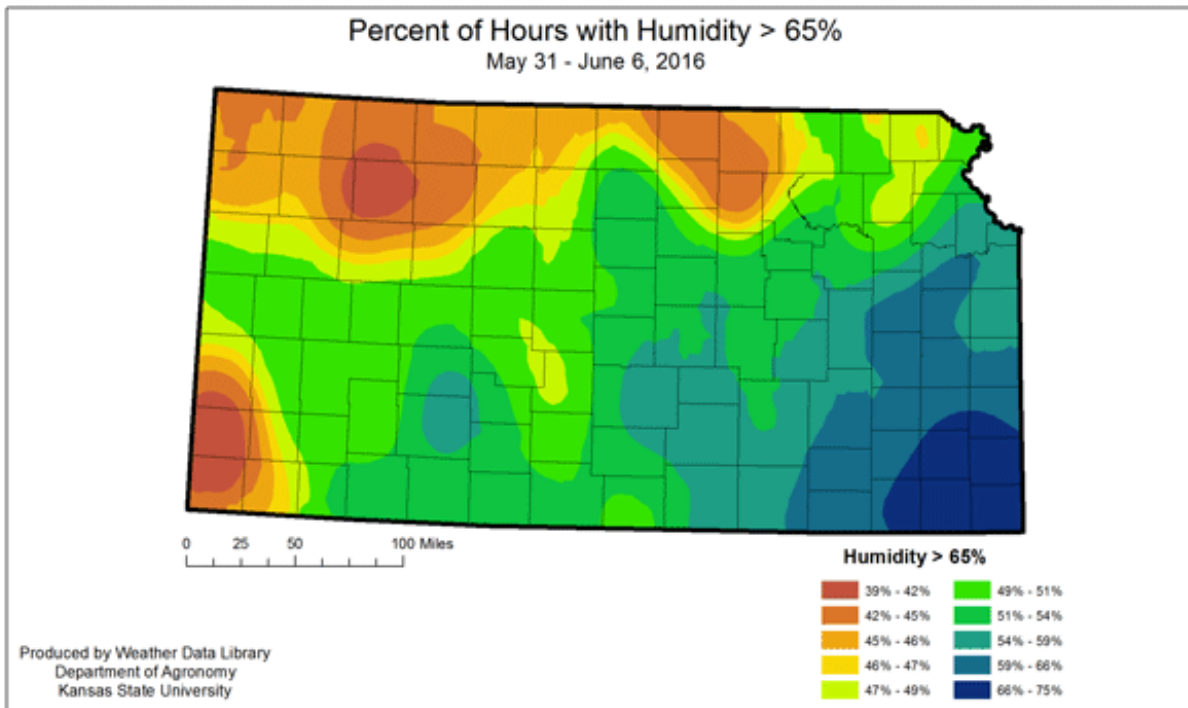
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degrees F, or 0.8 degrees warmer than normal.





The 8- to 14-day outlook suggests continuation of drier-than-average conditions statewide. Temperatures are expected to be warmer than normal for the period as well. The short-term seven-day precipitation forecast suggests that the heaviest rains will be in the North Central Division, where as much as two-and-a-half inches are expected. Amounts drop as you move south, with the rest of the state expected to receive between an inch-and-a-half to just a quarter of an inch.

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 web under weekly maps <http://climate.k-state.edu/maps/weekly/2016>

Mary Knapp, Weather Data Library

mknapp@ksu.edu

7. Comparative Vegetation Condition Report: May 31 - June 6

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

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

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

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

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

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

Kansas Vegetation Condition

Period 23: 05/31/2016 - 06/06/2016

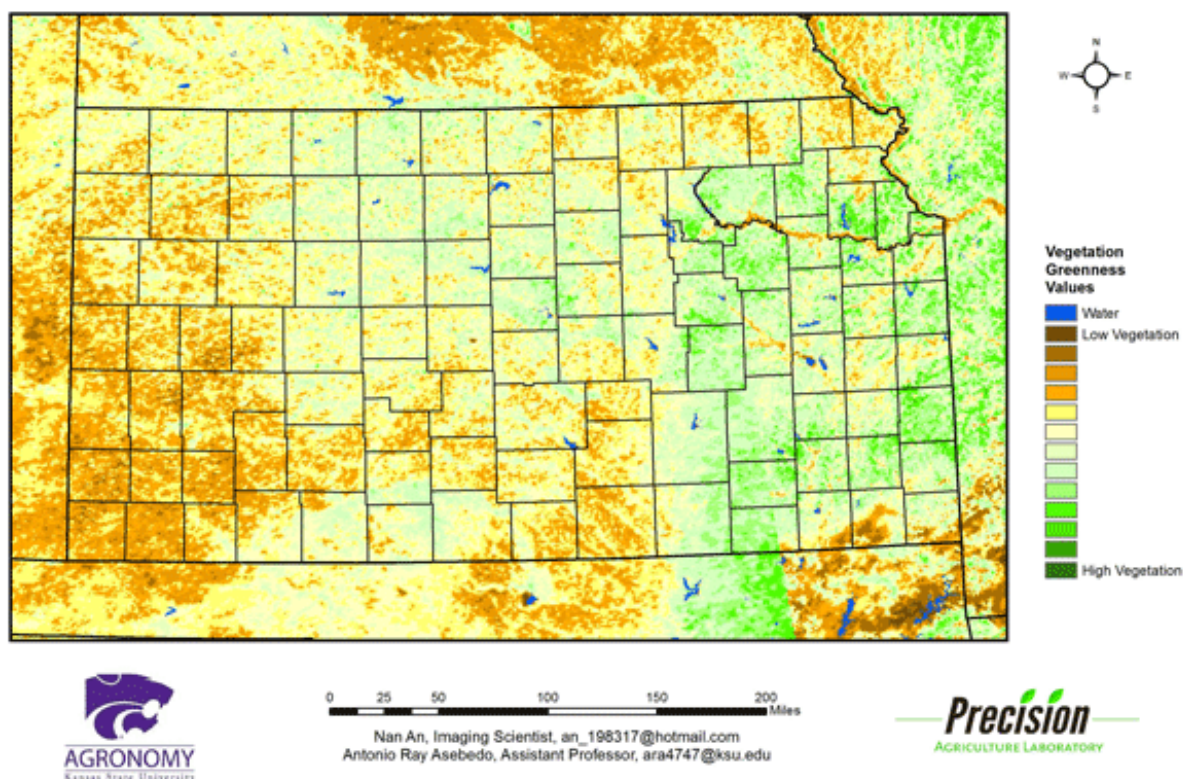


Figure 1. The Vegetation Condition Report for Kansas for May 31 – June 6, 2016 from K-State’s Precision Agriculture Laboratory continues to show only a small area of low NDVI values in extreme southeast Kansas. The rainy pattern and cool temperatures during this period delayed vegetative activity in this area. Impact from the warmer temperatures at the end of the period will be more visible in next week’s map.

Kansas Vegetation Condition Comparison
Late-May/Early-Jun 2016 compared to the Late-May/Early-Jun 2015

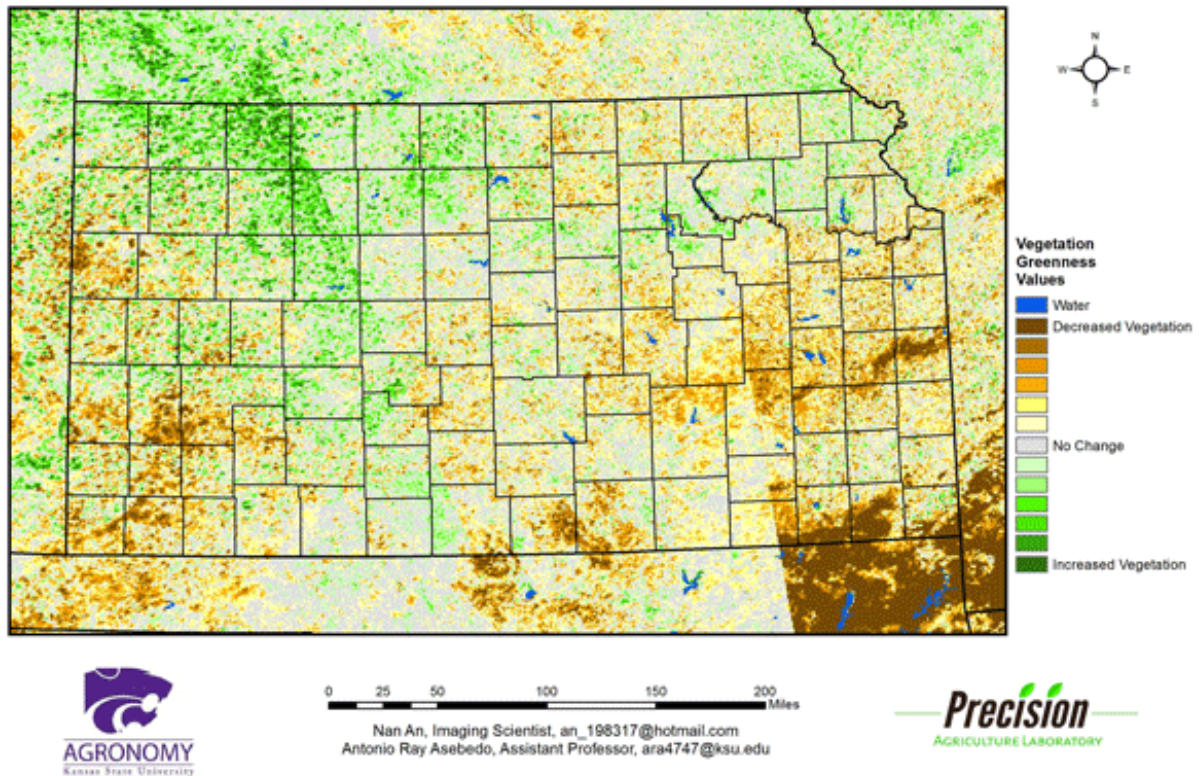


Figure 2. Compared to the previous year at this time for Kansas, the current Vegetation Condition Report for May 31 – June 6, 2016 from K-State’s Precision Agriculture Laboratory shows vegetative production much lower in extreme southeast Kansas, but higher across the rest of the state. Part of the difference is due to extended cloud cover. Although May was wetter than average in most of the state, it didn’t reach the extremes that occurred in 2015. Crop progress in Kansas overall is almost double that of last year at this time.

Kansas Vegetation Condition Comparison

Late-May/Early-Jun 2016 compared to the 27-Year Average for Late-May/Early-Jun

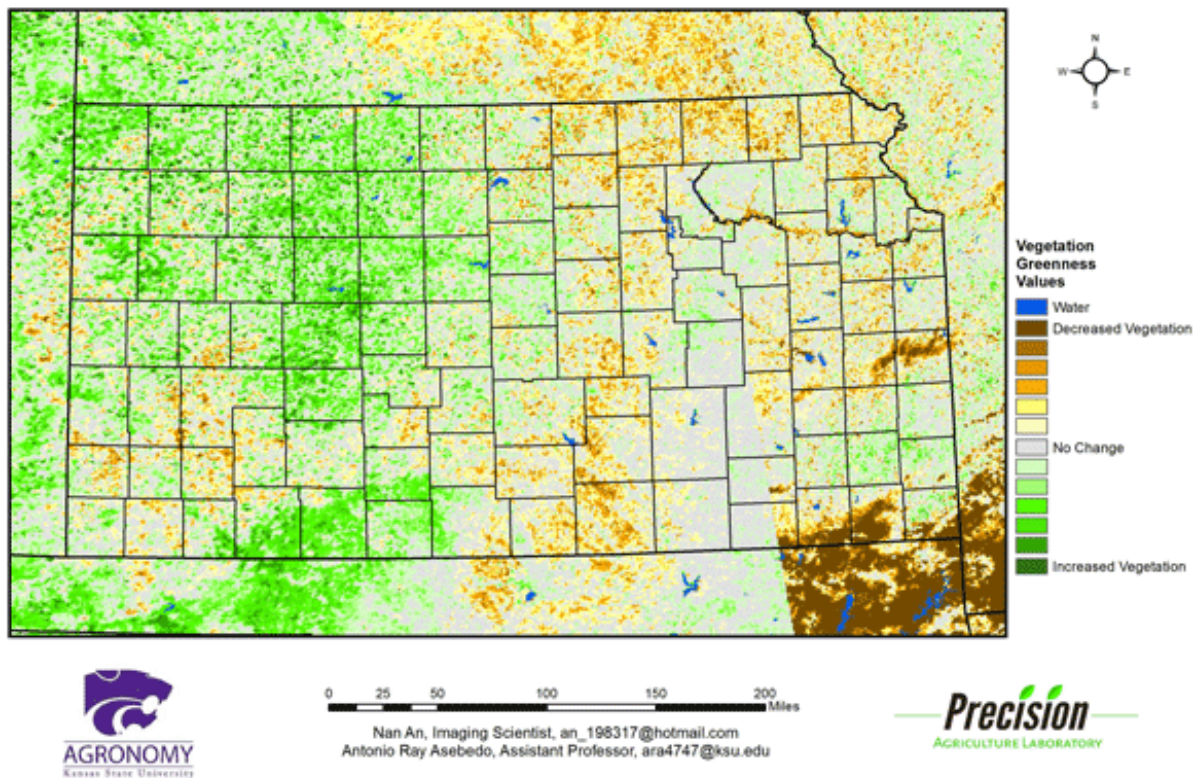


Figure 3. Compared to the 27-year average at this time for Kansas, this year's Vegetation Condition Report for May 31 – June 6, 2016 from K-State's Precision Agriculture Laboratory shows below-average vegetative activity is confined to the southeast areas of the state, where rain lingered. Part of that is due to persistent cloud cover in the region, affecting NDVI readings. Increased photosynthetic activity is most visible in the West Central Division. This area has recorded warmer-than-average temperatures coupled with favorable moisture, allowing for good growing conditions in the region. Excess moisture in the eastern half of the state has limited development somewhat.

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Continental U.S. Vegetation Condition

Period 23: 05/31/2016 - 06/06/2016

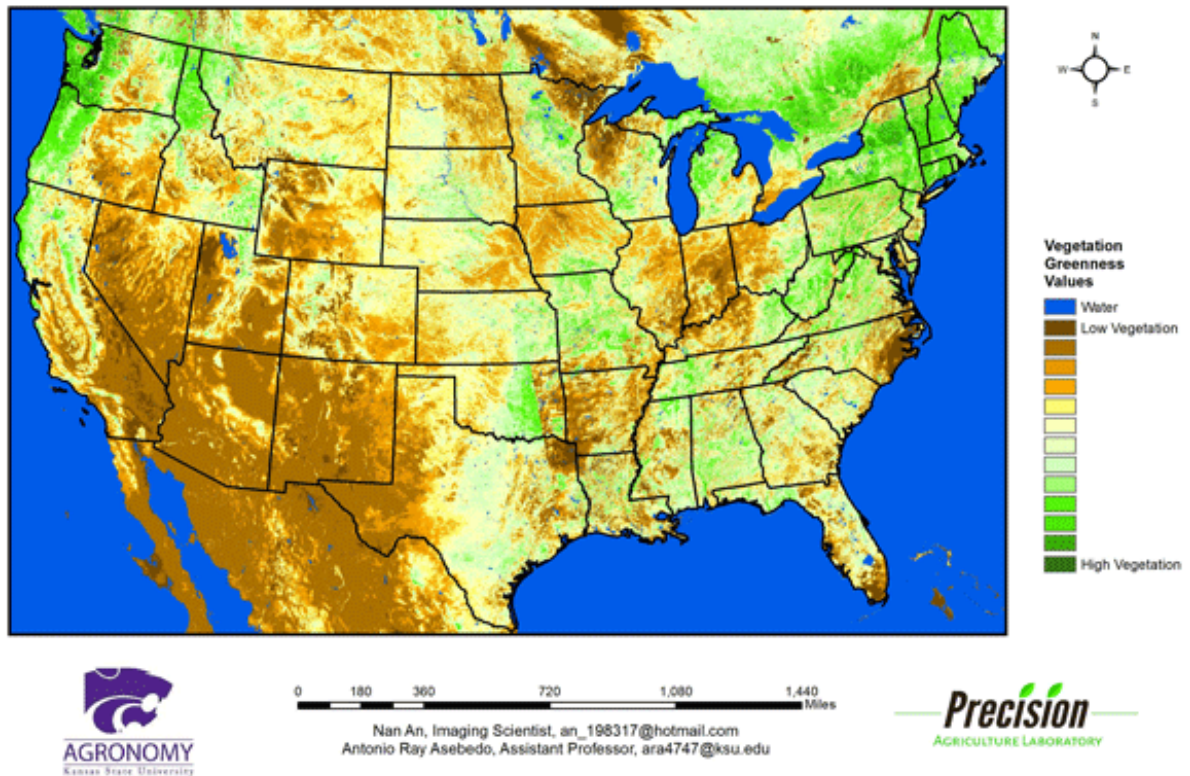


Figure 4. The Vegetation Condition Report for the U.S for May 31 – June 6, 2016 from K-State’s Precision Agriculture Laboratory shows low NDVI values across central Iowa, Illinois, and Indiana. Much warmer temperatures are driving the downturn in conditions as parts of Midwest are reporting lower-than-average precipitation. In southeastern Missouri and northern Arkansas, residual impacts from spring flooding are the major culprits in reducing photosynthetic activity.

Continental U.S. Vegetation Condition Comparison
Late-May/Early-Jun 2016 Compared to Late-May/Early-Jun 2015

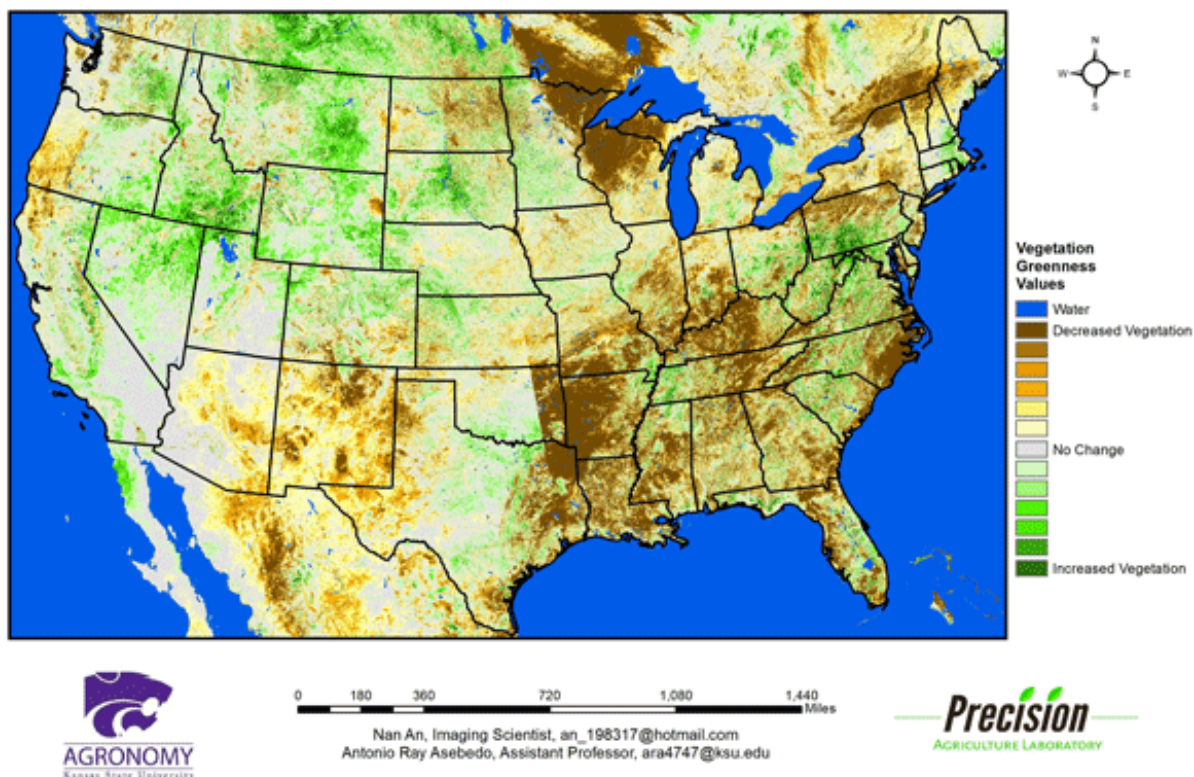


Figure 5. The U.S. comparison to last year at this time for the May 31- June 6, 2016 from K-State's Precision Agriculture Laboratory shows that lower NDVI values are most evident in the Eastern U.S. Drier-than-average conditions have delayed vegetation compared to last year.

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

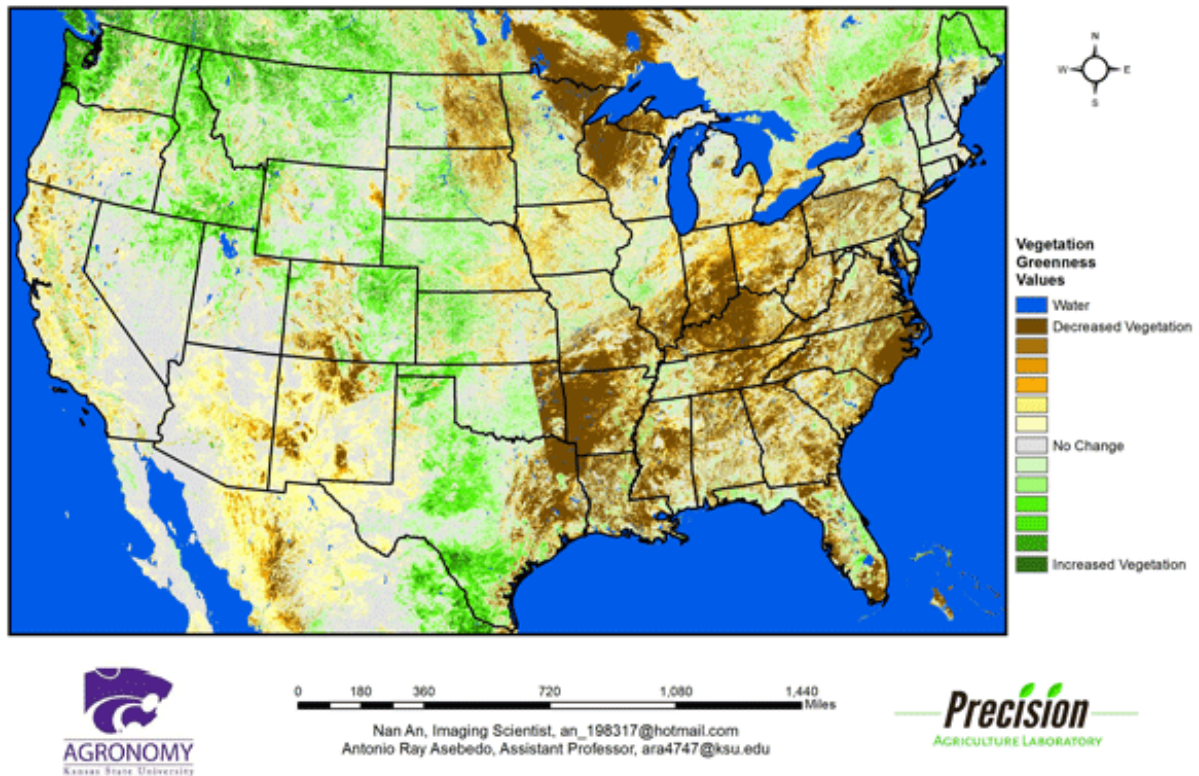


Figure 6. The U.S. comparison to the 27-year average for the period May 31- June 6, 2016 from K-State's Precision Agriculture Laboratory shows below-average photosynthetic across the Southeast. Persistent cloud cover has reduced NDVI values in the area. Texas shows the boundary of favorably moist conditions in the west to excessively wet conditions in the east. That wetter-than-normal pattern is the driver behind low photosynthetic activity in the Louisiana, Arkansas, and southeastern Missouri areas, but drier-than-normal conditions are decreasing photosynthetic activity in central Iowa and into Illinois.

Mary Knapp, Weather Data Library
mknapp@ksu.edu

Ray Asebedo, Precision Agriculture
ara4747@ksu.edu

Nan An, Imaging Scientist
an_198317@hotmail.com