Issue 576

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eUpdate

06/23/2016

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. Late planting of soybeans: Management considerations

Soybean planting progress in Kansas is ahead of last growing season but still there are soybean fields to get planted. In the latest Crop Progress and Condition report from Kansas Agricultural Statistics (June 19, 2016), soybean planting was at 89% complete, near the long-term average of 86%.

Where soybean planting has been delayed, producers should consider a few key management practices. Planting soybeans in the right soil conditions is essential for establishing an adequate soybean canopy and improving chances to increased yield potential.

Figure 1. Late-planting soybeans (June 10) into adequate soil conditions. Photo by Ignacio A. Ciampitti, K-State Research and Extension.

Maturity group factor: From our planting date x maturity group study in 2014 and 2015, late planting did not clearly result in a yield reduction at the dryland sites, and caused only a minimal yield reduction at the irrigated site. Medium maturity groups (ranging from 3.8 to 4.8) yielded better, depending on the site and growing season evaluated (Fig. 2 and 3). More information related to this study can be found in eUpdate issue 563 April 15, 2016 at:
https://webapp.agron.ksu.edu/agr_social/eu_article.throck?article_id=900

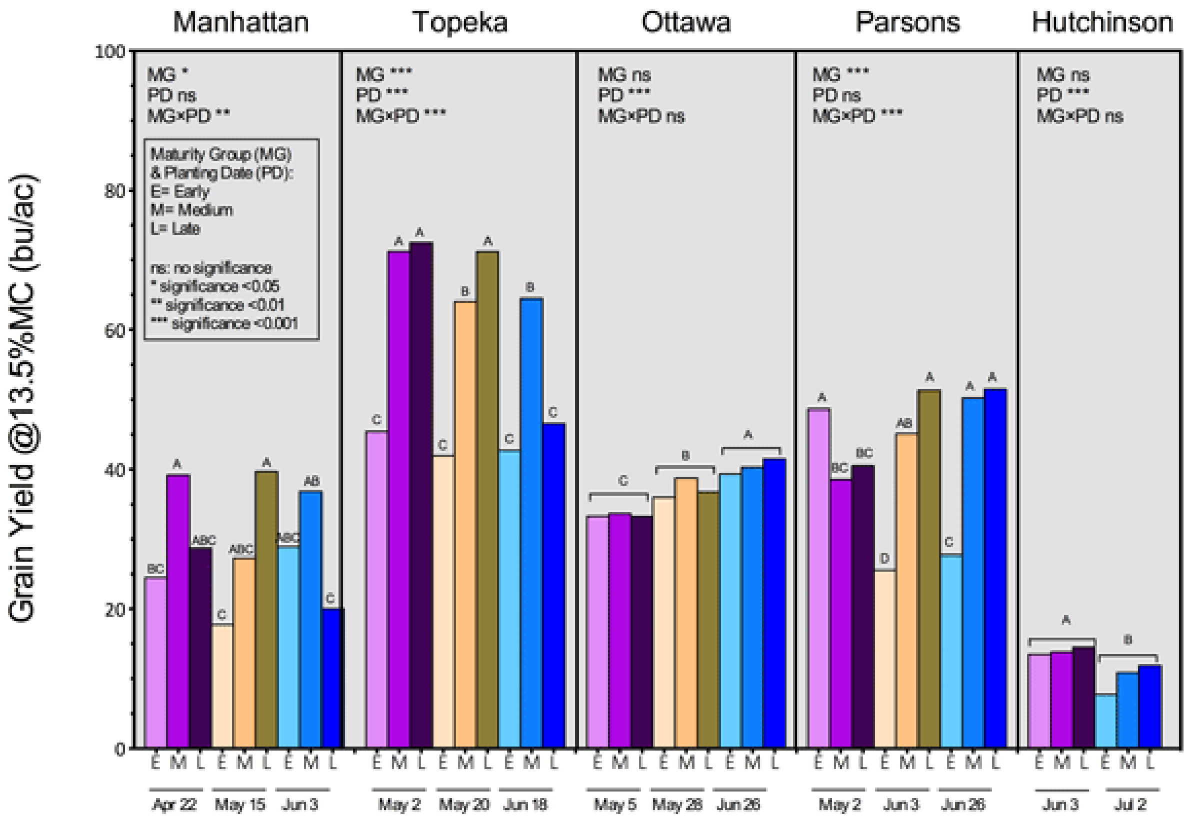

Figure 2. Soybean yields with different planting dates (early, mid, and late) and maturity groups (E = early, M = medium, L = late maturing groups) at five locations across Kansas for the 2014 growing season.

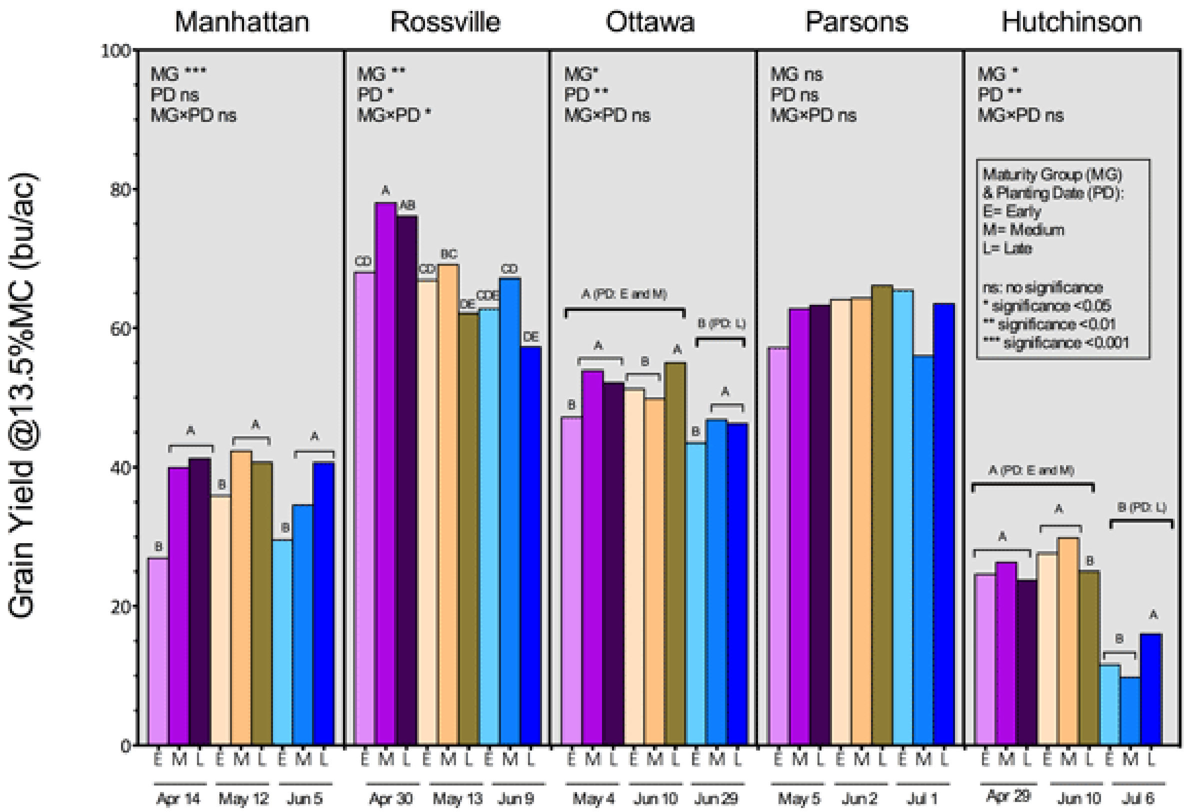

Figure 3. Soybean yields with different planting dates (early, mid, and late) and maturity groups (E = early, M = medium, L = late maturing groups) at five locations across Kansas for the 2015 growing season.

Seeding rate factor: Increasing the seeding rate of late-planted soybeans by 10-20% as compared to optimal seeding rate can help compensate for the shortened growing conditions. Research information on seeding rate and late planting of soybeans is currently being investigated further, with more updates on this topic in future issues of the Agronomy eUpdate. The same soybean cultivar planted early in the planting window, under normal conditions, will develop nearly 50% more productive nodes than when planted in late June: 19-25 nodes when planted early vs. 13-16 nodes when planted late. For soybean seeding rates and optimum plant populations, see eUpdate issue 565 April 22, 2016 at:
https://webapp.agron.ksu.edu/agr_social/eu_article.throck?article_id=912

Row spacing factor: Information on late-planted soybean across multiple row spacings suggests that narrow-rows (e.g. 7” or 15” vs. 30”) can hasten canopy closure, increasing season-long light interception, weed suppression, and potentially improving biomass and final yield. In some cases, the likelihood of finding yield responses to narrowing rows increases as the planting is delayed later in the season.

Finally, proper identification of soybean growth stages can make a difference in yield. We have worked with the United Soybean Board and the Kansas Soybean Commission recently to produce a soybean growth and development chart. It can be downloaded at: http://unitedsoybean.org/wp-content/uploads/52618-11_Kansas-Soybean-Growth-Chart.pdf

More information about key aspects of each growth stage and management practices can be found in that soybean chart.

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2. The time to make decisions for fungicide management of gray leaf spot is rapidly approaching

Tasseling has already begun in southeast Kansas and a few early planted fields in the south central part of the state. Over the next few weeks, corn in the rest of the state will be at the critical juncture for making fungicide application decisions for gray leaf spot management. Gray leaf spot has already been found on corn this year in Pottawatomie and Harvey counties when the corn was only in the V7 – V8 stage of development. In Harvey County, the levels were well above what you would expect to find at that stage of development.

Years of fungicide application research clearly demonstrates that the single best time to apply a fungicide to corn for gray leaf spot control is from VT to R1. A single application at V7 – V8 will not hold up against late season pressure and those who choose to put a fungicide down with the last herbicide treatment will most likely have to apply second cover at VT – R1 if there is any gray leaf spot pressure at all.

University fungicide trials also reveal that final disease severity plays a critical role in the magnitude and consistency of yield response to a foliar fungicide application. The tricky part is being able to predict before the VT to R1 stages what the disease pressure will be several weeks later. To make such a prediction, you need to consider "disease risk factors" and to scout for disease.

Disease risk factors include:

Susceptibility level of corn hybrid. Seed companies typically provide information on the susceptibility of their hybrids to gray leaf spot in their catalogs. In general, hybrids that are more susceptible to fungal foliar diseases will have a greater response to a foliar fungicide (if disease pressure is high enough).

Previous crop. Because gray leaf spot survives in corn residue, the risk of disease increases when corn is planted back into a field that was in corn the previous year.

Weather. Rainy and/or humid weather generally is most favorable to gray leaf spot. In growing seasons when these conditions prevail, the risk for disease development increases.

Field history. Some field locations may have a history of high foliar disease severity. Fields in river bottoms or low areas or surrounded by trees may be more prone to having gray leaf spot.

Begin scouting for gray leaf spot in corn about two weeks before expected tassel emergence. Gray leaf spot is characterized by rectangular lesions that are 1-2" in length and cover the entire area between the leaf veins. Early lesions are small, necrotic spots with yellow halos that gradually expand to full-sized lesions. Lesions are usually tan in color but may turn gray during foggy or rainy conditions. The key diagnostic feature is that the lesions are usually very rectangular in shape.

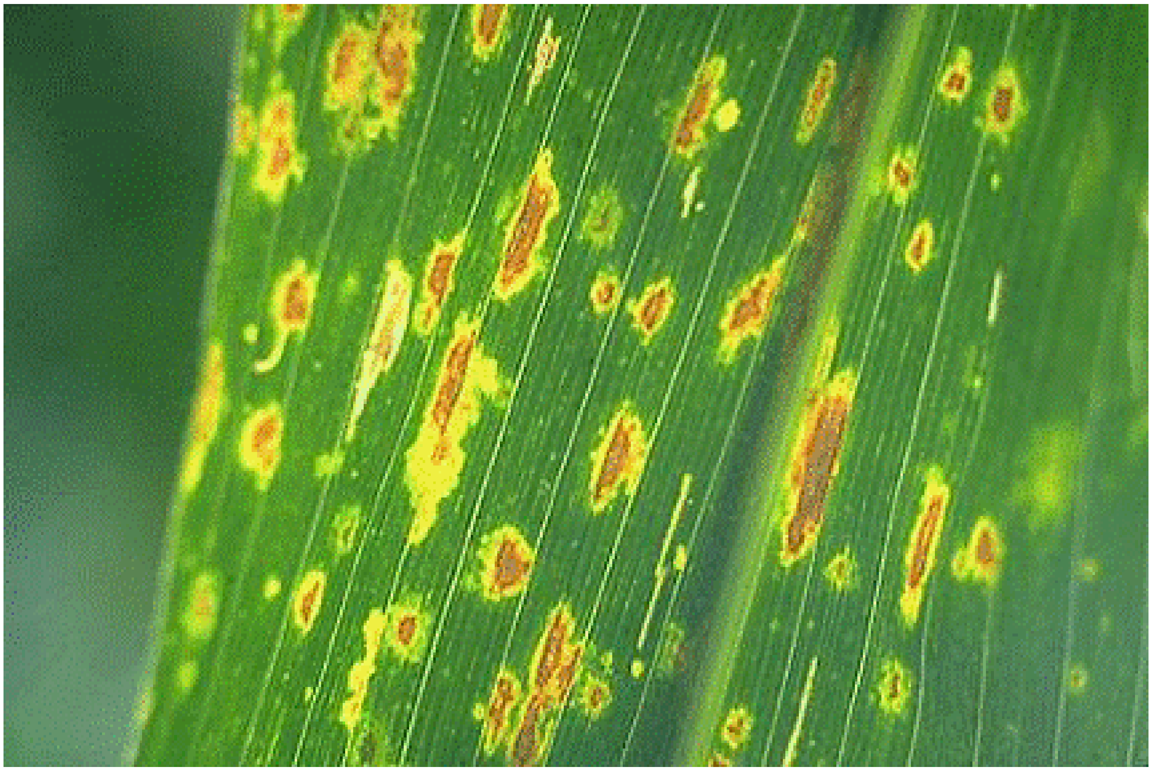

Figure 1. Early development of gray leaf spot lesions showing a distinct yellow halo. Photo courtesy of Doug Jardine, K-State Research and Extension.

Figure 2. Gray leaf spot on V7 corn in Harvey County, mid-June 2016. Photo by Doug Jardine, K-State Research and Extension.

Current disease management guidelines suggest the following criteria for considering an application of foliar fungicide:

For susceptible hybrids (those with the lowest rating within a company's line-up): If disease symptoms are present on the third leaf below the ear or higher on 50 percent of the plants examined.

For intermediate hybrids (those with an average rating within a company's line-up): If disease symptoms are present on the third leaf below the ear or higher on 50 percent of the plants examined, if the field is in an area with a history of foliar disease problems, if the previous crop was corn, if there is 35 percent or more surface residue, and if the weather is warm and humid.

For resistant hybrids (those with the best rating within a company's line-up): Fungicide applications generally are not recommended.

According to the data from Illinois corn fungicide trials, if at least 5 percent of the ear leaf area is affected by disease at the end of the season, a foliar fungicide applied between VT and R1 would likely have been beneficial. Using the disease risk factors and scouting observations collected just before tassel emergence will help you predict how severe disease may be several weeks after the VT to R1 stages, and help you decide whether to apply a foliar fungicide.

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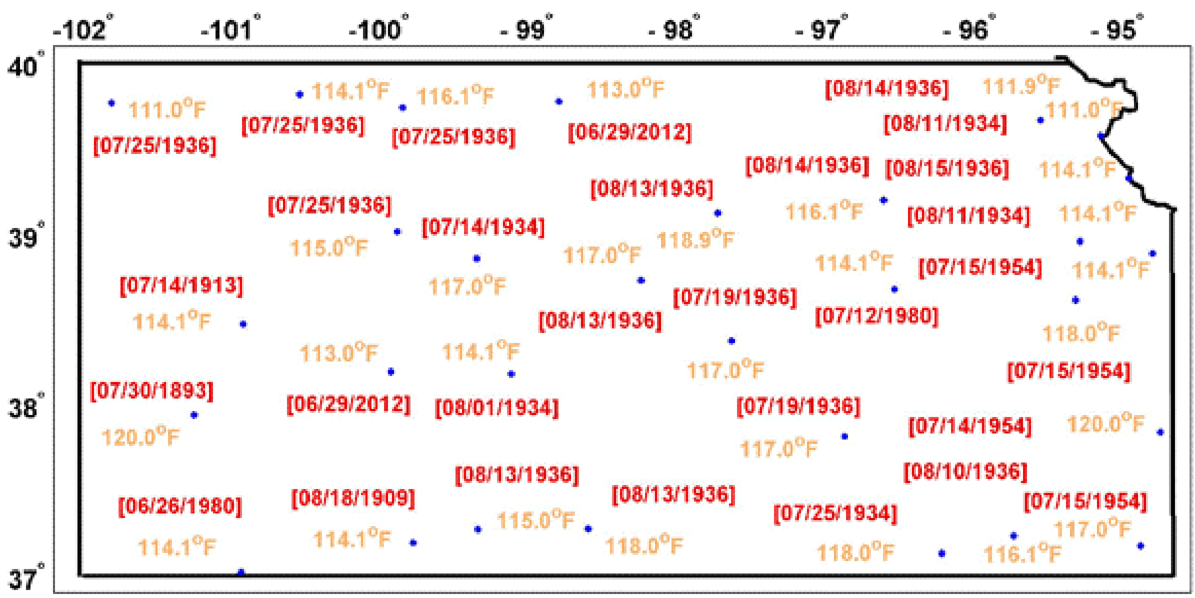
3. Kansas climate basics: Pt. 6 -- Maximum and minimum temperature records

(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 are explained in the introductory article in this series, from eUpdate No. 571, May 20, 2016. – Steve Watson)

Maximum temperature records in Kansas

The National Centers for Environmental Information (NCEI) documented a Kansas record of 121degrees F observed in July 1936 in Fredonia and Alton, Kansas. Neither of those climate stations are among the U.S. Historical Climatology Network (USHCN) stations due to the station being relocated over time. From 30 USHCN daily stations, 120 degrees F is the highest maximum temperature recorded in Kansas, in 1893 and 1954 (Fig. 1). Most of the highest maximum temperatures were observed in late 1930s. The month with the highest maximum temperatures is most often July.



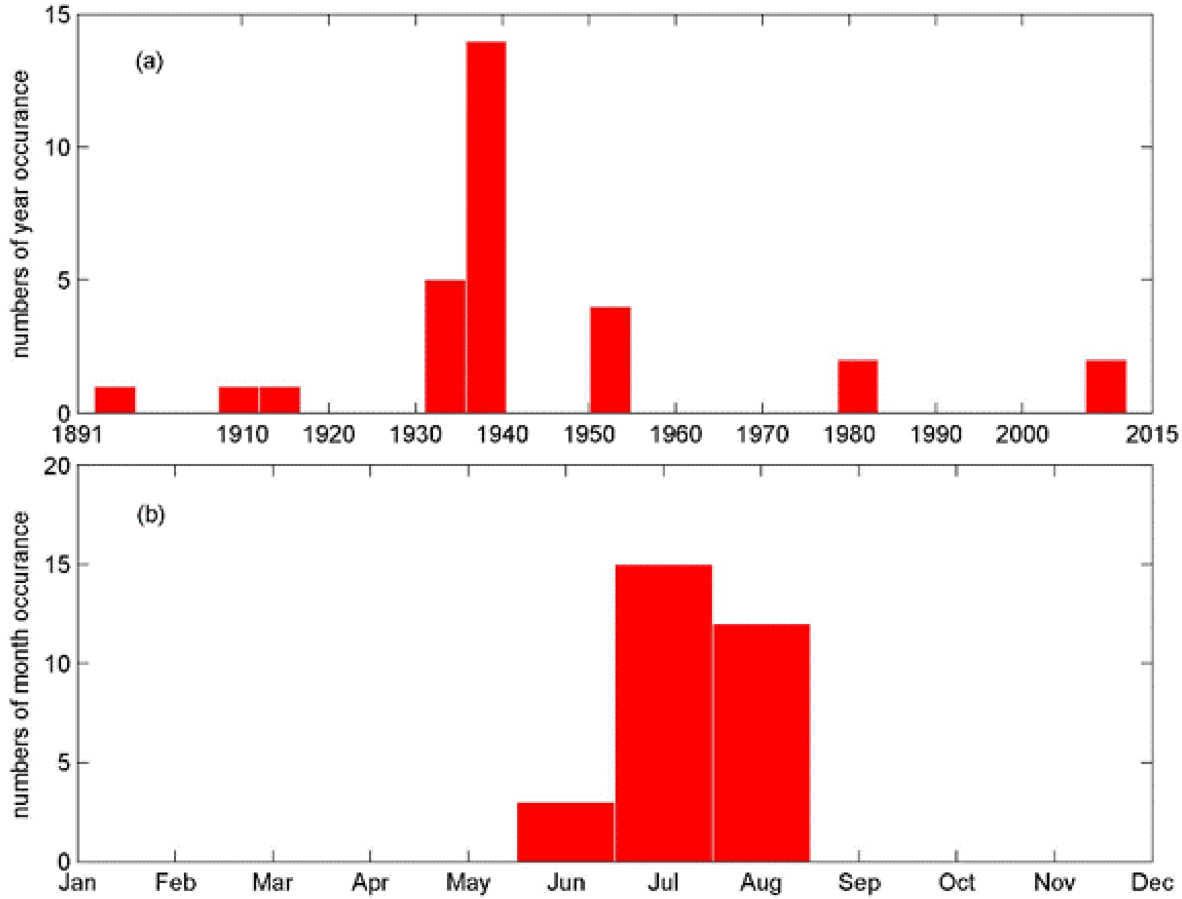


Figure 1. Top panel: daily maximum temperature records (^{o}F) and dates for 30 climate stations across Kansas over 1891 to 2015. Bottom panel: (a) histogram of years for all maximum temperature records in Kansas; and (b) histogram of months for all maximum temperature records observed in Kansas.

Minimum temperature records in Kansas

The NCEI documented a Kansas record of -40 degrees F observed in February 1905 in Lebanon. For the 30 USHCN stations selected, this record is not included because this climate station has experienced station relocation and therefore at least one discontinuity in the series. The lowest temperature record over 1891 to 2015 in our 30 USHCN stations is the -35 degrees F observed at Manhattan in February 1893. The majority of lowest minimum temperature records were observed during the period of 1890s to 1910s (Fig. 2). February is the most frequent month for lowest minimum temperature records, followed by January.

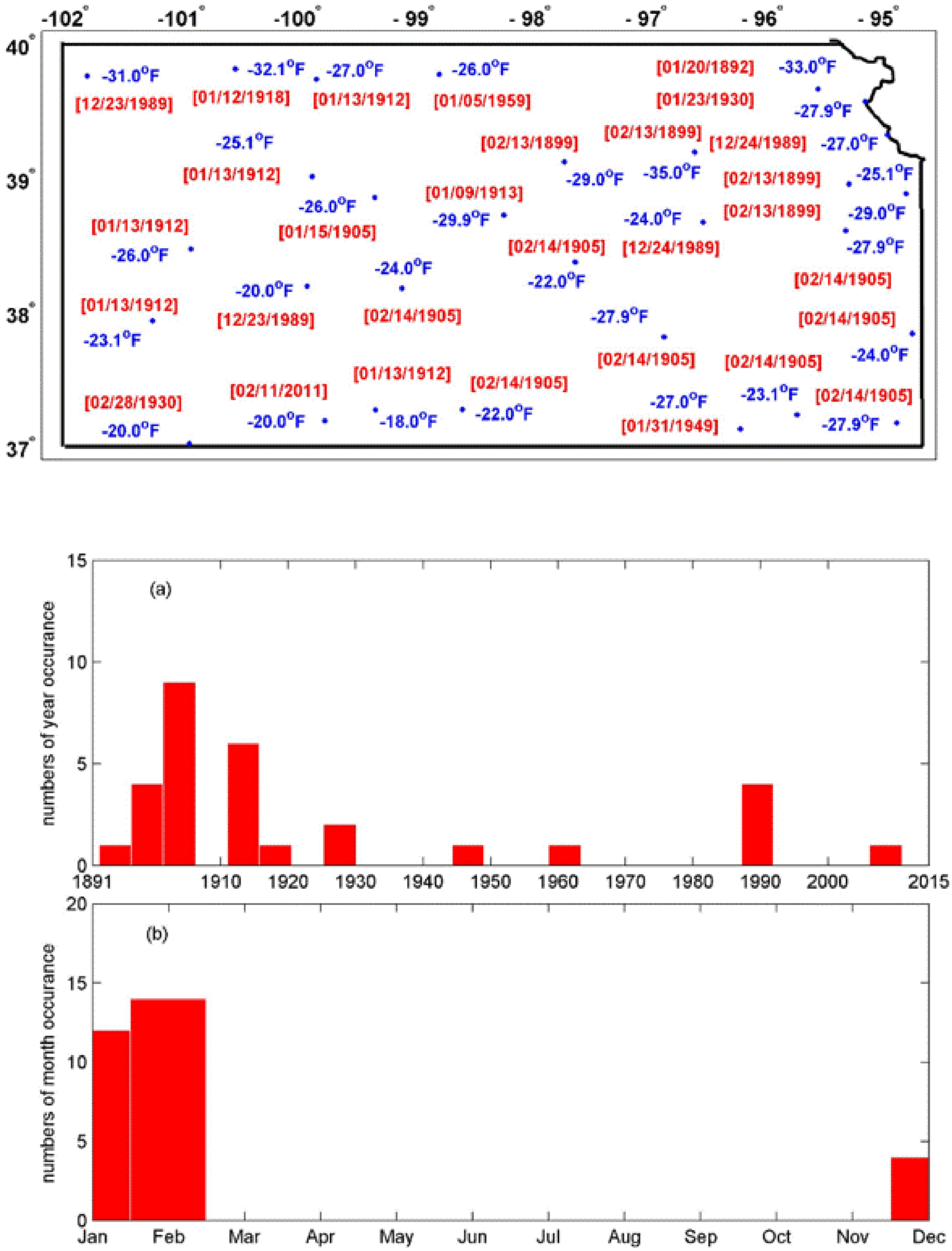


Figure 2. Top panel: daily minimum temperature records (°F) and dates from 30 climate stations across Kansas over 1891 to 2015. Bottom panel: (a) histogram of years for all minimum temperature records in Kansas; and (b) histogram of months for all minimum temperature records observed in Kansas.

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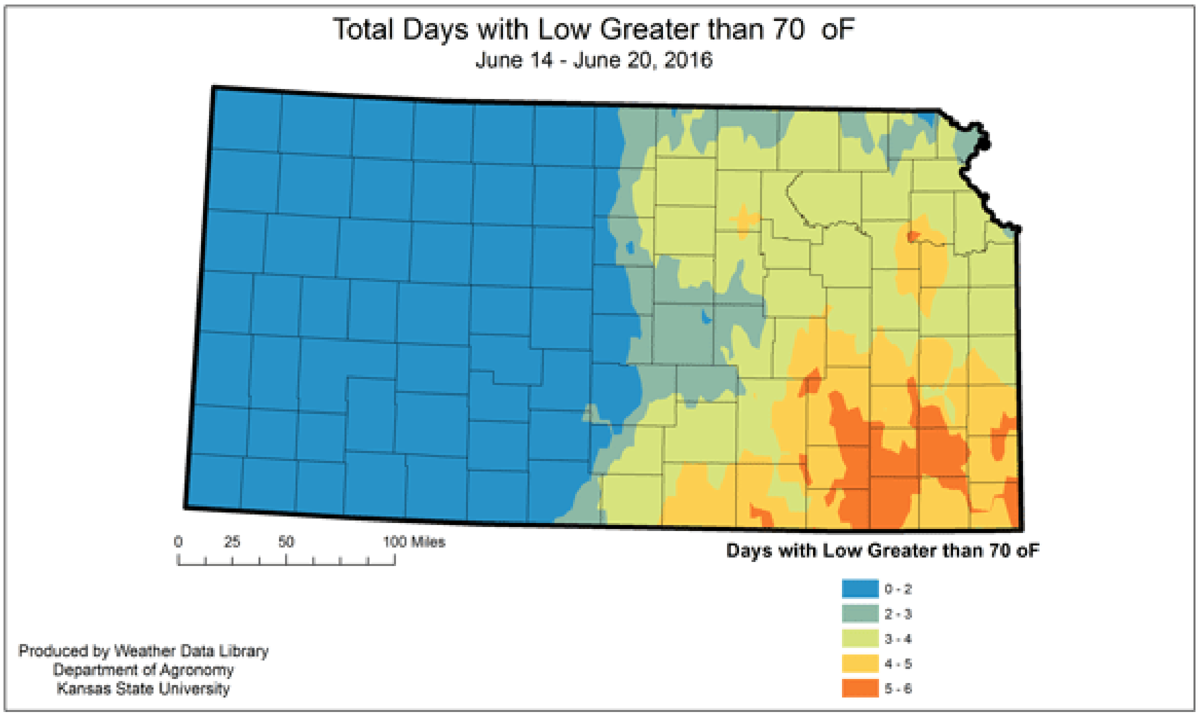
4. June heat in Kansas: High temperatures can stress livestock and corn

The heat continues in Kansas, particularly with the warm minimum temperatures. The Southeast and East Central Divisions had average minimum temperatures for the week ending on June 20th above 70 degrees F. Moving the 7-day period to include the lows through the 22nd has all of the eastern divisions, as well as the Central Division with average low temperatures greater than 70 degrees F. In the East Central Division, the average low for the 7-day period ending on the 22nd was 72.1 degrees F. Night time temperatures in excess of 70 degrees F for more than two consecutive days will increase the risk of stress to livestock (see references). As with people, the stress is cumulative.

Below is a map showing the distribution of 70+ lows for the week ending June 20th:



The heat this June can also cause problems for corn in Kansas. The effect of combined heat and drought stresses can reduce plant size, primarily when the plant is entering the stem elongation process. When the crop reaches the V10 (tenth-leaf) stage, nutrient and water demand (0.25 inch/day) are high. At this specific point, a combination of heat + drought stresses will affect potential number of kernels and ear size. Overall mean temperatures above 90 degrees F, and more importantly lower fluctuations between day and night temperatures, will produce a critical impact on plant size and the yield components of corn.

Heat stress will have more of an impact on corn at this stage of growth when combined with drought stress. But even in the absence of drought stress, heat stress alone can still accelerate vegetative phases and tasseling, potentially increasing the asynchrony between pollen shed and silk extrusion when corn reaches flowering time. The potential for yield reductions from stress at this stage of growth is small, however, compared with severe stress occurring right around pollination.

Figure 2. Leaf rolling in corn, June 2016, from the combined effect of heat and drought. This can also affect final plant size. Photo by Ignacio Ciampitti, K-State Research and Extension.

The K-State Mesonet web site has a special page that tracks the current heat index at: http://mesonet.k-state.edu/weather/heat/

The data updates every five minutes when you refresh the page, and is available for all 55 stations.

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Mader, T. L., Hungerford, L. L., Nienaber, J. A., Buhman, M. J., Davis, M. S., Hahn, G. L., Cerkoney, W. M., and Holt, S. M. 2001. Heat stress mortality in Midwest feedlots. J. Anim. Sci. 79: Suppl. 2:2.

5. Comparative Vegetation Condition Report: June 14 - 20

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:

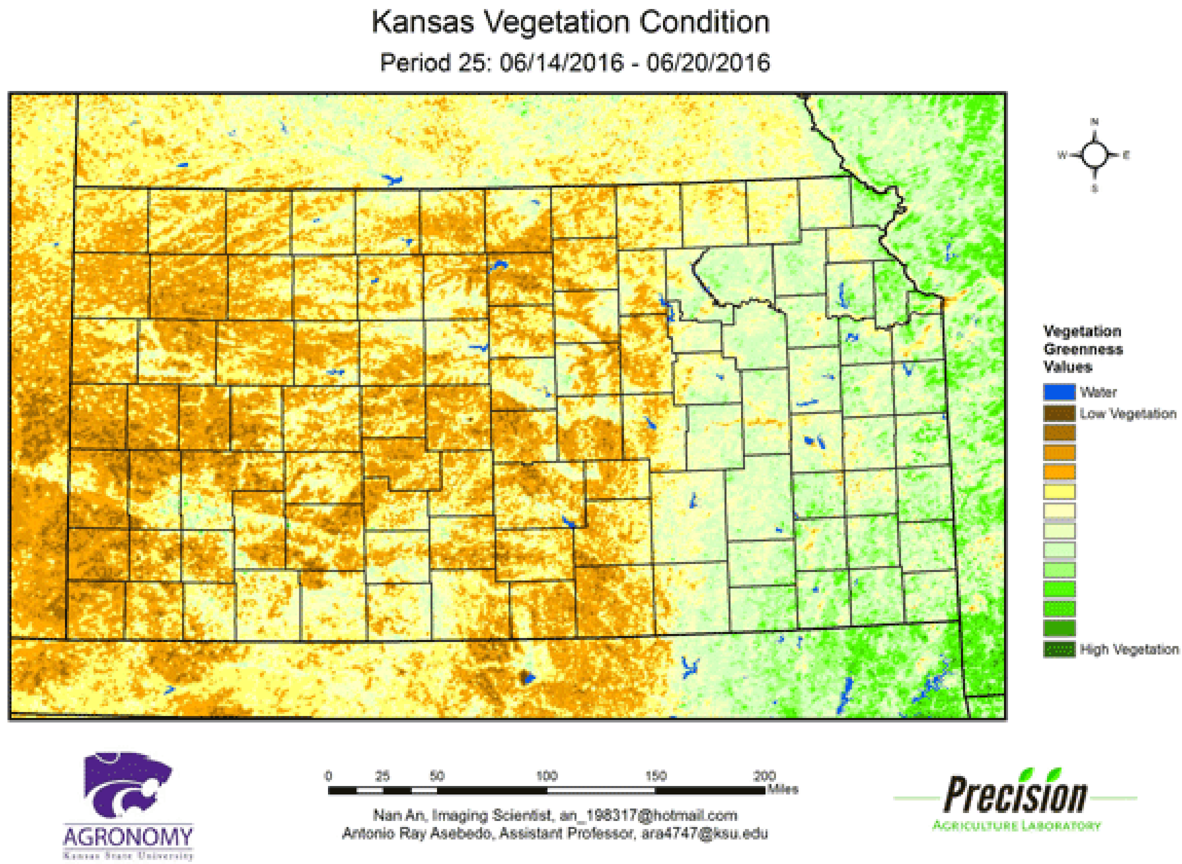

Figure 1. The Vegetation Condition Report for Kansas for June 14 – June 20, 2016 from K-State's Precision Agriculture Laboratory continues to show the greatest NDVI values are confined to extreme northeast Kansas, along the Missouri River. Continued dry, warm weather has limited vegetative activity in the rest of the state.

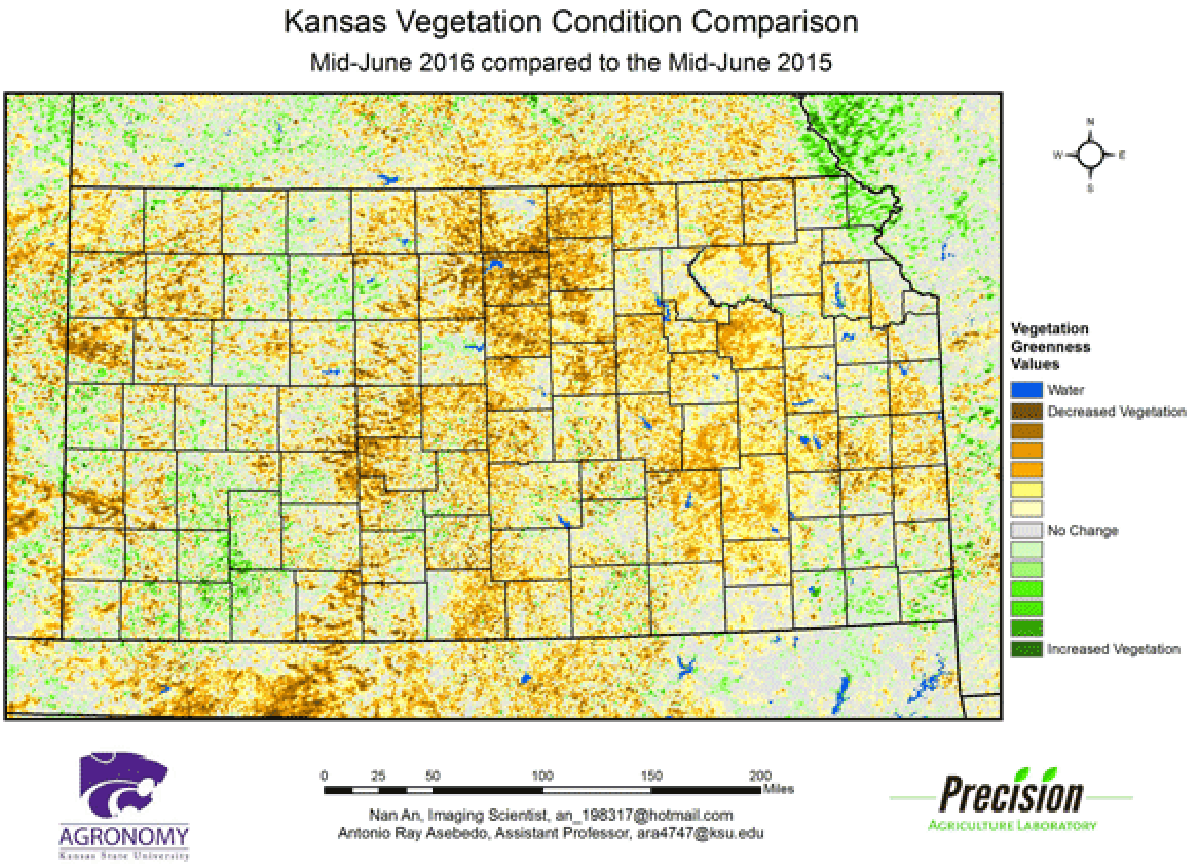

Figure 2. Compared to the previous year at this time for Kansas, the current Vegetation Condition Report for June 14 – June 20, 2016 from K-State's Precision Agriculture Laboratory shows much lower photosynthetic activity across much of the state. The area of greatest increase in photosynthetic activity is confined to extreme northeast Kansas. Although May was wetter than average in most of the state, it didn't reach the extremes seen in 2015 and June has been drier than average. Crop progress continues ahead of last year at this time.

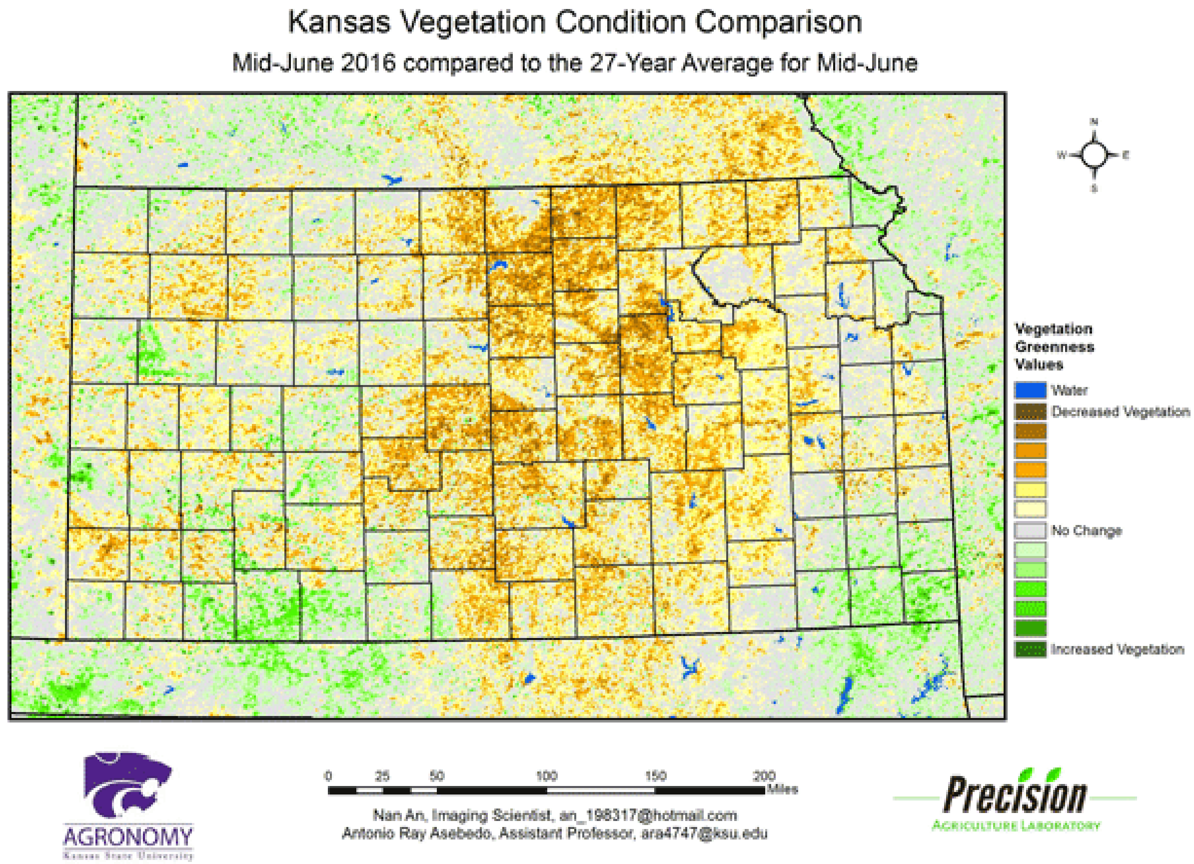

Figure 3. Compared to the 27-year average at this time for Kansas, this year's Vegetation Condition Report for June 14 – June 20, 2016 from K-State's Precision Agriculture Laboratory shows the area of below-average vegetative activity is greatest in the central part of the state. The rapid change to hot, dry conditions has accelerated plant develop and stressed newly planted row crops.

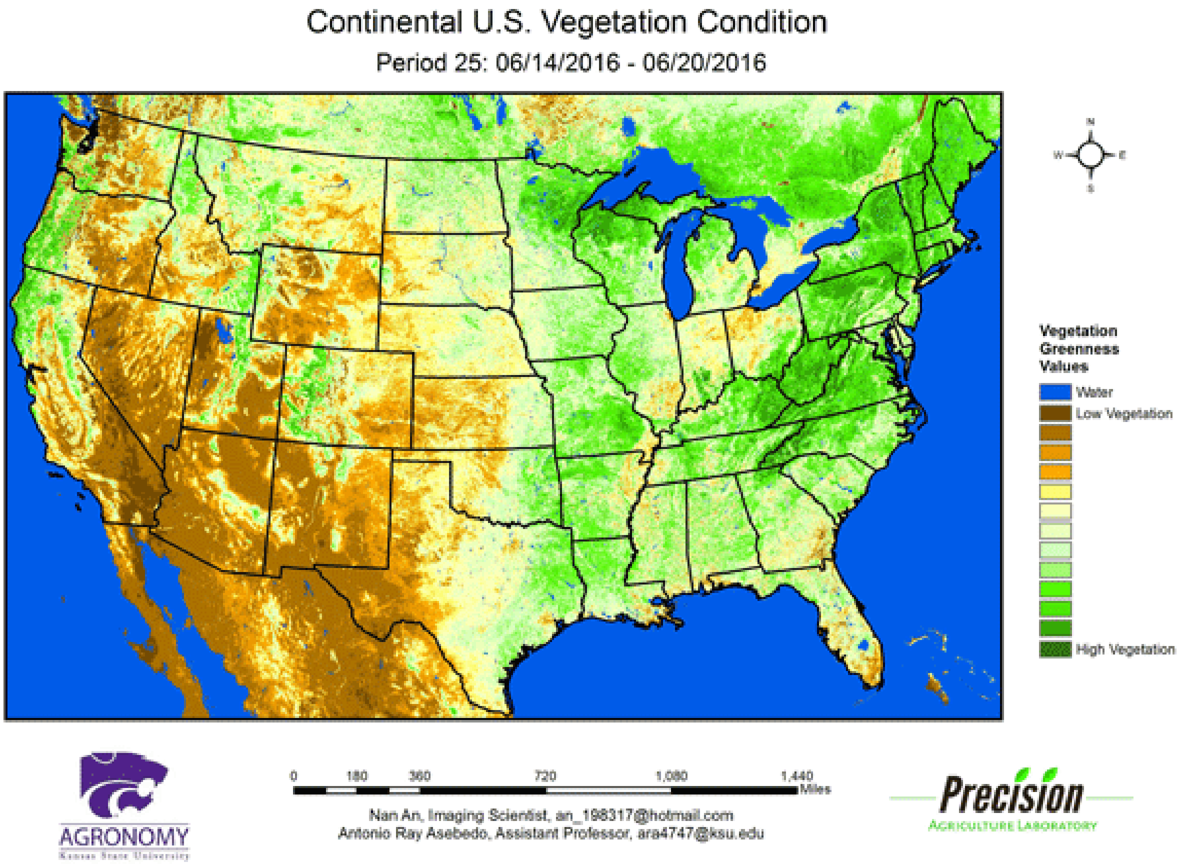

Figure 4. The Vegetation Condition Report for the U.S for June 14 - June 20, 2016 from K-State's Precision Agriculture Laboratory shows low NDVI values across Indiana and Ohio. Much warmer temperatures are driving the downturn in conditions as parts of Midwest are reporting lower-than-average precipitation. In southeastern Missouri and northern Arkansas conditions are more favorable, but likely to decrease as these areas missed out on favorable rains.

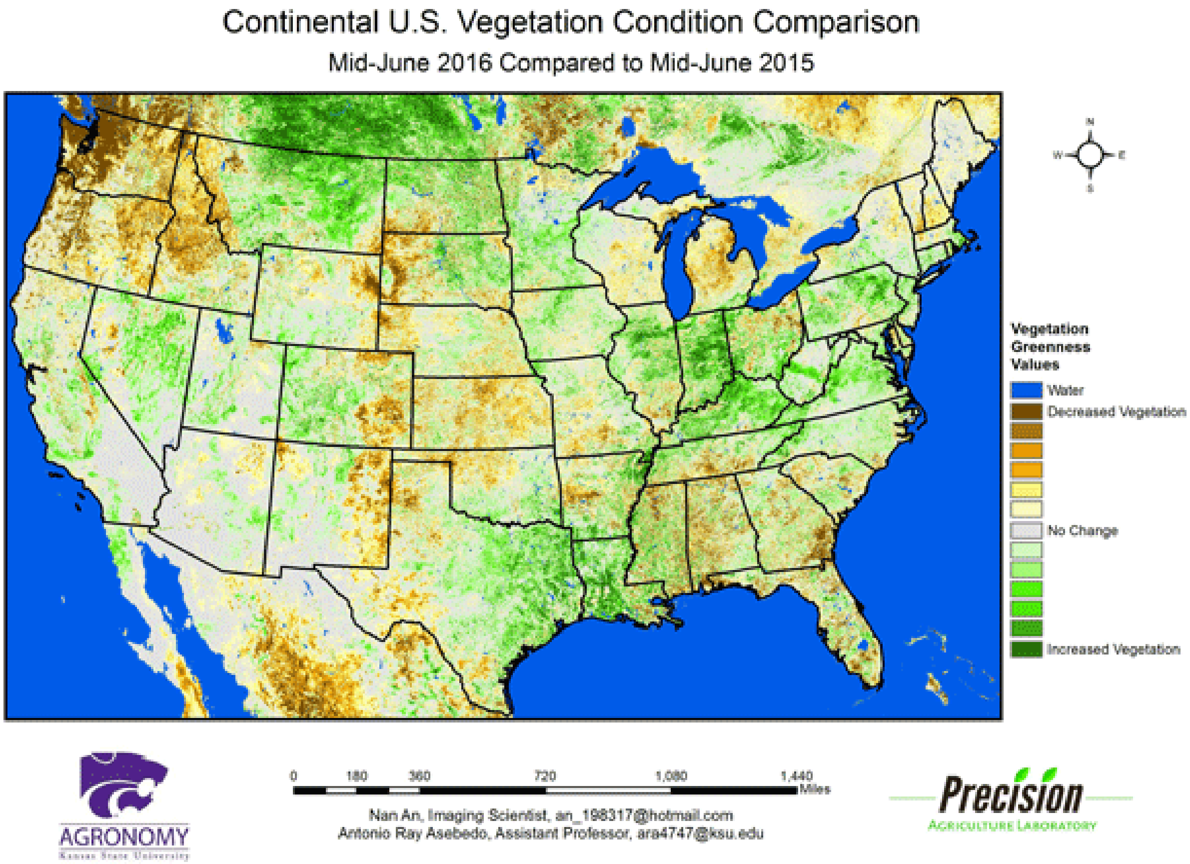

Figure 5. The U.S. comparison to last year at this time for the June 14 – June 20, 2016 from K-State's Precision Agriculture Laboratory shows that lower NDVI values are most evident in the Pacific Northwest and in the Central Plains. Drier-than-average conditions, coupled with extremely hot weather, have stressed vegetation compared to last year. In contrast, east Texas and Louisiana are benefiting from a dry pattern after the excess rains of May.

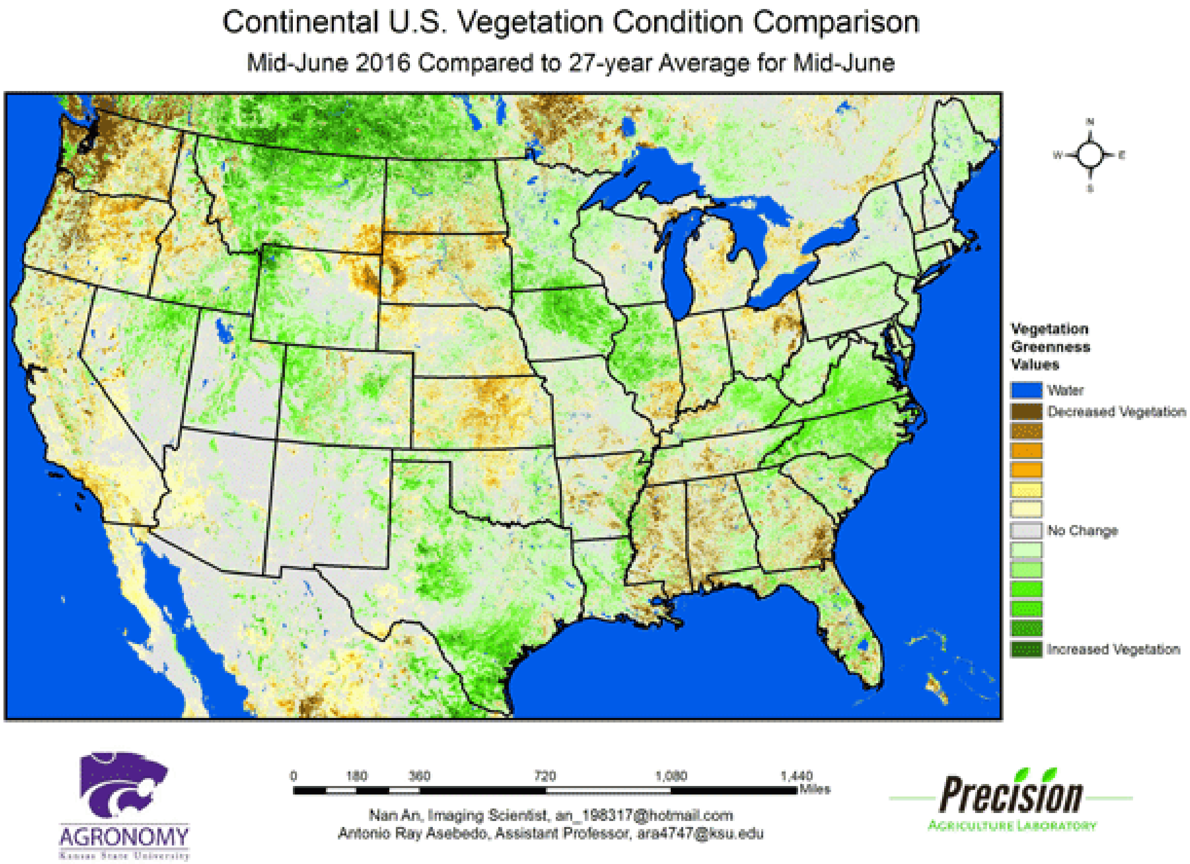

Figure 6. The U.S. comparison to the 27-year average for the period June 14 – June 20, 2016 from K-State's Precision Agriculture Laboratory shows increased areas of below-average photosynthetic activity. The boundary in Texas of favorably moist conditions in the west to excessively wet conditions in the east has shrunk. That wetter-than-normal pattern is the driver behind low photosynthetic activity in the Louisiana and Alabama area.

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