



Extension Agronomy

eUpdate

06/26/2015

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. Fusarium head blight in wheat: Questions and Answers

What is causing the white kernels in harvested wheat?

Wheat harvest began in earnest in many areas of the state this week. In some cases, farmers may be seeing some white, chalky kernels intermixed with otherwise normal looking grain (Figure 1). These white kernels are often an indication that Fusarium head blight (head scab) infections that took place weeks ago when the wheat was flowering or at the early stages of grain development. While it is possible to see the symptoms of infection in the field during the dough stages of kernel development, most people don't realize they have a problem until they see the Fusarium-damaged kernels in the grain.



Figure 1. Symptoms of wheat grain damaged by Fusarium head blight. Photo by Erick DeWolf, K-State Research and Extension.

Where did the Fusarium fungus come from?

The Fusarium fungus survives in the debris of many different types of grasses. In agricultural systems, the fungus is most likely to survive on the debris from previous corn and wheat crops. Planting wheat directly into fields with large amounts of crop residues on the soil surface increases the risk of disease. The local effect of the residue is diminished in years when weather conditions are highly favorable for the reproduction of the fungus. In these years, the Fusarium spores are moved considerable distances by wind and all fields are at risk for severe disease regardless of previous crop or amount of local residue.

Could fungicides have helped prevent Fusarium head blight?

Fungicides provide only partial suppression of Fusarium head blight. The triazole class of fungicides, such as Prosaro and Caramba, provide about 40-50% suppression of the disease. Products such as Folicur and Tilt provide 20-30% suppression. Other fungicides provide very little protection and are not labeled for the disease. Application timing is a significant issue for obtaining even these moderate levels of control of Fusarium head blight. The fungicide must be applied after heading to be effective. The most effective fungicide applications are timed to coincide with flowering or the early stages of kernel development.

Is there anything that can be done to address the Fusarium infection now?

During harvest it may be possible to reduce the amount of Fusarium-damaged kernels by adjusting the combine to remove the diseased kernels. Of course, there is a practical limit to benefits of these adjustments because some healthy grain will be lost at the same time. The bottom line is to try some different adjustments. See what you can do to reduce the amount of scabby kernels in the harvested grain.

If you have on-farm storage, you might also want to allocate part of your storage for holding the most severely damaged grain. Price discounts are often most severe at harvest and may decrease as an elevator or grain terminal has a better understanding of the overall grain quality they have to work with this year. Storing the grain temporarily on farm can offer some flexibility when marketing Fusarium-damaged grain.

Fusarium-damaged grain can be used for seed but you will want to take some extra precautions to ensure seed quality before planting the next crop. The Fusarium fungus can reduce germination of seed and cause seedling blights when the infected seed is planted. In some cases, plants that do survive may develop a root rot as mature plants. Fungicide seed treatments can help address these problems. Many of the widely marketed seed treatment products are labeled for control of seed-borne Fusarium and suppression of Fusarium root rot. More information about seed treatment options can be found in the publication: *Seed Treatment Fungicides for Wheat Disease Management*, 2015 (MF2955) at: <http://www.ksre.ksu.edu/bookstore/pubs/MF2955.pdf>

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2. Controlling weeds more than 6 inches tall in Roundup Ready soybean fields

It's been a crazy spring with the wet weather in much of Kansas, which has complicated herbicide application and weed control. Consequently, a number of weeds have gotten away from us and are growing rapidly in soybean fields. Controlling emerged weeds more than 6 inches tall is often considerably more difficult than controlling weeds less than 3 inches tall. 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.

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 also provided fairly good control of large marestail as a burndown treatment or postemergence in Liberty Link soybeans.

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, FirstRate, Synchrony, and Harmony.

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 and Palmer amaranth have become fairly common in many areas of Kansas.

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 are now growing wild. Flexstar, Cobra, Ultra Blazer, Marvel, and Prefix can be fairly effective for controlling small pigweed (< 3 inches tall). 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. These products are less effective as the pigweed, especially Palmer amaranth, gets larger. Fomesafen products (Flexstar, Marvel, Prefix, and others) should not be used in counties west of U.S. Highway 281, and fields treated with fomesafen products cannot be planted to wheat for 4.5 months, corn for 10 months, or alfalfa, canola, grain sorghum or sunflowers for 18 months after application. Because these burner herbicides are contact in nature, it is key to achieve as good of coverage on the leaves as possible. Using a minimum spray volume of 15 to 20 gallons per acre will be critical to get good control especially on larger pigweeds.

Additional residual pigweed control can be achieved by adding Outlook, Zidua, Dual Magnum, or Warrant to the postemergence treatment, but these herbicides will not control emerged pigweeds. Pursuit, Synchrony, and Harmony were once fairly effective for pigweed control and can still provide good control of susceptible populations, but many fields already have ALS-resistant waterhemp and Palmer amaranth.

Sunflower and Cocklebur

Fortunately, sunflowers and cocklebur are 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 the residual control of later-emerging plants, but be mindful that rotation restrictions with these two herbicides can be fairly lengthy as well.

Conclusion

If weeds have gotten larger than 6 inches tall, 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.

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3. Now is the time to make decisions for fungicide management of gray leaf spot

Most of the earliest-planted corn fields in Kansas are now, or soon will be, at the critical juncture for making fungicide application decisions for gray leaf spot management. The rest will follow in the next few weeks. 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.

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 corn in Kansas River Valley, mid-June 2015. 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 15 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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4. Potential corn ear development problems from off-label herbicide applications

Wet weather throughout Kansas in May created some difficult conditions for properly applying herbicides for adequate weed control in corn. At this point, numerous fields in southern Kansas are at the tasseling to blister stages in development and early planted fields are just beginning to tassel north of Interstate 70 in the eastern half of the state. However, numerous fields are still in the vegetative stage throughout the state. To complicate spray decisions even further, saturated soil conditions have led to various growth stages of corn being present in the same field (non-uniform fields), which makes applications of herbicides in accordance with the label a difficult task.

In 2008 and 2009, Kansas experienced similar wet weather conditions that delayed many corn herbicide applications. On occasion, fields with late applications of pesticides experienced poor pollination or had abnormally developed ears. It was speculated that the off-label applications might have been involved. In 2009, a demonstration of off-labeled applications of glyphosate at high rates was applied to Roundup Ready corn just prior to the tassel stage. Another demonstration area received a similar application at about the V12-V14 stage.



Figure 1. Ears from an untreated area. The tipping back is what we'd normally expect with high plant populations in a dryland setting with drought and temperature stress (in the year this photo was taken). Photos by Stu Duncan, K-State Research and Extension.



Figure 2. Ears from the pretassel treatment with glyphosate showing a few blank kernels, with sections of rows missing.



Figure 3. Ears from plants treated over the top with an off-label application of a high rate of glyphosate at about V12-V14. The corn shows much more severe problems with ear development.

Remember, this was simply a demonstration of off-label applications. These types of symptoms should not be evident if glyphosate is applied according to label restrictions.

Reviewing glyphosate labels: Glyphosate applied with drop nozzles can be applied on corn up to 48 inches tall. Increased risk of injury and arrested ear occur when application are made after this stage. Tank-mix partners at the late stages are minimal in number. Impact herbicide may be applied to corn up to 45 days before silage or grain harvest on corn. Again, drop nozzles are essential to attempt to get weeds controlled at that stage. All other herbicides are likely off label at these late stages. Control of large weeds at this stage often is marginal.

Agronomists at Purdue University have seen similar problems with off-label, late applications of glyphosate in Indiana, but primarily with something they have termed “arrested ear development.” They did a more detailed study looking at different combinations of fungicides, additives, and glyphosate applications at V14. Many of the symptoms they observed are similar to what we have seen in the field and in our demonstration. A full description of the Purdue study can be found at: <http://www.agry.purdue.edu/ext/corn/news/articles.08/ArrestedEars-1209.html>

A K-State publication on abnormal corn ears was recently released as a web-based document. In that document, we have other examples of damage from off-label herbicide applications. This publication can be found at: <https://slate.adobe.com/a/Z0xaA>

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5. Comparative Vegetation Condition Report: June 9 - 22

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 25: 06/09/2015 - 06/22/2015

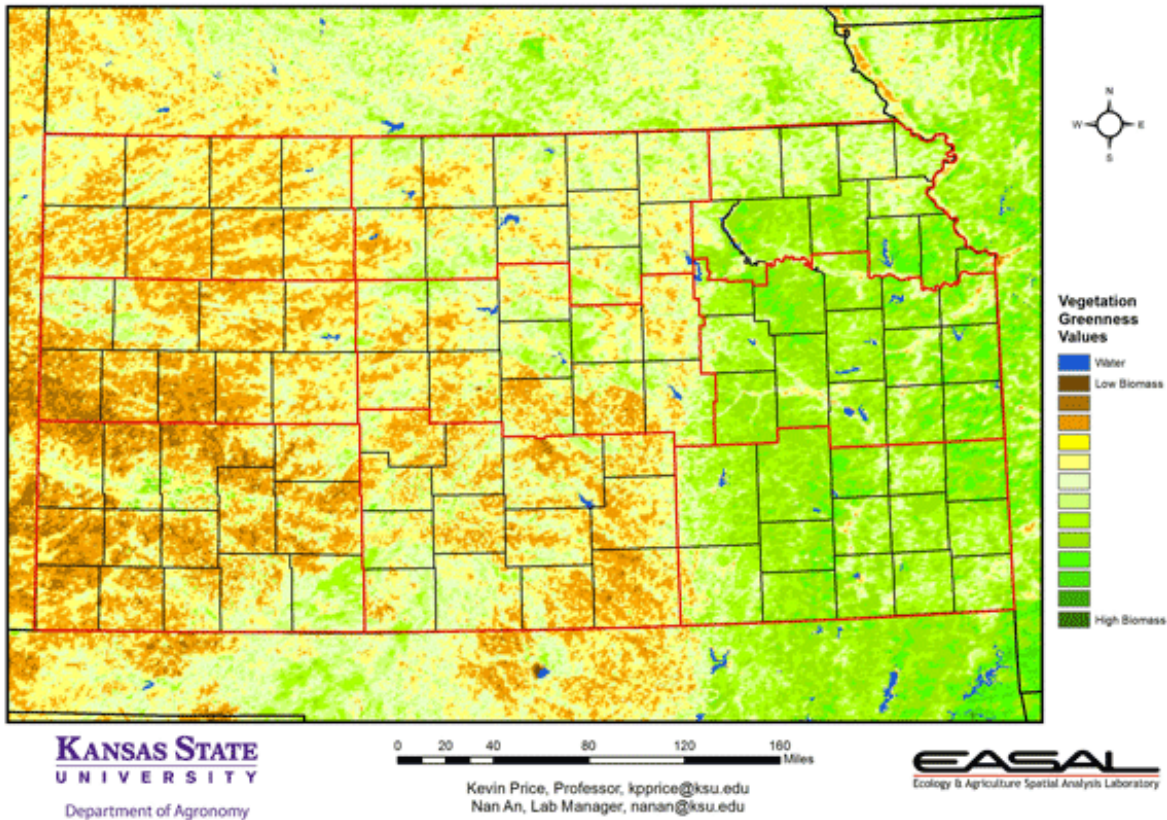


Figure 1. The Vegetation Condition Report for Kansas for June 9 – June 22, 2015 from K-State’s Ecology and Agriculture Spatial Analysis Laboratory shows that vegetative activity has continued to increase across the state. The highest NDVI values in western Kansas are visible along the stream beds where favorable moisture continues to spur biomass development.

Kansas Vegetation Condition Comparison

Mid-June 2015 compared to the Mid-June 2014

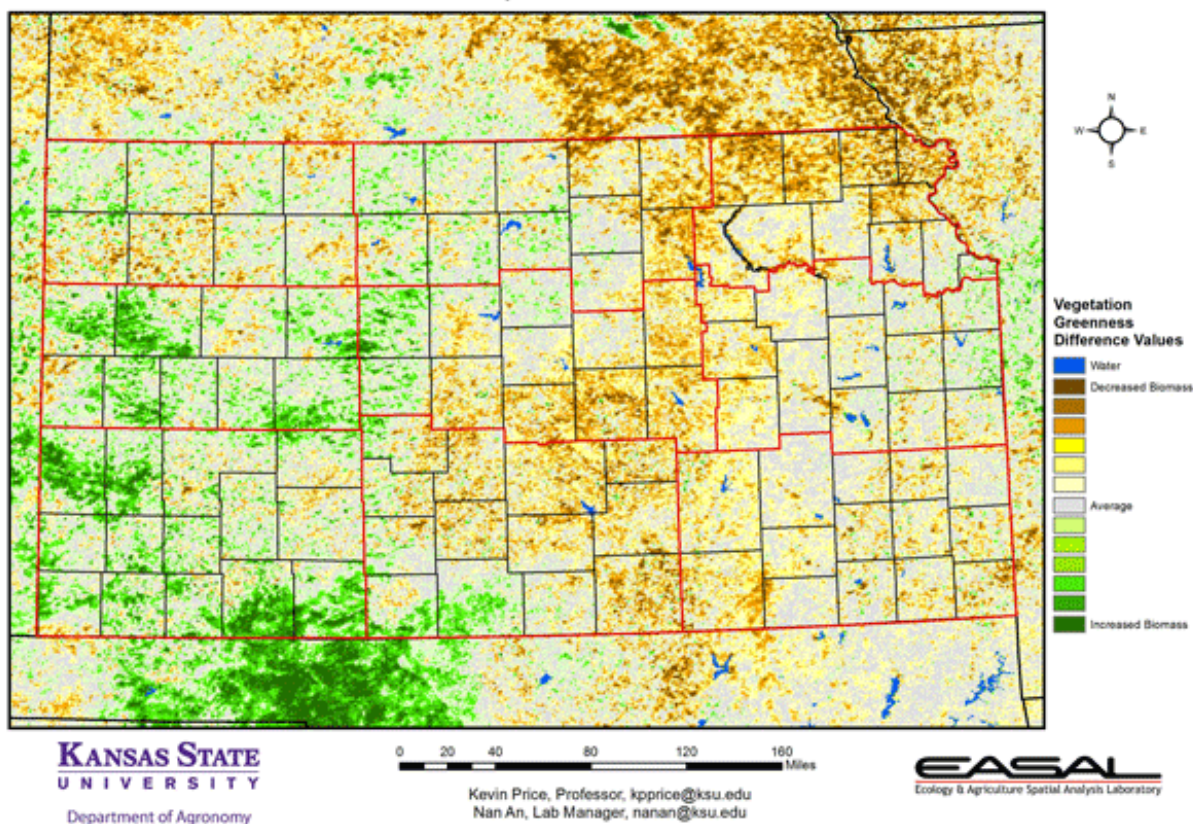


Figure 2. Compared to the previous year at this time for Kansas, the current Vegetation Condition Report for June 9 - June 22 from K-State's Ecology and Agriculture Spatial Analysis Laboratory shows biomass production is higher across much of the western parts of the state. It is particularly noticeable in Meade and Clark counties. Last year, precipitation didn't pick up until late June. This year, moisture in the region is averaging 120 to 150 percent of normal. In northeast Kansas, excess moisture continues to hinder both planting and crop development.

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Kansas Vegetation Condition Comparison

Mid-June 2015 compared to the 26-Year Average for Mid-June

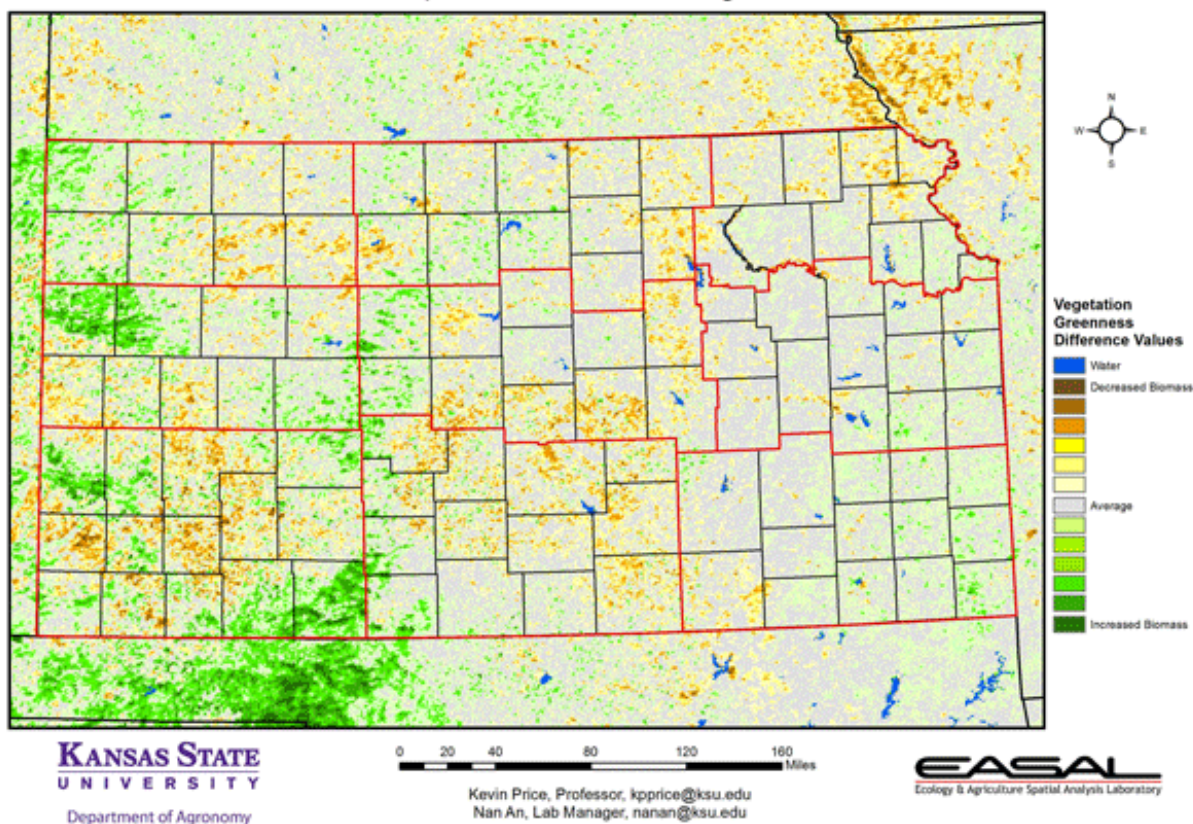


Figure 3. Compared to the 26-year average at this time for Kansas, this year's Vegetation Condition Report for June 9 – June 22 from K-State's Ecology and Agriculture Spatial Analysis Laboratory shows that the western divisions have the greatest increase over normal photosynthetic activity. While precipitation in this region is much above normal, it has not been quite as excessive as in the Northeastern Division. Warmer temperatures and drier weather over the central part of the state toward the end of the period have resulted in lower NDVI values as plants struggle to adapt to the rapid change where there has been limited root development.

U.S. Corn Belt Vegetation Condition

Period 25: 06/09/2015 - 06/22/2015

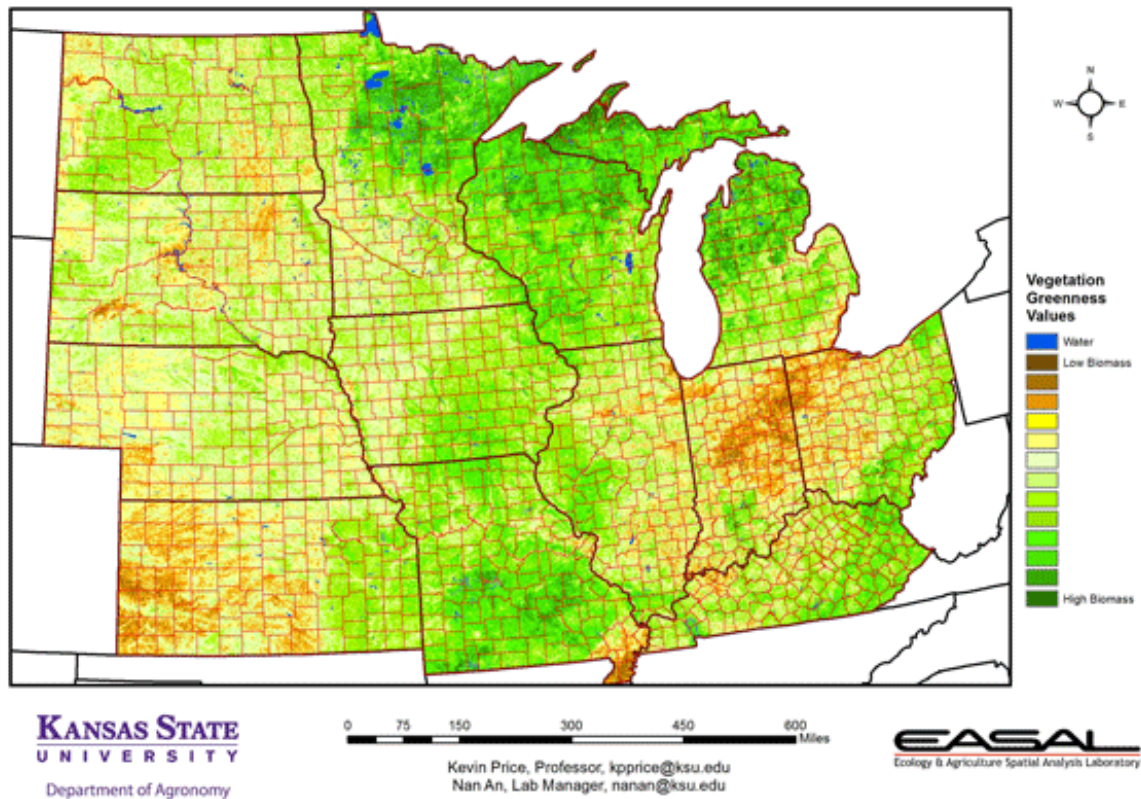


Figure 4. The Vegetation Condition Report for the Corn Belt for June 9 – June 22 from K-State’s Ecology and Agriculture Spatial Analysis Laboratory shows that the highest level of photosynthetic activity is across the center of the region, from Minnesota through southern Missouri. Favorable temperatures and moisture have resulted in accelerated biomass production.

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U.S. Corn Belt Vegetation Condition Comparison Mid-June 2015 Compared to Mid-June 2014

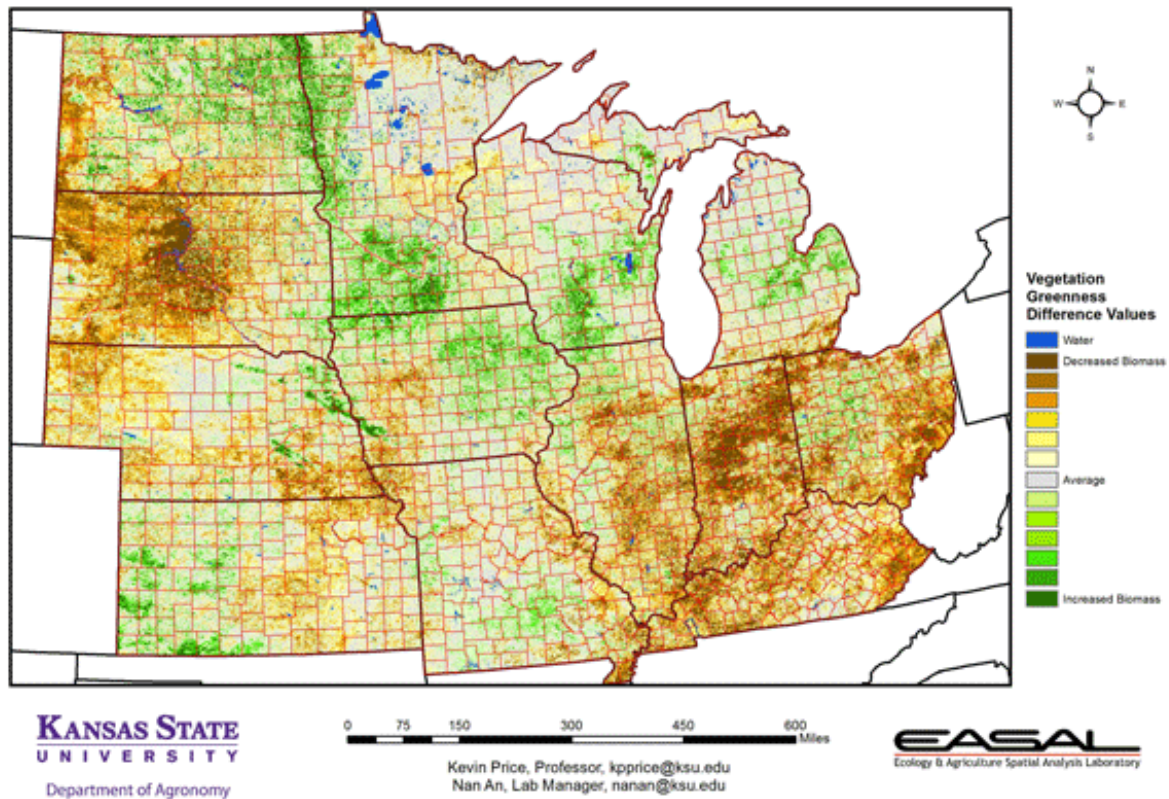


Figure 5. The comparison to last year in the Corn Belt for the period June 9 – June 22 from K-State’s Ecology and Agriculture Spatial Analysis Laboratory shows much of the region has much lower biomass production. The eastern parts of the region, particularly Ohio, Indiana, and northern Kentucky have much lower photosynthetic activity. The greatest increase in photosynthetic activity is in North Dakota and western Kansas, where flooded soils were not as common.

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

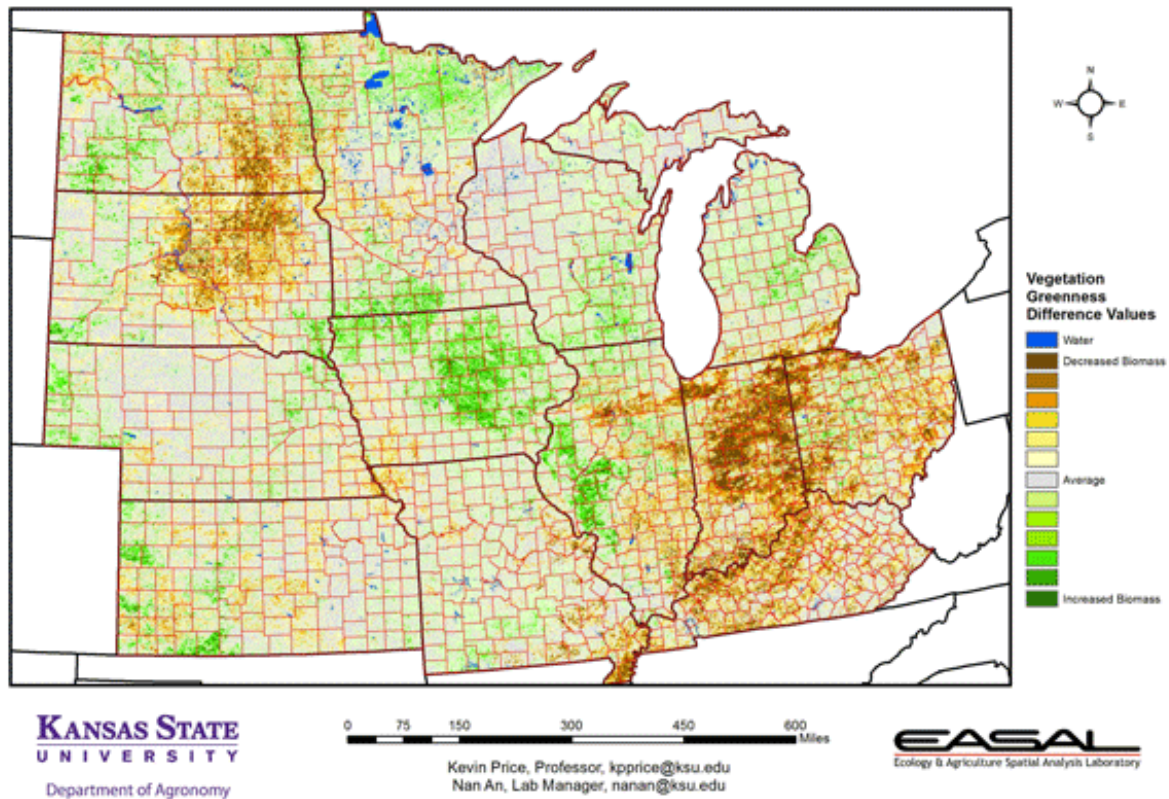


Figure 6. Compared to the 26-year average at this time for the Corn Belt, this year's Vegetation Condition Report for June 9 – June 22 from K-State's Ecology and Agriculture Spatial Analysis Laboratory shows that the eastern portion of the region has below-average photosynthetic activity. Cool, wet weather continues to slow plant development in eastern South Dakota and in Illinois and Ohio.

Continental U.S. Vegetation Condition

Period 25: 06/09/2015 - 06/22/2015

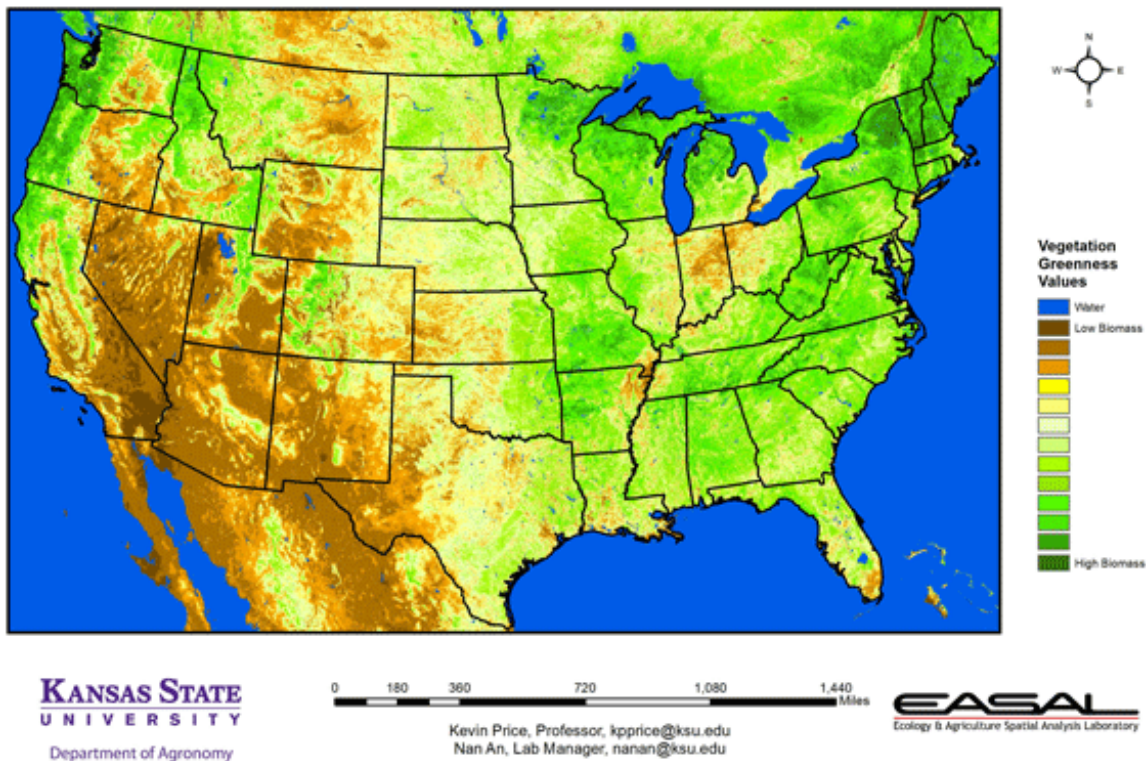


Figure 7. The Vegetation Condition Report for the U.S. for June 9 – June 22 from K-State’s Ecology and Agriculture Spatial Analysis Laboratory shows that high photosynthetic activity is most visible in the New England area and along the Pacific Northwest. Plant development has been favored by warmer-than-normal temperatures. There is also an area of increased photosynthetic activity in Arizona and New Mexico in response to increased precipitation in the region. Pockets of low photosynthetic activity are evident where excessively heavy rainfall has dominated in June, particularly in the Ohio River Valley and along the Central Mississippi River Valley.

Continental U.S. Vegetation Condition Comparison Mid-June 2015 Compared to Mid-June 2014

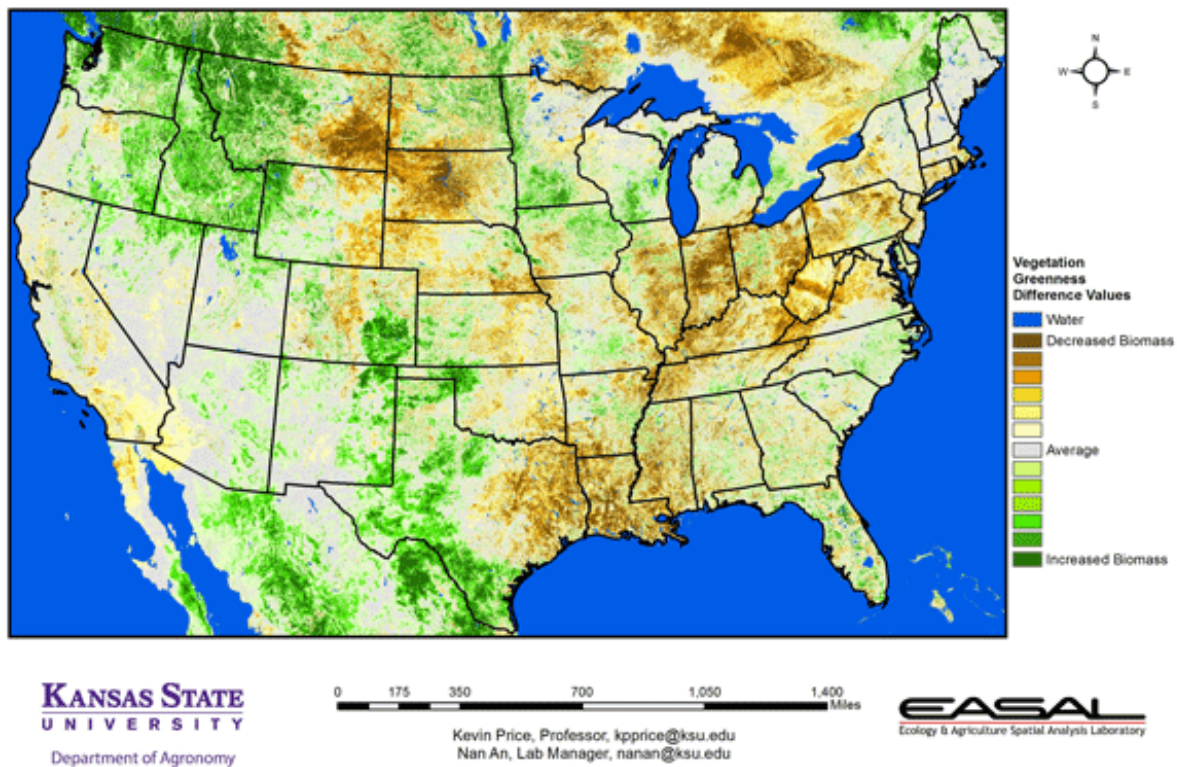


Figure 8. The U.S. comparison to last year at this time for the period June 9 – June 22 from K-State’s Ecology and Agriculture Spatial Analysis Laboratory shows lower photosynthetic activity in the eastern regions from Illinois through the Atlantic Seaboard. Cool temperatures and saturated soils have delayed development. Higher biomass production is visible in the western High Plains from southeastern Colorado through west Texas, where drought conditions have improved greatly. In the West, from Oregon through California, changes have been minimal. Conditions were poor last year and continue to be poor this year.

Continental U.S. Vegetation Condition Comparison
Mid-June 2015 Compared to 26-year Average for Mid-June

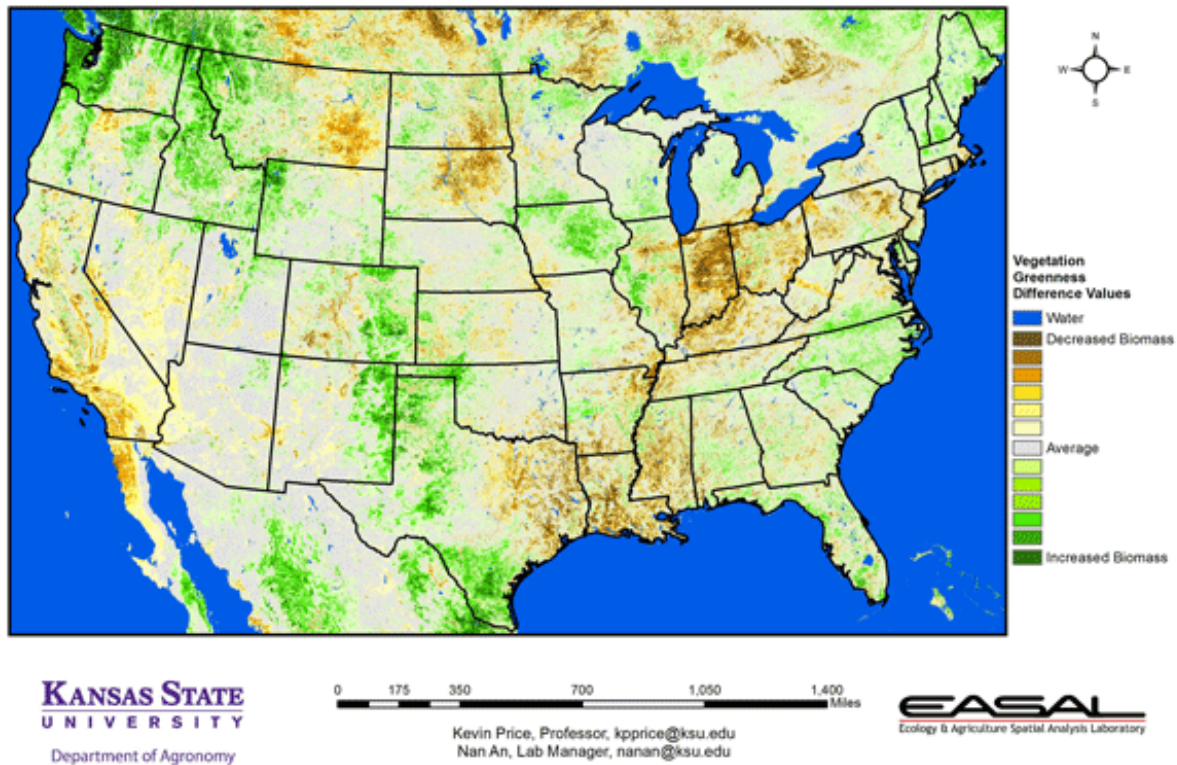


Figure 9. The U.S. comparison to the 26-year average for the period June 9 – June 22 from K-State’s Ecology and Agriculture Spatial Analysis Laboratory shows much of the country has close to average photosynthetic activity. Washington and Idaho stand out with higher-than-average biomass production, as early snowmelt and heavier-than-usual rainfall have reduced some of the drought impacts. Lower-than-average production is concentrated in the Ohio River Valley, where cooler temperatures and saturated soils have slowed plant development.

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