



K-STATE
Research and Extension

Extension Agronomy

eUpdate

10/09/2015

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. Check your wheat fields for fall armyworms

Where wheat has emerged, fields need to be checked for fall armyworms. This is especially important because this summer and fall were characterized by very active fall armyworm activity. Reports of fall armyworms infesting recently planted wheat fields in Oklahoma should put southern Kansas farmers on alert as this moth migrates northward from southern states to lay eggs on emerged wheat.

Freezing temperatures will kill the larvae, but current forecasts do not call for a freeze in southern Kansas any time soon.

When scouting fields for fall armyworm damage, look for “windowpane” injury caused by tiny larvae chewing on seedling leaves (Figure 1). Each individual field should be scouted in several locations, including the field margins and the interior. The larvae themselves are usually too small to be easily observed after they first hatch, and hide in or around the base of seedlings. Within a few days of hatching, the larvae become large enough to destroy entire leaves (Figure 2).



Figure 1. “Windowpane” feeding damage on wheat leaf.

Source: <http://entomology.k-state.edu/extension/insect-information/crop-pests/wheat/fallarmyworm.html>

The suggested treatment threshold is 2-3 actively feeding larvae per linear foot of row in wheat. Fields with 25 to 30 percent of plants with windowpane injury should be re-examined daily and treated immediately if stand establishment appears threatened. Larvae increase in size at an

exponential rate, and so do their food requirements. Later instars do the most damage, sometimes destroying entire stands, and are the least susceptible to insecticides. Without treatment, problems can continue until larvae reach maturity or until a killing frost. Thin stands of wheat are especially at risk.



Figure 2. Fall armyworm larva.

Source: <http://entomology.k-state.edu/extension/insect-information/crop-pests/wheat/fallarmyworm.html>

If a killing frost does not occur soon, fields may require chemical treatment. For treatment options, please refer to the latest K-State Wheat Insect Management guide at:
<http://www.bookstore.ksre.ksu.edu/pubs/mf745.pdf/>

Leaf damage by early stage army cutworm larvae will look very similar to that of fall armyworms. Army cutworm larvae are even more difficult to see than fall armyworm larvae because they feed mostly at night and hide in the soil. Although army cutworm larvae will grow more slowly than fall armyworm larvae, they will feed throughout the winter (unlike fall armyworm larvae), burrowing in the soil to escape frost and emerging again to feed during spells of warmer weather.

Army cutworm moths emerge in May and then migrate westward to Colorado where they escape hot summer weather in the mountains.

Mostly the same insecticides are registered for control of both species, but higher rates are recommended for fall armyworm. Any fields with mixed populations should be treated with the fall armyworm rate.

If you are seeing worm-feeding damage, you need to know what kind of worms you have. The upside down 'Y' on the head capsule of fall armyworms is a distinguishing feature (Figure 3) not shared by army cutworms (Figure 4).

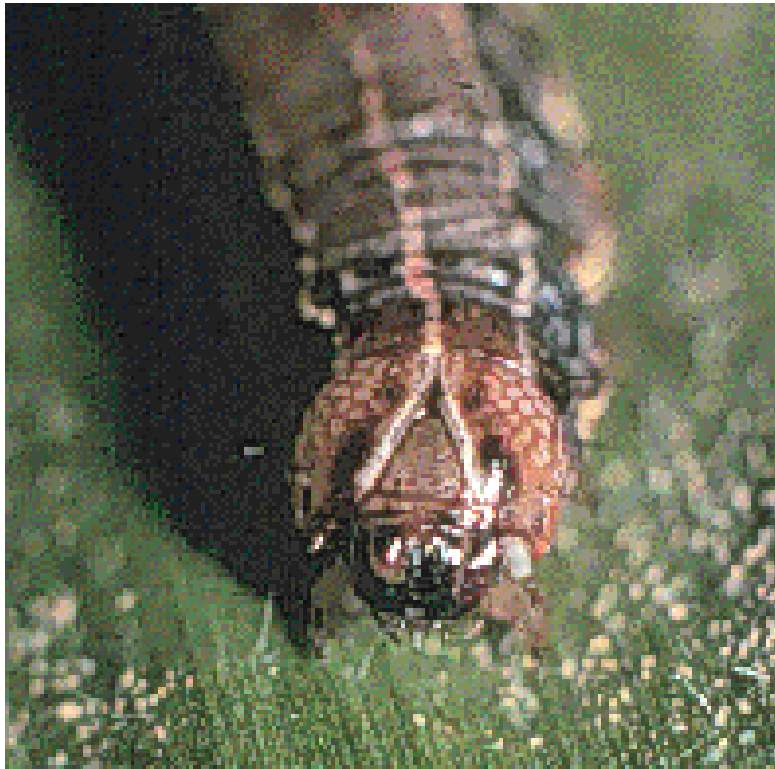


Figure 3. Head capsule of fall armyworm, with the upside down “Y” marking.
Source: <http://www2.ca.uky.edu/entomology/entfacts/ef302.asp>



Figure 4. Army cutworm larvae.

Source: http://cropwatch.unl.edu/archive/-/asset_publisher/VHeSpfv0Agju/content/it-s-time-to-scout-wheat-alfalfa-for-cutworms

The threshold for treating army cutworms is 5 or more larvae per row foot, provided worms are still small (a certainty at this time of year). However, most damage from this species will occur in the spring and they are difficult to find in the soil while small.

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2. Get an early start on weed control in soybeans

Fall harvest is a good time to assess the weed problems you had in those fields going to soybeans next year, and start planning your weed control program. In most cases, it is no longer possible to rely strictly on glyphosate for broadleaf weed control in Roundup Ready soybeans. Before deciding what herbicide program to implement, it is necessary to identify the problem weeds in each field, and what kind of herbicide resistance issues might be present. Some good options for the most common broadleaf weed and grass problems include:

Marestail. Marestail is probably the most widespread glyphosate-resistant weed in Kansas. Marestail control in fields going to soybeans should begin with fall or early spring herbicide treatments that include dicamba, 2,4-D, or an ALS-inhibiting herbicide such as Canopy EX or Autumn Super. Unfortunately, ALS-resistant marestail may also be present in some fields, so a tank-mix with dicamba or 2,4-D is still recommended. Dicamba has provided better marestail control than 2,4-D in K-State research the last several years. Fall treatments should be delayed until November when most of the fall-germinating marestail has emerged. With spring applications, be aware of the intervals required between application of these herbicides and planting soybeans.

The Kixor-containing products, Sharpen, OpTill, or Verdict can be used for burndown control of marestail any time before soybean emergence (cracking). To optimize marestail control with the Kixor products, spray before marestail gets too big, use an adequate spray volume to insure good spray coverage, and apply in combination with a methylated seed oil. The Kixor rates that can be used in soybeans will not provide very much residual control of marestail. Other residual preplant herbicides that can help with burndown and residual marestail control include Valor and FirstRate-based herbicides, such as Valor XLT, Fierce, Fierce XLT, Envive, Trivence, Enlite, Authority First, Sonic, Gangster, or Surveil.

Marestail is best controlled before soybean planting and before the marestail begins to bolt. FirstRate or Synchrony would probably be the most effective tank-mix partner with glyphosate for postemergence marestail control in Roundup Ready soybeans. However, if ALS-resistant marestail are present, these treatments will not be very effective. Liberty is one of the better herbicides to control marestail that has started to bolt in the spring. Liberty can be used as a burndown treatment prior to emergence of any soybeans, or as a postemergence treatment in Liberty Link soybeans.

Pigweeds (including waterhemp and Palmer amaranth). Glyphosate-resistant waterhemp and Palmer amaranth are now pretty common in many fields throughout the state. For preemergence pigweed control, the Valor-based herbicides (Valor SX, Valor XLT, Fierce, Fierce XLT, Gangster, Surveil, Envive, Enlite, and Trivence) and Authority-based herbicides (Authority Maxx, Authority Elite, Authority XL, Authority First, Sonic, Authority Assist, Authority MTZ, and Spartan) can all provide very good to excellent control to supplement a postemergence program. Prefix is another excellent “foundation” herbicide for residual pigweed control in soybeans and can be applied early postemergence as well as prior to emergence. Metribuzin, Dual II Magnum, Outlook, Warrant, and Prowl H2O products can also provide some early-season pigweed control, but generally are not as effective as those previously mentioned products. Zidua and Anthem contain the active ingredient pyroxasulfone (also a component of Fierce). Pyroxasulfone has a similar mode of action to Dual II Magnum, Warrant, and Outlook but may provide longer residual control of pigweeds.

Although some of these herbicides can be applied in the fall or early spring, those treatments generally will not persist long enough to give good pigweed control into the soybean growing season. If pigweed is the primary target, treatments will be most effective if applied later in the spring. A sequential application may be the best approach in no-till, with half of the herbicide applied in mid- to late April and the remainder right after planting. If glyphosate-resistant pigweeds escape preemergence control, the primary postemergence tank-mix options would be Cobra, Flexstar, Ultra Blazer, or Marvel. However, timing is critical for good control. These products should be applied before pigweeds exceed 3 inches tall for optimum control.

Velvetleaf. Glyphosate is not always entirely effective on velvetleaf. To assist in velvetleaf control, the Valor-based and FirstRate-based herbicides (Valor SX, Valor XLT, Fierce, Fierce XLT, Gangster, Surveil, Authority First, and Sonic) are some of the most effective preplant and preemergence herbicides you can use. Postemergence tank-mixes to enhance velvetleaf control would include FirstRate, Cadet, and Resource.

Cocklebur. The most effective preplant and preemergence herbicides to aid in cocklebur control are those that contain FirstRate, Classic, or Scepter. Such products would include Authority First, Sonic, Gangster, Surveil, Envive, Trivence, Valor XLT, and Fierce XLT. Extreme, which is a premix of glyphosate and Pursuit, can also be used as a preplant or postemergence treatment in Roundup Ready soybeans to provide residual cocklebur control. However, all of these herbicides are ALS-inhibiting herbicides, and ALS-resistant cocklebur may be present in some fields.

Morningglory. Glyphosate sometimes has trouble controlling morningglory. To help get better control, you can use either Authority-based or Valor-based herbicides preplant or preemergence. Liberty can also provide good morningglory control in Liberty Link soybeans.

Kochia. Kochia is a major weed problem in western areas and has often been difficult to control with glyphosate, especially as it gets bigger. In addition, glyphosate-resistant kochia is now common across much of western Kansas. Since much of the kochia emerges well before soybean planting, one of the keys to managing kochia in soybeans is to control it early in the spring before soybean planting. Research by K-State in recent years indicates that several preemergence herbicides can help provide control of glyphosate-resistant kochia, especially the Authority-based products listed above. Early applications of dicamba can also provide effective control of kochia, but the appropriate precipitation and preplant waiting intervals need to be followed to avoid potential soybean injury and stand loss. The Kixor-containing products may help with kochia burndown, but the Kixor rates that can be used in soybeans will not provide very much residual control. ALS-inhibiting herbicides may or may not provide kochia control because of the occurrence of ALS-resistant kochia.

Crabgrass and small-seeded broadleaf weeds. Glyphosate usually gives good control of most grasses, but producers may want to apply a foundation herbicide to control grasses early, followed by a postemergence glyphosate application to clean up any escapes. Prefix, Fierce, Dual II Magnum, Outlook, and Prowl H2O can all provide good early-season grass and pigweed control ahead of Roundup Ready soybeans. Of these, Prefix and Fierce generally provide the best pigweed control, and Prowl H2O the least. Several residual herbicides, such as Warrant, Outlook, Zidua, and metolachlor products can be applied as a postemergence tank-mix with glyphosate, depending on soybean growth stage, to provide extended residual control of grasses and broadleaves later in the season. However, it is important to understand that these products do not have postemergence activity, so they will not control emerged glyphosate-resistant pigweeds.

Liberty Link soybeans are an alternative technology to Roundup Ready, especially in the presence of glyphosate-resistant weeds. Liberty can provide effective postemergence control on a broad spectrum of weeds, but good performance is very dependent on several application factors, such as weed size, spray coverage, and humidity. The most successful Liberty Link weed control programs will utilize a good preemergence herbicide treatment at planting, followed by a timely application of Liberty when the weeds are relatively small using a minimum spray volume of 15 gallons per acre to ensure good spray coverage.

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3. Effectiveness of low-rate in-furrow pelletized lime at wheat planting to manage acid soils

Many wheat fields in Kansas have soil pH lower than 5.5, often caused by long-term use of ammonium-based fertilizers and crop removal of base cations.

At soil pH levels below 5.5, toxic aluminum becomes more soluble in the soil, which has detrimental effects on wheat growth. The main effect of available aluminum in soil solution is decreased root growth, which reduces the capacity of roots to explore the soil for water and nutrients. As a consequence, wheat becomes stunted, resulting in reduced forage production and grain yield. Early-season wheat growth and forage production is generally more affected by low soil pH and aluminum toxicity than grain yields, so the penalty for low soil pH is often greater for dual-purpose or forage-only wheat farmers than for grain-only producers.

The recommended practice to correct low soil pH is to apply agricultural lime based on soil test recommendations. An article in the August 14, 2015 issue of the Agronomy eUpdate gives me details on liming acid soils for optimum wheat production:

https://webapp.agron.ksu.edu/agr_social/eu_article.throck?article_id=6622/

However, changing soil pH is not always a rapid process. It can sometimes take a year or more to fully realize the effects of agricultural lime, so the economics of broadcasting lime on rented ground can be greatly influenced by the lease duration.

Banding of phosphorus (P) fertilizer in-furrow at planting is an alternative strategy often implemented by farmers to reduce the negative effects of low soil pH. In-furrow P fertilizer may be a suitable alternative for rented ground as it can result in increased wheat growth and forage production in low pH soils by reducing aluminum toxicity and increasing the amount of readily available P to the crop.

Likewise, some producers have considered banding 200 or 400 lbs/acre/year of pelletized lime at sowing as a low-cost alternative to broadcast applications, similar to in-furrow P application.

Pelletized lime contains finely ground limestone compressed into granules. This allows for even and accurate distribution of the material in the field and avoids dust problems. Although pelletized lime is frequently marketed as a low-use-rate, quick fix for low soil pH; research has shown that broadcast pelletized lime is not more efficient than broadcasted regular agricultural lime when applied at similar effective rates. When used at recommended rates, pelletized lime is cost prohibitive because it is 4 to 5 times more expensive than regular agricultural lime. Thus, pelletized lime has been proposed as a maintenance product to be applied annually at 300 to 400 lbs/acre/year.

A recent study on acid soils in north central Oklahoma has shown that this practice is not effective in ameliorating acid soils. Adding 200 or 400 lbs/acre/year in-furrow pelletized lime or 25 or 50 lbs/acre/year triple super phosphate (TSP) at time of sowing did not increase soil pH when compared to the control treatment in most cases (Table 1). On the other hand, application of broadcast incorporated agricultural lime at 2,000 or 4,000 lbs/acre significantly increased soil pH when compared to any of the other treatments.

Table 1. Soil pH measured at wheat harvest as affected by liming or phosphorus treatments on an acid soil near Waukomis, Okla.

	Soil pH		
Treatment	2009-10	2010-11	2011-12
Control	4.9 d	4.8 c	4.7 c
200 lbs/ac/yr Pell Lime	5.0 cd	4.9 c	4.8 c
400 lbs/ac/yr Pell Lime	5.1 c	4.9 c	4.9 c
25 lbs/ac/yr TSP	4.9 cd	4.9 c	4.7 c
50 lbs/ac/yr TSP	5.0 cd	4.9 c	4.8 c
2,000 lbs/ac ECCE	5.6 b	5.3 b	5.1 b
4,000 lbs/ac ECCE	5.9 a	5.5 a	5.3 a

Abbreviations: TSP (Triple super phosphate), ECCE (effective calcium carbonate equivalent). Identical letters in the same column indicate no statistical difference.

Additionally, volume of soil in which pelletized lime effectively increased soil pH was very limited. This was evaluated by slicing vertical trenches perpendicular to wheat rows after wheat harvest and taking pH measurements at regular intervals from the application band. The vertical trenches opened at the plots where pelletized lime was applied at 400 lbs/acre/year following wheat harvest from two growing seasons is shown in Figure 1. The pellets of lime applied in-furrow remained intact even after several months from their application and were still visible to the naked eye both years. This indicates that the lime pellets have very little or no dissociation within the winter wheat growing season, and consequently will induce limited changes in soil pH.

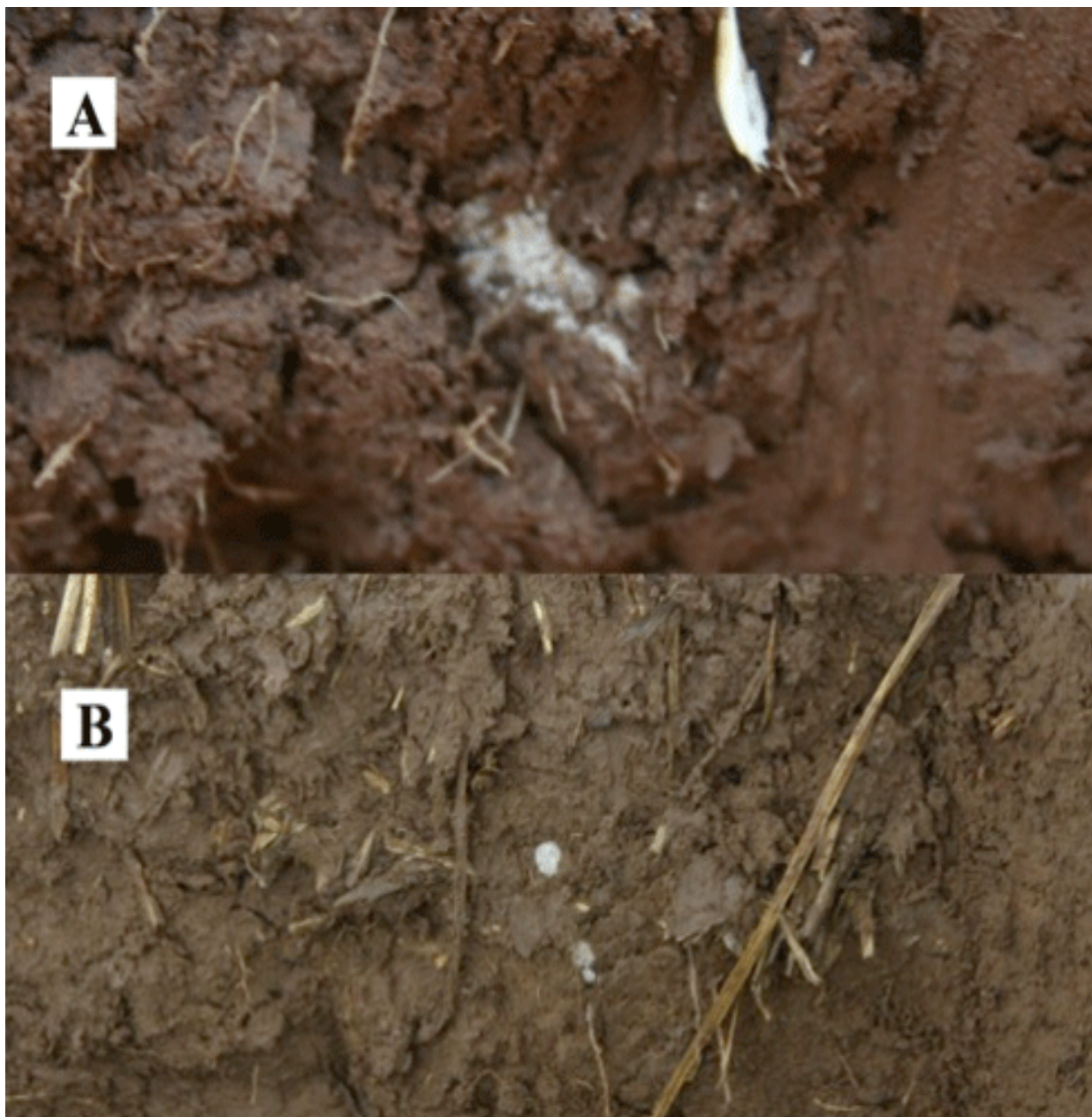


Figure 1. Trenches opened in (A) June 2011 and (B) June 2012 showing little or no diffusion of the pelletized lime across the soil profile. Pellets were visible and practically unmodified

approximately 220 days after pelletized lime banding. Photo by Romulo Lollato, K-State Research and Extension.

Measurements of soil pH taken in the trenches opened after wheat harvest indicates that pelletized lime at 200 and 400 lbs/acre/year raised soil pH to values higher than 5.0 only at and around the pellet (Figure 2). In the 400 lbs/acre/year pelletized lime treatment, soil pH ranged between 5.3 and 6.0 in an area within about a 0.5-inch radius surrounding the pellet. The pH averaged 4.5 deeper in the profile. Broadcast-incorporated lime led to a greater increase in soil pH -- as high as 6.5 -- than that produced by the pelletized lime. In addition, broadcast incorporated lime increased soil pH throughout the incorporated depth with a much wider change in soil pH across the soil profile.

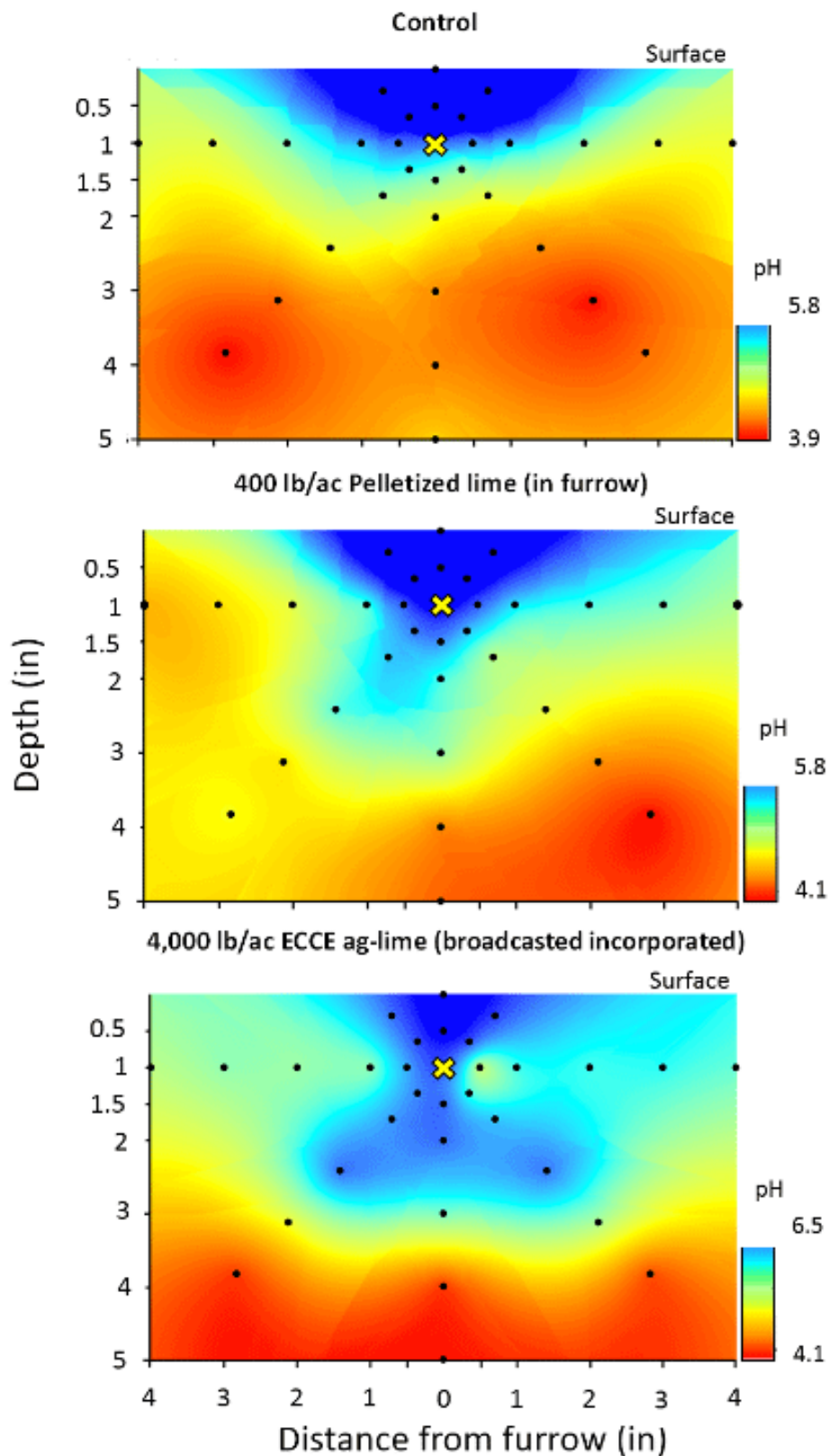


Figure 2. Distribution of pH measured following wheat harvest in June 2011 across the soil profile (depth and distance from furrow) as a function of acidity correction strategy at Waukomis, Okla. Notice the difference in scales between the two upper panels and the lower

panel. Broadcast ECCE ag-lime resulted in a greater increase in soil pH than did 400 lb/acre pelletized lime or the control.

With such a limited soil area affected by banded pelletized lime, very little contribution could be expected from pelletized lime to wheat aboveground growth or grain yield. Indeed, early spring wheat biomass production was not increased due to the application of in-furrow pelletized lime at 200 or 400 lbs/ac/yr when compared to the control plots (Figure 3).

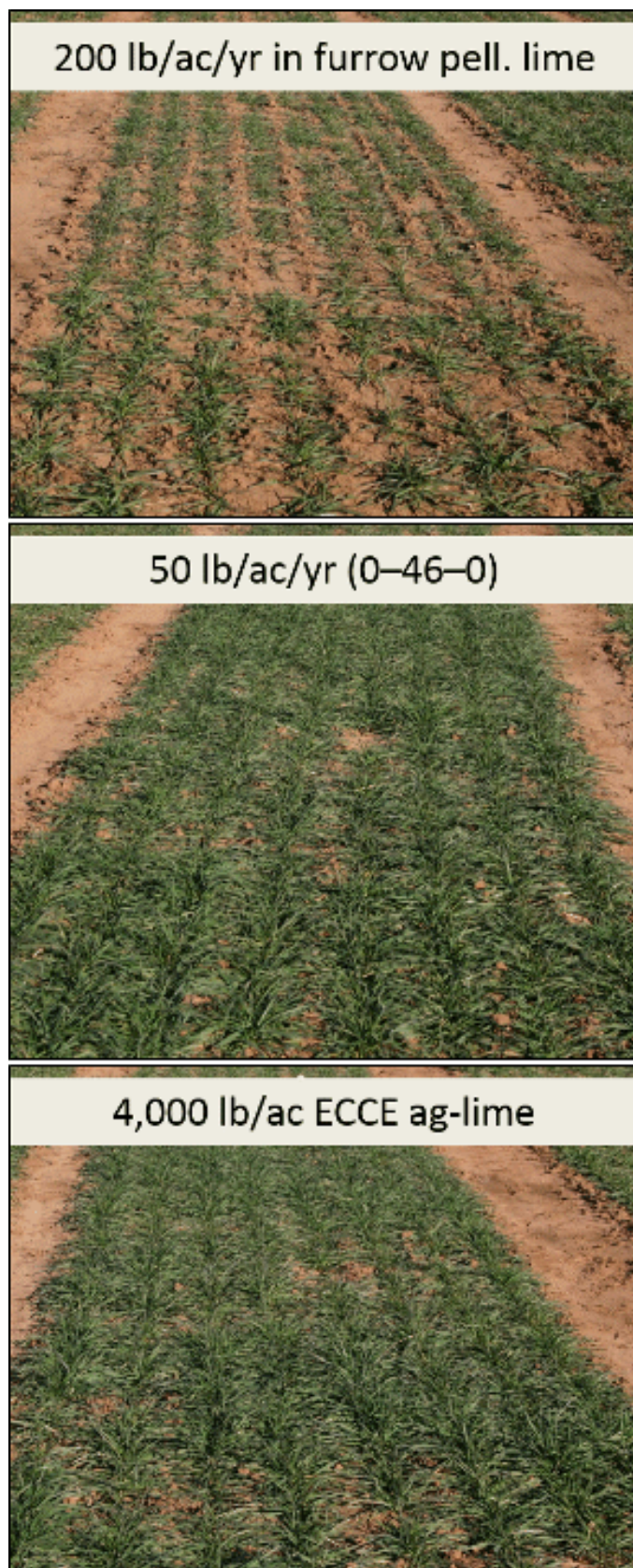


Figure 3. Poor stand establishment, tillering, and biomass production of the wheat crop in the 200 lb/ac in-furrow pelletized lime treatment in an acid soil at Waukomis, OK. Although soil pH

was not increased by the triple super phosphate (0-46-0) treatments, wheat growth was similar to that observed on the plots that received 4,000 lbs/ac of broadcast agricultural lime due to the positive effects of readily available P to the crop.

Although triple super-phosphate did not increase soil pH, it increased biomass production to levels similar to those measured in the plots treated with broadcast incorporated agricultural lime. Banded P fertilizer in acid soils or broadcast incorporated agricultural lime led to better stand establishment and tillering of the wheat crop as function of readily-available P or increased soil pH, respectively. Banded pelletized lime at 200 or 400 lb/acre/year resulted in much poorer stand establishment and vegetative growth as compared to banded P fertilizer or broadcast agricultural lime.

These results show that banding pelletized lime at 200 or 400 lbs/acre/year is not a suitable strategy to overcome low soil pH problems, as the change in soil pH will be restricted to a small region surrounding the pellet, at least within the wheat growing season. In-furrow pelletized lime behaves like large granules of lime and do not dissolve in the soil within that time period. Broadcast and incorporated agricultural lime was the most effective treatment in increasing soil pH, but banded P fertilizer can also be used to increase wheat biomass production in acid soils despite not increasing soil pH. This indicates that banding P fertilizer is especially attractive in situations where the farm is being rented and long-term correction of soil pH is not an economical alternative to the producer.

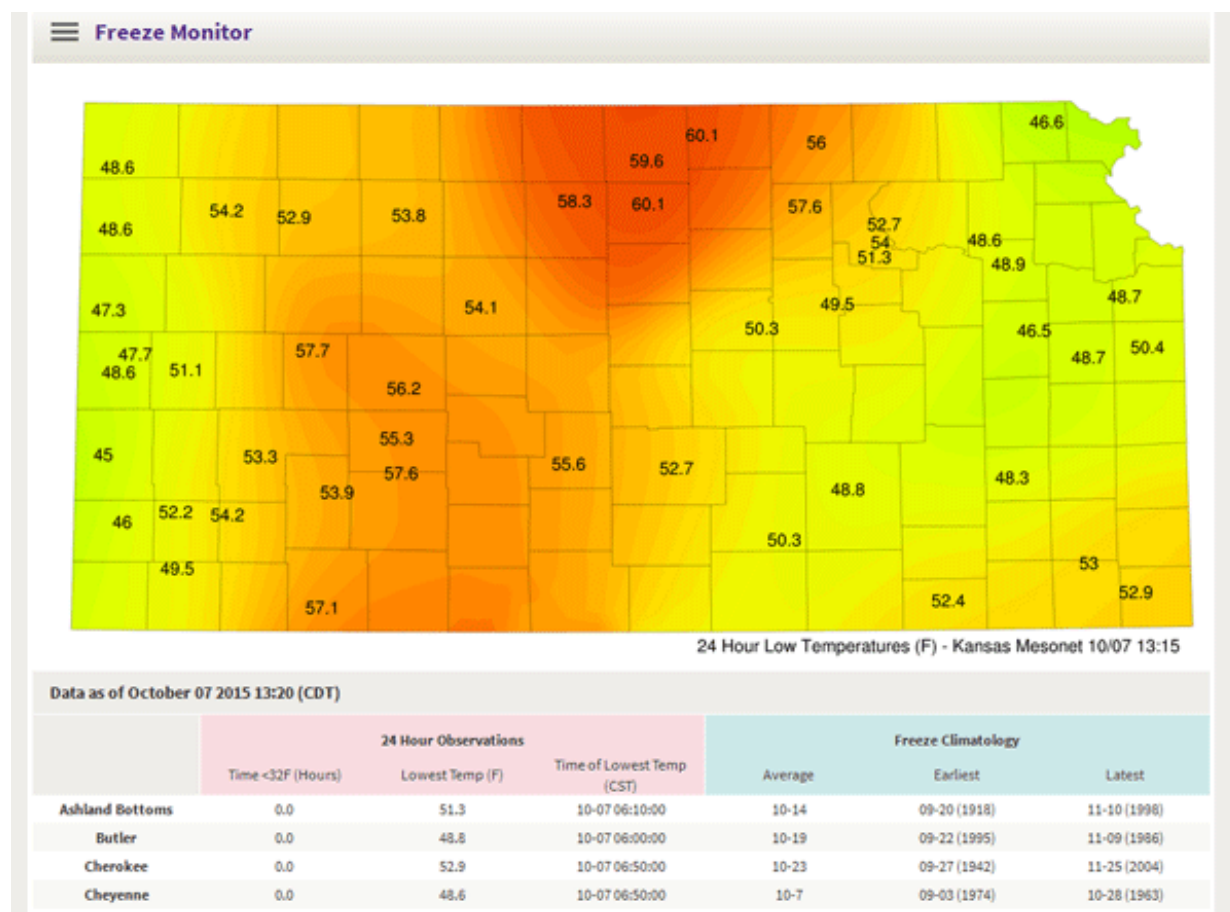
This eUpdate article is adapted from Oklahoma State University Cooperative Extension Service publication PSS-2164, *Effectiveness of In-furrow Pelletized Lime for Winter Wheat Grown in Low Soil pH*, by Romulo Lollato, Jeff Edwards, and Hailing Zhang.

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At this time of the year, freezing temperatures are of interest. Questions arise as to how cold did it get, and how long the temperatures were below freezing. To answer these questions, the Kansas mesonet on K-State's Weather Data Library web site has launched a new product called Freeze Monitor.

The Freeze Monitor page shows a map of the lowest temperatures reported at the mesonet locations in the last 24 hours. In addition to the map, the page includes a table with the lowest reading, the number of hours below freezing, and autumn freeze climatology. The climatology shows the average, earliest, and latest dates for the first 32 degrees F reading at each location.

These dates are based on the period of record for the National Weather Service (NWS) Coop station nearest the mesonet towers. For some of our earliest mesonet sites, such as Hays, Colby, Tribune, and Parsons, the mesonet towers and the NWS Coop stations are side-by-side. Observations from mesonet stations on both the map and chart are updated every five minutes.



The Freeze Monitor is at: ksu.ag/1j8NIID

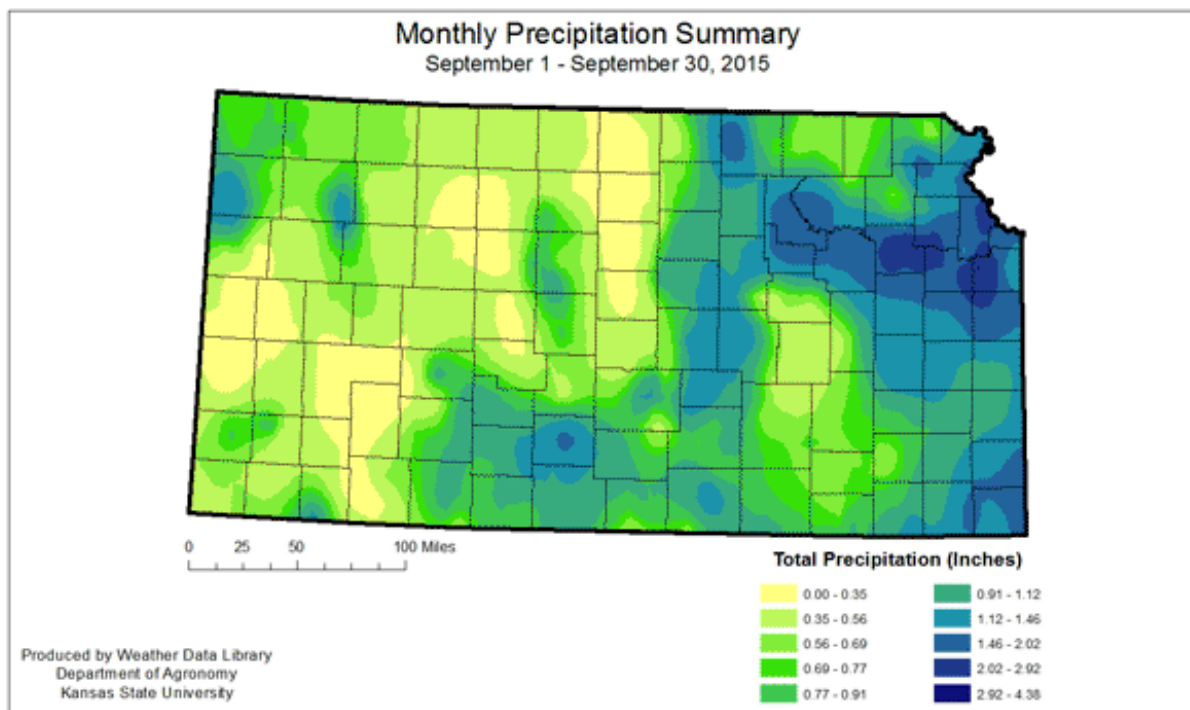
Chip Redmond, Weather Data Library

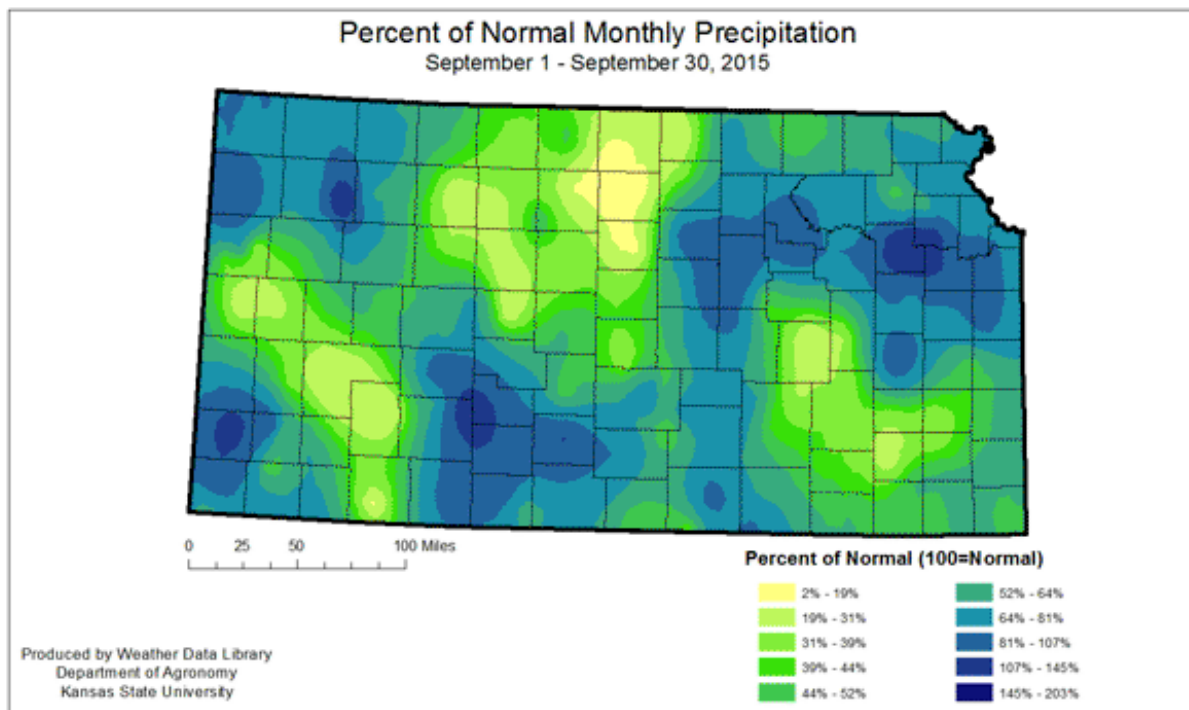
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5. Kansas weather summary September 2015: Warm and dry

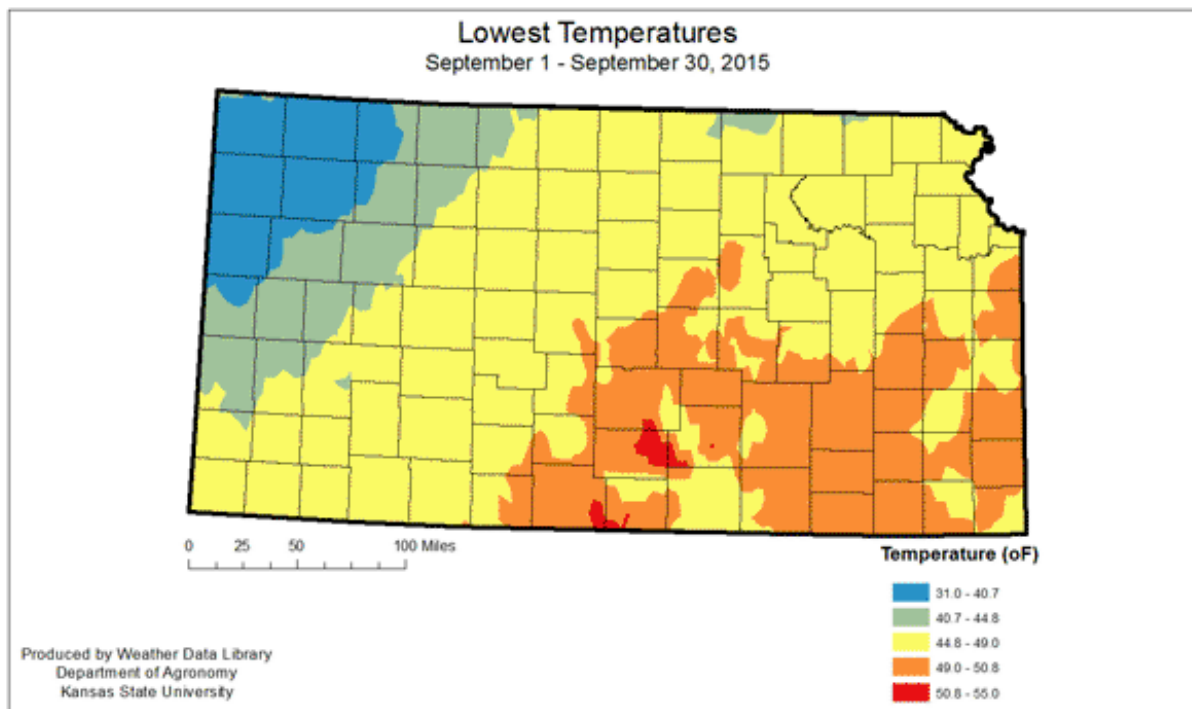
The outlooks for September were a disappointment, as the cooler- and wetter-than-average conditions failed to materialize. September was drier than normal in most of the state. Statewide average precipitation was 1.58 inches, or 53 percent of normal. The North Central Division had the lowest percent of normal precipitation at 39 percent, or an average of 1.04 inches. The West Central Division wasn't far ahead with 42 percent of normal, or an average of 0.71 inches. The East Central Division was closest to normal with an average of 2.85 inches, or 75 percent of normal. This ranks as the 25th driest September on record, placing it in the lower third of the 121-year distribution. The greatest monthly precipitation totals reported were 7.70 inches at Lecompton, Douglas County (NWS) and 8.02 inches at Topeka 4.6 ESE, Jefferson County, (CoCoRaHS). Still, 16 daily precipitation records were set in September. Lecompton's record of 4.36 inches, reported on the 8th, set a new record for the station in September.

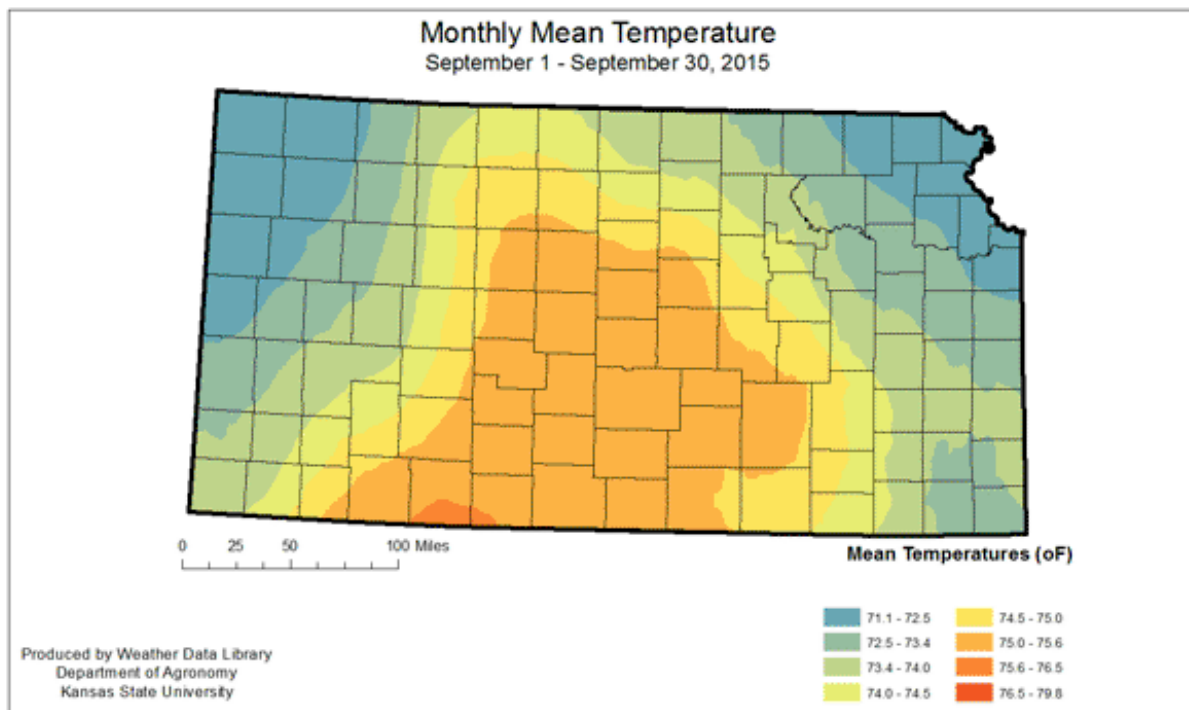




Temperatures were warmer than normal across the state. The statewide average temperature was 73.8 degrees F, 5.7 degrees warmer than normal for the month. There were 10 new record daily high

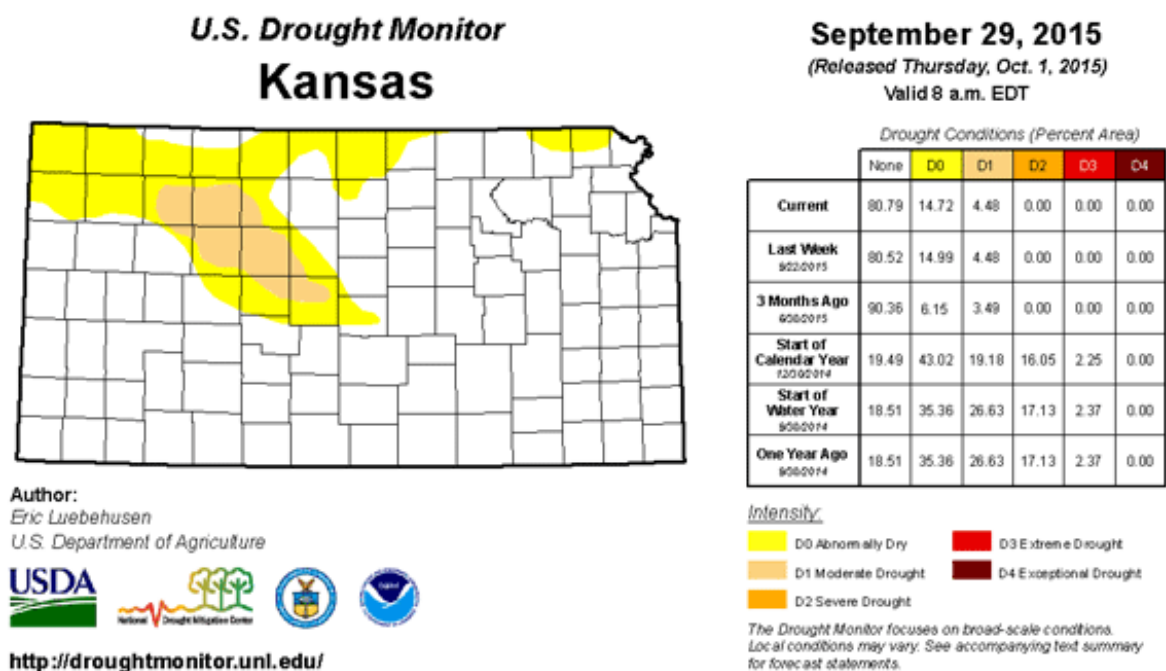
temperatures set during the month, and 16 records tied. None of the records was a new daily high for the month. In contrast, there were no record cold high temperatures. On the low temperature side, the same trend prevailed with 34 new record warm minimum temperatures and 25 records tied. The 75 degrees F at Toronto Lake, reported on the 8th, tied for a record warm minimum temperature in September. There was one new record daily cold minimum temperature for the month, but no new monthly record lows set. The South Central and Southeast Divisions were the closest to normal, with the South Central Division averaging 4.9 degree F warmer than normal and the Southeast Division averaging 3.9 degrees F warmer than normal. The Northwest Division was the warmest, averaging 72.1 degrees F, or 6.9 degrees warmer than normal. The warmest reading was 107 degrees F on the 7th at Hays, Ellis County (NWS). The coolest reading for the state was 33 degrees F at Brewster, Thomas County (NWS) on the 19th. The warmer-than-average temperatures allowed late-planted spring crops such as corn and soybeans to progress rapidly in development. Concerns now are for the dry conditions, with winter crops needing moisture for establishment before winter.





Severe weather was higher in September, despite the dry conditions. Preliminary data indicates there were 5 tornadoes reported. There were 63 hail reports and 64 damaging wind reports.

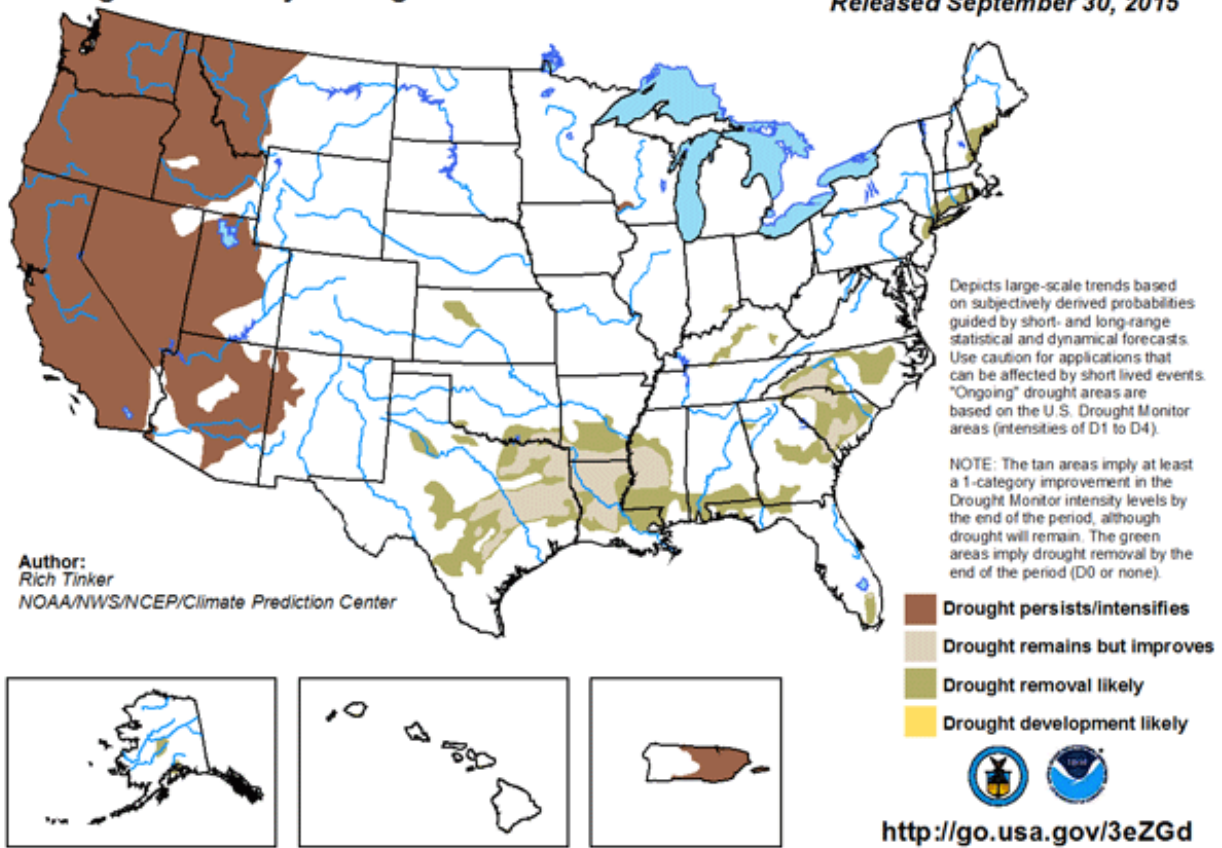
Drought conditions deteriorated, which was not unexpected, given the lower-than-average precipitation. Moderate drought conditions returned, and the area of abnormal dry conditions expanded. The moderate drought ranges from northwest through parts of central Kansas. Thirty-seven counties in western Kansas remain in drought watch status according to the latest advisory from the Kansas Water Office. A return to normal or above-normal precipitation is needed to sustain improvements. Some long-term hydrological deficits are in place affecting some water supplies and reservoirs. The drought outlook is for improving conditions, but the precipitation outlook for October is neutral.



U.S. Monthly Drought Outlook

Drought Tendency During the Valid Period

Valid for October 2015
Released September 30, 2015



Sep 2015

Kansas Climate Division Summary

Precipitation (inches)			Temperature (°F)						
September 2015			2015 Jan. through Sept.			Monthly Extremes			
Division Total	Dep. ¹	% Normal	Total	Dep. ¹	% Normal	Ave	Dep. ¹	Max	Min
Northwest	0.89	-0.63	61	16.34	-2.07	88	72.1	6.9	102 33
West	0.71	-0.89	42	17.05	-0.84	95	73.0	6.6	102 36
Central									
Southwest	0.92	-0.70	52	21.90	4.84	127	74.7	6.0	104 43
est									

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North Central	1.04	-1.59	39	21.54	-2.38	88	74.1	6.2	104	44
Central	1.35	-1.16	51	22.00	-2.99	86	75.3	6.2	107	46
South Central	1.90	-0.70	74	27.33	1.26	104	75.1	4.9	104	32
Northeast	2.61	-1.00	70	30.76	1.49	104	73.0	5.6	99	44
East Central	2.85	-0.81	75	29.62	-1.64	93	73.4	5.2	101	46
Southeast	1.78	-2.23	44	30.62	-2.80	91	73.5	3.9	99	43
STATE	1.53	-1.09	56	24.21	-0.41	98	73.8	5.7	107	32

1. Departure from 1981-2010 normal value
2. State Highest temperature: 107 oF at Hays 1S (Ellis County) on the 7th.
3. State Lowest temperature: 33 oF at Brewster 4W (Thomas County) on the 19th
4. Greatest 24hr rainfall: 4.38 inches at Topeka Municipal Airport, Shawnee County on the 10th (NWS); 4.68 inches at Topeka 5.8 ENE, Jefferson County on the 11th (CoCoRaHS).

Source: KSU Weather Data Library

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6. Comparative Vegetation Condition Report: September 22 - October 5

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 40: 09/22/2015 - 10/05/2015

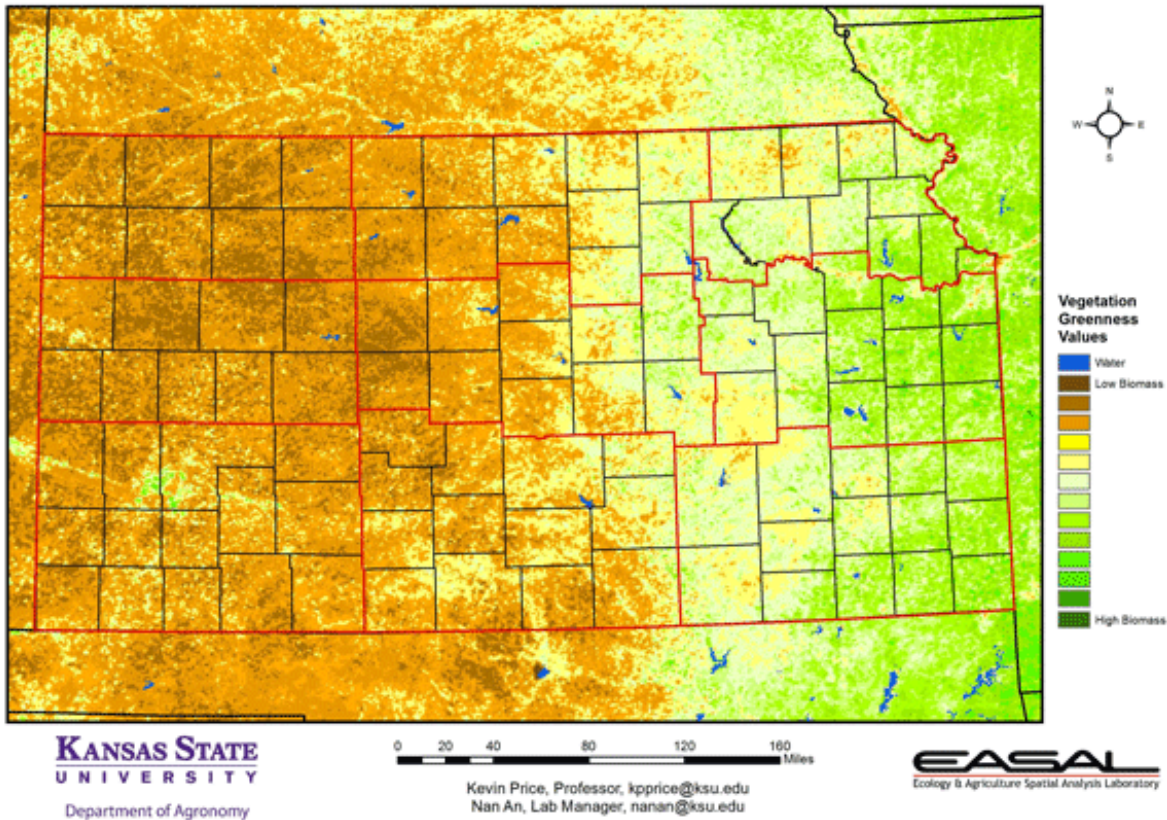


Figure 1. The Vegetation Condition Report for Kansas for September 22 – October 5 from K-State’s Ecology and Agriculture Spatial Analysis Laboratory shows that the area of highest biomass production continues to shrink eastward. Areas of reduced photosynthetic activity are increasingly visible in northeast Kansas and parts of east central Kansas. Abnormally dry conditions are expanding in these areas.

Kansas Vegetation Condition Comparison
Late-Sept/Early-Oct 2015 compared to the Late-Sept/Early-Oct 2014

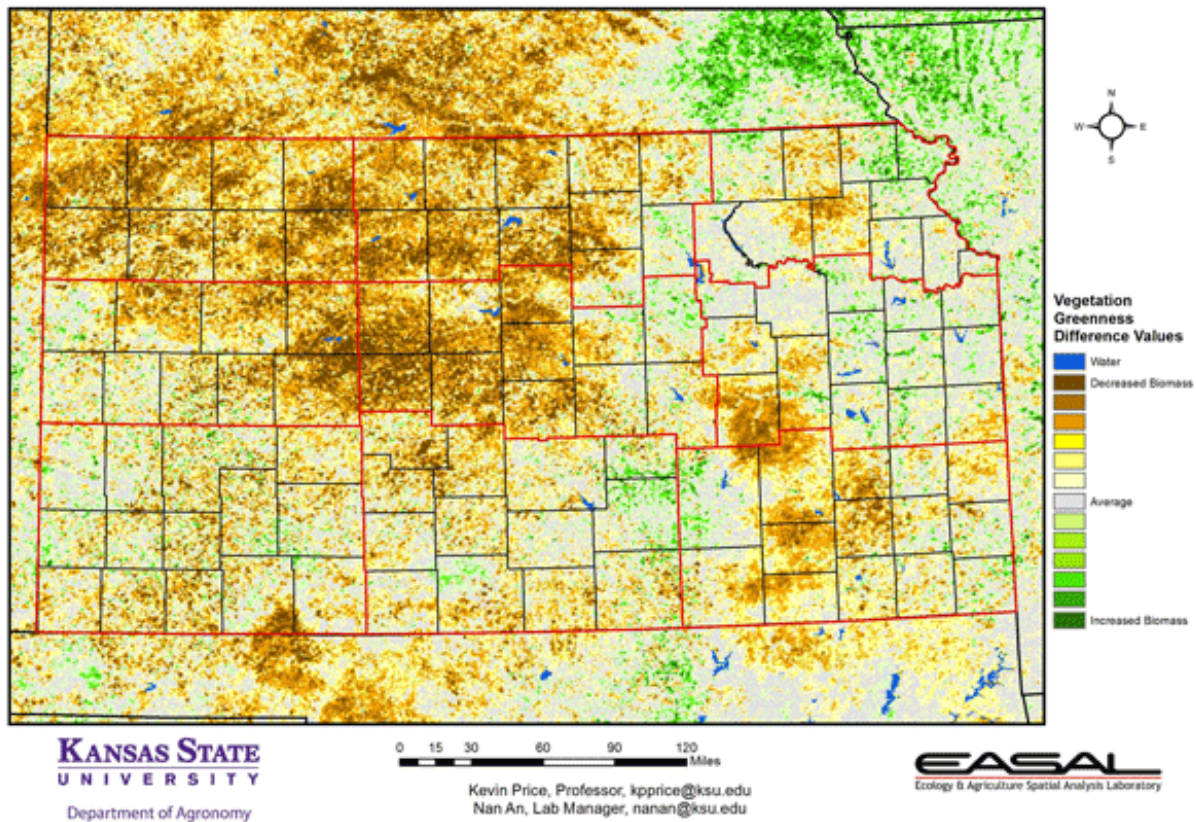


Figure 2. Compared to the previous year at this time for Kansas, the current Vegetation Condition Report for September 22 – October 5 from K-State’s Ecology and Agriculture Spatial Analysis Laboratory shows much of Northwest, North Central, and Central Divisions have lower NDVI values. These areas have only recently had moisture 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 have had a drier September than last year.

Kansas Vegetation Condition Comparison

Late-Sept/Early-Oct 2015 compared to the 26-Year Average for Late-Sept/Early-Oct

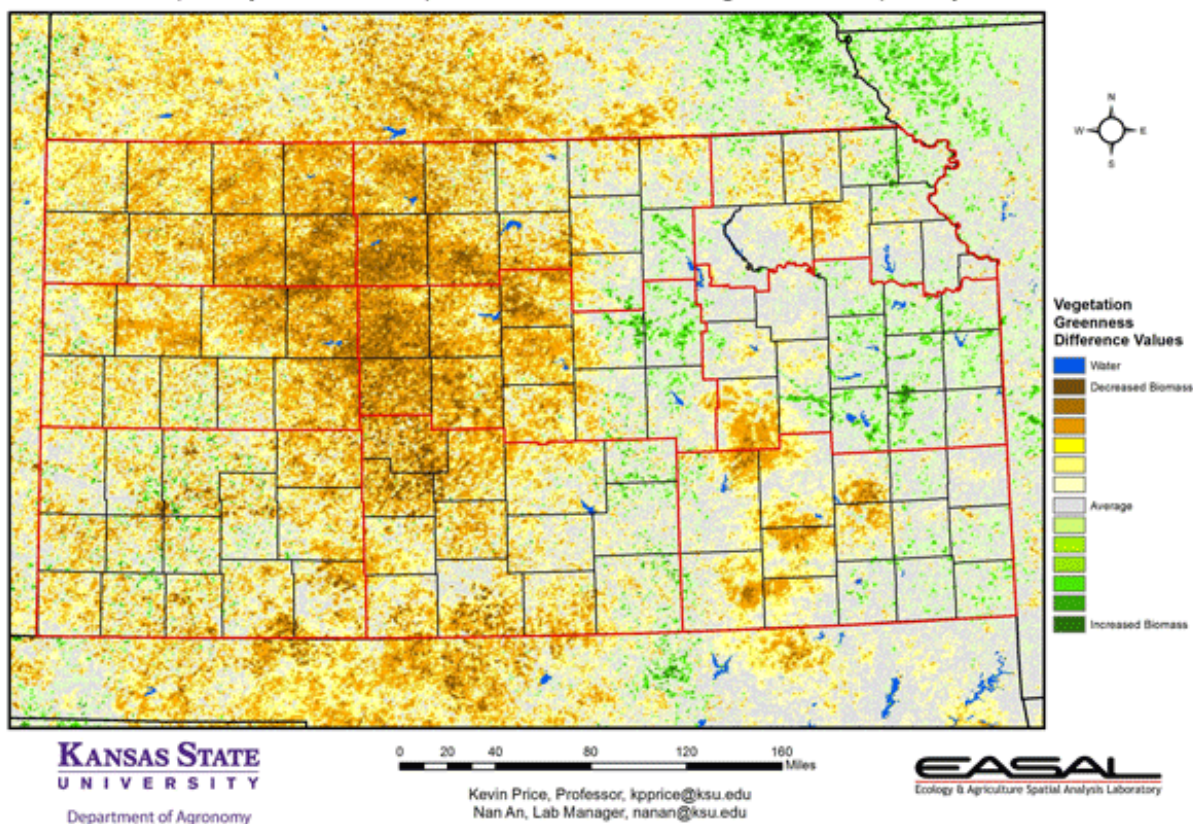


Figure 3. Compared to the 26-year average at this time for Kansas, this year's Vegetation Condition Report for September 22 – October 5 from K-State's Ecology and Agriculture Spatial Analysis Laboratory shows that the western half of the state has at- or below-average photosynthetic activity. The epicenter 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 40: 09/22/2015 - 10/05/2015

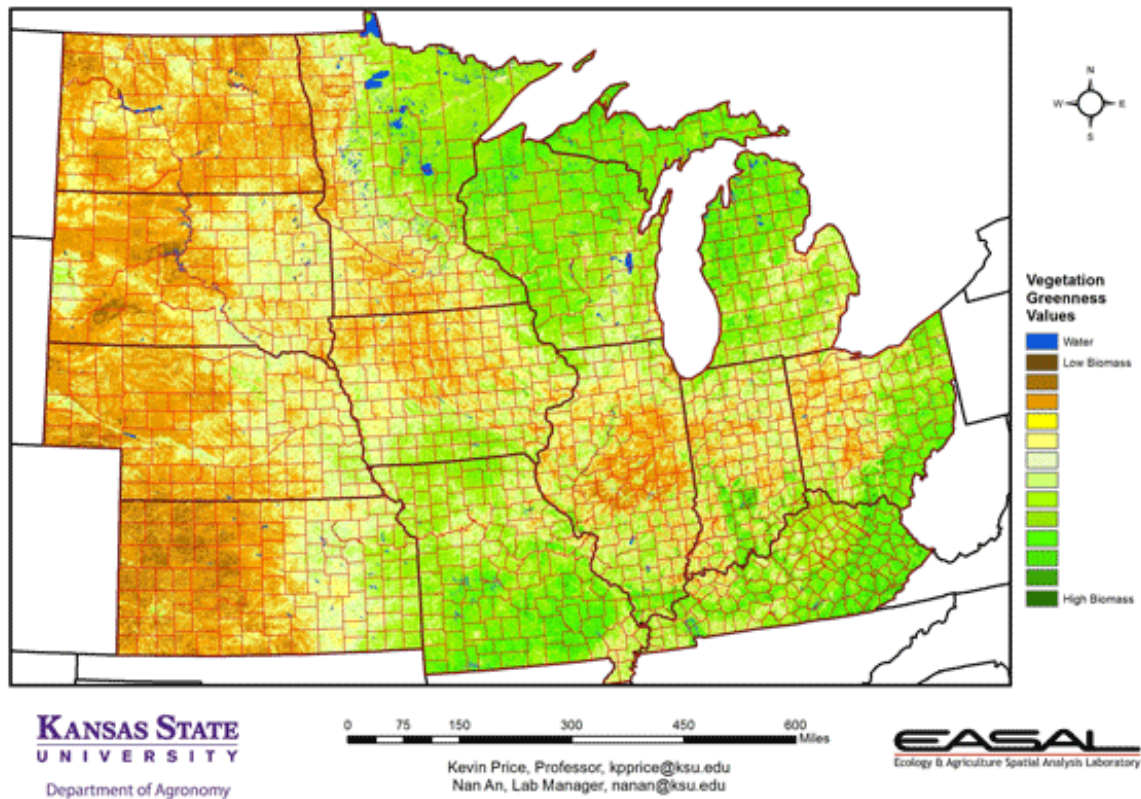


Figure 4. The Vegetation Condition Report for the Corn Belt for September 22 – October 5 from K-State’s Ecology and Agriculture Spatial Analysis Laboratory shows that the area of greatest photosynthetic activity is concentrated in the northern and southern parts of the region. Favorable moisture conditions have resulted in high photosynthetic activity. As crops mature and harvest expands, areas of lower NDVI values continue to increase as well.

U.S. Corn Belt Vegetation Condition Comparison
Late-Sept/Early-Oct 2015 Compared to Late-Sept/Early-Oct 2014

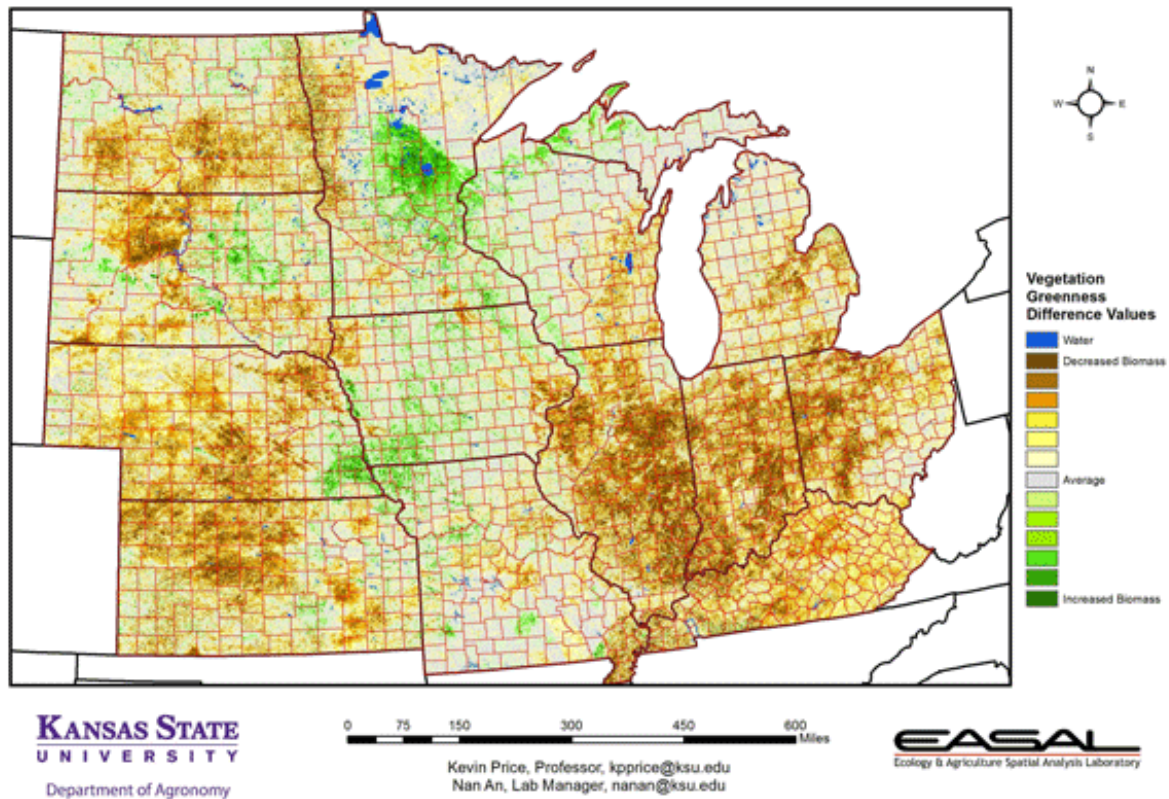


Figure 5. The comparison to last year in the Corn Belt for the period for September 22 – October 5 from K-State’s Ecology and Agriculture Spatial Analysis Laboratory shows lower photosynthetic activity across most of the region. Where there are pockets of higher NDVI values, this is likely due to late-planted spring crops that are slower in maturing. In North Dakota, crop progress is generally well ahead of last year’s development.

U.S. Corn Belt Vegetation Condition Comparison
Late-Sept/Early-Oct 2015 Compared to the 26-Year Average for Late-Sept/Early-Oct

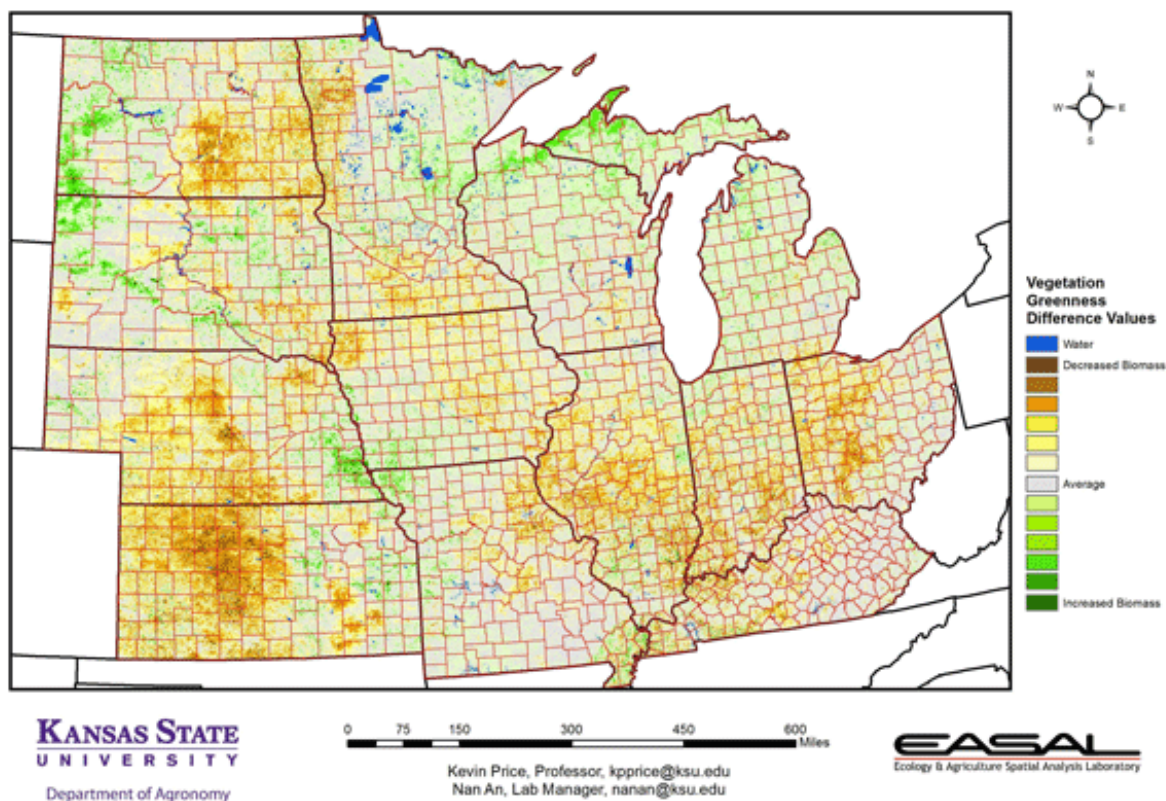


Figure 6. Compared to the 26-year average at this time for the Corn Belt, this year's Vegetation Condition Report for September 22 – October 5 from K-State's Ecology and Agriculture Spatial Analysis Laboratory shows most of the region has average biomass production. Lower NDVI values are most evident in western Kansas and central Nebraska, where drought conditions are worsening.

Continental U.S. Vegetation Condition

Period 40: 09/22/2015 - 10/05/2015

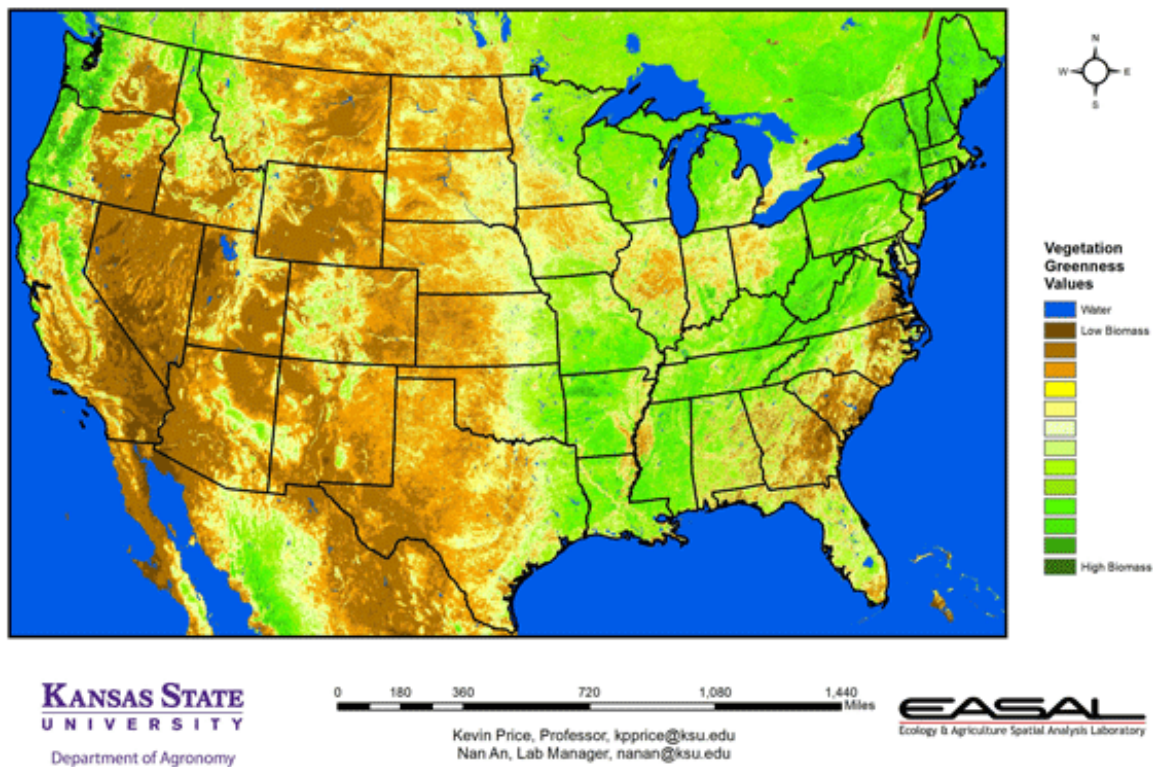


Figure 7. The Vegetation Condition Report for the U.S for September 22 – October 5 from K-State’s Ecology and Agriculture Spatial Analysis Laboratory shows that the area of highest photosynthetic activity is centered in the Appalachians of West Virginia and Tennessee. Lower NDVI values are noticeable from Georgia through the Carolinas. Flooding rains have supplanted drought as a concern in these areas. Increases in NDVI values are notable along the western Cascades in Oregon, where cooler and rainier weather have been present.

Continental U.S. Vegetation Condition Comparison
Late-Sept/Early-Oct 2015 Compared to Late-Sept/Early-Oct 2014

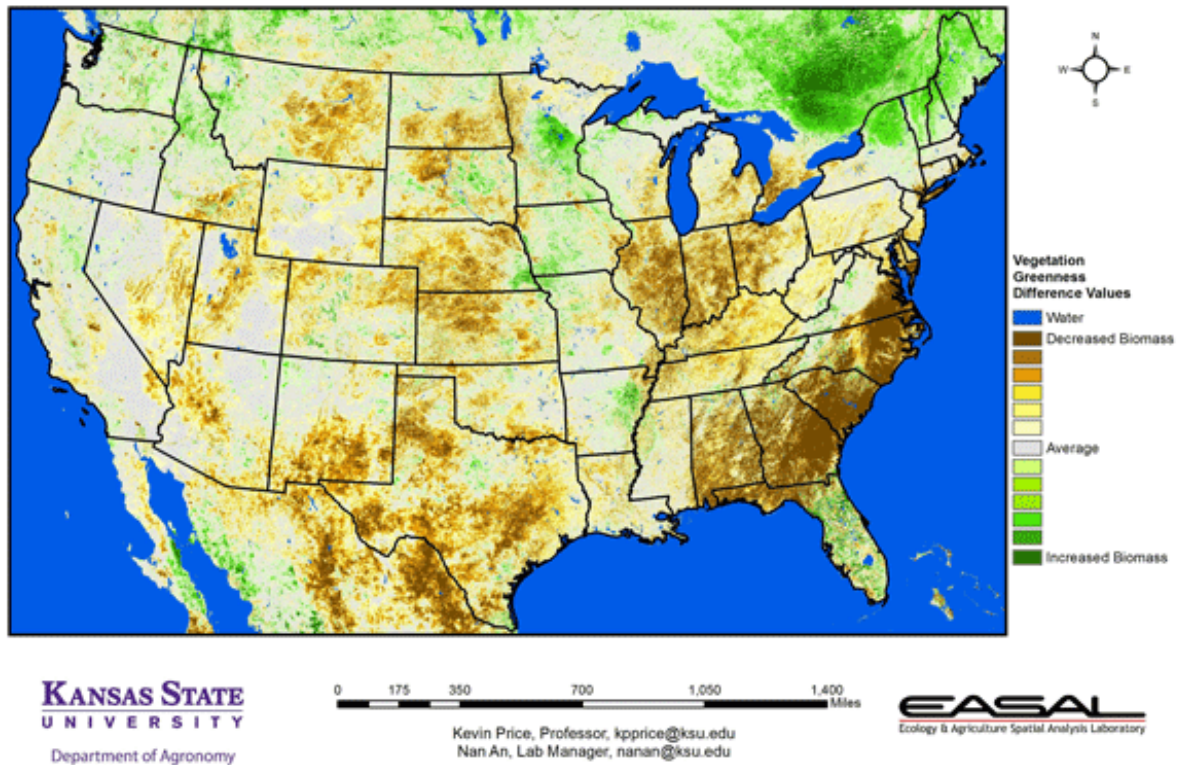


Figure 8. The U.S. comparison to last year at this time for the period September 22 - October 5 from K-State's Ecology and Agriculture Spatial Analysis Laboratory shows that lower NDVI values are most evident from Alabama through the Carolinas. Little change is evident in Oregon and Northern California, where drought remains unchanged from last year.

Continental U.S. Vegetation Condition Comparison
Late-Sept/Early-Oct 2015 Compared to 26-year Average for Late-Sept/Early-Oct

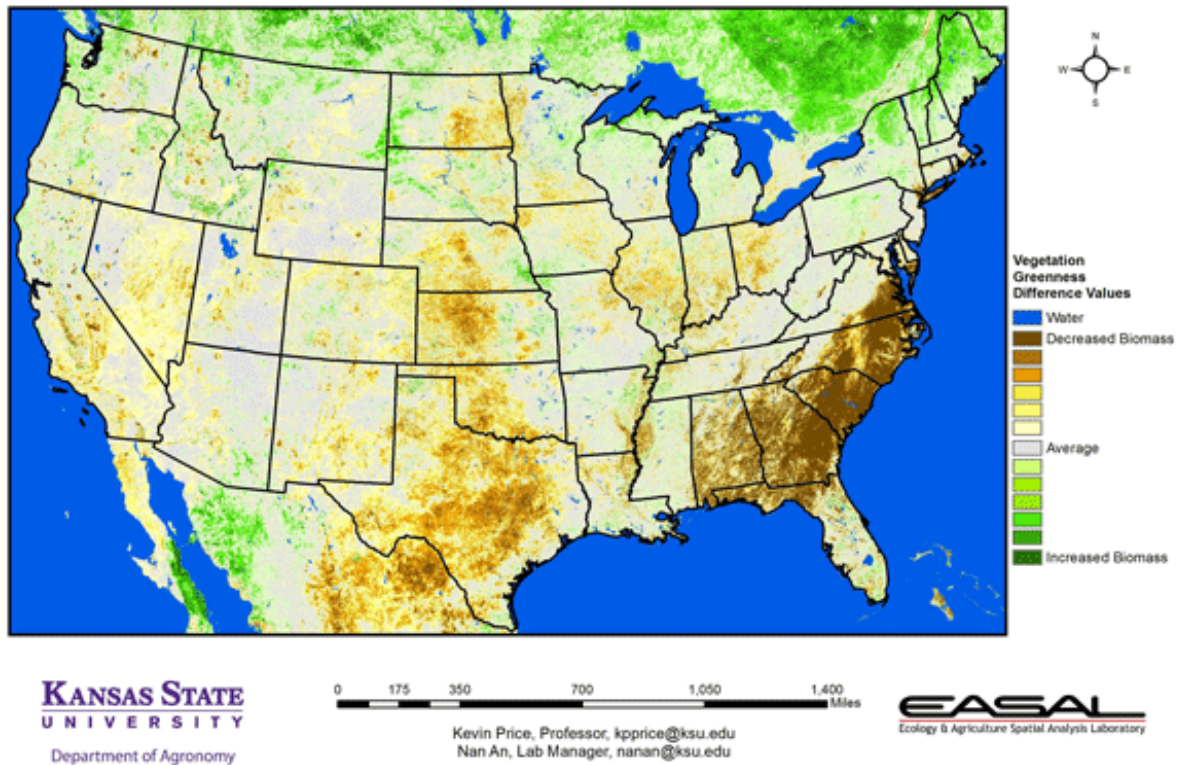


Figure 9. The U.S. comparison to the 26-year average for the period September 22 – October 5 from K-State’s Ecology and Agriculture Spatial Analysis Laboratory shows lower-than-normal photosynthetic activity in the Plains from central Nebraska through Texas. Expanding drought is the major culprit in this region. Below-average NDVI values are also visible from Alabama through the southern Atlantic Coast states. High rainfall has been the issue in these areas.

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