Issue 456

K-STATE
Research and Extension

Extension Agronomy

eUpdate

05/16/2014

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.

eUpdate Table of Contents | 05/16/2014 | Issue 456

1. Row crop planting progress and conditions in Kansas

For all row crops, planting progress in Kansas is further along this year than it was at the same time last year. Corn is the furthest along, but air and soil temperatures during this last week (May 12-16) did not help progress the crop. Because of the slow progress of the crop, differences in planting date of about one week or even more will be hard to notice at the end of the season. For both soybean and sorghum, planting progress is ahead of last year, and the coming weeks will be critical in shaping the potential yield.

Corn status in Kansas

The most recent Kansas Agricultural Statistics (KAS) crop progress report estimated that almost three-fourths of the Kansas' corn crop had now been planted as of earlier this week, ahead of the average (63%) and well above last year's corn planting progress (29% for 2013 season). KAS also reported that 35% of the corn is already above the ground, compared to the 5-yr average (30%). Last year at this time, only 5% of the corn had emerged.

One of the most critical factors for corn during emergence is the uniformity of the seedlings. Uneven corn stands causes yield losses. For example, when 25-50% of a corn stand emerges between one to three weeks late, yield losses can be close to 7-10%, according to published research by Emerson Nafziger and colleagues at the University of Illinois. Yield losses increased as the difference in emergence in the corn stands are exacerbated.

The main factors controlling the uniformity in corn are soil moisture, soil temperature, seeding depth, and good seed-soil contact. In addition, planting dates can affect uniformity of emergence in corn. In a demonstration experiment planted this year, early (March 21) vs. "normal" (April 16) planting dates resulted in differences in plant emergence uniformity. This was related to the soil temperature at each planting time. For the early planting date, soil temperature measured at 4 inches was 46°F; while for the normal planting date was 52°F (Figure 1).

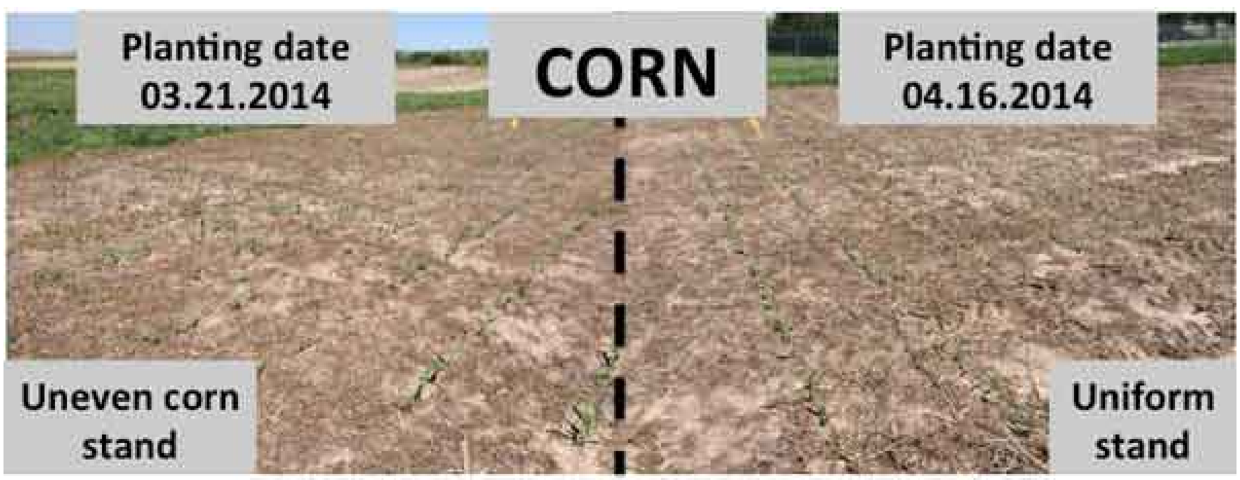

Figure 1. Corn planting dates affected stand uniformity in this test. Photo by Ignacio Ciampitti,

K-State Research and Extension.

Soybean status in Kansas

The overall planting progress of soybean in the most recent Kansas Agricultural Statistics report was 16%, well ahead from the last year's 1%, but within the average of the last 5-year planting conditions and progress (15% average). The overall emergence for soybean takes place between 5 to 20 days after planting, depending on soil moisture, soil temperature, and seeding depth among other critical factors.

After planting, acceptable soil temperatures for proper soybean emergence and establishment are around 50 °F. Although soybean can emerge at lower temperatures, stand uniformity and final number of plants can be compromised. A research study at Purdue University showed that the number of days from planting until emergence will be reduced as the planting date gets later, related to higher soil temperatures, which is not surprising. Still, final plant stand (success of emergence) was highest when all plants emerged within two weeks after planting and soybeans were planted when soil temperatures were not too cool. A planting date experiment is currently underway in Kansas for diverse locations from central to eastern areas. For Manhattan, the first planting date was April 22nd with soil temperatures around 59 °F (Figure 2). Plants emerged after 20 days and stand uniformity was not especially good, related to the lower temperatures that occurred last week.

Figure 2. Early planting of soybean and stand uniformity. Photo by Ignacio Ciampitti, K-State Research and Extension.

Sorghum status in Kansas

Kansas Agricultural Statistics projected that 3% of sorghum crop in Kansas was planted as of May 11, ahead of last year's pace (1%), but slightly below the 5-yr average (4%).

Optimum soil temperatures for sorghum are around 50-55 °F. If the crop is planted when the soil temperature is below 50 °F and in wet soils, failure in emergence can be expected (Figure 3). In a demonstration plot, sorghum was planted in late March (March 21) and just few plants were coming out 4 to 5 weeks after planting. In contrast, when plots were planted during the first week of May, when soil temperature were above 60 °F (measured at 4"), both corn and sorghum emerged about one-week after planting (Figure 4).

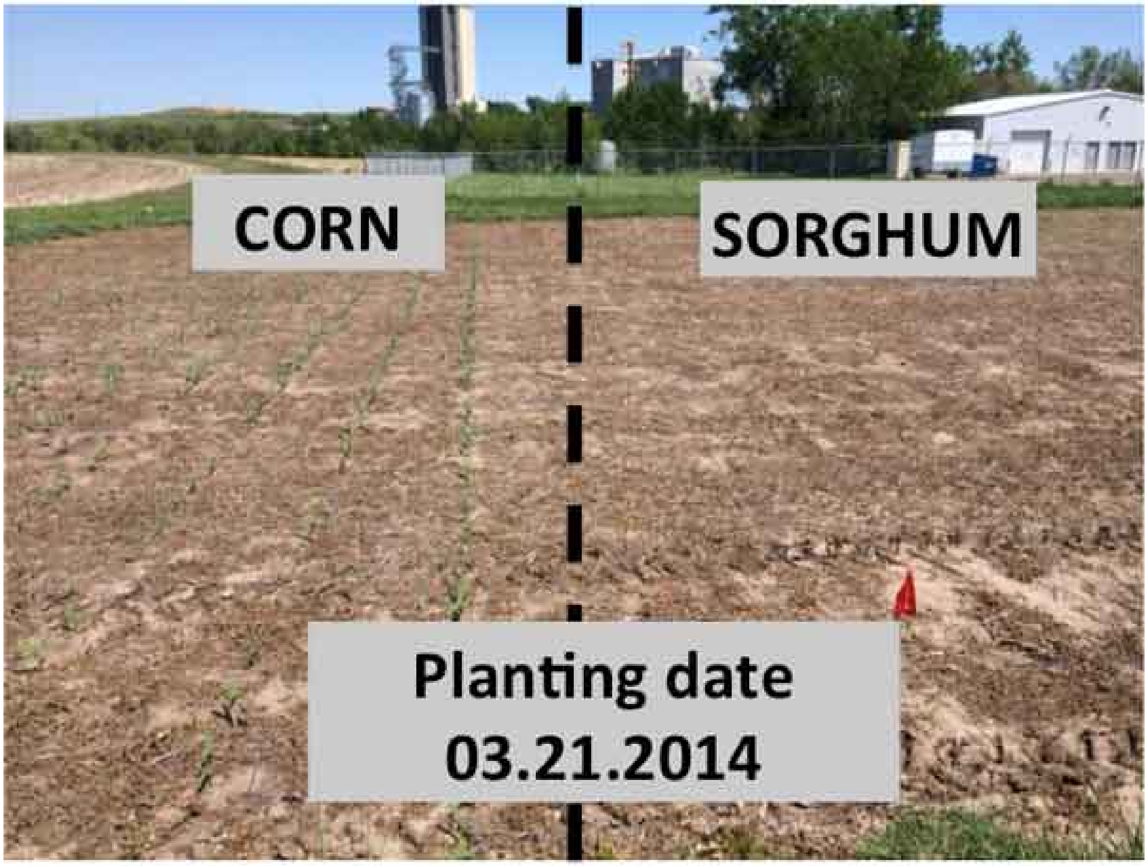

Figure 3. Sorghum vs. corn emergence when planted early on March 21. Photo by Ignacio Ciampitti, K-State Research and Extension.

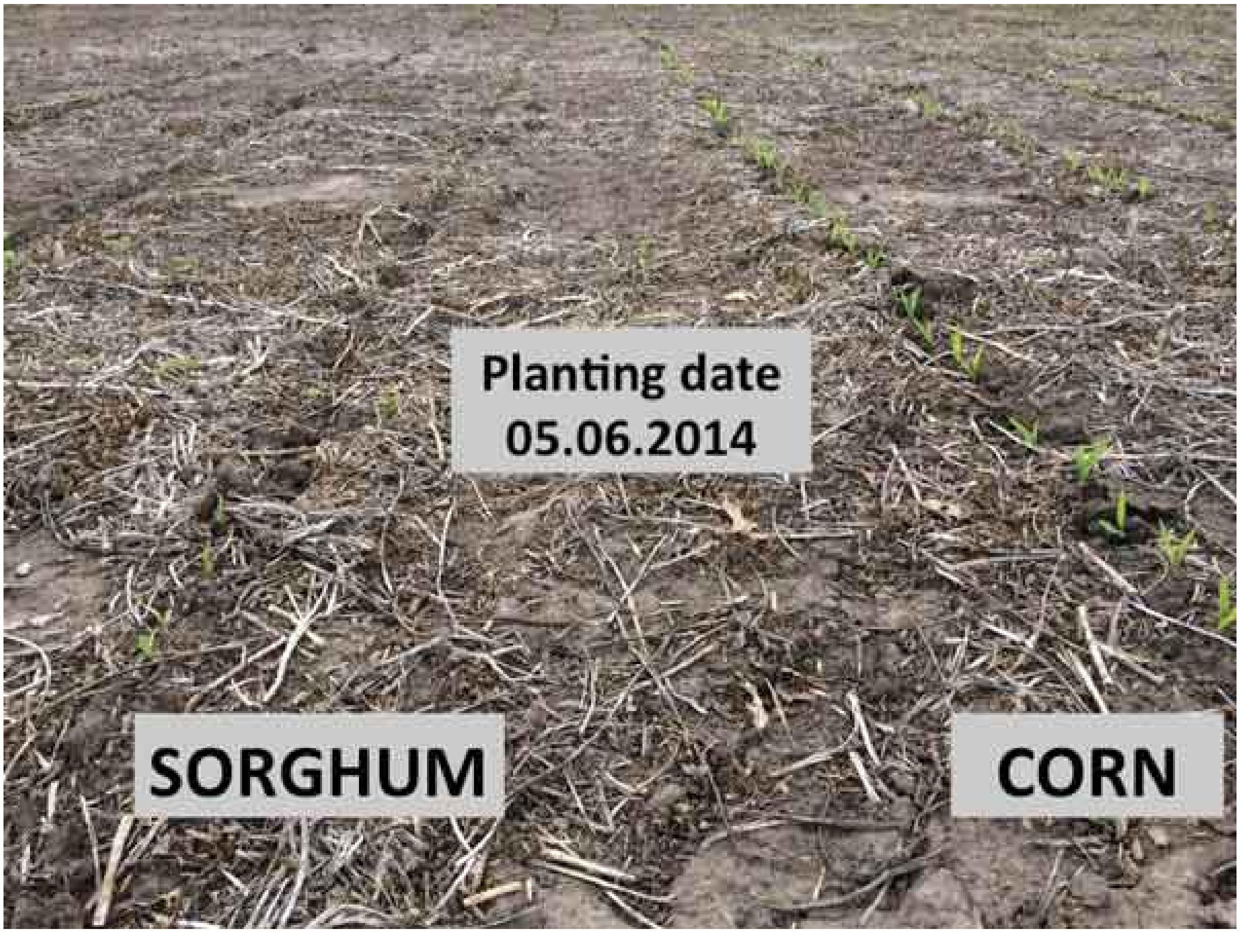

Figure 4. Sorghum vs. corn emergence when planted at a "normal" planting time, May 6. Stand uniformity was similar in the two crops. Photo by Ignacio Ciampitti, K-State Research and Extension.

Thus, soil temperature is a much more critical factor for sorghum then corn. In a planting date experiment, sorghum planted during the first week of May showed excellent uniformity of emergence and final plant stand (Figure 4). Plants emerged a week after planting.

Figure 5. Sorghum stand uniformity when planted about the first week of May, with a soil

temperature at 4” of about 65 °F. Photo by Ignacio Ciampitti, K-State Research and Extension.

Summary

As the growing season progresses, the low temperatures during this week will minimize the difference in emergence and seedling development that might normally be seen with different planting dates. Emergence and early growth has been unusually slow this spring so far due to a lack of growing degree units (GDUs). For example for Silver Lake, the GDUs accumulated from May 9-15 were 90; while for the same period in the last year, the GDUs were close to 110 (almost 20 units more in just one week). In general, for corn, 125 soil GDUs are required from planting to emergence.

One important factor to be considered is residue cover. Even though we noticed better soil moisture under more residue, the emergence process can take longer (under the current temperatures) with heavy vs. low residue. Those differences will show up within the same field as uneven crop stands.

Lastly, the low temperatures overnight on May 15-16 (mid-30s), will delay the progress of the crop, with a potentially much larger impact on the crop that was recently planted.

For more information about early season crop topics, check the following resources:

Diagnosing corn early-season growth problems (eUpdate #454, May 2nd):
https://webapp.agron.ksu.edu/agr_social/eu_article.throck?article_id=222

Soybean seeding rates and optimum plant populations (eUpdate #453, April 25th):

https://webapp.agron.ksu.edu/agr_social/eu_article.throck?article_id=218

Freeze effects injury on corn (eUpdate #452, April 18th):

https://webapp.agron.ksu.edu/agr_social/eu_article.throck?article_id=209

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

2. Soybean pest management research

Soybean yield can be affected by various pests, including weeds, diseases, and insects. The economics of soybean production have changed in the last decade, so more attention is being focused on saving soybean yield from these factors through pesticide applications. A three-year study was conducted at the East Central Experiment Field in Ottawa to evaluate soybean response to preemergence herbicides with residual weed control, foliar fungicides, and foliar insecticides.

Procedures

The experimental site was located on a Woodson silt loam. Soybean were no-till planted on 30-in. rows into sorghum stubble in 2010, corn stubble in 2011, and soybean stubble in 2013. Soybean were planted on June 21, 2010; June 9, 2011; and May 29, 2013, with soybean varieties AG4606, S47-R3, and S46-G9, respectively.

Treatments included: (1) burndown herbicide without residual; (2) burndown herbicide with residual; (3) burndown herbicide with residual + foliar fungicide at R3; and (4) burndown herbicide with residual + foliar fungicide and insecticide at R3.

Common waterhemp weed control ratings were evaluated at the V4 soybean growth stage. All treatments received 0.75 lb a.i./a glyphosate application at the V4 soybean growth stage. Fungicide and insecticide treatments were applied at the R3 reproductive stage (beginning of pod formation). No significant foliar disease pressure was observed in the trial across all three years, but some insect pressure was noted at the time of the R3 insecticide application. In 2010, one bean leaf beetle and one stinkbug per 100 feet of soybean row were noted at the time of the R3 application. In 2011, two bean leaf beetles and one corn earworm per foot of row were observed at the R3 stage. In 2013, two green clover worms and two grasshoppers per 100 feet of row were observed at R3.

Results

Soybean in 2010 were planted at a site with glyphosate-susceptible common waterhemp. As a result, excellent weed control was received across all herbicide treatments, and no significant differences were observed in soybean yield between herbicide treatments in 2010. In 2011 and 2013, soybean were planted at a site with glyphosate-resistant common waterhemp. Consequently, weed control ratings at the V4 growth stage were poor for the glyphosate and the glyphosate + 2,4-D burndown treatment compared with treatments that included saflufenacil (the active ingredient in Sharpen) and pyroxasulfone (the active ingredient in Zidua, Fierce, and Anthem).

Treatments that contained saflufenacil in the burndown mixture provided control of small emerged common waterhemp at the time of soybean planting, and the residual of pyroxasulfone maintained excellent weed control through the first 6 weeks of the growing season. Although there was a weed control difference in 2011 among herbicides with and without residual, soybean yield did not differ. In 2013, however, there was a 4.6 bu/a advantage with the residual herbicide treatment due to reduced weed competition.

Only trace levels of frogeye leaf spot disease were present in 2010 and 2013, whereas no foliar disease was observed in 2011. In 2010, soybean treated with a fungicide resulted in a 5.1 bu/a yield increase over the untreated check. Insect pressure was below the treatment threshold in 2010, but the addition of an insecticide at the R3 growth stage significantly increased soybean yield by 2.4 bu/a over soybean treated with a fungicide alone. In 2011, insect pressure reached the treatment threshold of one corn earworm per ft of soybean row, but no significant yield increase was observed with the addition of an insecticide. In 2013, insect pressure was low, and the addition of an insecticide did not significantly increase yield.

Summary

A three-year study was conducted to evaluate soybean yield response to herbicides with preemergence residual weed control, foliar fungicides, and foliar insecticides. Preemergence herbicides provided excellent control of glyphosate-resistant common waterhemp, resulting in a significant soybean yield increase of 4.6 bu/a in 2013. Soybean yield was significantly increased with the addition of a foliar fungicide and foliar fungicide + insecticide applied at the R3 growth stage in 2010. Yield increases of 5.1 and 7.5 bu/a were observed for the fungicide and fungicide + insecticide treatments, respectively.

Effect of herbicides, foliar fungicides, and foliar fungicides on soybean yields and common waterhemp control: Ottawa, 2010-2013

Year	Preemergence herbicide and rate (lb a.i./acre) (All plots also received a postemergence glyphosate treatment at V4)	Treatment at R3	Common waterhemp % control	Soybean yield (bu/acre)
2010	Glyphosate (0.75)	--	96.7	45.2
	Glyphosate (0.75) + saflufenacil* (0.02) + imazethapyr* (0.06)	--	92.3	44.9
	Glyphosate (0.75) + saflufenacil (0.02) + imazethapyr (0.06)	Pyraclostrobin (fungicide)	90.8	50.0
	Glyphosate (0.75) + saflufenacil (0.02) + imazethapyr (0.06)	Pyraclostrobin (fungicide) + zeta-cypermethrin (insecticide)	96.7	52.4
	LSD (0.05)		8.9	2.1
2011	Glyphosate (0.75)	--	15.0	24.6
	Glyphosate (0.75) + saflufenacil (0.02) + imazethapyr (0.13)	--	88.3	23.5
	Glyphosate (0.75) + saflufenacil (0.02) + imazethapyr (0.13)	Fluxapyroxad (fungicide) + pyraclostrobin (fungicide)	89.7	24.8
	Glyphosate (0.75) + saflufenacil (0.02) + imazethapyr (0.13)	Fluxapyroxad (fungicide) + pyraclostrobin	92.7	26.3

		(fungicide) + alpha-cypermethrin (insecticide)		
	LSD (0.05)		12.5	3.4
2013	Glyphosate (0.75) + 2,4-D (0.50)	--	6.7	29.3
	Glyphosate (0.75) + saflufenacil (0.02) + imazethapyr (0.13)	--	89.3	33.8
	Glyphosate (0.75) + saflufenacil (0.02) + imazethapyr (0.13)	Fluxapyroxad (fungicide) + pyraclostrobin (fungicide)	93.3	36.4
	Glyphosate (0.75) + saflufenacil (0.02) + imazethapyr (0.13)	Fluxapyroxad (fungicide) + pyraclostrobin (fungicide) + alpha-cypermethrin (insecticide)	93.3	35.7
	LSD (0.05)		9.9	3.3

Note: In 2010, the common waterhemp population was susceptible to glyphosate. In 2011 and 2013, the common water hemp population was resistant to glyphosate.

* Saflufenacil is the active ingredient in Sharpen. Imazethapyr is the active ingredient in Zidua, Fierce, and Anthem.

Source: Kansas Field Research 2014, SRP-1102 http://www.ksre.ksu.edu/bookstore/pubs/SRP1102.pdf

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

Eric Adee, East Central Experiment Field, Agronomist-in-Charge
eadee@ksu.edu

3. Use of legumes in wheat-bermudagrass pastures

Bermudagrass is a productive forage species when intensively managed. However, it has periods of dormancy and requires proper use to maintain forage quality. Bermudagrass also requires adequate nitrogen (N) fertilizer to optimize forage yield and quality. Interseeding wheat or other small grains can lengthen the grazing season but this requires additional N fertilization.

Legumes in the bermudagrass pasture could improve forage quality and reduce fertilizer usage, but legumes are difficult to establish and maintain with the competitive grass. Clovers can maintain summer survival once established in bermudagrass sod and may be productive enough to substitute for some N fertilization. Including a winter annual legume with wheat could produce more N and forage crude protein.

At the Southeast Agricultural Research Center, we conducted a study to compare dry cow performance on a wheat-bermudagrass pasture system that included summer legumes with a single 50 lb/a N application vs. wheat-bermudagrass with additional N applications of 100 lb/a and no legumes.

Procedures

The research was conducted on eight five-acre "Hardie" bermudagrass pastures at the Mound Valley Unit of the Southeast Agricultural Research Center (Parsons silt loam soil). Everest wheat (90 lb/a) was interseeded (no-till) into all eight bermudagrass sod pastures on September 19, 2012. The next day, 40 lb/acre of Austrian winter fieldpeas was interseeded into the four pastures assigned to the Legume treatment. These Legume pastures then received additional red clover (8 lb/acre) and ladino clover (3 lb/acre) by broadcast on march 7, 2013. Pastures that received no legumes were fertilized with 46 lb/acre N as urea each on February 5 and 50 lb/acre N on May 14, 2013. All pastures, both with and without clover, received 45-26-27 of N-P_2O_5-K_2O on July 2.

Thirty-two pregnant fall-calving cows of predominantly Angus breeding were weighed on consecutive days and assigned randomly by weight to pastures on April 10. On July 23, the cows were weighed again on consecutive days and removed from the pastures.

Results

Gains during the 2013 season were greater by an average of 20 percent for the Legume than the Nitrogen system. In the years that we've conducted this study, we've found increased performance with the legume about half of the time, and no difference the other half. Never has there been a reduction from the use of legumes in lieu of N.

Performance of cows grazing bermudagrass pastures interseeded with wheat and fertilized with nitrogen or in
Mound Valley Unit, Southeast Agricultural Research Center, 2013

Factor	Nitrogen (no legume)	Legume
Nitrogen fertilizer (lb/acre)	45 (July) + 46 (Feb) + 50 (May)	45 (July)
Number of cows	16	16
Number of days on pasture	104	104
Stocking rate (cows/acre)	0.8	0.8
Cow gain (lbs) after 104 days	207a	249b
Cow daily gain (lbs)	1.99a	2.40b
Cow gain per acre (lb/acre)	259	312

Means within a row followed by a different letter were significantly different at P = 0.05.

Source: Agricultural Research 2014, K-State Report of Progress 1105, Southeast Agricultural Research Center, http://www.ksre.ksu.edu/bookstore/pubs/SRP1105.pdf

Joe Moyer, Southeast Agricultural Research Center, Forage Agronomist
jmoyer@ksu.edu

Lyle Lomas, Southeast Agricultural Research Center, Head and Animal Scientist
llomas@ksu.edu

4. Wheat tours scheduled in north central and northwest Kansas

Many wheat tours and field days are scheduled for the coming weeks in north central and northwest Kansas. At the link below you'll find a complete listing of all locations and dates, and a description of the varieties at each location. We hope you can make one or more of our wheat tours and field days this year.

http://www.northwest.ksu.edu/p.aspx?tabid=96

Lucas Haag, Northwest Area Crops and Soils Specialist
lhaag@ksu.edu

5. South Central Experiment Field Spring Field Day, May 20

The Spring Field Day at the South Central Experiment Field will be held May 20, starting at 5:30 p.m. The event begins at the Redd Foundation field, located at 7904 South Highpoint Road (two miles west of Partridge on Trail West Road, then half mile south on Highpoint Road). The second half of the evening will be at the field headquarters, 10620 S. Dean Road.

The main topics will be wheat and winter canola. Among those speaking will be Alan Fritz, K-State wheat breeder at Manhattan, and Erick DeWolf, K-State Extension plant pathologist.

More information about the field day is available by calling Gary Cramer, agronomist-in-charge, at 620-662-9021. A meal will follow the field day.

6. Comparative Vegetation Condition Report: April 29 - May 12

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=CRP3Y5NIggw
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 25-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, service climatologist:

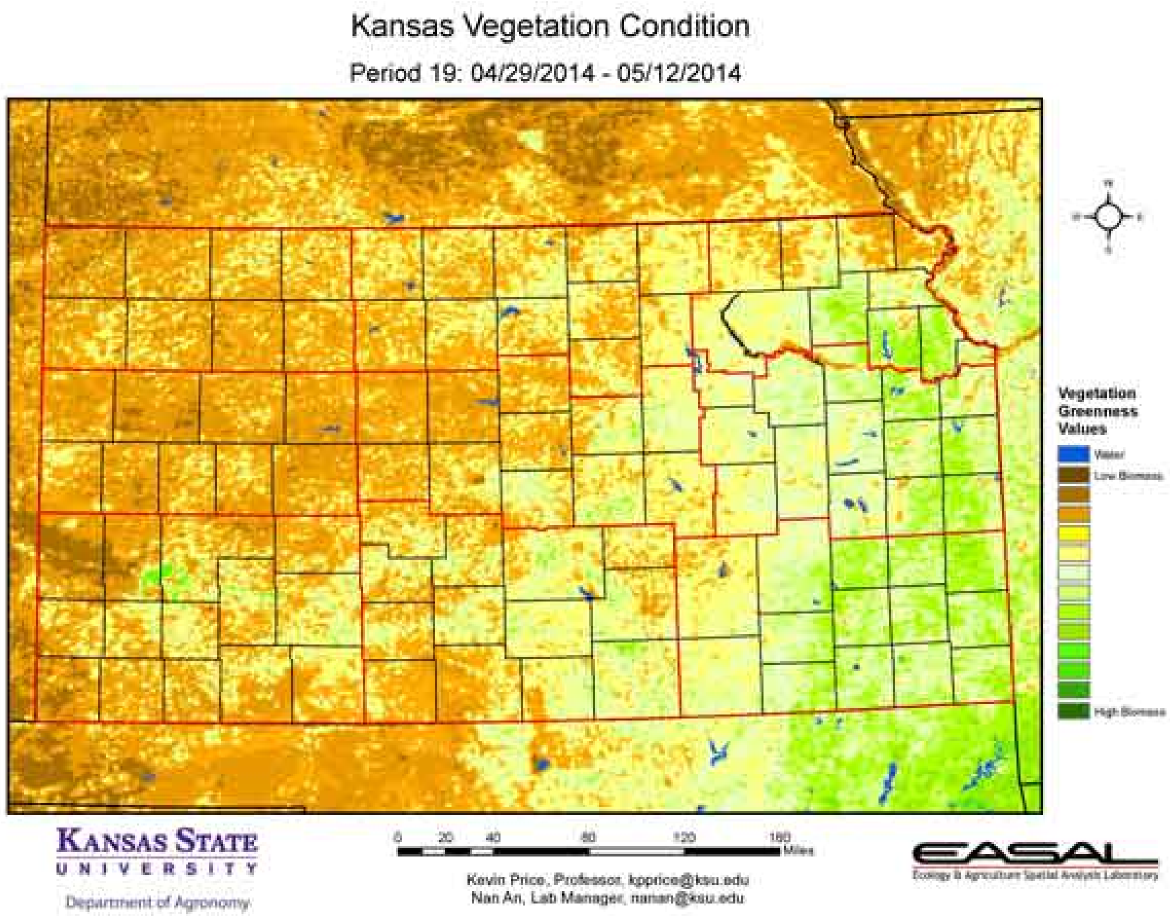

Figure 1. The Vegetation Condition Report for Kansas for April 29 – May 12 from K-State's Ecology and Agriculture Spatial Analysis Laboratory shows that vegetative activity continues to expand northward in the eastern third of the state. In the western areas, biomass production is very limited. Extreme temperatures – both heat and freeze – coupled with drought have stressed vegetation.

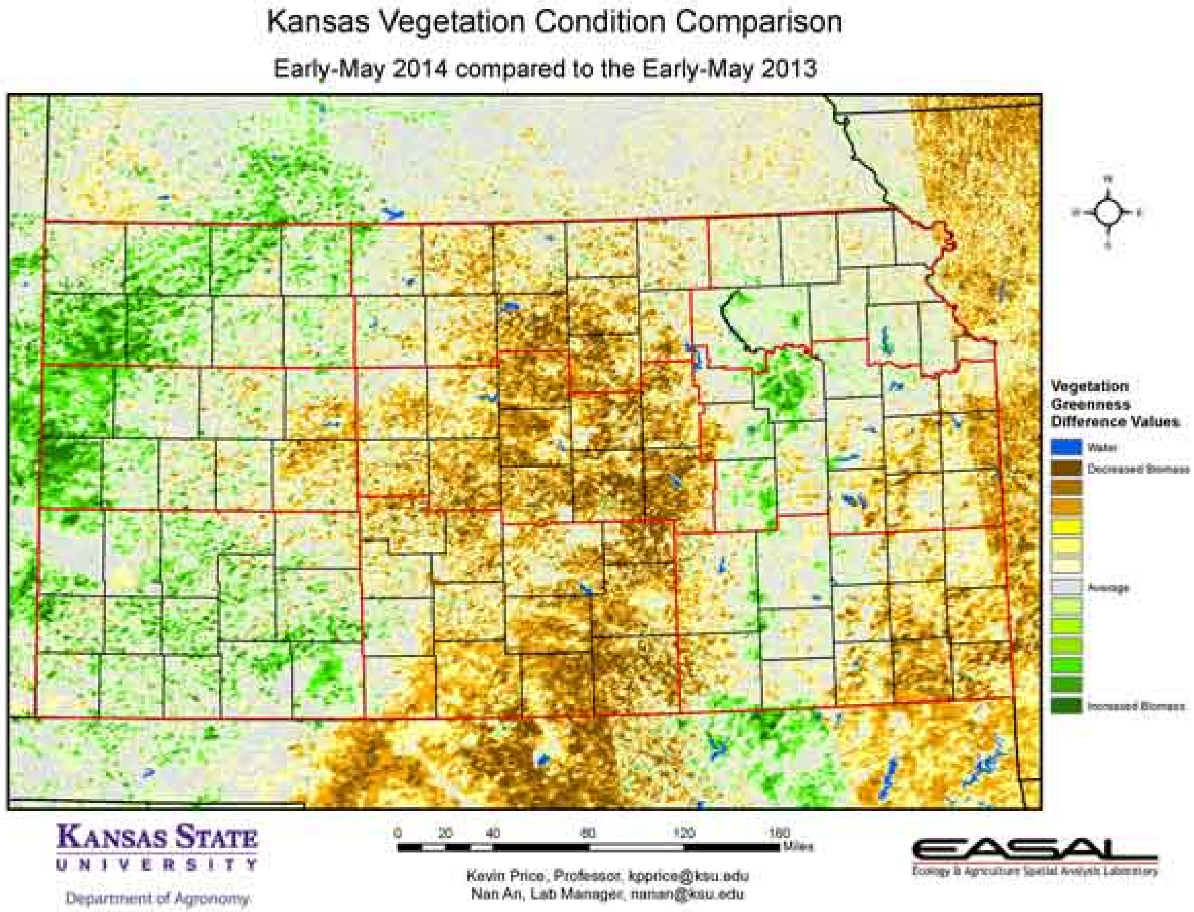

Figure 2. Compared to the previous year at this time for Kansas, the current Vegetation Condition Report for April 29 – May 12 from K-State's Ecology and Agriculture Spatial Analysis Laboratory shows that parts of northwest and west central Kansas have higher NDVI values. This is due mainly to the extremely poor conditions that dominated the region last year rather than high productivity this year.

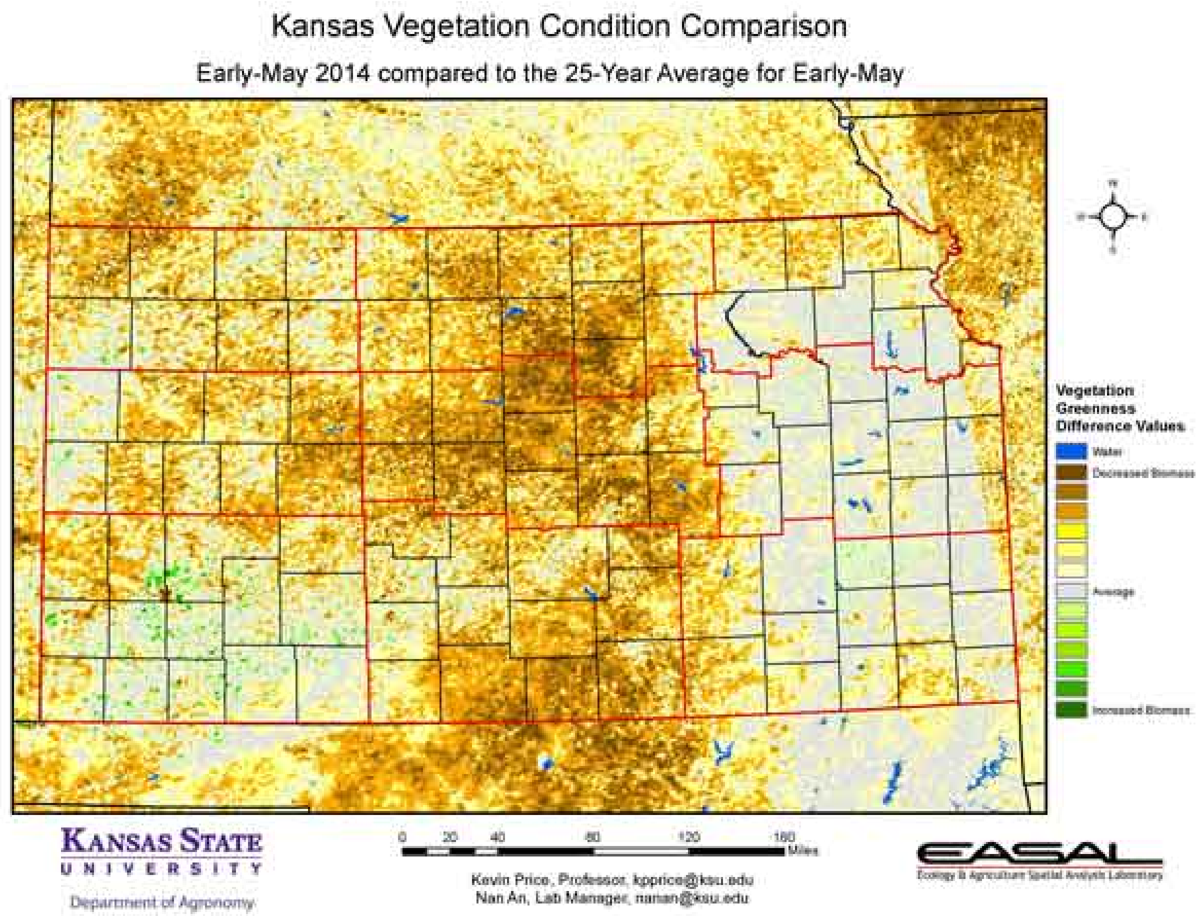

Figure 3. Compared to the 25-year average at this time for Kansas, this year's Vegetation Condition Report for April 29 – May 12 from K-State's Ecology and Agriculture Spatial Analysis Laboratory shows much-below-average photosynthetic activity in the central third of the state. Cold temperatures and dry conditions have stressed vegetation. This stress is also beginning to develop in southeast Kansas, while parts of southwest Kansas are benefitting from the early season irrigation during this two-week composite period.

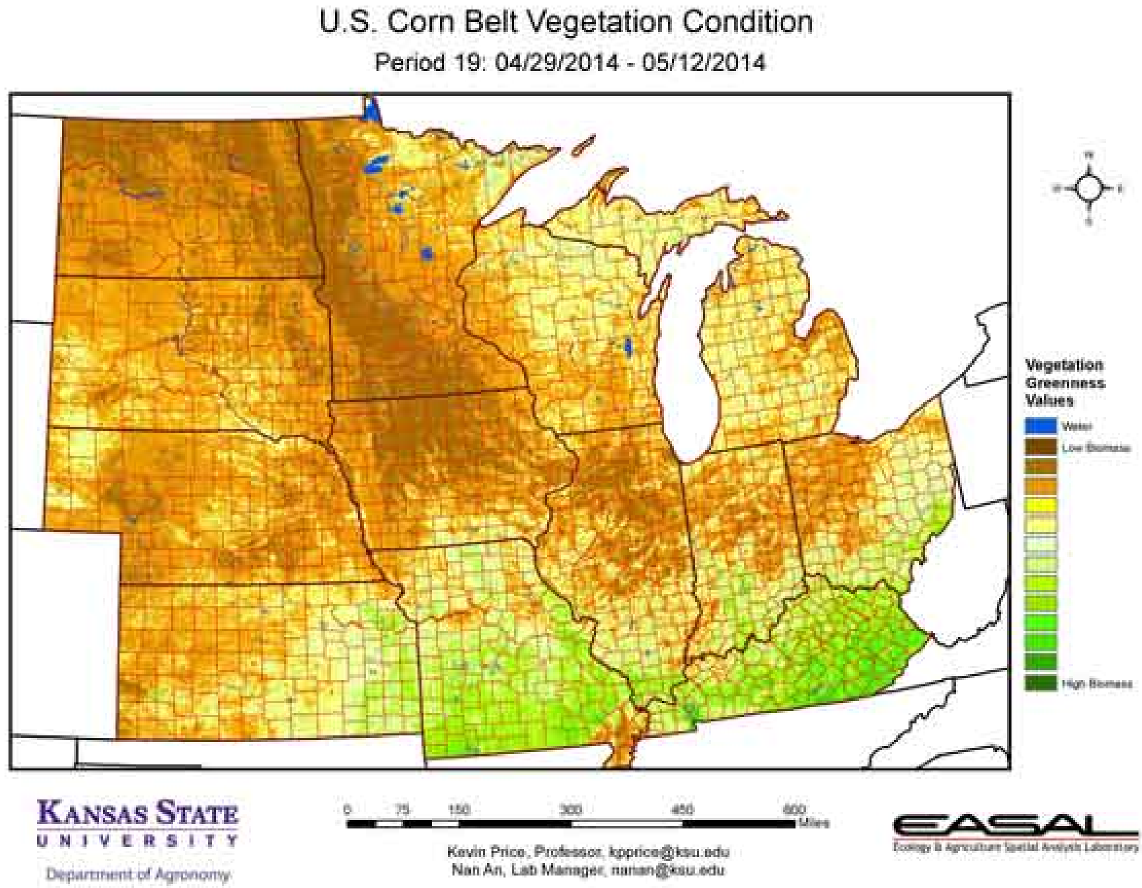

Figure 4. The Vegetation Condition Report for the Corn Belt for April 29 – May 12 from K-State's Ecology and Agriculture Spatial Analysis Laboratory shows that very low biomass productivity continues in the northern portions of the region. There are still reports of 4-inch soil temperatures below freezing in parts of North Dakota and Minnesota.

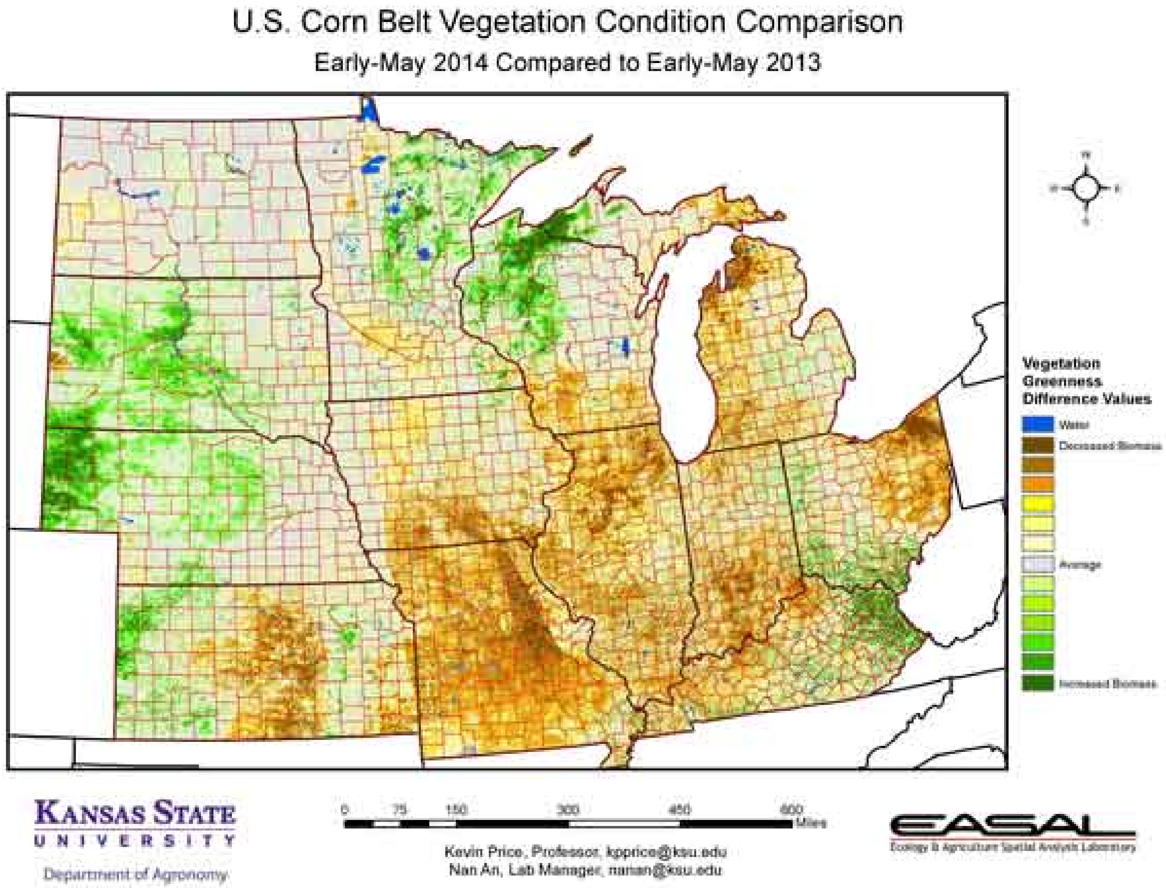

Figure 5. The comparison to last year in the Corn Belt for the period April 29 – May 12 from K-State's Ecology and Agriculture Spatial Analysis Laboratory shows lower biomass production is centered in Missouri and Illinois. Delayed planting and continued cool weather have reduced vegetative activity. In central Kansas, the combination of drought and late freeze (Apr 15^{th}) have reduced photosynthetic activity.

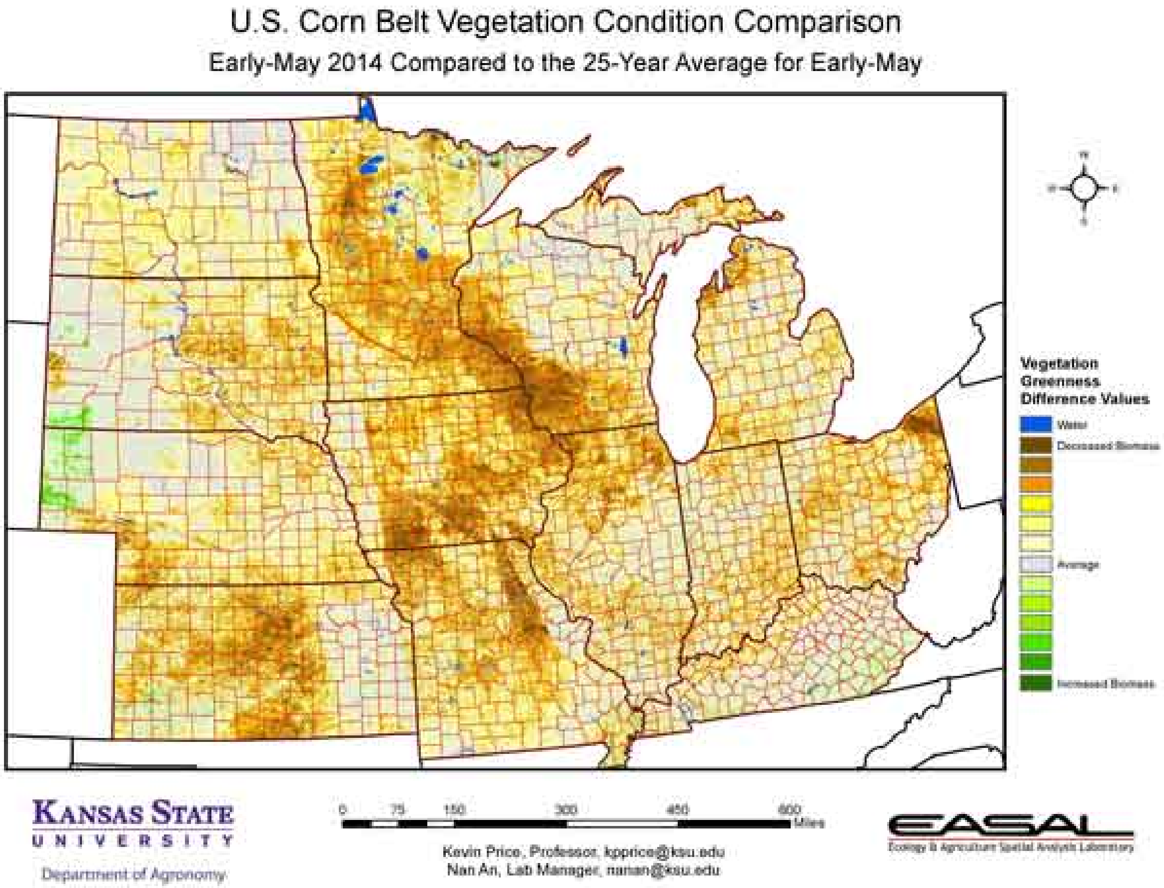

Figure 6. Compared to the 25-year average at this time for the Corn Belt, this year's Vegetation Condition Report for April 29 – May 12 from K-State's Ecology and Agriculture Spatial Analysis Laboratory shows that below-average biomass production is concentrated in the center of the region. In the eastern part of this area, the main culprits are delayed planting, cool temperatures, and cool soils. In Kansas, the main culprit is drought and the severe winter, coupled with freezing temperatures on April 15th.

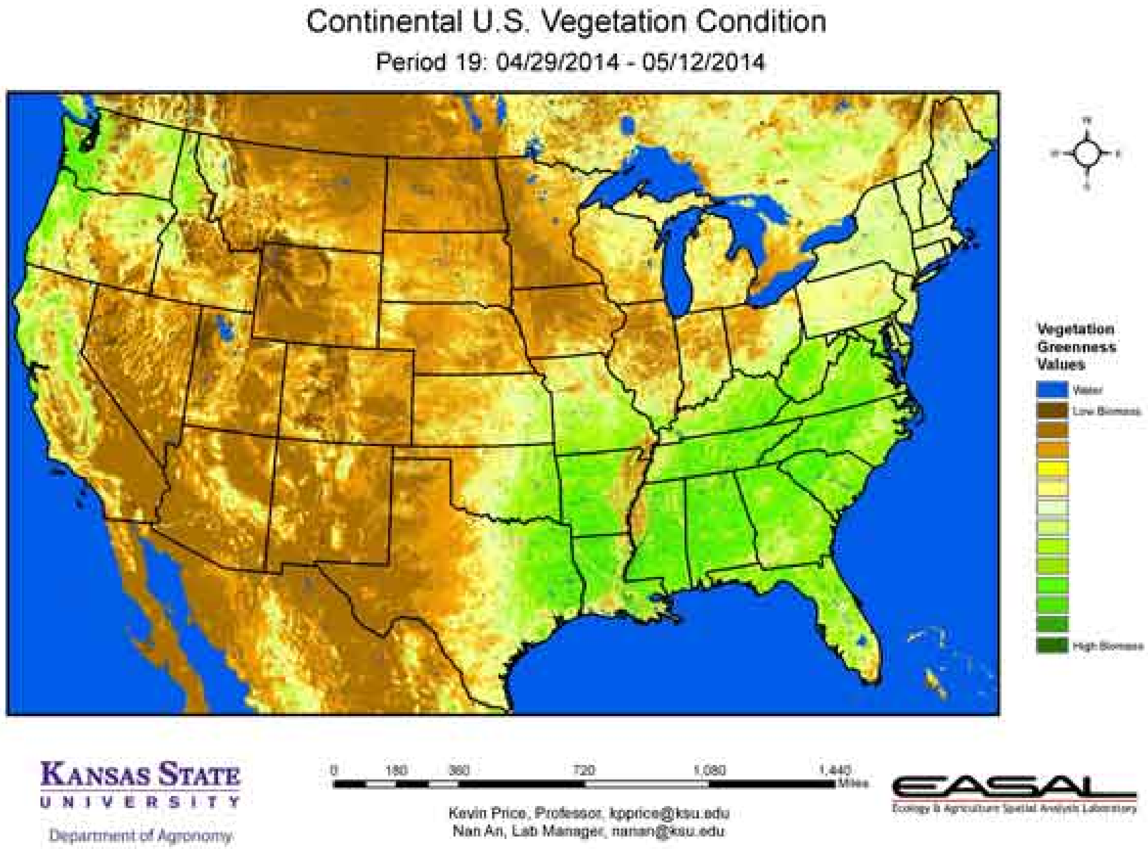

Figure 7. The Vegetation Condition Report for the U.S. for April 29 – May 12 from K-State's Ecology and Agriculture Spatial Analysis Laboratory shows that increased vegetative activity continues to spread northward along the Atlantic Seaboard, and also remains a feature in the Pacific Northwest.

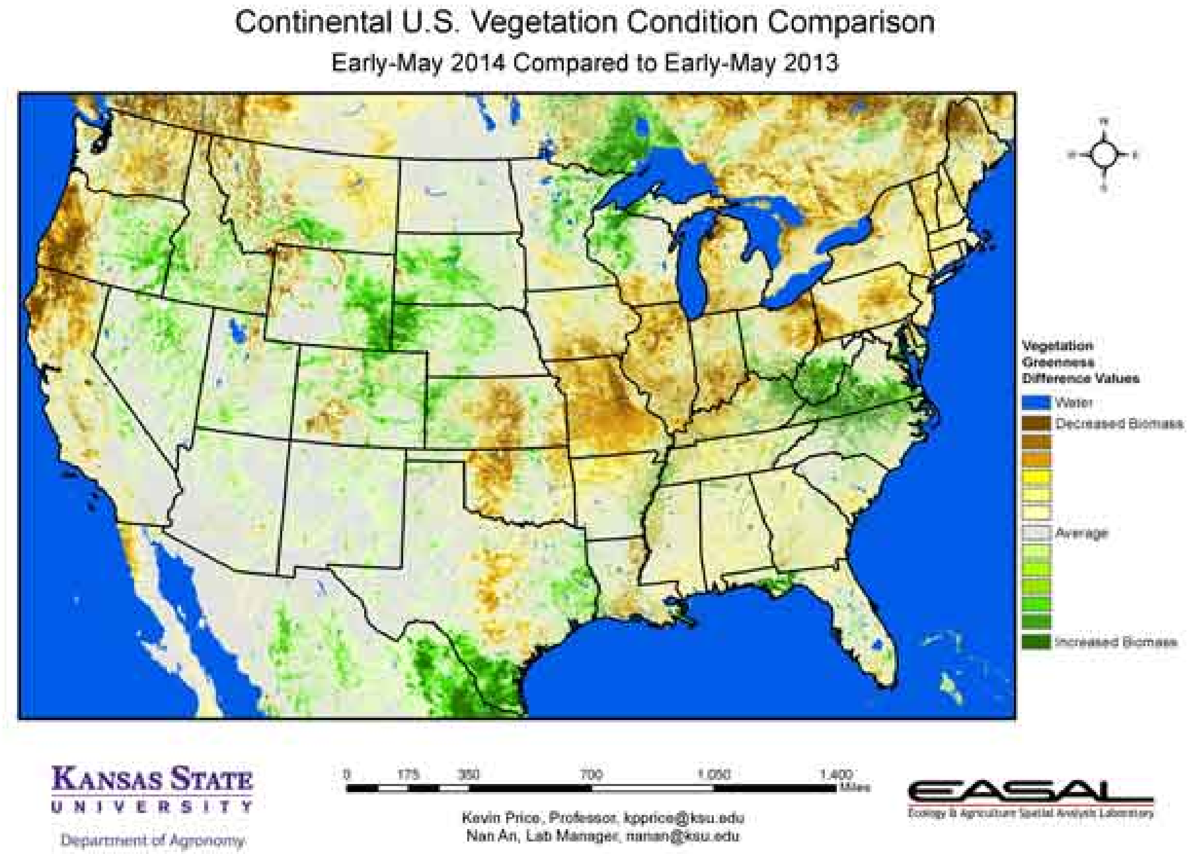

Figure 8. The U.S. comparison to last year at this time for the period April 29 – May 12 from K-State's Ecology and Agriculture Spatial Analysis Laboratory shows that parts of Virginia and West Virginia have higher levels of biomass production, as do parts of eastern Wyoming and the Nebraska Panhandle. Favorable moisture and temperatures in these areas have increased photosynthetic activity. In contrast, much the central U.S. has lower biomass production. From Missouri eastward the major factor is persistent cold temperatures. From central Kansas through central Texas, drought is the major culprit.

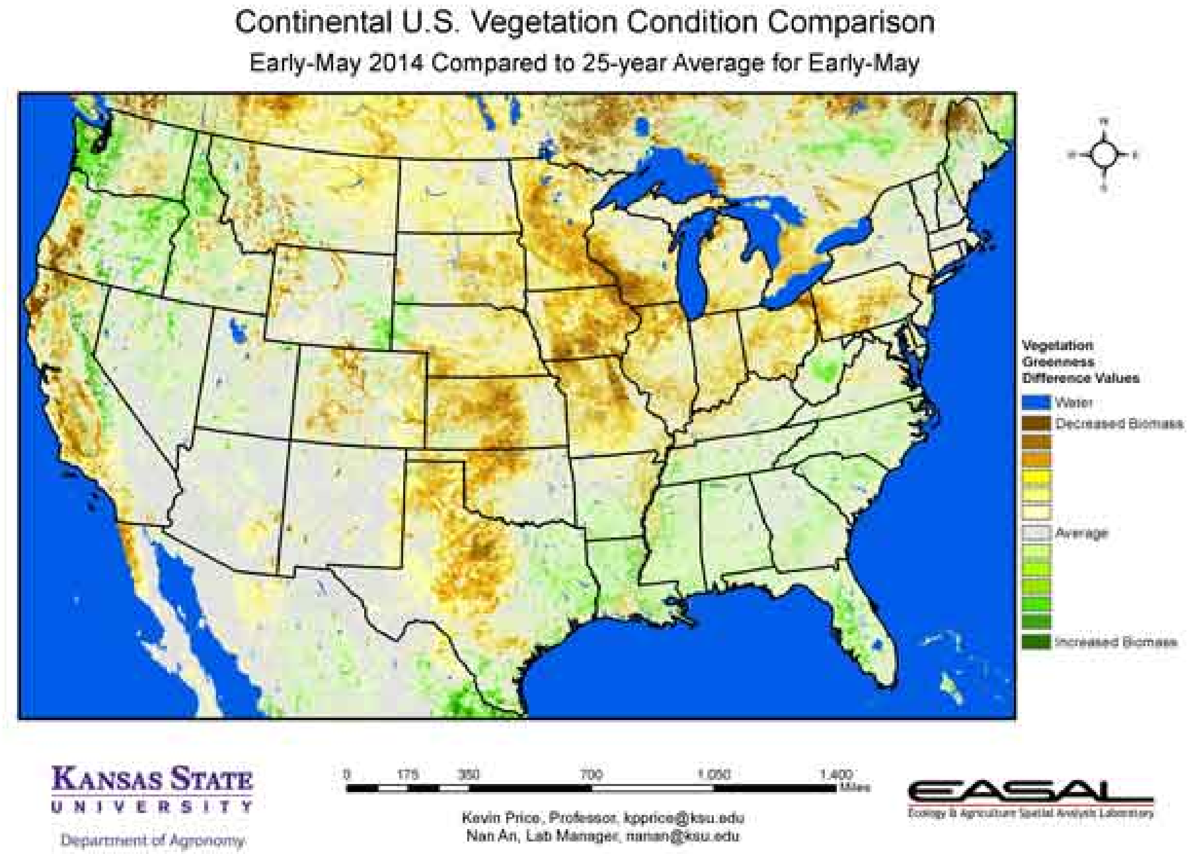

Figure 9. The U.S. comparison to the 25-year average for the period April 29 – May 12 from K-State's Ecology and Agriculture Spatial Analysis Laboratory shows that below-average biomass production is concentrated in the central parts of the U.S. and along the West Coast from Oregon through southern California. East of Missouri, the cool, wet spring has delayed development. To the west, worsening drought conditions are taking a toll on the vegetation in the Central/Southern Plains and along the Pacific Coast.

Mary Knapp, Weather Data Library
mknapp@ksu.edu

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

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