



Extension Agronomy

eUpdate

09/18/2015

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. Why are there so many pigweeds in soybeans this year?

More fields of soybeans than usual in Kansas have a problem with pigweeds this year – both Palmer amaranth and waterhemp. Populations of these pigweeds are unusually high, and the weeds have gotten tall and formed seed by now. In these fields, the pigweed seedbank in the soil after harvest will be heavy and could create significant problems for years to come.



Figure 1. Glyphosate-resistant Palmer amaranth in soybeans. Photo by Dallas Peterson, K-State Research and Extension.

Why is pigweed pressure heavier this year than in recent years? Increasing pigweed pressure in soybeans has been the trend in Kansas over the past 10 years or so, increasing a bit overall every year. But this year pigweed pressure has taken a big step up.

There are two main reasons for what is happening this year:

1. Glyphosate resistance is spreading. More populations of Palmer amaranth and waterhemp are now resistant to glyphosate. Waterhemp populations have been resistant to glyphosate for several years. Glyphosate resistance in Palmer amaranth has been a more recent occurrence, and resistant populations are now increasing rapidly within the state.

2. Wet weather in May and early June. The rainy pattern in May and early June delayed planting and caused producers in some areas of Kansas to plant later than expected. As a result of both the wet soils and the delayed planting, the effectiveness of EPP (early preplant) herbicides had worn off by the time the beans were planted. Pigweeds began emerging in some cases before the beans could be planted. Then when the soils dried out enough to plant beans, producers had to hurry their operations and may not have had time to apply burndown or preemergence residual herbicides.

Producers who are still trying to rely primarily on postemergence herbicides to control pigweeds are having an increasingly hard time getting good control. It used to be that glyphosate would provide 95% or more control of both waterhemp and Palmer amaranth even if those weeds were a foot tall or more. But now, glyphosate provides poor control of pigweeds on many fields in Kansas.

There are other options for postemergence control, but most of those options require that the weeds be less than 3 to 4 inches tall for good control. That means producers have to watch their fields closely early in the season and spray the weeds when they first see them emerging. That's an entirely different mindset than just a few years ago when glyphosate was more consistently effective on pigweeds. Both waterhemp and Palmer amaranth grow very quickly once they have emerged, and can quickly get too tall for good control with postemergence herbicides – if they are glyphosate-resistant. If these weeds get to be a foot tall or more, postemergence herbicide alternatives to glyphosate often just burn back the tops of the weeds but will not kill them.

Consequently, a good residual herbicide program in the spring will likely be important for pigweed management in the future, regardless of the postemergence program. Where glyphosate-resistant pigweeds have become a problem, producers may want to consider Liberty Link or conventional soybeans. However, even these soybean varieties will need to be part of a planned program that utilizes residual herbicides and timely applications. Timely applications and higher spray volumes that can provide good thorough coverage of the weeds is very important for the postemergence herbicide options currently available for pigweed control in soybeans.

There may be new varieties of soybeans coming in the future with resistance to 2,4-D (Enlist) or dicamba (Xtend) if key export markets get approved. However, these options also work best in a program approach using residual herbicides and timely postemergence applications. In our tests at K-State, a tankmix of glyphosate+2,4-D or glyphosate+dicamba still had problems controlling 6-inch-tall Palmer amaranth this summer. So it will still be important to apply these postemergence herbicides on small weeds to get good control.

The best approach to good pigweed control in no-till is to start with a two-pass program early. Apply EPP residual herbicides at a two-thirds rate in mid- to late-April, then follow up with rest of the residual herbicide at planting. If pigweeds are emerged at planting time, it will be important to include a burndown herbicide to control those weeds as well. If you want to rely strictly on a single EPP treatment, be sure to include an adequate rate of a residual herbicide product in the mix.

Then be ready to apply any needed postemergence herbicides early, before weeds get to be 3 to 4 inches tall. On fields with heavy pigweed pressure, you may want to add additional residual herbicides to the postemergence treatment.

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2. Summer field crop status in Kansas

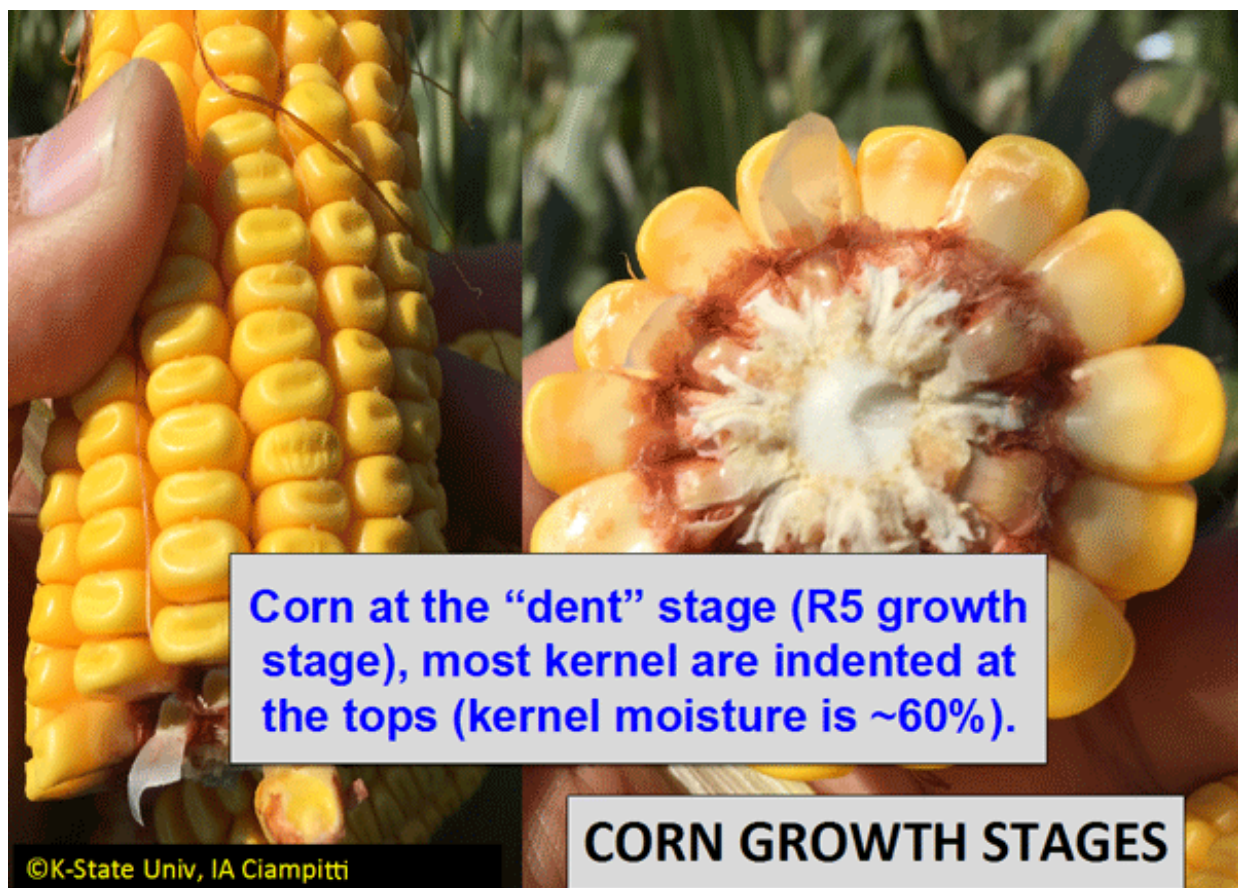
At this point in the 2015 growing season, all summer field crops around the state are entering into their final reproductive stages. Corn has already gone through the dent stage (R5) on most fields and, depending on the weather conditions, could take from a few days to weeks to become fully mature -- 25-35% moisture content, formation of black layer. For both the soybean and sorghum crops, the coming weeks will be critical in shaping the final yield. Grain fill duration will be connected to temperature and precipitation conditions and the source:sink balance within the plant, which involves the leaf to grain relationship. A lack of functional green canopy will result in a short grain fill period; and a similar situation will occur if the grain number is reduced.

At the national level, the most recent [USDA crop progress report](#) estimated total corn production at about 13.7 billion bushels, which is 4% less than the 2014 crop production. The average yield is predicted to be close to 169 bu/acre, 2 bu/acre down from 2014. Soybean follows a similar trend, with overall yield per acre down 1% compared with 2014. Sorghum yield per acre was projected to increase by 7 bu/acre, from 68 to 75 bu/acre, and an overall production of 572 million bushels.

Corn

The most recent Kansas Agricultural Statistics Service crop progress report estimates that 91% of all Kansas' corn crop is at the dent stage, more than 50% of the crop is mature, and 11% has been harvested. Overall, 56% of the corn crop in Kansas was classified by the USDA as being in good or excellent condition. As compared with last year, the pollination time and grain-fill period was much more favorable for corn yields this year.

The dent stage (R5) takes place 40 days after silking, which varies with weather conditions. Grains are drying down in the dent stage, with a moisture content level around 50-60%. Past experience has shown that when corn is reaching the dent stage, biotic or abiotic stress conditions -- such as high temperature stress, drought, pests, hailstorm, etc. -- may exert some impact on final kernel weight by shortening the dry matter accumulation period. Currently, most of the corn is approaching maturity; thus, the influence of stress conditions on yield would be small. Final kernel weight is determined as the crop reaches full physiological maturity, or maximum dry mass accumulation. This can be identified as the formation of the black layer, the black line formed at the bottom of the grain (Figure 1).



Corn at the “dent” stage (R5 growth stage), most kernel are indented at the tops (kernel moisture is ~60%).

CORN GROWTH STAGES

©K-State Univ, IA Ciampitti

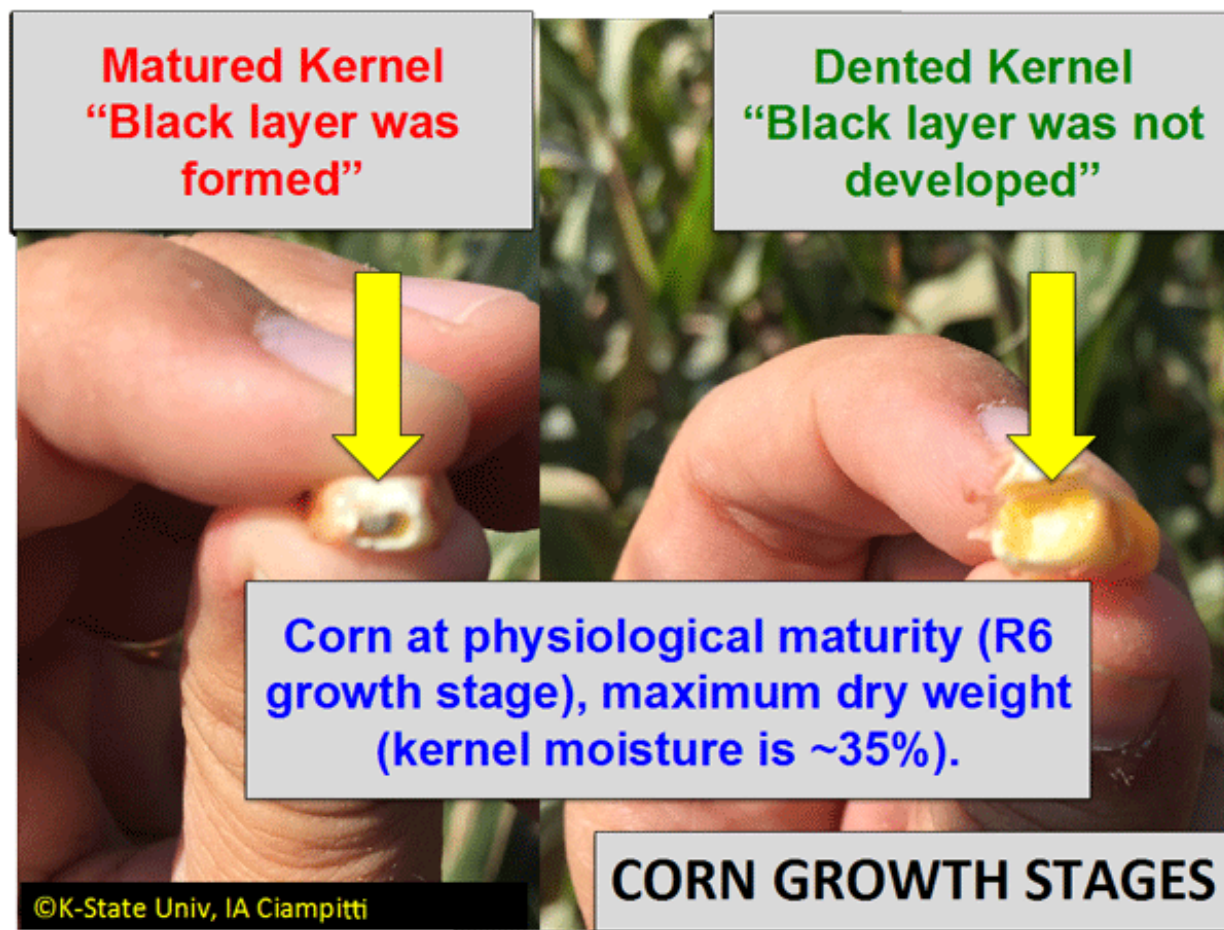


Figure 1. Corn at dent stage and at black layer growth stages. Photo and infographic prepared by Ignacio Ciampitti, K-State Research and Extension.

The most important task from this point on is to scout the fields for the presence of weak stalks and plan the harvesting procedure -- prioritizing corn fields with weak or broken stems.

Soybean

In most of the areas of the state the soybean crop is reaching the final stages of the reproductive phase, ranging from R5 (beginning seed) to R7 (beginning maturity) stages. More information about soybean growth and development can be found at: bit.ly/IDBeanStage

Kansas Agricultural Statistics reported 96% of the state's soybean crop is setting pods. At present, 55% of the soybean crop condition has been rated good or excellent. The senescence process, detected as yellowing in soybean fields, is progressing quickly now with the warm temperatures and dry conditions experienced in recent weeks. Kansas Agricultural Statistics reported that 19% of leaves had dropped, similar to this point in 2014.

A considerable portion of the potential soybean yield will be determined in the upcoming weeks, between full seed stage (R6; Figure 2) and the beginning of maturity (R7). The beginning of maturity

is recognized when only one pod on the main stem has reached mature color (e.g. brown color). At this point of the season, any biotic or abiotic stress can still impact seed size. As discussed in a previous eUpdate article ("Estimating soybean yields," [eUpdate #525](#)), drought and heat conditions at this point in the season can severely impact seed size. Large changes (e.g. 10-20%) in yield could result from changes in the final seed weight.

Continue to scout your soybean fields for crop production issues. Lodging can be an issue for soybeans. Lodging can affect harvesting, as well as the late-season photosynthetic efficiency of soybeans – which can accelerate senescence and cause reductions in seed weight and yield.

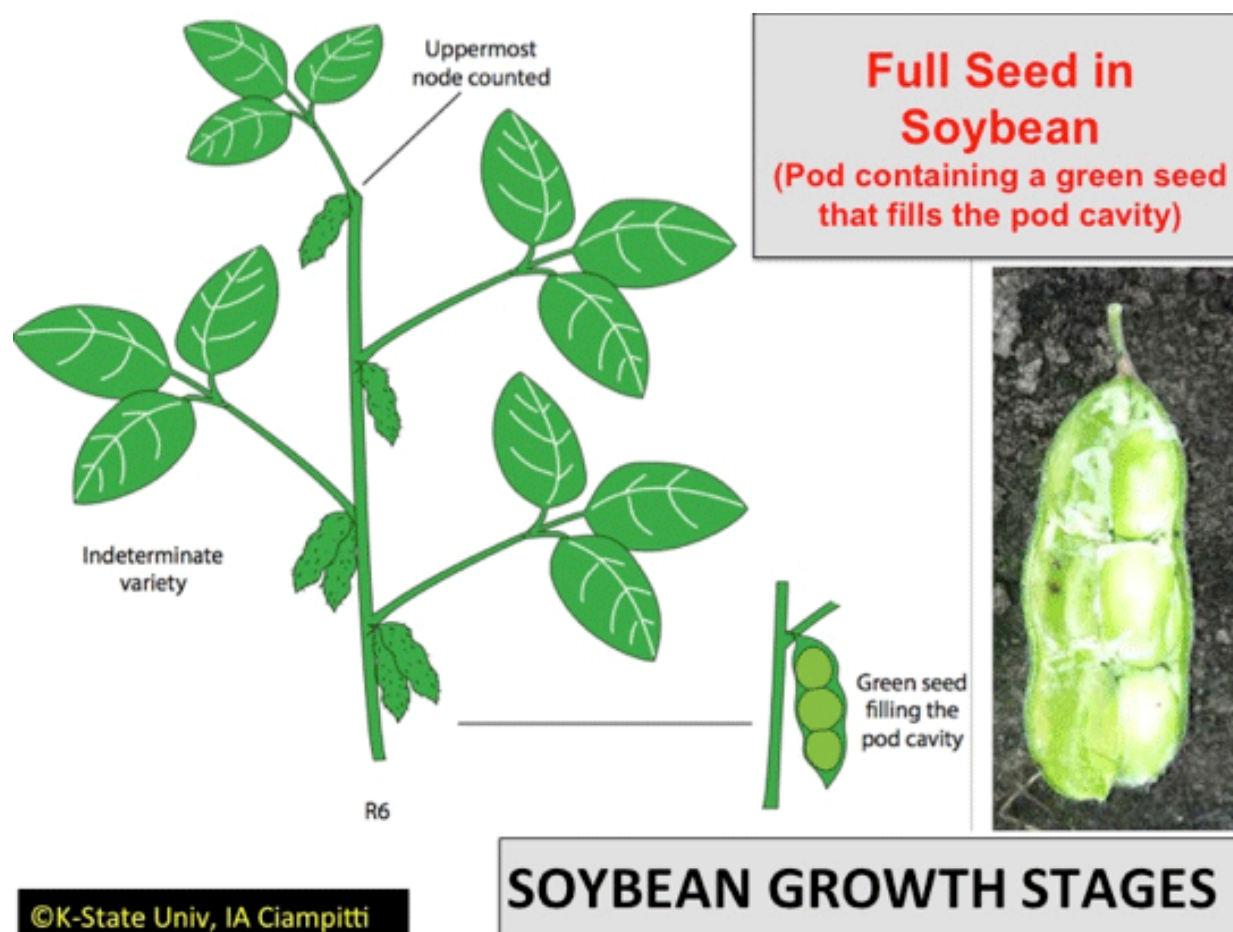


Figure 2. Soybean at full seed stage. Photo and infographic prepared by Ignacio Ciampitti, K-State Research and Extension.

Grain sorghum

Kansas Agricultural Statistics projected that 83% of the sorghum crop in Kansas is at or beyond the coloring stage, 18% ahead of last year's pace. Almost a quarter of the entire sorghum acreage in Kansas was reported at full maturity, 13% ahead of last year. More than 60% of the sorghum crop was classified as being in good or excellent condition; with 7% projected as a very poor or poor. Similar to soybean, a portion of the potential sorghum yield remains to be determined in the next coming weeks.

One of the main late-season factors that can affect sorghum yields in Kansas is the possibility of a killing freeze before maturity. An early freeze will reduce the final seed weight due to a cessation in the dry matter allocation to the grain. The only management practice to avoid this phenomenon is to use shorter-season hybrids and earlier planting dates in environments prone to early freezes. This was difficult to accomplish in the challenging wet spring in 2015.

Another challenge for sorghum farmers is the presence of sugarcane aphids. The occurrence of the aphids across the state continues to expand. Timely scouting for the presence of the aphids and taking appropriate action if the economic threshold is achieved is critical. More information on the sugarcane aphid can be found at:

https://webapp.agron.ksu.edu/agr_social/eu_article.throck?article_id=685

Continue to scout your sorghum fields for crop production issues, including lodging or bird feeding. Often the utilization of pre-harvest desiccation will help reduce the moisture content and will promote a more uniform maturation and an earlier harvest time. Utilization of pre-harvest desiccants is recommended when the crop is fully mature (25-35% moisture content), which is the stage at which a desiccant will not affect yields. Applications before maturity could compromise the final yield. Information related to different products and waiting period can be found at:

<http://www.ksre.ksu.edu/bookstore/pubs/MF3046.pdf>

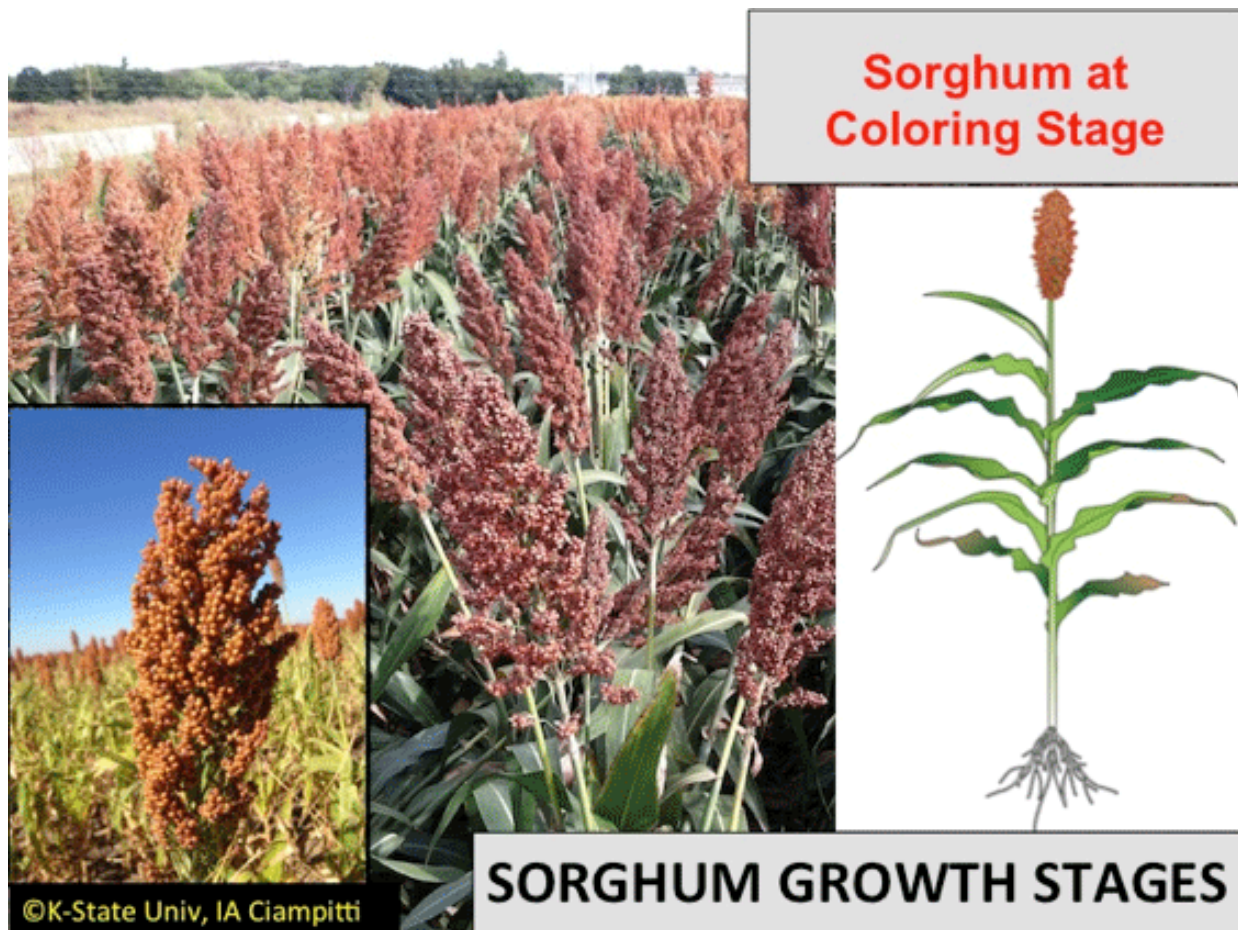


Figure 3. Sorghum at the coloring stage. Photo and infographic prepared by Ignacio Ciampitti, K-State Research and Extension.

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3. Knowing wheat seed size can improve accuracy of wheat seeding density

Wheat seeding rate recommendations in Kansas are often stated in terms of pounds of seed per acre, and vary according to precipitation zone. However, seed size can have an impact in the final number of seeds actually planted per acre.

A variety with larger kernels, when planted according to pounds per acre recommendations, will result in fewer seeds planted per acre and thinner stands than a variety with smaller kernels. As a result, if the weather and fertility during the growing season are not favorable for tiller formation and survival, grain yields may be reduced due to the resultant thinner stand.

On the other extreme, a variety with small kernels planted according to pounds per acre recommendations can result in above-optimal stand establishment, increasing plant-to-plant competition for available resources such as water, nutrients, and incident solar radiation.

Another advantage of planting in terms of seeds per acre rather than pounds per acre is that seed costs can be reduced for varieties with a small kernel size when wheat kernel size.

Seed size can be measured in terms of the number of seeds per pound. The “normal” range is about 14-16,000 seeds per pound, but it can range from 10,000 seeds per pound to more than 18,000 seeds per pound.

Although seed size is specific to each individual wheat variety, it can vary within variety depending on seed lot and seed cleaning process. Figure 1 shows three different wheat varieties and, for each variety, seed size as affected by seed cleaning method. For this simple study, the varieties Everest, WB-Grainfield, and SY Wolf were evaluated at different times during the seed cleaning process: “Unclean” (harvested seed before cleaning), “Air screened” (seed following air cleaning or the blower), “Mid gravity” (seed from the low end of the gravity table), and “Top gravity” (the seed from the top end of the gravity table).

It is clear from Figure 1 that wheat variety plays a major role in determining wheat kernel size, as does the quality of seed cleaning. Overall, the number of seeds per pound decreased (or individual seed size increased) as the quality of the seed cleaning process increased.

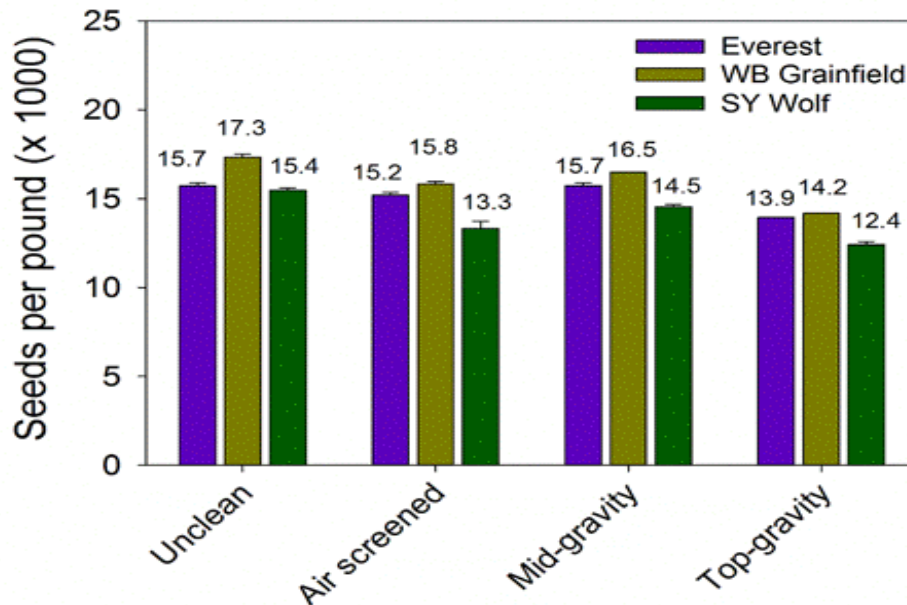


Figure 1. Effects of wheat variety and seed cleaning on final number of seeds per pound. Seed for this research provided by Byron Evers with Ohlde Seed Farms.

The two most contrasting treatments from the above study, the “Unclean” WB-Grainfield (top figure, 17,335 seeds per pound) vs. the “Top-gravity” SY Wolf (bottom figure, 12,427 seeds per pound) are shown in Figure 2. To achieve the same number of seeds per acre at seeding, “Top-gravity” SY Wolf would require a 39% increase in pounds per acre planted when compared to “Unclean” WB-Grainfield. In other words, if both varieties are planted at a seeding rate of 75 pounds/acre, the final number of seeds planted per acre will be 1.3 million seeds/acre for “Unclean” WB-Grainfield and 930,000 seeds/acre for “Top-gravity” SY Wolf.

If the goal was to achieve 1.2 million planted seeds per acre, wheat would be overseeded at about 8% for the smaller seed and underseeded in about 22.5% for the larger seed when using a seeding rate of 75 pounds per acre for both. This assumes the same emergence rate for the cleaned and uncleaned seed, which would not necessarily be expected.



Figure 2. Differences in seed size between treatments “Unclean” WB-Grainfield (17,335 seeds per pound) and “Top-gravity” SY Wolf (12,427 seeds per pound). Photo by Romulo Lollato, K-State Research and Extension.

These results highlight the importance of measuring wheat seed size before planting to ensure the final amount of seeds planted per acre will be close to the original target.

Certified seed, or seed submitted for germination testing, will have seeds/lb information available. However, an easy on-farm method to estimate the average seed weight of a seed lot is to collect several representative 100-seed samples and weight each 100-seed sample in grams. To calculate seeds/lb, divide the conversion factor 45,360 by the average weight of the 100-seed samples. Samples should be collected from the lot as is, including large and small kernels in the same proportion as found in the seed lot. The targeted number of seeds per acre is then divided by the number of seeds per pound to determine the number of pounds to be planted per acre. The following table is a quick reference guide to adjust the planting rate in pounds per acre based on seed size and the targeted number of seeds planted per acre:

Table 1. Target planting rate (seeds per acre)					
Seeds/lb	600,000	750,000	900,000	1,200,000	1,500,000
	Pounds of seed per acre				
10,000	60	75	90	120	150
12,000	50	63	75	100	125
14,000	43	54	64	86	107
16,000	38	47	56	75	94
18,000	33	42	50	67	83
20,000	30	38	45	60	75

How to use Table 1:

A dryland wheat producer in western Kansas whose target seeding rate may be 750,000 seeds per acre has a seed lot with large kernels, averaging 12,000 seeds per pound. The seeding rate in pounds per acre for this seed lot for a final placement of 750,000 seeds per acre should be about 63 lb/acre. The same producer planting a different lot with smaller seeds averaging 16,000 seeds per pound should plant about 47 lb/acre to achieve the same final seed placement of 750,000 seeds per acre.

A wheat producer in eastern Kansas whose target may be 1.2 million seeds per acre has two seed lots; the first averaging 14,000 seeds per pound and the second, with slightly smaller kernels, averaging 16,000 seeds per pound. This producer should use a seeding rate of 86 lb/acre in the first seed lot and 75 lb/acre in the second seed lot to achieve the same final seed placement (in terms of number of seeds per acre). In this case, both seed lots were in the “normal” range of about 14-16,000 seeds per pound, and a simple $\pm 10\%$ adjustment on the seeding rate should compensate for differences in seed size.

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4. Calibrating the seed drill prior to wheat planting improve seed distribution

The decisions taken prior to wheat planting can account for much of the success or failure of the wheat crop. These decisions include selecting a variety well adapted to the area and with a good yield stability record, soil sampling to determine fertility needs, pre-plant fertilization (N, P, K, lime), either tillage for weed control and seedbed preparation or using a contact herbicide in no-till situations, and proper drill calibration. Proper drill calibration can increase the chances of success of the wheat crop by ensuring the amount of seed planted per acre is close to the target.

There are several methods to calibrate seed drills. The stationary method, which is a simple 5-step method to calibrate a wheat drill prior to planting, is described below. In stationary drill calibration, a drill operation is simulated by turning the drive wheel freely above ground, weighing the seeds delivered from the drill spouts, and comparing the result to a targeted seed weight by length of drill-row. The five steps are as follows:

1. **Determine seeding density.**

Targeted seeding density varies within Kansas based on annual precipitation. A target range of seeds per acre based on current K-State recommendations (based on recommended pounds per acre for a variety with an average 15,000 seeds per pound) is shown in Table 1:

Annual precip.	Target seeding density
	Seeds per acre
> 20 in	675,000 - 900,000
20 - 30 in	900,000 - 1,125,000
>30 in	1,125,000 - 1,350,000
Irrigated	1,350,000 - 1,800,000

1. **Determine the number of seeds to be placed in 50 drill-row feet based on row spacing and targeted seeding density.**

Determine the linear row feet of actual planted seed per acre based on the drill's row width (Table 2). With narrower row spacings, there will be more linear row feet of planted seed than at wide row spacings. Afterwards, estimate the number of seeds to be collected in 50 drill-row feet based on row width and the target seeds per acre. This can be done by dividing the number of target seeds per acre by the number of linear row feet per acre based on row width and multiplying the result by 50. Percent emergence can be accounted for by dividing the result by the fraction emergence (for instance, dividing by 0.85 for 85% emergence). Table 2 shows calculations for selected row widths and targeted number of seeds per acre considering 85% emergence.

After determining the number of seeds to be collected from 50 drill-row feet, weigh the equivalent amount of seed of each variety you intend to plant. For instance, if the target is 675,000 seeds per acre and row width is 12 inches, a total of 775 seeds need to be planted in a 50 drill-row feet. Considering 85% emergence, this number increases to 912 seeds (Table 2). Count and weight 912 seeds from each variety. If no scale is available, place the 912 seeds in a clear graduate cylinder such as a rain gauge and mark the level for each variety.

Table 2. Seeds per 50 drill-row feet as function of row width and target number of seeds per acre. Feet of linear row per acre as function of row width is also shown.							
		Target number of seeds per acre					
		675,000	750,000	900,000	1,125,000	1,350,000	1,800,000
Row width (inches)	Feet of linear row per acre	Seeds per 50 drill-row feet					
6	87,120	456	506	608	760	912	1,215
7	74,674	532	591	709	886	1,063	1,418
7.5	69,696	570	633	760	950	1,139	1,519
8	65,340	608	675	810	1,013	1,215	1,620
10	52,272	760	844	1,013	1,266	1,519	2,026
12	43,560	912	1,013	1,215	1,519	1,823	2,431

1. Determine the number of wheel revolutions needed for 50 drill-row ft.

Hook the seed drill to a tractor and raise the drill off the ground. Measure the drive wheel's circumference using a tape measure, and divide 50 drill-row feet by the length of the drive wheel's circumference to determine how many times the drive wheel needs to be rotated to account for 50 drill-row feet. For instance, if the drive wheel's circumference is 7 feet, dividing 50 by 7 indicates that the wheel needs to be rotated 7.15 times to account for 50 drill-row feet. Mark a starting point in the wheel with a tape (i.e. duct tape) to facilitate counting how many times the wheel is being turned.

1. Calibrate the drill

Adjust the seed meter using the rate chart provided by the manufacturer for the desired seeding rate, which should result in a first approximation of final calibration. Add enough seed of the variety to be calibrated to ensure seed cups will remain covered throughout the calibration process. Rotate the wheel the number of revolutions needed to cover 50 drill-row feet as calculated in step 3 and collect the seed from each spout in a bucket or similar container. The more spouts evaluated, the more accurate will the calibration be. Weigh the collected seed (or pour it in the marked graduate cylinder from step 2) and compare to the target weight of seed per 50 drill-row feet as determined in step 2. If the collected seed weighs too little or too much compared to the target, adjust the metering system to deliver more or less seed, respectively. It is recommended to keep a record of the different seeding rates achieved at each setting for future reference. Repeat this process until the number of seeds delivered from the drill spouts matches the target established on step 2.

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5. Kansas Bankers Association Awards nominations due by November 2

Nominations for the 2015 Kansas Bankers Association Conservation Awards Program are now being accepted. This year the Kansas Bankers Association, K-State Research and Extension, and the Kansas Department of Wildlife, Parks, and Tourism have announced six award categories: Energy Conservation, Water Quality, Water Conservation, Soil Conservation, Windbreaks, and Wildlife Habitat.

The purpose of this program is to stimulate a greater interest in the conservation of the agricultural and natural resources of Kansas by giving recognition to those farmers and landowners who have made outstanding progress in practicing conservation on their farms.

Each year over 200 Kansas producers and landowners are recognized through this program. Nominations can be made by any person in the county. They should be sent to the County Extension Agricultural Agent or the Kansas Department of Wildlife, Parks, and Tourism District Biologist by November 2, 2015.

The K-State Extension agent for Agriculture and Natural Resources, or the Extension Coordinator, is designated Chairperson of the committee to select persons to receive awards.

For more information, see:

<http://www.agronomy.k-state.edu/extension/kansas-bankers-awards.html>

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6. Agronomy Field Day to feature sorghum production research, Oct. 9

Exciting advances in sorghum research will be featured at the 2015 Agronomy Field Day on October 9 at the Agronomy North Farm, 2200 Kimball Ave. in Manhattan. Topics will range from increases in yield potential to the sugarcane aphid, cover crops, and more.

Higher yield potential remains the No. 1 priority for producers, and it's the top priority for K-State sorghum breeders as well. In theory, grain sorghum should yield just as much as corn in Kansas, given the same amount of fertilizer and with substantially less water, according to Tesfaye Tesso, K-State sorghum breeder in Manhattan and one of the featured speakers at the field day.

In practice, this has not yet happened consistently. New experimental lines in advanced testing at K-State are about to change that, however, Tesso said. These advancements are thanks in large part to funding from the Kansas Grain Sorghum Commission.

"Sorghum has high yield potential, much higher than what we're getting now. We know that," Tesso said. "We have been working to find new compatible parental lines that will be able to produce hybrids that can come closer to realizing sorghum's yield potential. At the same time, we need to make sure any new line has an acceptable maturity range, good standability, drought tolerance, good head exertion, and other necessary agronomic traits."

Tesso will talk about the most recent results of this research into higher-yielding sorghum lines at the field day.

The full list of topics and K-State speakers:

- Sorghum genetics and breeding – Tesfaye Tesso, Sorghum Breeder, and Geoffrey Morris, Sorghum Geneticist
- Inzen sorghum, a tool for postemergence grass control in sorghum– Curtis Thompson, Weed Management Specialist
- Heat and water stress sorghum physiology – Vara Prasad and Krishna Jagadish, Crop Physiologists
- Sorghum in Kansas cropping systems – Ignacio Ciampitti, Crop Production Specialist
- Sorghum response to cover crops in no-till systems – Kraig Roozeboom, Cropping Systems Agronomist
- Update on sugarcane aphid in Kansas – Brian McCornack, Entomologist

The field day will begin with registration at 9 a.m. and wrap up at 1 p.m. Sessions include two concurrent one-hour tours in the morning, starting at 9:30, followed by a poster session during and after lunch.

In addition, there will be displays from commercial companies and K-State researchers in the shed near the registration area, along with the crop garden, forage garden, and weed garden for browsing. Extension specialists will be available to answer questions.

There is no charge to attend, and a complimentary lunch will be available. Preregistration is requested by October 6 so that a lunch count can be made. Those interested in attending can preregister by calling Troy Lynn Eckart at 785-532-5776. To preregister online, see:

<https://kstateagron2015.eventbrite.com>

On-site registration will also be available.

For more information, interested persons can contact Dorivar Ruiz Diaz at 785-532-6183 or ruizdiaz@ksu.edu

Research and new technologies for sorghum production



*Agronomy
Field Day 2015
Agronomy North Farm, Manhattan
Friday, October 9
9:00 a.m.- 1:00 pm*

KANSAS STATE
UNIVERSITY

Department of Agronomy

7. Comparative Vegetation Condition Report: September 1 - 14

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 37: 09/01/2015 - 09/14/2015

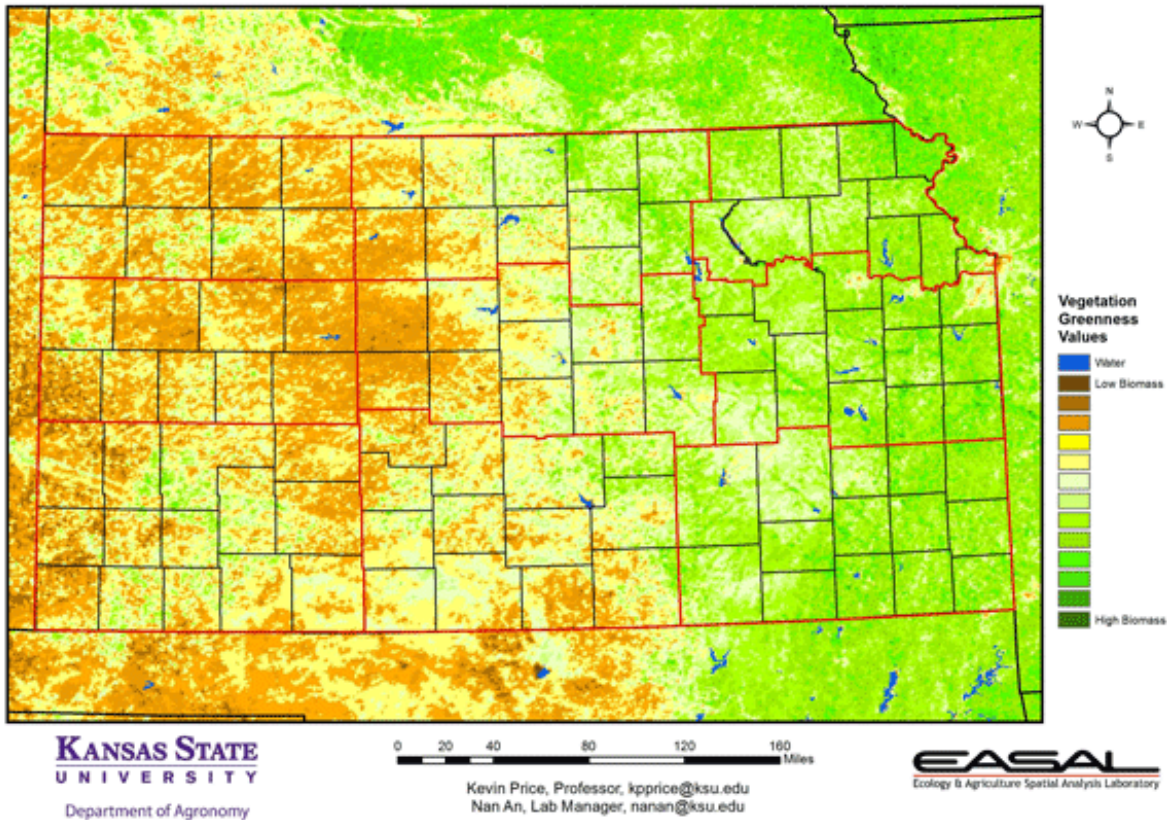


Figure 1. The Vegetation Condition Report for Kansas for September 1 – 14 from K-State’s Ecology and Agriculture Spatial Analysis Laboratory shows that the highest biomass production continues to be in eastern Kansas. There is an area of increased photosynthetic activity in southwest Kansas, where rainfall continues to be higher than average. The highest NDVI values continue in Brown and Doniphan counties along the Missouri River Valley. Favorable soil moisture and moderate temperatures resulted in increased biomass production in these areas. Lower NDVI values are visible in Trego, Ellis, Rush, and Ness counties, where drought conditions have intensified.

Kansas Vegetation Condition Comparison
Early-September 2015 compared to the Early-September 2014

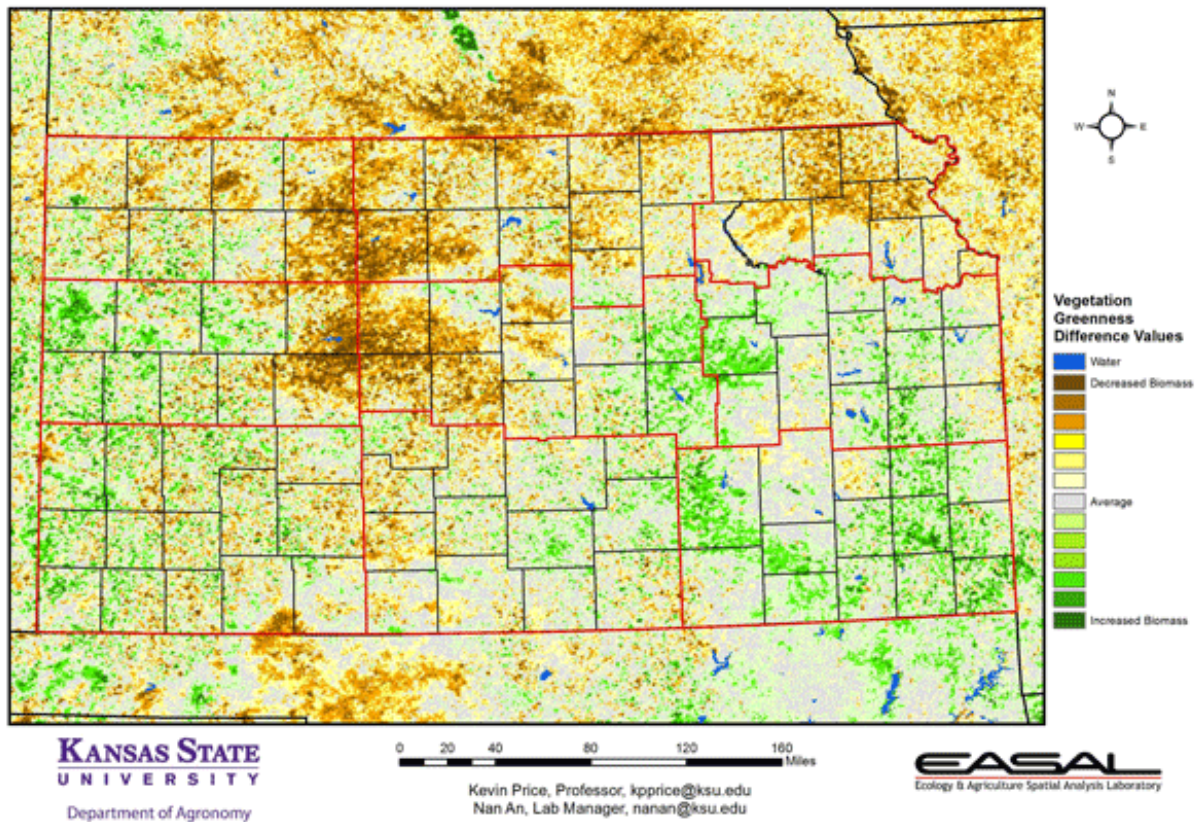


Figure 2. Compared to the previous year at this time for Kansas, the current Vegetation Condition Report for September 1 – 14 from K-State’s Ecology and Agriculture Spatial Analysis Laboratory shows parts of central and south central Kansas have lower photosynthetic activity. These areas continue to miss out on the storm systems and drought conditions have intensified. This area is now considered to be in moderate drought. In contrast the East Central Division has had more favorable conditions this year. Moderate temperatures and favorable moisture have resulted in higher photosynthetic activity.

Kansas Vegetation Condition Comparison

Early-September 2015 compared to the 26-Year Average for Early-September

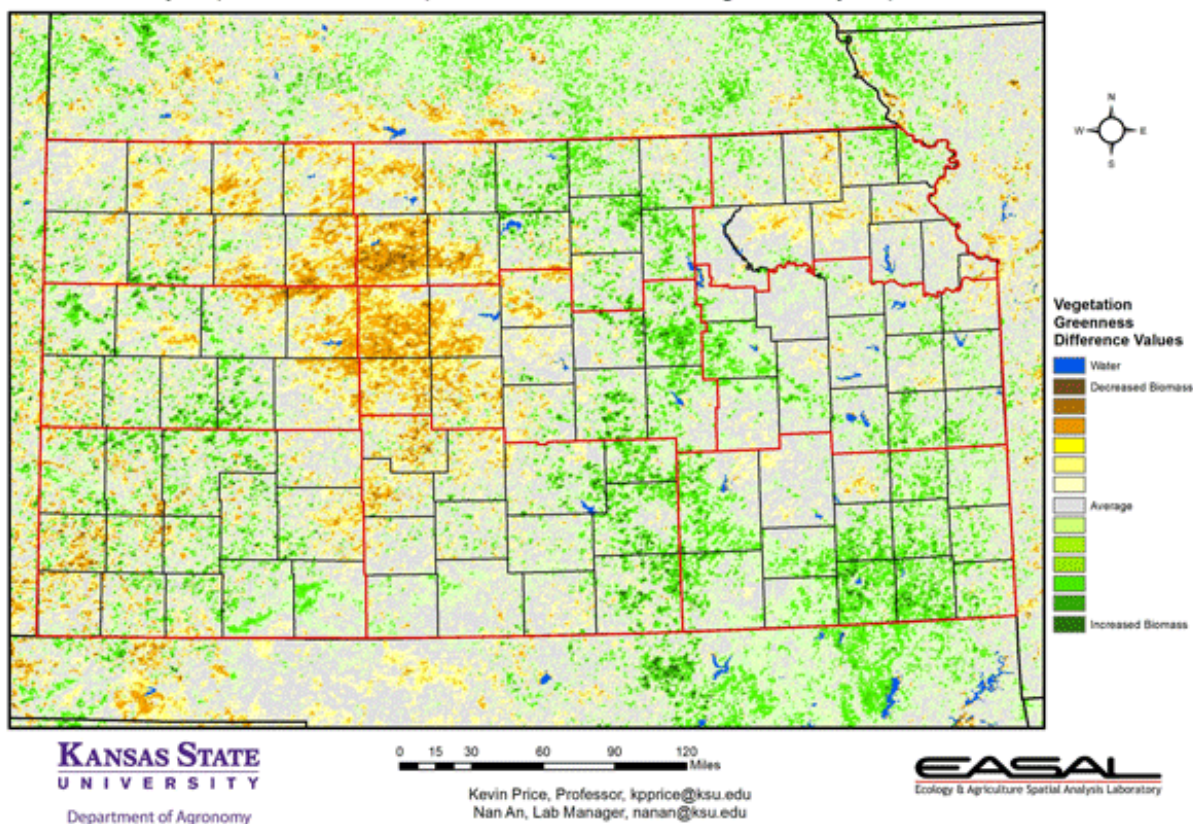


Figure 3. Compared to the 26-year average at this time for Kansas, this year's Vegetation Condition Report for September 1 – 14 from K-State's Ecology and Agriculture Spatial Analysis Laboratory shows that most of the state continues to show at- or above-average photosynthetic activity. Most of the below-average photosynthetic activity is concentrated in Ellis and Rush counties. These areas continue to miss most of the storm systems are now considered to be in moderate drought.

U.S. Corn Belt Vegetation Condition

Period 37: 09/01/2015 - 09/14/2015

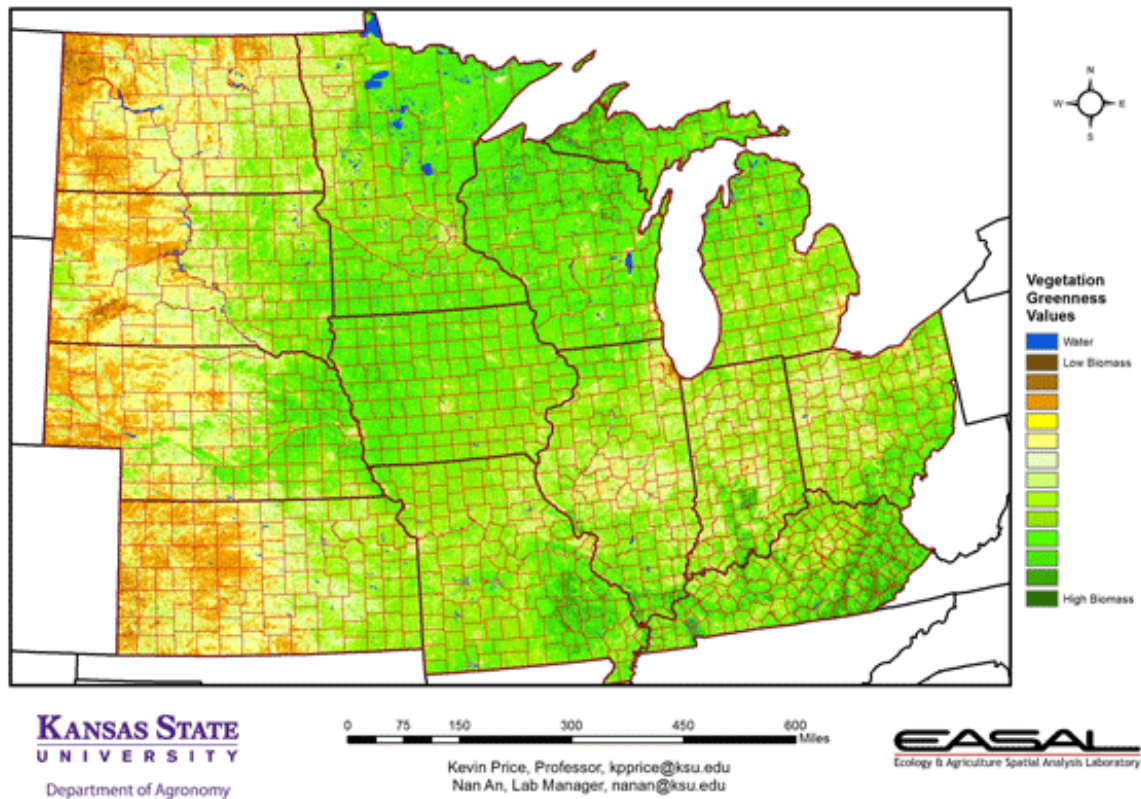


Figure 4. The Vegetation Condition Report for the Corn Belt for September 1 – 14 from K-State’s Ecology and Agriculture Spatial Analysis Laboratory shows that the greatest level of photosynthetic activity is concentrated from Iowa and southern Minnesota into Illinois. Favorable moisture conditions have resulted in high photosynthetic activity. In Iowa, corn is 80 percent good to excellent with reports of some disease pressure.

U.S. Corn Belt Vegetation Condition Comparison
Early-September 2015 Compared to Early-September 2014

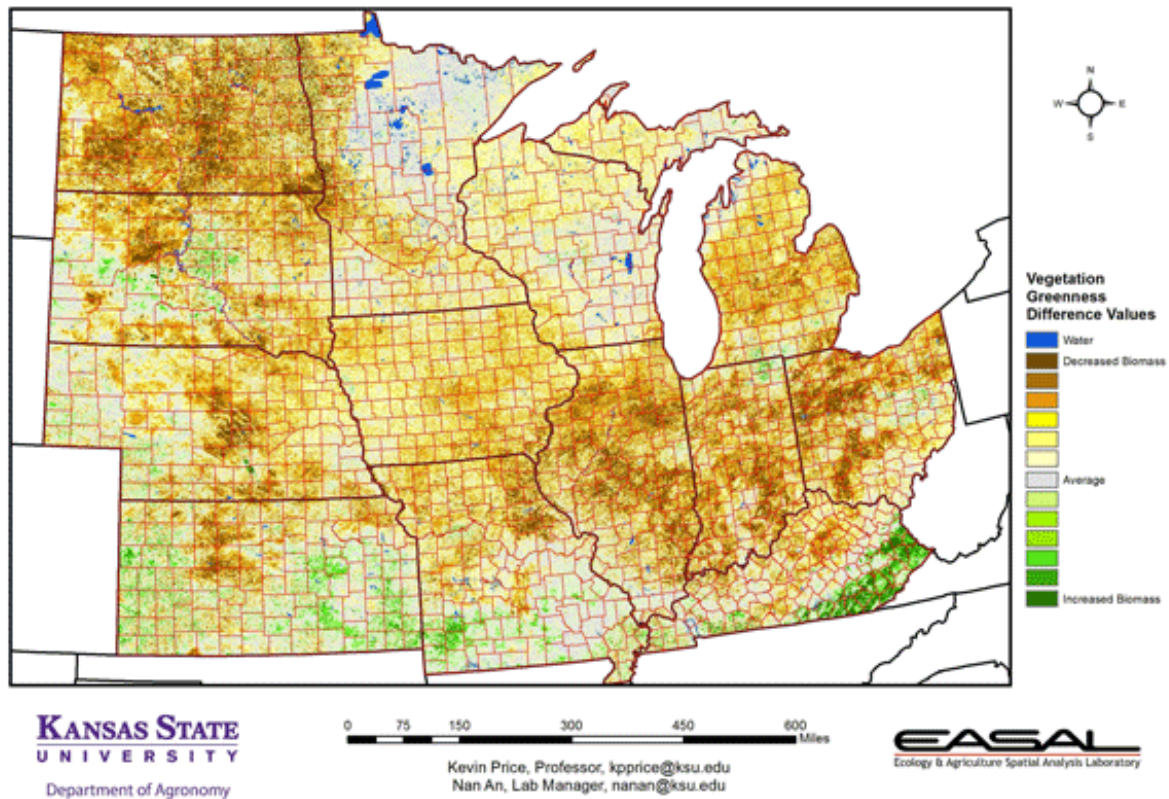


Figure 5. The comparison to last year in the Corn Belt for the period for September 1 – 14 from K-State’s Ecology and Agriculture Spatial Analysis Laboratory shows lower photosynthetic activity along the western and eastern portions of the region. The greatest decrease is in Michigan. Both corn and soybean development is ahead of last year.

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

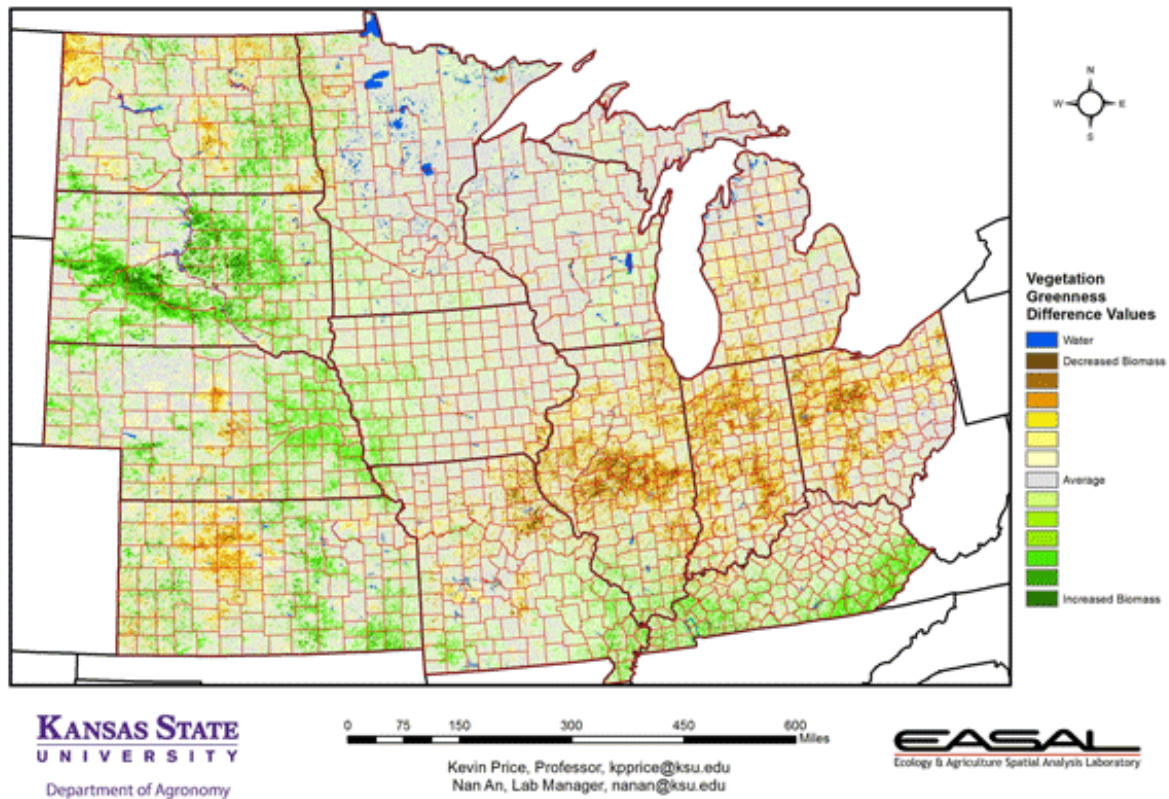


Figure 6. Compared to the 26-year average at this time for the Corn Belt, this year's Vegetation Condition Report for September 1 – 14 from K-State's Ecology and Agriculture Spatial Analysis Laboratory shows most of the region has average biomass production. Central Illinois through eastern Pennsylvania stand out with below-average NDVI values, although crop conditions are rated favorably this year. Crop development is ahead of average in these regions. There is an area of below-average photosynthetic activity in western Kansas, where drought is intensifying.

Continental U.S. Vegetation Condition

Period 37: 09/01/2015 - 09/14/2015

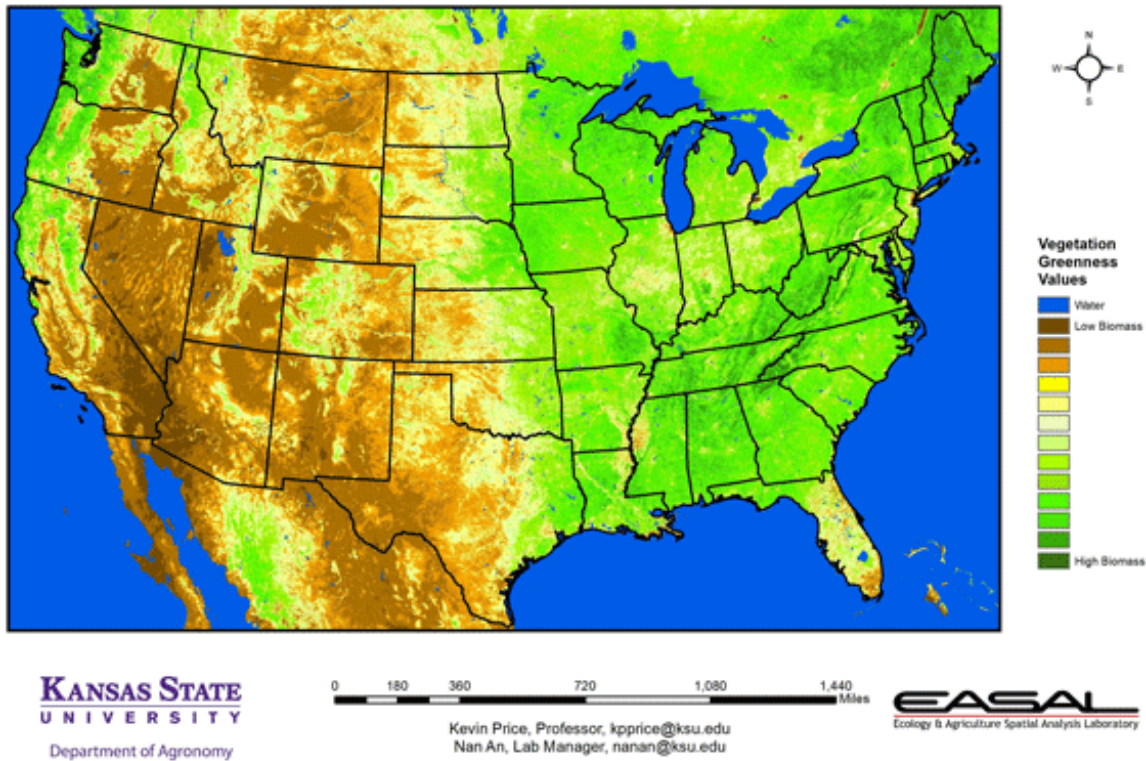


Figure 7. The Vegetation Condition Report for the U.S for September 1 – 14 from K-State’s Ecology and Agriculture Spatial Analysis Laboratory shows that the highest photosynthetic activity is centered in the Upper Midwest. Lower NDVI values are noticeable in Florida, where drought conditions continue. While rains have been more prevalent, they have had minimal impact. Low NDVI values are also notable along the western Cascades in Oregon, where drought and wildfires continue to affect vegetation.

Continental U.S. Vegetation Condition Comparison
Early-September 2015 Compared to Early-September 2014

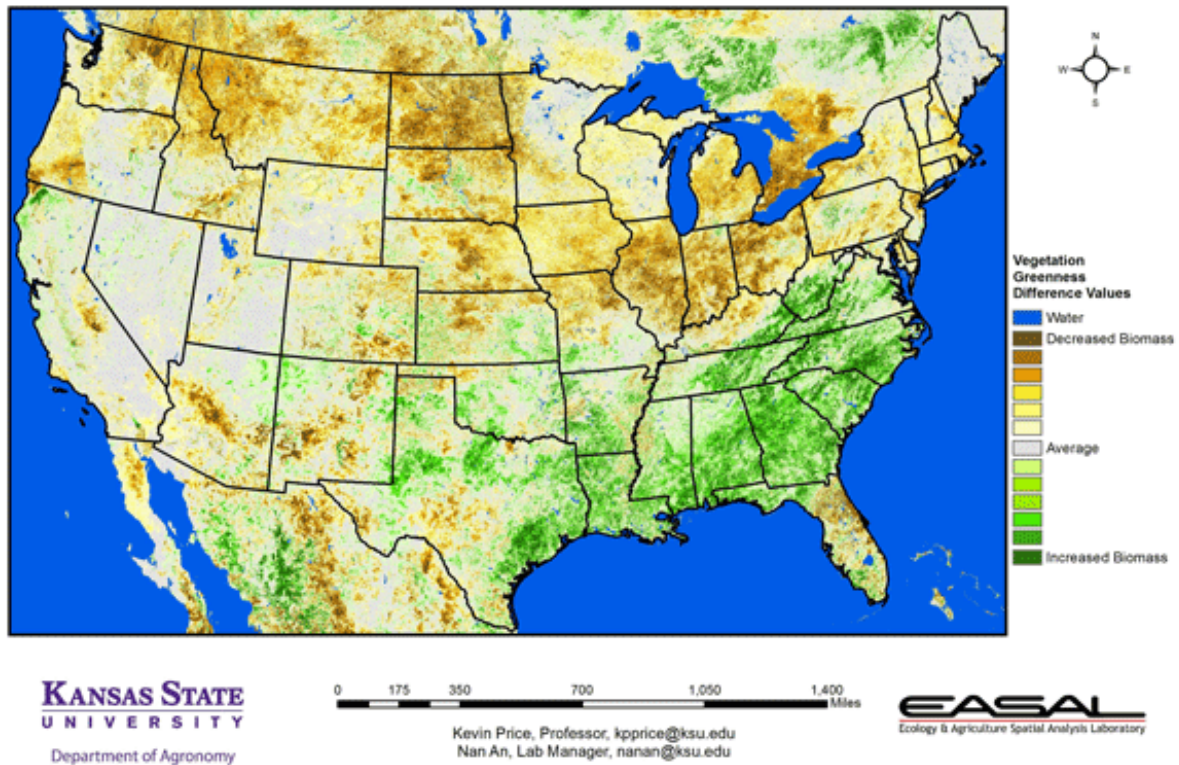


Figure 8. The U.S. comparison to last year at this time for the period September 1 – 14 from K-State’s Ecology and Agriculture Spatial Analysis Laboratory shows that lower NDVI values are most evident along the northern tier of states. Crop development in much of the region is ahead of average. In the West Coast region, lower NDVI values are visible in northern California into northern Idaho and western Montana. Decreased photosynthetic activity is also evident in western Montana, as extreme drought expands in the area.

Continental U.S. Vegetation Condition Comparison
 Early-September 2015 Compared to 26-year Average for Early-September

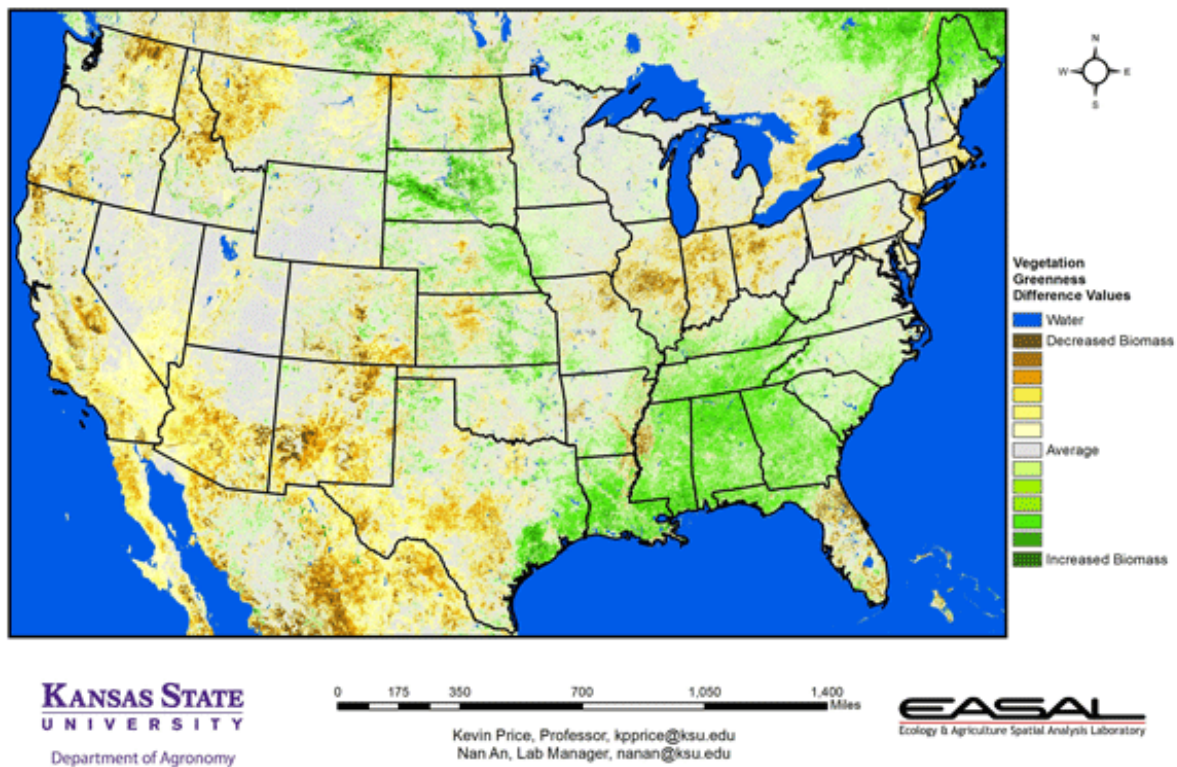


Figure 9. The U.S. comparison to the 26-year average for the period September 1 – 14 from K-State’s Ecology and Agriculture Spatial Analysis Laboratory shows that the West continues to have lower-than-normal photosynthetic activity, while the greatest increase in NDVI values is in Mississippi and Alabama. There is also an area of below-average NDVI values along the lower Great Lakes to Upstate New York into New England. This marks an area of expanding moisture stress and crop development is ahead of average.

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