

Extension Agronomy

eUpdate

09/16/2016

These e-Updates are a regular weekly item from K-State Extension Agronomy and Steve Watson, Agronomy e-Update Editor. All of the Research and Extension faculty in Agronomy will be involved as sources from time to time. If you have any questions or suggestions for topics you'd like to have us address in this weekly update, contact Steve Watson, 785-532-7105 swatson@ksu.edu, or Curtis Thompson, Extension Agronomy State Leader and Weed Management Specialist 785-532-3444 cthompso@ksu.edu.

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1. Late-season stalk lodging in corn

Stalk lodging in corn occurs when the stalk weakens and breaks at some point below the ear. When this occurs, it results in harvest losses and slows down harvesting considerably. Grain moisture levels may also be unacceptably high in lodged corn.



Figure 1. Stalk rot in corn at Kansas River Valley Experiment Field, 2016. Photo by Eric Adee, K-State Research and Extension.

The first things to consider when stalk lodging occurs are either stalk rot diseases or corn borer damage. In fact, we often find stalk rot disease organisms (charcoal rot, Fusarium, Gibberella, anthracnose, and Diplodia) on corn with stalk lodging. And stalk rot is often the ultimate cause of lodging. But in most cases, the stalk rot diseases were only able to infect the plants because certain other factors predisposed the plants to disease infection. We must look deeper for the primary causes.

What are the most common causes of stalk lodging in corn throughout the state?

Carbohydrate depletion in the stalk during grain fill. Higher-yielding, "racehorse" hybrids tend to produce superior yields at the expense of late-season stalk integrity. These hybrids translocate a high

Kansas State University Department of Agronomy 2004 Throckmorton Plant Sciences Center | Manhattan, KS 66506 www.agronomy.ksu.edu | www.facebook.com/KState.Agron | www.twitter.com/KStateAgron percentage of carbohydrates from the stalks to the ears during grain fill. The latter is reflected with a substantial reduction in the stalk diameter from flowering until maturity (stem shrinking process). This weakens the lower stalk until eventually it will break over, possibly after becoming infected with a stalk rot disease. This doesn't mean producers should stay away from the racehorse hybrids. These hybrids have to be managed well. They should be harvested early, shortly after physiological maturity. This may mean harvesting the corn at about 25-30 percent moisture. This can result in discounts for high moisture, but it's better than leaving those hybrids in the field so long that stalk lodging occurs.

Hybrid differences in stalk strength or stalk rot susceptibility. Some hybrids have genetically stronger stalks than others. This is often related to a hybrid's yield potential, as mentioned above, and how it allocates carbohydrates during grain fill. But there are also genetic differences in stalk strength due to other reasons, including better resistance to stalk rot diseases. If a field of corn has stalk lodging problems, it could be due in part to hybrid selection.

Poor root growth and other stresses. Cold, waterlogged soils, severe drought, and soil compaction can all result in short, inadequate root systems and crowns that are damaged to the point that water and nutrients cannot effectively move through them. Under these conditions, the roots may not be able to effectively extract enough water and nutrients from soil to support plant growth and carbohydrate production. When carbohydrate production is below normal during any part of the growing season, the ears will continue to take what they need during grain fill, which can leave the stalks depleted even under average yield conditions. The developing ear always has priority for carbohydrates within the plant.

Poor leaf health. Any factor that results in poor leaf health will reduce carbohydrate production during the season. In 2016, we have had the highest levels of southern rust infection in recent memory. In many fields, gray leaf spot was once again a problem but less so than in 2015. A new corn disease, bacterial leaf streak (see eUpdate Issue 588) was also present in many western and central Kansas counties. While it is unknown if bacterial streak alone will result in yield loss, its contribution to reduced leaf health along with southern rust and gray leaf spot will increase stalk rot possibilities. When carbohydrate production from photosynthesis is inadequate due to loss of green leaf area in the leaves, the plant will mobilize reserves from the crown and lower stalk to complete grain fill (see carbohydrate depletion above). Many of the highest yielding hybrids lack good resistance to leaf diseases because the use of resistance genes can cause a "yield drag" in the hybrid. Therefore, when growing these hybrids, producers should be ready to apply a fungicide should leaf diseases develop. Stay green, another characteristic in hybrids, is highly correlated to stalk rot resistance and reduced lodging. The stay green effect associated with the use of strobilurin fungicides has also been reported to reduce lodging. This same characteristic may also interfere with grain dry down in the field.

High plant density. Plants become tall and thin when supra-optimal populations are used, which result in thin stalks with inadequate strength. In addition, plant-to-plant competition for light, nutrients, and water enhances the competition for carbohydrates between the stalk and ear within the plant, thus reducing the vigor of the cells in the stalk and predisposing them to invasion by stalk rot.

Nutrient imbalances and/or deficiencies. Nutrient imbalances and/or deficiencies predispose corn plants to stalk rot and stalk lodging. Both potassium and chloride deficiency have been shown to reduce stalk quality and strength, and stalk rot resistance. High nitrogen levels coupled with low

Kansas State University Department of Agronomy 2004 Throckmorton Plant Sciences Center | Manhattan, KS 66506 www.agronomy.ksu.edu | www.facebook.com/KState.Agron | www.twitter.com/KStateAgron potassium levels increase the amount of premature stalk death, and create an ideal situation for stalk rot and lodging. Soil chloride levels should be maintained above 20 lbs per acre.

Corn rootworm and corn borers. Damage caused by the corn rootworm and the European corn borer can predispose the corn plant to invasion by stalk rotting organisms, as well as lead to outright yield loss.

Mid-season hail damage. Similar to the damage caused by insects, the physical damage caused by mid-season hail can set up the plant for invasion by stalk rotting organisms. Stalk bruising and the resulting internal damage may also physically weaken corn stalks, making them more likely to lodge later in the season.

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2. Evaluating wheat seed size to 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, when planting by pounds per acre, the final number of seeds actually planted per acre will depend on seed size. When planting at 60 lbs/acre, for example, a variety with larger kernels will result in fewer seeds planted per acre and possibly thinner stands than a variety with smaller kernels.

If using a seeding rate in terms of pounds per acre and too few seeds per acre are planted because of very large seed size, grain yields may be reduced due to the thinner stand if the weather and fertility during the growing season are not favorable for fall tiller formation and survival. Examples of varieties with large kernels include WB4458 and Ruby Lee. Farmers can compensate for this by using a higher seeding rate in terms of pounds per acre with large-seeded varieties (see Table 1 toward the end of this article).

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

The alternative is to base your seeding rate on number of seeds per acre rather than pounds per acre, to compensate for differences in seed 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 even within variety depending on seed lot and seed cleaning process. Figure 1 shows three different wheat varieties. For each variety, seed size as affected by seed cleaning. For this simple study, the varieties Everest, WB-Grainfield, and SY Wolf were evaluated at different times during the seed cleaning process. In Figure 1:

"Unclean" refers to seed before cleaning "Air screened" refers to seed remaining after air cleaning or a blower "Mid gravity" refers to seed from the low end of a gravity table "Top gravity" refers to seed from the top end of a gravity table

It is clear from Figure 1 that both wheat variety and quality of seed cleaning play a major role in determining wheat kernel size. Overall, the number of seeds per pound decreased (meaning that 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 Ohlde Seeds. Research by Romulo Lollato, K-State Research and Extension.

Figure 2 exemplifies 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). To achieve the same number of seeds per acre, "Top-gravity" SY Wolf would require a 39% increase in seeding rate in terms of pounds per acre 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 by about 8% for the smaller seed ("Unclean" WB-Grainfield) and underseeded by about 22.5% for the larger seed ("Top-gravity" SY Wolf). 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 Dr. Romulo Lollato, K-State Research and Extension.

If planting by seeds per acre instead of pounds per acre, we might see the opposite results -- seed cleaning would actually increase stand establishment. The seeds in the study mentioned above were no-tilled into heavy corn residue in an experiment during the 2015-16 growing season, with final seeding rate established in seeds per acre. The resulting stand counts are shown in Figure 3. These results indicate that the seed cleaning process increased stand establishment. These results were possibly due to better seed quality, as the cleaning process removed small and shriveled grains that may have lower vigor than larger, healthier ones. Whether planting by seeds per acre or pounds per

acre, these results highlight the importance of measuring wheat seed size before planting to avoid having the final number of seeds planted per acre too far away from 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 weigh 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:

Seeds/Ib	Target planting rate (seeds per acre)						
	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		

Table 1. Guide to adjusting the planting rate in pounds/acre based on seed size and the

How to use Table 1:

A dryland wheat producer in western Kansas whose target may be 750,000 seeds per acre has a seed lot with large kernels, averaging 12,000 seeds per pound. 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 seed lot with smaller seeds averaging 16,000 seeds per pound, should plant about 47 lb/acre to achieve the same final seed placement of 720,000 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 about 86 lb/acre in the first seed lot and 75 lb/acre in the second seed lot to achieve the same final seed count 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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3. Calibrating the seed drill prior to wheat planting improve seed distribution

The decisions taken prior to wheat planting can account for great proportion 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), 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. In this article, the stationary method, which is a simple 5-step method to calibrate a wheat drill prior to planting, is discussed. In stationary drill calibration, a drill operation is simulated by turning the drive wheel freely above ground, weighting the seeds delivered from the drill spouts, and comparing to a targeted seed weight by length of drill-row. The five steps are discussed below.

1. Determine seeding density.

Table 1. Recommended wheat seeding density				
	Target seeding density			
Average annual precipitation	Seeds per acre			
Less than 20 inches	675,000 – 900,000			
20 – 30 inches	900,000 – 1,125,000			
More than 30 inches	1,125,000 – 1,350,000			
Irrigated	1,350,000 – 1,800,000			

Targeted seeding density varies within Kansas based on annual precipitation. A target range of seeds per acre based on current K-State recommendations is shown in the Table 1.

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

Determine the number of linear row feet per acre based on the drill's row width (Table 2). 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, weight 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. See	able 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 nun	Target number of seeds per acre						
Row width	Feet of	675,000	750,000	900,000	1,125,000	1,350,000	1,800,000		
(inches)	linear row								
	per acre								
		Seeds per 5	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	1,103	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. Weight the collected seed (or pour it in the marked graduate cylinder from step 2) and compare to the target seed per 50 drill-row feet as determined in step 2. If the collected seed weights too low or too heavy compared to the target, adjust the metering system to deliver more or less seeds, 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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4. Update on sugarcane aphids and other pests of sorghum

Many later-planted fields of sorghum in Kansas are being hit hard by sugarcane aphids (SCA), and this is only part of a bigger problem. Most SCA-infested fields also have some greenbugs and corn leaf aphids in the mix. As plants mature, both SCA and the corn leaf aphids will move up into the panicles where they can reduce seed weight and quality (see photos).

However, there are also large numbers of chinch bugs, false chinch bugs, and lygus bugs feeding in panicles and blasting grain. Their feeding damage is much worse than aphid damage because this damage leaves no grain at all.

Under normal conditions, a variety of generalist predators probably consume a lot of seed bug eggs, and also the eggs of headworms. The large populations of SCA probably represent "easy pickings" for these predators, so these natural predators are likely focused mostly on SCA and not so much on other types of prey, resulting in many secondary pests escaping biological control.

So far, harvesting problems resulting from heavy honeydew deposition have been limited to southern regions. Recent rains may have been sufficient to wash off a lot of the honeydew in some parts of Kansas. Under hot, windy conditions, the honeydew can become less sticky and tends to dry on the leaves. There is a concern that growth of sooty mold on the honeydew could present a problem fouling the heads, but growth of mold seems to be quite limited so far.

The question of whether to spray is a difficult one, given the current low grain prices. Consider the stage of the crop first. If your grain is already turning color, you are probably OK, but sorghum at all stages up until hard dough will be at risk from this complex of pests.

Applications costs (assuming either Transform or Sivanto is used) will range from about \$12 an acre (Transform from the ground) to about \$22 an acre (Sivanto from the air). There is a good chance this cost will not be recovered unless the field yields 100 bushels per acre or better – not a very encouraging proposition.

These products should also control the seed bugs, which have the potential to inflict much greater losses than the aphids, but will not control headworms, which are also having a late generation in southern regions of the state.

Growers need to consider not only the yield potential of the field, but also how much is invested in the crop. If the field is in earlier stages of development (say, just beginning grain fill), a treatment may be considered for sake of preserving the grain and the investment already made in the crop, even if it appears unlikely the cost will be fully recovered. Even in later stages of grain fill, an application may be warranted if a majority of plants are heavily infested with lots of aphids in the heads, given the risk of harvesting problems.

It is important to use a minimum of 5 gallons per acre of carrier in aerial applications, or 15-20 gallons per acre from a ground rig, in order to get good coverage of the plants. These two insecticides will penetrate the leaves and kill the aphids on the undersides, but they have low residual activity, providing only about 10-14 days protection at best, which is why any "escape" plants can give rise to resurgent infestations. One should also consider that the efficacy of these materials will be significantly reduced at lower temperatures.

Cooler overnight temperatures should substantially slow aphid feeding (and thus their growth and reproduction), although it will take a good freeze to kill them.



Note that aphid feeding does not 'blast' the grain, but seed size and weight is reduced.

The panicles on the left were impacted by sugarcane aphids + corn leaf aphids, with a bit of seed bug damage also. Damaged panicles weighed 70% less than those from a less-affected portion of the field, although none was without some damage.





Lygus bug, Lygus lineolaris

False chinch bug, Nysius rafanus

Chinch bug Blissus leucopterous

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5. Fungicide seed treatments for wheat

(Note: The following article is a slightly edited transcript of a short K-State Research and Extension

YouTube video produced by Dan Donnert, KSRE videographer. The link to this video is: <u>https://youtu.be/SlaluMAK530</u> – Steve Watson, Agronomy eUpdate Editor)

During the last decade or so we saw a little higher commodity prices, and that stimulated some interest in fungicide seed treatments. As commodity prices have gone down again, people are starting to question whether they really need to do this or not. If you're not interested in using a fungicide seed treatment on all your wheat, then I would set priorities.

For grain production, one of the higher priorities would be wheat that you're planning to bring onto your farm as new varieties that you'll be saving for your own seed.

There are a number of different seed-borne diseases that we might be concerned about. Some of them are just seed-borne, while some may also have a very loose association with soil-borne factors. One such disease is common bunt, which is sometimes called stinking smut because of the strong fishy odor that fungus is able to produce on contaminated grain. Another one might be loose smut. And last year we had flag smut, a disease that re-emerged after a long break of more than 30 years.

All three of those diseases would be primarily seed-borne only diseases and targets for a fungicide seed treatment.

We might also consider fungicide seed treatments for controlling diseases like Fusarium. This disease, which can be seed-borne and come in on seed lots that were infected by Fusarium head blight in the previous year. The seed-borne phase of the Fusarium fungus can affect germination of the seed lot. It can also cause damping off or seedling blight type of diseases in which the seedlings contract the disease and collapse and die before they even emerge in many cases.



Figure 1. Common bunt, or stinking smut, in wheat. Photo by Erick DeWolf, K-State Research and

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Figure 2. Loose smut in wheat. Photo by Erick DeWolf, K-State Research and Extension.



Figure 3. Flag smut in wheat. Photo courtesy of Erick DeWolf, K-State Research and Extension.



Figure 4. Fusarium head blight (scab) in wheat. Photo by Erick DeWolf, K-State Research and Extension.

Most of the fungicide seed treatments marketed widely in the state now include one or more active ingredients that are going to give a fairly broad spectrum of control, including the smut diseases – loose smut and flag smut, quite easily. Where we see some differences is in the control of seed-borne Fusarium or some of those other more difficult-to-control fungi.

It's going to be a balance for producers to decide, what are the priority fields and what are the costs? These seed-borne diseases can cause a lot of problems for us, so if you look at it in terms of insurance, this is a pretty low-cost practice wheat producers can do to protect against the potential losses they could experience.

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6. Pre-harvest glyphosate treatment on sorghum in a no-till system

Producers who would like to try to "beat the rush" at their local grain elevator during grain sorghum harvest this year may be thinking of applying glyphosate as a desiccant. Will this affect standability or yield of the sorghum crop?

The answer to the question about standability is "yes," applying glyphosate as a desiccant to sorghum can affect the stalk quality and standability of sorghum in some cases. Unlike corn, grain sorghum is a perennial plant and remains alive until it is killed by a hard freeze. Killing the plants before a freeze can affect the integrity of the stalks. For that reason, the sorghum field should be inspected for existing stalk issues prior to applying the glyphosate. If stalk rots are present, applying glyphosate may increase the chance of plant lodging if it is not harvested in a timely manner.

Conditions this year, especially in south central Kansas, have been favorable for the development of Fusarium stalk rot. We have already had a couple of samples come in to the plant disease diagnostic clinic at K-State. So, checking for stalk rot prior to desiccant usage might be particularly important this year.

The answer to the second question about the effect of a desiccant on sorghum yields is not as straightforward. It depends of the timing of the desiccant application.

Most glyphosate labels require that applications be made to the sorghum crop when grain moisture is at 30% or less to minimize any possible yield reductions. Also, there is a seven-day period between time of application and harvest.

Sorghum response to pre-harvest glyphosate treatments to sorghum

If glyphosate is applied at the correct time, K-State research in 2011 and 2012 by former Agronomy graduate student Josh Jennings found that using a desiccant did not affect sorghum yields one way or another.

From 2011 to 2013 he established six field trials to test the effect of pre-harvest glyphosate treatments on sorghum. In 2011 to 2012, field trials were conducted at Belleville, Manhattan, and Ottawa. In 2012 to 2013 field trials were located in Belleville, Manhattan, and Hutchinson.

Table 1 summarizes the effect of the pre-harvest treatments on grain sorghum. Hutchinson data is not included in the table because environmental conditions in 2012 prevented grain sorghum harvest. There were no treatment-by-environment interactions so the data below is averaged across the five field trials over the two-year period.

Table 1. Effect of pre-harvest glyphosate applications on grain sorghum (averaged across 5				
locations, 2011 and 2012)				
Glyphosate	No glyphosate			

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Yield (bu/acre)	98	99
Grain moisture (%)	12.1	12.3
Test weight (lbs/bu)	60.4	60.2
Seed size (300 seeds, grams)*	5.81	5.90
* 2011 only		

Glyphosate was applied to the sorghum crop when grain moisture was approximately 18-22%. The grain was harvested 8-11 days following the application. Average yield reduction to the sorghum crop when sprayed with glyphosate was about 1 bushel or roughly 1% less than untreated.

Another factor is whether the presence of aphids, headworms, or other insect pests in the head should make any difference in the decision to use desiccants. There is no research on this, but by the time a desiccant is applied the grain fill period is complete and these insects can really do no more damage than they have already done. As a result, the presence of insects at this late stage of development shouldn't play any role in the decision of whether to use a desiccant.

Wheat response to pre-harvest glyphosate treatments to sorghum

In addition to getting the sorghum crop ready for harvest earlier than normal, desiccants can be helpful in cropping systems where wheat is planted directly after sorghum harvest. Killing the sorghum plants early can help save soil moisture for the wheat crop.

The research mentioned above also tested the effect of using a sorghum desiccant on the yield of wheat planted directly after sorghum harvest. Wheat yield responses varied across field trials over both years, so the data in Table 2 includes wheat yields within each field trial over both years of the experiment.

Table 2. Mean winter	wheat yields f	following treate	d and untreated s	orghum]	
	Location and year						
Sorghum	Belleville	Manhattan	Ottawa	Belleville	Manh	attan	Hut
pre-harvest treatment	(2011-2012)	(2011-2012)	(2011-2012)	(2012-2013)	(2012	2013)	(20
	Yield (bu/acre	<u>)</u>					
Glyphosate	40	45	54	39	51		34
No glyphosate	38	36	51	38	49		35

Averaged over all three locations in 2011-2012, when glyphosate was applied to the sorghum preharvest, wheat yielded 12-13% more on average than wheat following untreated sorghum. This is equivalent to an average increase of about 5-6 bushels/acre. Averaged over all three locations in 2012-2013, wheat yields following grain sorghum treated with pre-harvest glyphosate were increased by only 1% or less than a bushel.

In 2011, applications of glyphosate, on average, were applied 22 days earlier than glyphosate treatments in 2012. The first freeze date was also 12 days later in 2011 than in 2012. As a result, the

pre-harvest applications of glyphosate were applied, on average, 38 days prior to the first freeze in 2011 and only 6 days prior to the first freeze in 2012.

Overall, when glyphosate was applied to the sorghum pre-harvest, wheat yielded 6-7% more on average than wheat following untreated sorghum. That is equivalent to an average increase of about 3 bushels for the wheat crop.

Summary

The use of glyphosate as a preharvest desiccant on grain sorghum will reduce the moisture level of sorghum grain and may allow producers to harvest the crop earlier than normal. Care must be taken to make sure the crop is harvested in a timely manner, however. If not, the desiccant could increase lodging potential. If applied at the proper time, a desiccant will probably have little or no effect on sorghum yields.

Applications of glyphosate to grain sorghum prior to fall harvest can also help improve the performance of the following wheat crop if applied early enough in the late summer/early fall. Wheat yields following glyphosate-treated grain sorghum, on average, were 6% greater in 2011-2012 compared to 2012-2013 when glyphosate treatments were made at least 38 days prior to the first freeze date. When pre-harvest glyphosate is applied to the grain sorghum crop later than that, response of wheat yields following treated sorghum may be minimal.

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7. Selecting a wheat variety for dual-purpose grazing and grain

(Note: The following article is a slightly edited transcript of a short K-State Research and Extension

YouTube video produced by Dan Donnert, KSRE videographer. The link to this video is: <u>https://youtu.be/zZpE7eDnsfA</u> – Steve Watson, Agronomy eUpdate Editor)

When we talk about variety selection for dual-purpose wheat production, one of the things we need to consider in addition to grain yield is forage yield.



Varieties have different forage yield potential, which is highly related to their tillering ability. That's one of the considerations, although it might not be the most important consideration in a dualpurpose situation. The reason is that many of the varieties have at least fair forage yield potential. The amount of forage produced is more dependent on weather conditions than variety. In a warm fall with plenty of moisture, most varieties will be good forage producers. But there are varietal differences.

Producers have the option to compare the different varieties with a new K-State publication titled "Wheat Variety Date of First Hollow Stem, Fall Forage Yield, and Grain Yield 2016."

Another factor producers should consider when they're selecting a variety for dual-purpose production is the date of first hollow stem. First hollow stem is when the growing point is about a half-inch above the crown – when the growing point is going up through the shoot in the spring. That's the optimal time to remove cattle from wheat pasture. If we're grazing past first hollow stem, we're looking at about 1 to 5 percent grain yield loss per day. So if we're a couple weeks past first hollow stem, we could be looking at as much as 50 percent yield loss or more.

If we have a variety with relatively late first hollow stem, it may not be the best forage yielding variety but it may give you a few more weeks to graze during the spring.

Kansas State University Department of Agronomy 2004 Throckmorton Plant Sciences Center | Manhattan, KS 66506 www.agronomy.ksu.edu | www.facebook.com/KState.Agron | www.twitter.com/KStateAgron If producers are going for grain after grazing, they also need to look at the grain yield recovery potential after grazing of the varieties. By grazing, we're imposing a stress on the wheat crop by removing leaf area and tillers. Different varieties will respond differently to that stress. Varieties that do not have good spring tillering potential may not do very well in those situations. You might want to look at varieties that have good spring tillering potential to recover from that stress due to grazing.

It's very challenging, but having dual-purpose wheat gives producers the flexibility to just graze out if prices are conducive for that, or go for grain after the grazing.

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8. Comparative Vegetation Condition Report September 6 - 12

The weekly Vegetation Condition Report maps below can be a valuable tool for making crop selection and marketing decisions.

The objective of these reports is to provide users with a means of assessing the relative condition of crops and grassland. The maps can be used to assess current plant growth rates, as well as comparisons to the previous year and relative to the 27-year average. The report is used by individual farmers and ranchers, the commodities market, and political leaders for assessing factors such as production potential and drought impact across their state.

The Vegetation Condition Report (VCR) maps were originally developed by Dr. Kevin Price, K-State professor emeritus of agronomy and geography. His pioneering work in this area is gratefully acknowledged.

The maps have recently been revised, using newer technology and enhanced sources of data. Dr. Nan An, Imaging Scientist, collaborated with Dr. Antonio Ray Asebedo, assistant professor and lab director of the Precision Agriculture Lab in the Department of Agronomy at Kansas State University, on the new VCR development. Multiple improvements have been made, such as new image processing algorithms with new remotely sensed data from EROS Data Center.

These improvements increase sensitivity for capturing more variability in plant biomass and photosynthetic capacity. However, the same format as the previous versions of the VCR maps was retained, thus allowing the transition to be as seamless as possible for the end user. For this spring, it was decided not to incorporate the snow cover data, which had been used in past years. However, this feature will be added back at a later date. In addition, production of the Corn Belt maps has been stopped, as the continental U.S. maps will provide the same data for these areas. Dr. Asebedo and Dr. An will continue development and improvement of the VCRs and other advanced maps.

The maps in this issue of the newsletter show the current state of photosynthetic activity in Kansas, and the continental U.S., with comments from Mary Knapp, assistant state climatologist:

Kansas Vegetation Condition

Period 37: 09/06/2016 - 09/12/2016



Figure 1. The Vegetation Condition Report for Kansas for September 6 – September 12, 2016 from K-State's Precision Agriculture Laboratory continues to show high NDVI values across the eastern third of the state. An exception can be seen in the Kansas City metro area. This is a result of the heavy rains that inundated the area early in the month.



Kansas Vegetation Condition Comparison Early-September 2016 compared to the Early-September 2015

Figure 2. Compared to the previous year at this time for Kansas, the current Vegetation Condition Report for September 6 – September 12, 2016 from K-State's Precision Agriculture Laboratory shows the largest area of increased vegetative production is in north central Kansas. Currently this area is drought-free, whereas last year there was moderate drought in the area. Pockets of decreased NDVI readings are evident in areas where heavy rain and cloud cover this year masked the vegetative activity.



Kansas Vegetation Condition Comparison Early-September 2016 compared to the 27-Year Average for Early-September

Figure 3. Compared to the 27-year average at this time for Kansas, this year's Vegetation Condition Report for September 6 – September 12, 2016 from K-State's Precision Agriculture Laboratory shows the area of below-average vegetative activity is confined to the eastern counties. These low NDVI values are the result of heavy rains and cloud cover in this area. Moderate temperatures and seasonal rainfall have favored plant growth across most of the state.



Figure 4. The Vegetation Condition Report for the U.S for September 6 – September 12, 2016 from K-State's Precision Agriculture Laboratory shows high NDVI values in the western Corn Belt, particularly Minnesota and Wisconsin. Favorable rainfall and more seasonal temperatures continue to favor photosynthetic activity across the region. More vegetative activity has become visible in east Texas and Louisiana, although the region is still experiencing high waters/flooding from rains in August.

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Continental U.S. Vegetation Condition



Continental U.S. Vegetation Condition Comparison Early-September 2016 Compared to Early-September 2015

Figure 5. The U.S. comparison to last year at this time for September 6 - September 12, 2016 from K-State's Precision Agriculture Laboratory shows that lower NDVI values continue across much of the Southern U.S. west of the Rockies. Persistent rain and cloud cover continues to mask vegetative activity in Louisiana. Moderate drought conditions persist in the Carolinas. In contrast, the low NDVI values slicing from the Dakotas through western Missouri are due to clouds this year.



Figure 6. The U.S. comparison to the 27-year average for the period September 6 – September 12, 2016 from K-State's Precision Agriculture Laboratory shows areas of below-average photosynthetic activity in California, where drought persists. The slice of below-average NDVI values from the Dakotas through western Missouri into Arkansas and Louisiana are the result of persistent clouds in the area. Much of the Hill Country in Texas shows higher-than-average vegetative activity due to favorable rains and temperatures.

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