Issue 875

K-STATE Research and Extension

Extension Agronomy

eUpdate

09/30/2021

These e-Updates are a regular weekly item from K-State Extension Agronomy and Kathy Gehl, Agronomy eUpdate 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 Kathy Gehl, 785-532-3354 kgehl@ksu.edu, or Dalas Peterson, Extension Agronomy State Leader and Weed Management Specialist 785-532-0405 dpeterso@ksu.edu.

Subscribe to the eUpdate mailing list: https://listserv.ksu.edu/cgi-bin?SUBED1=EUPDATE&A=1

eUpdate Table of Contents | 09/30/2021 | Issue 875

1. Soybean dry down rate before harvest

The latest USDA-National Agricultural Statistics Service crop progress and condition report released September 27, 2021 classified 58% of the soybean crop to be in good or excellent condition. Overall, 57% of all soybeans in Kansas are dropping leaves, behind the 65% from last year but ahead of the five-year average of 52%.

Weather outlook

The weather conditions expected for October will be critical for soybeans as related to seed filling and determining final seed weight.

Current conditions have been much warmer than normal thus far in September. In addition, current forecast projections favor continued warmth through much of October. The future for precipitation is slightly better with the 8-14 day outlook, suggesting some possibility for near-average to slightly above average amounts. While this is needed rain, it may be too late for grain filling. Also, keep in mind that there is a significant drop in normal rainfall amounts from September to October as we move into a typically drier part of the year.

Soybean dry down

Soybeans will reach final maturity with high seed water content, moving from 90% to around 60% from beginning of seed filling until final maturity. Final maturity is defined as the formation of the black layer in the seeds. The dry down rate will depend on the maturity group (affecting the length of the season), planting date, and weather conditions experienced during the latter part of the reproductive phase.

Changes in the water content during the seed-filling process (Figure 1) were previously described in our "Soybean Growth and Development" poster. As described for corn, seed water loss for soybeans can also divided in two phases: 1) before "black layer" or maturity, and 2) after black layer. For understanding the changes in water content before "black layer", visit the previous article in Issue 816 (August 28, 2020) related to the contribution of seed filling to yield: https://bit.ly/3jpq5Wu

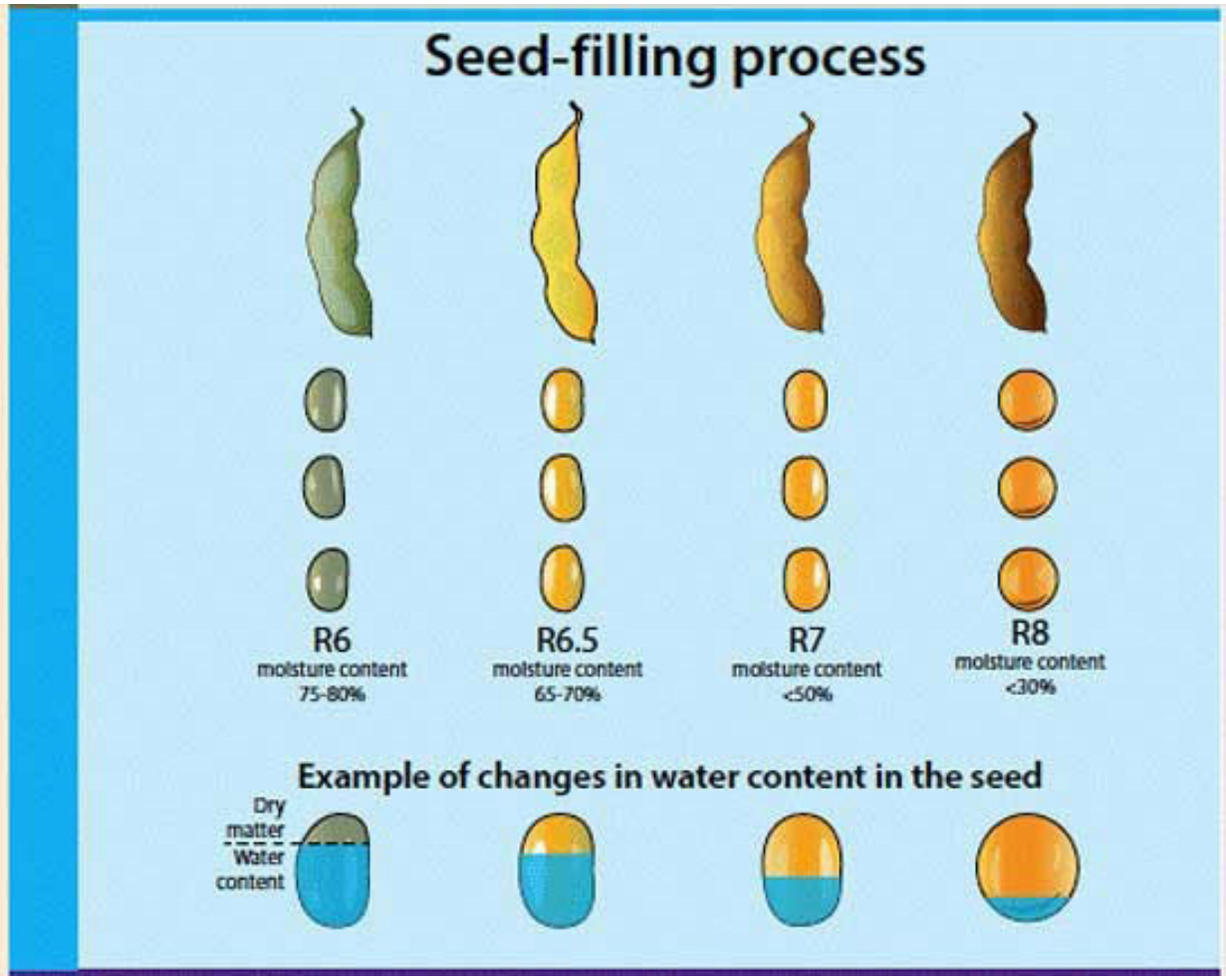

Figure 1. Soybean seed filling process from full seed to full maturity. Photo and infographic prepared by Ignacio Ciampitti, K-State Research and Extension. Taken from Soybean Growth and Development, MF3339.

To address the question related to the dry down rate for soybeans, a study was conducted to investigate the changes in water content from black layer formation (maturity) until harvest time (Figure 2). During the last days of September and mid-October 2016, the overall dry down rate was around 3% per day (from 58% to 12% seed moisture) – taking an overall period of 15 days.

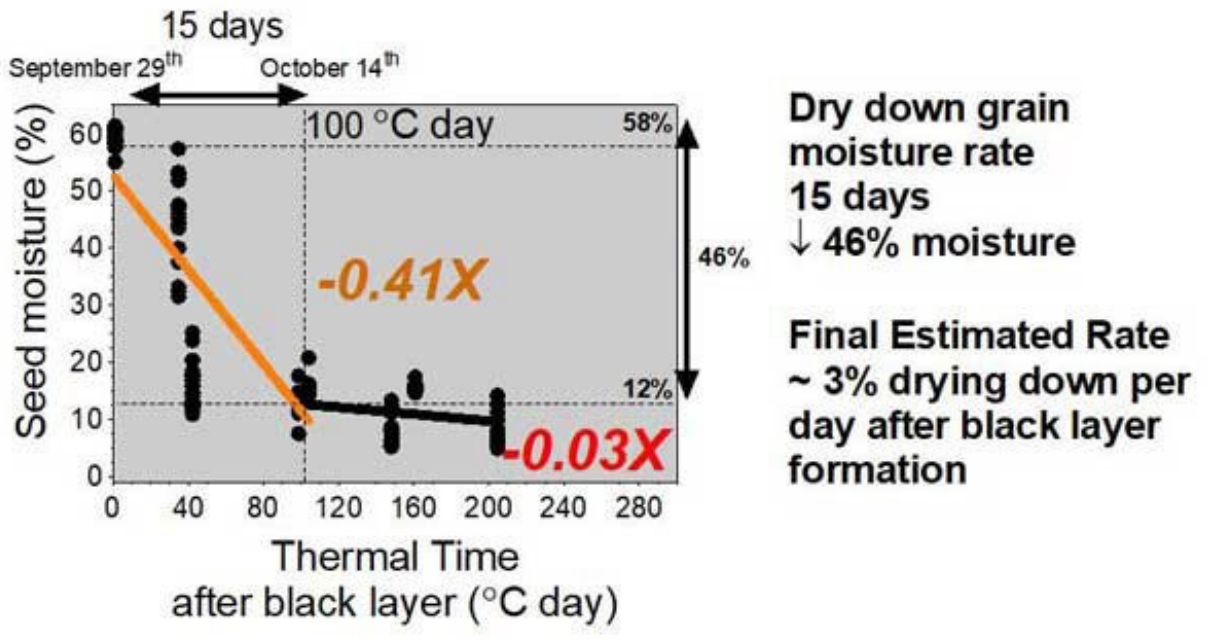

Figure 2. Grain moisture dry down (orange line) across three hybrids and different N rates near Manhattan, KS. Horizontal dashed lines marked the 58% seed moisture at black layer formation. * Graph prepared by Ignacio Ciampitti, K-State Research and Extension.

**Note: It is desired to reach harvest with 13% seed moisture to maximize the final seed volume to be sold, thus the importance of timing harvest with the right seed moisture content.*

Soybean dry down rate was three-time faster, 3% per day, relative to corn at 1% per day. These dry down rates for corn and soybeans are primarily affected by temperature, humidity, and overall water content at the point of black layer formation (maturity). These main factors should be considered when the time comes to schedule soybean harvest.

Ignacio A. Ciampitti, Farming Systems
ciampitti@ksu.edu

Christopher "Chip" Redmond, Kanas Mesonet Manager
christopherredmond@ksu.edu

2. Management considerations for no-till wheat following sorghum or other summer crops

With fall harvest progressing at earlier than normal rates, favorable wheat prices, and upcoming chances of precipitation, many producers are considering planting wheat back into freshly harvested summer crop residue. Following are several key management considerations to keep in mind, a more detailed discussion on these can be found in K-State publication MF-2641, Managing No-Till Wheat Following a Summer Crop in Eastern Kansas.

Variety Selection: If planting wheat after corn, adapted varieties with the best ratings for fusarium head blight (scab) should be used. Due to moisture use by the previous summer crop, varieties with high levels of drought tolerance should be used. As wheat after a summer crop is generally planted later, varieties with good ratings for winter hardiness and late fall tillering should be selected. These ratings are available in K-State publication MF991, Wheat Variety Disease and Insect Ratings 2021.

Planting Date: Wheat should be planted as soon as possible after harvest. Later planting dates shorten the window available for the formation of fall tillers, which are the more productive than spring-initiated tillers.

Seeding Rate: Seeding rates should be increased with delayed planting or in challenging high-residue environments where adequate stand establishment may be difficult. As previously mentioned, delayed planting reduces the opportunity for the initiation of fall tillers, increasing seeding rates can overcome some of that reduction.

Harvest Considerations: Evenly spreading crop residue at harvest is a key action that can positively affect the productivity of the subsequent wheat crop. Uneven distribution of the summer crop residue can make it difficult to maintain adequate depth of seed placement and can also result in uneven nutrient availability as areas with higher crop residue will likely immobilize more nitrogen.

Seeding Equipment and Seeding Depth: Seeding to adequate depth in high-residue conditions is necessary to ensure healthy crown development, maintain access to sufficient soil moisture in drying conditions, and reduces the potential for winter injury. Producers should make sure that their drill is set to achieve adequate depth in the thickest layers of crop residue. Drills and air-seeders often need additional ballast (weight) added to the drill to maintain adequate downforce to cut through the residue and place seed at the target depth. Producers should use ground speeds that maximize the performance of the seeding operation. Often increasing ground speed aids in the flow of residue through the seeding tool, however increasing speed also increases the ballast and downforce requirements necessary to achieve the target seeding depth.

Nutrient Management: In general, higher rates of fall applied nitrogen are necessary for wheat when planted after corn or sorghum. This is especially true for after sorghum which generally his residue that is lower in nitrogen content, making it more likely to immobilize available nitrogen. An additional 30 lb/ac of Nitrogen should be applied for wheat following grain sorghum or sunflowers as compared to other crops. Wheat planted after soybeans should not have its nitrogen application lowered relative to continuous wheat as the organic nitrogen release from the soybean crop is likely to occur too late to significantly benefit the wheat crop.

Herbicide History: Producers should check the label of all products used in the proceeding crop and their plant back restriction to wheat. Precipitation received since application can play a large role in

potential injury to the wheat crop by any herbicide residual.

Allelopathy: The potential effect of allelopathy of sorghum residue on wheat stand establishment and yield is often difficult to separate from nutrient availability and other potential yield limiting factors. Concerns over allelopathy should not discourage producers from no-till planting wheat after grain sorghum when the aforementioned production concerns are addressed.

Grain sorghum termination and desiccation with glyphosate

Producers who would like to facilitate a timely sorghum harvest 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, inspect sorghum field for existing stalk issues prior to applying the glyphosate. If stalk rots are present, applying glyphosate may increase the chance of plant lodging if not harvested in a timely manner.

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. In addition, there is a seven-day period between time of application and harvest.

Sorghum response to pre-harvest glyphosate treatments

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.

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 (yield not collected in 2012).

Table 1 summarizes the effect of the pre-harvest treatments on grain sorghum. The response was similar in all harvested experiments, 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 five sites in 2011 and 2012).

	Glyphosate	No glyphosate
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%. Grain harvest occurred 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.

A potential question 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, grain filling is complete and yield reducing insect damage is unlikely. The presence of insects at this late stage of development should not 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 following treated and untreated sorghum.

	Location and year					
Sorghum pre-harvest treatment	Belleville (2011-2012)	Manhattan (2011-2012)	Ottawa (2011-2012)	Belleville (2012-2013)	Manhattan (2012-2013)	Hutchinson (2012-2013)
	Yield (bu/acre)					
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 pre-harvest, 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. A hard freeze soon after a pre-harvest glyphosate application to sorghum essentially negated the effect of the glyphosate application.

Summary

The use of glyphosate as a preharvest desiccant on grain sorghum will reduce the moisture level of grain sorghum and may allow producers to harvest the crop earlier than normal. However, care must be taken to ensure the crop is harvested in a timely manner. If not, the desiccant could increase lodging potential. If applied at the proper time (after physiological maturity - formation of black layer at the bottom of the sorghum grains), 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.

Lucas Haag, Northwest Area Agronomist
lhaag@ksu.edu

Kraig Roozeboom, Cropping Systems Agronomist
kraig@ksu.edu

Ignacio Ciampitti, Farming Systems
ciampitti@ksu.edu

3. Test to prevent nitrate and prussic acid poisoning

Many Kansas cattle operations rely on some type of harvested feed to use in the winter months and common among those sources is forage sorghum, millets, sorghum-sudangrass, and sudan. Forages in the sorghum family are prone to two different problems for feeding cattle, nitrate poisoning and prussic acid (hydrocyanic acid, HCN) poisoning. Millet (proso and pearl) do not contain prussic acid but can have nitrates. Prussic acid and nitrate poisoning are easy to get confused because both result in a lack of oxygen availability to the animal and are more likely to occur when the plant is stressed (fertility, hail, drought).

Table 1. Key characteristics of nitrate and prussic acid poisoning.

Item	Nitrate	Prussic Acid
Plant parts most affected	Base of plant	Young or new growth
Types of plants	Many, especially sorghum family, pigweed (palmer amaranth, redroot, waterhemp), kochia, oat hay	Many (> 3,000 plant species), sorghums including Johnson grass, white clover, birdsfoot trefoil, Indiangrass, *Cyndon* spp. (Bermuda)
Grazing problems	Consumption of lower plant, rarely a problem unless extremely high levels or forced to eat entire stem	Consumption of newest growth
Hay	Not impacted by drying	Not impacted by drying
Time of death	Several hours after consumption	Within minutes of consumption, treatment can rarely occur fast enough to save the animal
Blood/Oxygen	Chocolate brown colored blood, hemoglobin converted to methemoglobin and unable to carry oxygen	Blood bright cherry red, hemoglobin contains oxygen, but not available to cells

In dry areas of the state, cattle may be removed from pasture early. Bringing hungry cattle into pens with weeds can be very dangerous as the nitrate concentration may be elevated throughout the plant and animal intake high. Manure in corrals can contribute to the elevation of nitrates in the weeds. Elevated nitrates may not result in death but could cause abortions.

The current KSU forage fact sheet on prussic acid poisoning indicates that prussic acid potential dissipates as the forage dries. Additionally, hay or silage that likely contained high cyanide concentrations at harvest should be analyzed before it is fed. This second statement is often forgotten and it's assumed that when the plant dries, all the cells are ruptured and any HCN is released. To confirm this, we measured dhurrin content in sorghum hay in a study last year. The dhurrin content was stable from 1 to 10 weeks of dry storage. In the plant, dhurrin (the precursor to HCN in sorghum species) and the enzyme that converts it to cyanide, are stored in separate compartments within the cell. When the plant is eaten, the compartments are ruptured, and the

cyanide formed and released. Measurement of dhurrin directly is used in some research studies. However, commercial labs do not typically measure dhurrin directly. Rather the procedure includes something to stimulate cyanide release. If hay is made from forages in the sorghum family or other susceptible species, testing for prussic acid in forage that has suffered from drought, hail or fertility issues is advised. Testing is cheap compared to the cost of losing even one animal.

Management recommendations common to both prussic acid and nitrates

- Test first, don't gamble. Keep in mind, different labs use different tests that have different scales.
- Feed animals with a known safe feedstuff(s) and have them full before introduction to potentially problematic feeds. Don't turn in hungry.
- Ensiling will reduce concentrations of either by 40-60% in well-made silage, but silage put up under less-than-optimal conditions could still contain very high levels. If extremely high before ensiling, a 50% reduction may not be enough to result in safe feed.
- Dhurrin concentrates in the upper portion of the plant and with more plant growth (>24"), concentration levels may be diluted if measuring the whole plant.
- Nitrate concentrates in the base of the plant and is least in head and leaves, grazing or cutting high can reduce nitrate levels in the forage.
- Do not harvest drought stressed forage within 7 to 14 days after good rainfall to reduce the levels of accumulated nitrates.

If testing before grazing, samples should reflect what the animals are expected to consume, generally leaves and upper portion of the plant. Sample a minimum of 15 sites across a given field. One method is to sample from each corner and the center by walking diagonal lines and sample plants every 50-100 steps or as appropriate for field size.

We expect levels of nitrates and prussic acid to be variable across a field, so more samples are better than less. A rule of thumb is to sample 10 to 20 % of the bales per field or cutting as a minimum. Be aware of areas of the field that exhibited more plant stress than others. If large enough areas, you may want to sample them separately. Your acreage size and feeding methods likely factor into this decision. Use a forage probe that cuts across all plant parts in a bale rather than a grab sample from individual bales or windrows. Most county extension offices can help with sampling procedures and equipment.

Prussic acid in sorghum following a freeze event

Frost causes plant cells to rupture and prussic acid gas forms in the process. Because the prussic acid is in a gaseous state, it will gradually dissipate as the frosted/frozen tissues dry. Thus, risks are highest when grazing frosted sorghums and sudangrasses that are still green. New growth of sorghum species following frost can be dangerously high in prussic acid due to its young stage of growth. Prussic acid content decreases dramatically during the hay drying process and during ensiling. It is recommended to wait ten days until after a killing freeze before grazing. Sorghum and sudangrass forage that has undergone silage fermentation is generally safe to feed.

For more complete information on these problems see these publications Nitrate Toxicity and Prussic Acid Poisoning. If you have samples with high prussic acid concentrations, and are willing to share information on variety, growth, fertility, and harvest conditions, it will be helpful as we strive to better understand this issue.

Sandy Johnson, Extension Beef Specialist, Northwest Research-Extension Center
sandyj@ksu.edu

John Holman, Cropping Systems Agronomist, Southwest Research-Extension Center
jholman@ksu.edu

Augustine Obour, Soil Scientist, Agricultural Research Center - Hays
aobour@ksu.edu

4. Control woody plants on rangeland: Basal bark and cut-stump herbicide applications

Late summer and fall can be an excellent time to treat unwanted stands of woody plants. Scattered stands of individual trees should either be treated individually using the basal bark method (for labeled plants less than 4-6 inches in diameter) or the cut stump treatment method. The basal bark and cut stump treatments will not be effective if the plants cannot be treated down to the soil line. Avoid conditions where water (or snow later in the season) prevents spraying to the ground line.

Basal bark application method

Producers can treat smaller diameter susceptible woody plants individually this fall by spraying the basal stem parts with triclopyr plus diesel fuel. The lower 12-15 inches of the stems or trunks of susceptible small trees should be thoroughly wetted on all sides with a triclopyr-diesel mixture. Triclopyr goes by the tradenames Remedy Ultra and Pathfinder II. Remedy Ultra is a 4 lb/gallon product. The labeled recommendations for Remedy Ultra are 20-30% solution in diesel. Pathfinder II is a ready-to-use product and does not have to be mixed with diesel. PastureGard HL is a premix of triclopyr and fluroxypyr, and can be applied as a basal bark or cut-stump treatment as a 25% solution in diesel. Crossbow, a mixture of triclopyr and 2,4-D, can also provide control of certain woody plants as a 4% solution in diesel. Milestone, with the active ingredient aminopyralid, is effective on black and common honeylocust. Mix Milestone 5% v/v with a compatible basal oil; e.g. Dyne-Amic from Helena Chemical. Before selecting a basal oil, do a jar test by mixing Milestone and basal oil to determine compatibility.

Cut-stump method

If the woody plant is greater than 6 inches in diameter, the best method is to:

- Cut it off at ground level.
- Treat the cut surface with triclopyr and diesel fuel within 30-60 minutes, before the sap seals over the exposed area.
- Spray the cambium and light-colored sapwood to insure translocation of the herbicide (Figure 1).
- Treat any exposed trunk or exposed roots.

The stump of ash, cottonwood, elm, oaks, persimmon, willow, and Russian olive can be treated with a 1:1 ratio of dicamba (Clarity, Sterling Blue) in water instead of triclopyr if desired. The stumps of Eastern red cedar do not need to be treated since, unlike many woody plants, this species does not root sprout. Simply cutting Eastern red cedar below the lowest green branch will kill it. Common trees in Kansas that re-sprout after cutting include: ash, cottonwood, elm, oaks, osage orange (hedge), persimmon, black and common honey locust, saltcedar, and Russian olive. In sprouting species, new shoots arise from dormant buds at or below the ground often resulting in a multi-stemmed clump.

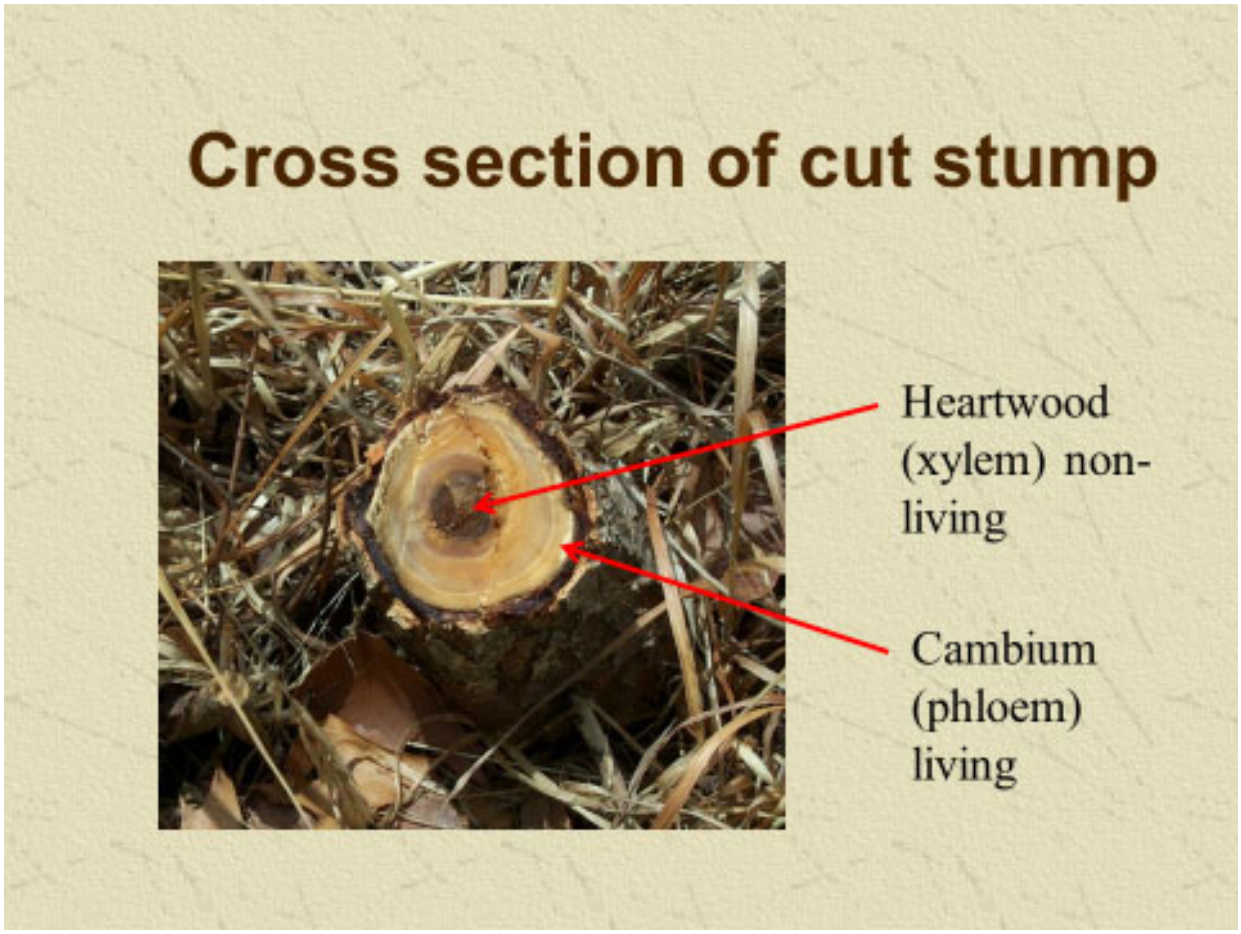

Figure 1. Treat the cambium tissue for cut-stump treatments.

Table 1. Cut-Stump Herbicides

Herbicide	Active ingredients per gallon	Rate
Crossbow[1]	2 lb 2,4-D + 1 lb triclopyr	4% in diesel
Remedy Ultra	4 lb triclopyr	20-30% in diesel
Pathfinder II	0.75 lb triclopyr	Ready to use
PastureGard HL	3 lb triclopyr + 1 lb fluroxypyr	25% in diesel
Milestone	2 lb aminopyralid	10% in water
Sterling Blue/Clarity	4 lb dicamba	25-50% in water
Roundup PowerMAX	5.5 lb glyphosate	50-100% in water
Arsenal	2 lb imazapyr	10% in water
Tordon 22K	2 lb picloram	10% in water
Capstone	0.1 lb aminopyralid + 1 lb triclopyr amine	Undiluted

[1] Trade names are used to help identify herbicides. No endorsement is intended, nor is any criticism implied of similar products not mentioned.

Common honeylocust can re-sprout from a wide diameter area around the main plant because of root suckers. One option is to make a basal bark treatment with triclopyr-containing products to kill the entire plant in the fall. Then the main plant can be cut down in subsequent years once the tree is dead. Cut-stump applications of Milestone as a 10% solution in water has been more effective than triclopyr on common honeylocust.

Table 2. Cut-Stump Treatments

Species	Herbicides
Ash	Crossbow, Pathfinder II, PastureGard HL, Banvel/Clarity, Arsenal, Capstone
Common honeylocust	Remedy Ultra, Pathfinder II, PastureGard HL, Milestone, Sterling Blue/Clarity, Tordon 22K, Capstone
Cottonwood	Crossbow, Remedy Ultra, Pathfinder II, Sterling Blue/Clarity, Arsenal, Tordon 22K, Capstone
Elm	Crossbow, Remedy Ultra, Pathfinder II, PastureGard HL, Banvel/Clarity, Arsenal, Tordon 22K, Capstone
Oaks	Remedy Ultra, Pathfinder II, PastureGard HL, Banvel/Clarity, Roundup PowerMAX, Arsenal, Tordon 22K, Capstone
Osage orange (hedge)	Remedy Ultra, Pathfinder II, PastureGard HL
Persimmon	Remedy Ultra, Pathfinder II, PastureGard HL, Sterling Blue/Clarity, Arsenal, Capstone
Russian olive	Crossbow, Pathfinder II, Sterling Blue/Clarity, Arsenal
Salt cedar	Remedy Ultra, Pathfinder II, PastureGard HL, Roundup PowerMAX, Arsenal
Willow	Crossbow, Remedy Ultra, Pathfinder II, PastureGard HL, Roundup PowerMAX

Tordon RTU and Pathway can be used on cut surfaces in noncropland areas such as fence rows, roadsides, and rights-of-way. However, Tordon RTU, and Pathway are not labeled for use on range and pasture. Glyphosate labels vary on what sites are labeled for cut-stump application on rangeland. Roundup PowerMAX can be applied on any terrestrial site. Roundup ULTRA can only be applied as a cut-stump treatment on non-cropland. Be sure to check the label as rangeland is sometimes included as a site under non-cropland on some glyphosate labels.

Application equipment for cut-stump application includes pressurized hand sprayers, small backpack sprayers, sprayer mounted on ATV with handheld gun, hydraulic tree shears or saws with an attached spray nozzle, or even a paint brush. Two of the more common pieces of equipment for cutting the woody plants are the turbo saw and the hydra clip (Figure 2).

Figure 2. Turbo saw (left) and hydra clip (right).

Although exposure to animals is reduced by basal and cut-stump treatments, grazing and haying restrictions still need to be followed. There are no restrictions before grazing with any of the herbicides discussed. Check labels for restrictions for use prior to hay harvesting, removal of animals before slaughter, and for use around lactating dairy animals.

Application tips for using cut-stump treatments:

- Always follow directions on the herbicide label.
- Before spraying, brush any sawdust or debris off cut surface.
- Apply herbicide to freshly cut stump.
- Spray cut surface and stump to ground level.
- Spray exposed roots above soil surface.
- The cambium layer is the critical area to spray.
- Apply enough liquid that it pools on cut surface.

Walt Fick, Rangeland Management Specialist
whfick@ksu.edu

5. Free soybean cyst nematode testing is available from the K-State Plant Disease Diagnostic Lab

Now is the time to be testing fields for soybean cyst nematode (SCN). To make that process easier, the K-State Plant Disease Diagnostic Lab is now offering **FREE** SCN testing for Kansas producers. This program is facilitated by a grant received from the SCN Coalition. This free testing program will expire, so now is a good time to take advantage of it! Here we provide some additional information about SCN and details about collecting and shipping a good sample.

Soybean cyst nematode (SCN) is a major problem in soybean fields throughout eastern and central Kansas (Figure 1). It is important to monitor SCN levels regularly to determine if management strategies, such as variety resistance and crop rotation, have been successful.

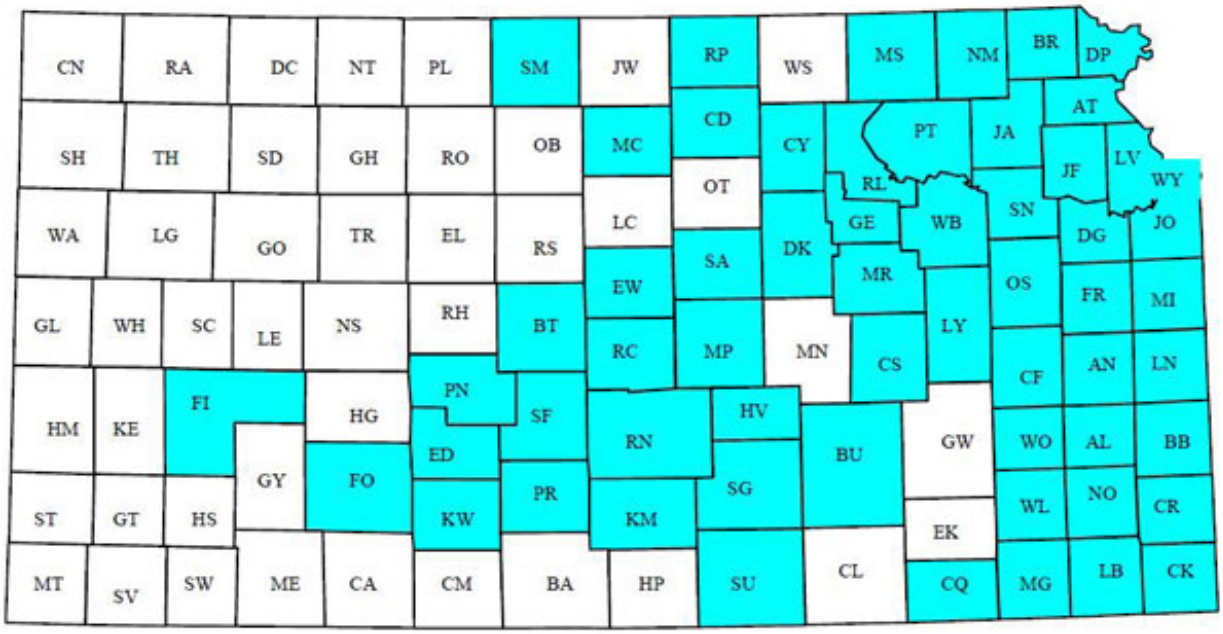

Figure 1. As of September 1, 2021, SCN was identified in 59 Kansas counties that produce >85% of Kansas soybeans. Map courtesy of Timothy Todd.

Immediately following harvest is the best time to check fields for SCN and start planning for next season. Confirming the presence of SCN and determining population levels is the basis for a successful integrated management program. Here we discuss the recommended strategy for SCN sampling.

To collect a SCN sample you will need:

1. A soil probe (or sharpshooter spade)
2. A bucket
3. A labeled bag. Label should include the following information:
    a. Field identification (*i.e.* Field ID: North Farm, near Doe Creek)
    b. Size of the area being sampled (*i.e.* 20 acres)
    c. Crop history (*i.e.* soybean, corn, and soybean)

Recommended field pattern for sample collection:

If your field is fairly uniform, divide it into quadrants for your SCN sample collection. Sections of the field that have had different cropping histories or have a different soil type should be sampled separately. **For each quadrant or area of the field, you will collect 10 to 20 cores to a depth of 6 to 8 inches.**

It is important that when collecting soil cores you walk in a systematic pattern, such as a "Z" pattern (Figure 2). Collect a total of 10 to 20 soil cores, emptying each into the bucket after collection. All core samples should be mixed well, to account for any minor variation between cores. After mixing, collect 1 pint of soil, approximately 2 cups, in a labeled plastic bag and seal.

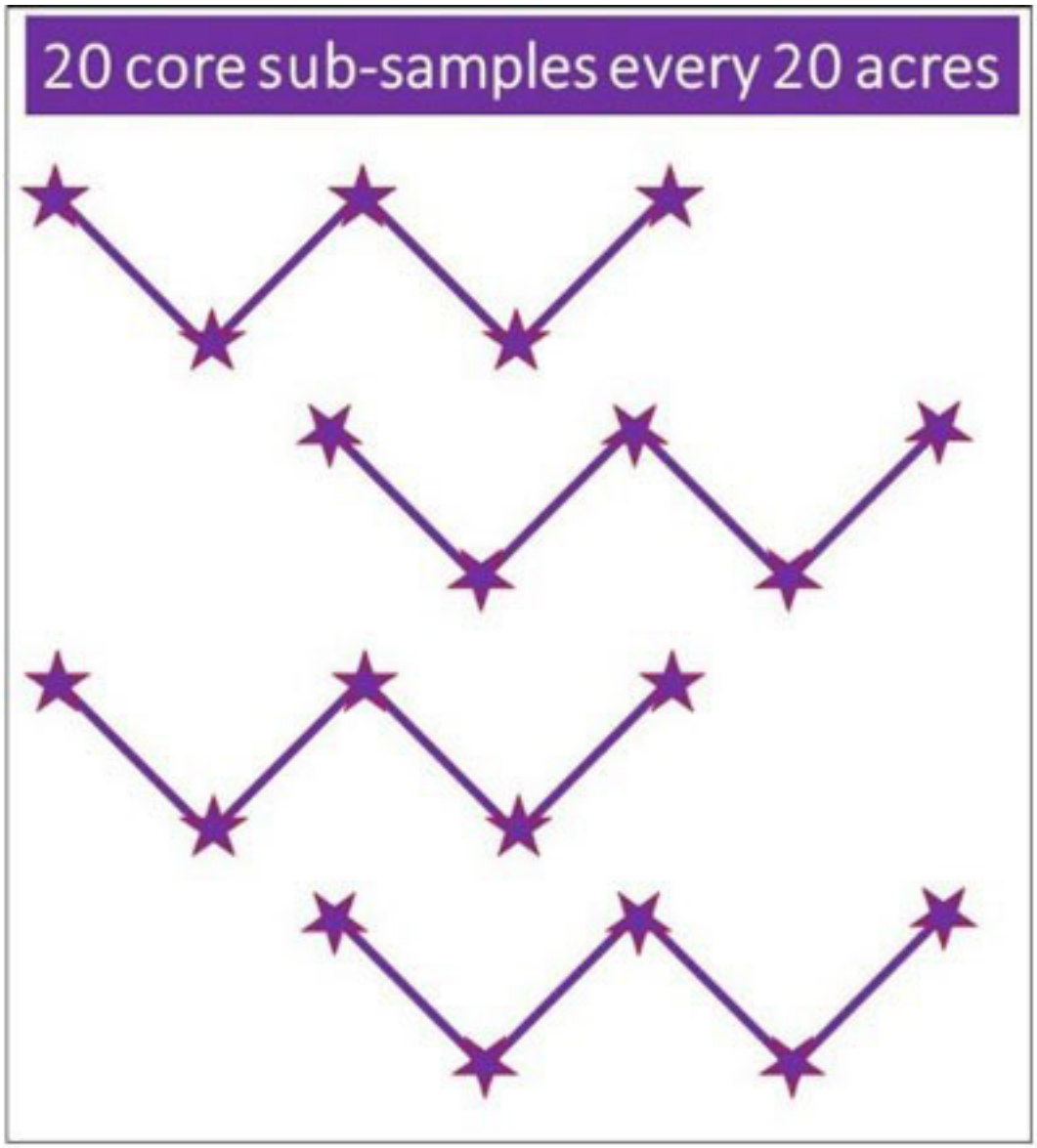

Figure 2. Example of a good sampling pattern for collecting soil to test for SCN.

When sending your samples to the diagnostic lab make sure to:

1. Keep samples refrigerated until shipping
2. Send overnight or as fast as possible (time is crucial)
3. Avoid leaving bags in the sun (which can kill nematodes)
4. Send the samples to the Plant Disease Diagnostic Lab in the K-State Plant Pathology Department.
5. You can find the **Plant Disease Diagnostic Check sheet** at https://www.plantpath.k-state.edu/extension/diagnostic-lab/documents/DiseaseLabChecksheet.pdf

Shipping address:

K-State Plant Disease Diagnostic Lab
4032 Throckmorton PSC
1712 Claflin Road
Manhattan, KS 66506
clinic@ksu.edu
785-532-1383

Remember, your results will only be as good as the sample that you send to the lab!

Check out this short, informative video from our lab: Soybean Cyst Nematode-SCN Sampling 2020: https://youtu.be/b6Eo0isI1I0 .

For more information, feel free to contact us at the K-State Plant Pathology Department.

Rodrigo Onofre, Plant Pathology Post-Doctoral Fellow
onofre@ksu.edu

Timothy Todd, Nematologist
nema@ksu.edu

6. Weed management, weed escapes, and targeted control practices survey

A collaborative research project is underway with weed scientists from Kansas State, University of Nebraska, and University of Wisconsin. As part of this effort, they have created a survey for growers, consultants, and extension personnel.

The objective of the 2021 Soybean and Corn Weed Management, Weed Escapes, and Targeted Spraying Technologies SURVEY is to understand the main chemical weed control strategies and weed escapes in soybean and corn production fields in the United States during the 2021 growing season and to evaluate the interest and awareness regarding novel targeted herbicide spraying technologies (e.g., Seek & Spray systems, Drone-Mounted Weed Sensors and Sprayers).

You can access the survey at: https://uwmadison.co1.qualtrics.com/jfe/form/SV_e8rltNtwDgwtQXA

Your time participating in this survey is much appreciated and your responses will be of great value to our future weed management research and extension efforts.

Please don't hesitate to reach out if you have questions.

Rodrigo Werle, University of Wisconsin-Madison
rwerle@wisc.edu

Chris Proctor, University of Nebraska-Lincoln
caproctor@unl.edu

Anita Dille, Kansas State University
dieleman@ksu.edu