Issue 909

K-STATE Research and Extension

Extension Agronomy

eUpdate

06/02/2022

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.

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1. Considerations for weed control following wheat harvest

Post-harvest weed control in wheat stubble is very important to conserve critical soil moisture and prevent weeds from going to seed and adding to the weed seedbank. This year, it will be especially important to be ready to spray after wheat harvest because of less cover from shorter and thinner wheat than we have seen in the last few years in many areas.

When thinking about weed control in wheat stubble, there are two priorities – controlling already emerged weeds and preventing later flushes. Making applications before weeds exceed 4 to 6 inches is necessary for good control of already emerged weeds (Figure 1). Residual herbicides are needed to reduce the number of herbicide applications needed to control multiple flushes of weeds.

Figure 1. This large Palmer amaranth is regrowing after being sprayed with paraquat. Photo by Sarah Lancaster, K-State Research and Extension.

The standard treatment for many years to control weeds and volunteer wheat in wheat stubble was glyphosate plus 2,4-D LVE and/or dicamba. This tank-mix provided two herbicide modes-of-action to

help target challenging (and often drought-stressed) weeds. These herbicides continue to be important for weed control in wheat stubble. However, these tank-mixes may not be adequate in many cases because of herbicide resistance in weed populations, particularly glyphosate resistance in Palmer amaranth and kochia. Higher rates of the 2,4-D and dicamba may improve control, but in most cases 1 qt/acre of 2,4-D or 1 pint/acre of dicamba are the highest rates that should be used.

Paraquat (Gramoxone, others) is one herbicide that can work well in place of glyphosate to control emerged pigweed and kochia. Paraquat is a contact herbicide with a different mode of action (Group 27 - cell membrane disruptor), so spray coverage is critical. Spray volumes of 20 gallons/acre or higher are preferred, especially on larger weeds or denser stands. Recent work at K-State suggests that making the paraquat application as soon as possible following wheat harvest allows for better coverage and more effective control, especially on pigweeds. Paraquat also needs to be applied with a non-ionic surfactant or oil concentrate to enhance surface coverage of the plant foliage. A tank mix with **atrazine** will enhance control on emerged weeds and provide some residual weed control, if planning to plant corn or sorghum next spring. Likewise, **metribuzin** can be tank-mixed with paraquat if rotating to soybean to enhance control and provide some residual activity.

If planting wheat this fall, **saflufenacil (Sharpen)** applied at one to two fluid ounces per acre is an option to provide postemergence and short-term residual control of Palmer amaranth, kochia and other broadleaf weeds. Sharpen should be applied with glyphosate for grass control, and can be applied with other products labeled for use in wheat stubble. Sharpen works best with the addition of methylated seed oil and good spray coverage, so using 15 to 20 gallons/acre spray solution is important. If rotating to soybean, note the zero to 45-day rotation interval, depending on use rate and soil texture

Flumioxazin (Valor and others) can be added to burndown treatments at rates of one to four fluid ounces per acre for activity on emerged broadleaf weeds and some residual activity on broadleaf and grass weeds in wheat stubble. Flumioxazin can be mixed with glyphosate or clethodim (Select Max) for enhanced grass control. It can also be mixed with 2,4-D, atrazine, metribuzin, or paraquat. Wheat can be planted 30 days after 2 oz/ac, or 60 days after 3 oz/ac Valor application, if at least one inch of rain occurs between application and planting. Corn, sorghum, cotton, sunflowers, or soybeans can be planted in the spring following flumioxazin treatment. Residual weed control with flumioxazin will depend on rainfall (0.25 inch) for activation, just as with pre-plant treatment in soybeans.

It should be noted that saflufenacil and flumioxazin provide relatively short-lived residual control, when compared to other residual activity herbicides. Observations suggest flumioxazin has longer residual activity than Sharpen. However, either product will provide some residual weed control that may be enough to reduce the number of sprays for the remainder of the summer/fall.

For more detailed information, see the "2022 Chemical Weed Control for Field Crops, Pastures, and Noncropland" guide available online at https://www.bookstore.ksre.ksu.edu/pubs/CHEMWEEDGUIDE.pdf or check with your local K-State Research and Extension office for a paper copy. The use of trade names is for clarity to readers and does not imply endorsement of a particular product, nor does exclusion imply non-approval. Always consult the herbicide label for the most current use requirements.

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2. Optimal time for sampling corn nematode is between V5 to V7 growth stage

There are many disease organisms that can reduce corn yields in Kansas. One of the stealthiest is the root-lesion nematode (RLN) because it operates below ground on the roots and often has no specific, identifiable symptoms other than yield loss. It is present, at some level, in nearly all corn fields in the state. Historically the largest yield losses, which can exceed 40 percent in individual fields, occur in western Kansas where irrigated, no-till, continuous corn production systems in sandy soils are common.

Like most nematode problems, visible symptoms, if any, may be limited to patchy areas of the field where growth is stunted. Sometimes yellowing may also occur (Figure 1). Occasionally, roots may have lesions on them or roots may appear to be pruned (Figure 2).

Figure 1. Yellowing of plants caused by root-lesion and other nematode injury. Yield in the center of these areas was as low as 30 bu/ac. Photo courtesy of Tamra Jackson-Ziems, University of Nebraska-Lincoln.

Figure 2. Badly damaged roots near the end of the season with lesions and root pruning. Photo courtesy of Tamra Jackson-Ziems, University of Nebraska-Lincoln.

The best way to identify a root lesion nematode problem is by a whole-root assay. Optimal time for sampling is when corn is between V5 to V7 growth stage. Suspect plants should be dug from the soil. Try to keep some of the soil with the roots. Keep samples away from excessive heat.

You can also find more information about sampling for corn nematode on a recent YouTube video by K-State Plant Pathology at https://youtu.be/WWC23etxJYs

There are several commercially available seed treatment nematicides currently marketed, but in university trials, results have been inconsistent. Although root lesion nematode has a wide host range, studies have shown that soybean and sorghum are effective rotation crops for controlling the most common species of RLN in Kansas. Other plant-parasitic nematodes that occasionally result in losses include the sting, stunt, and stubby-root nematodes.

Need help with a corn nematode problem?

Contact your local K-State Extension Office. They will work with you to send photos of the problem (close-up, whole plant, roots, and field shot) and root and soil samples to the K-State Plant Disease Diagnostic Lab.

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3. Free Soybean Cyst testing from the K-State Plant Disease Diagnostic Lab

Soybean cyst nematode (SCN) can cause severe yield reduction and it's has been confirmed in 59 counties in 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. Testing for SCN is the first step for a successful integrated management program.

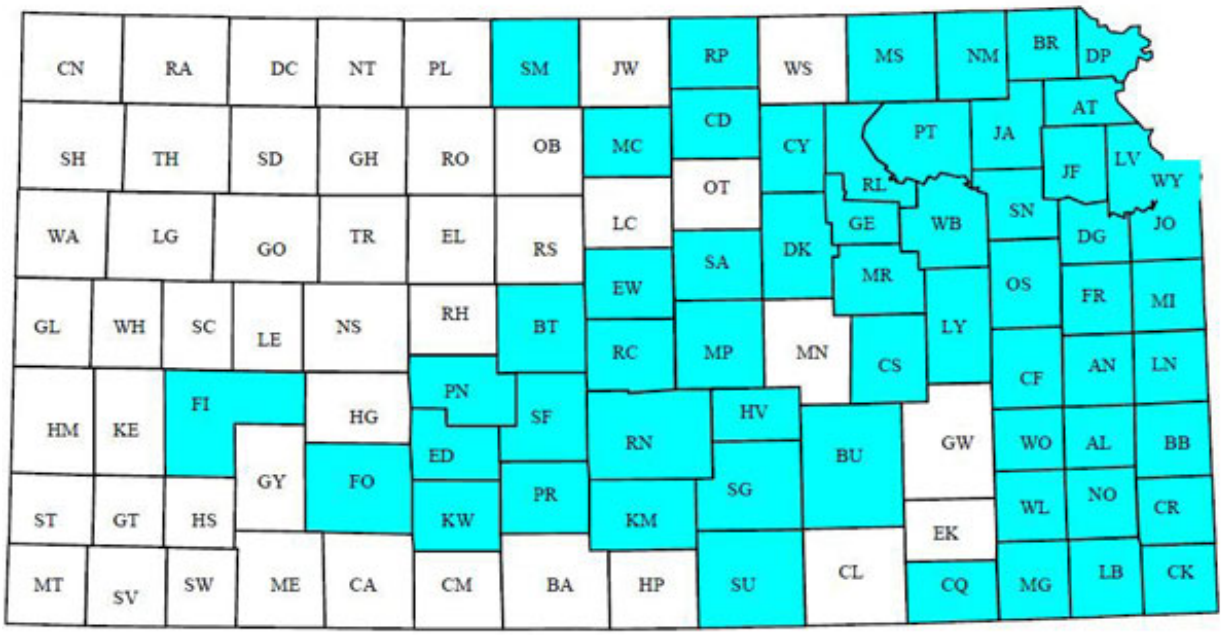

Figure 1. As of September 1, 2021, SCN was identified in 59 Kansas counties that produce >85% of Kansas soybeans. Map courtesy of Timothy Todd, K-State Research and Extension.

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. Below is some additional information about SCN and details about collecting and shipping a good sample.

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.

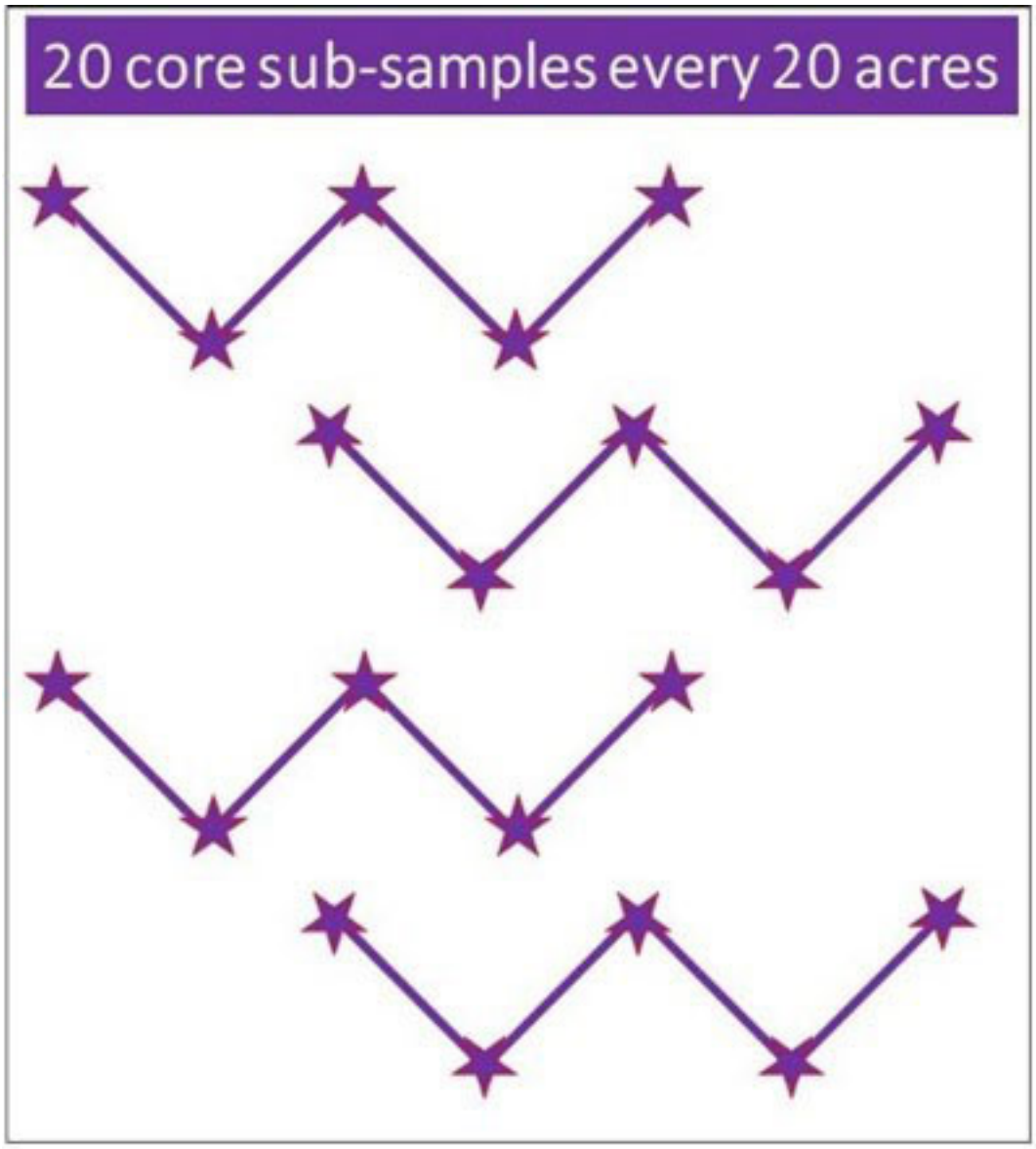

Figure 2. Example of a good sampling pattern for collecting soil to test for SCN.

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
3. Avoid leaving bags in the sun
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

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 either your local K-State Extension Office or us at the K-State Plant Pathology Department.

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4. Soil Health Matrix Decision Tool: A new free tool for producers

The Soil Health Matrix Decision Tool is a free tool that was recently developed by the Soil Health Nexus and a regional advisory team with support from North Central SARE. It is designed as a 101 tool to assess the effects of current and future management practices on soil health.

Producers who are looking to implement a new soil health practice on their operation can use this comparative tool to get an overall feel for practices that benefit soil health and which management decisions may be the best fit for their operation.

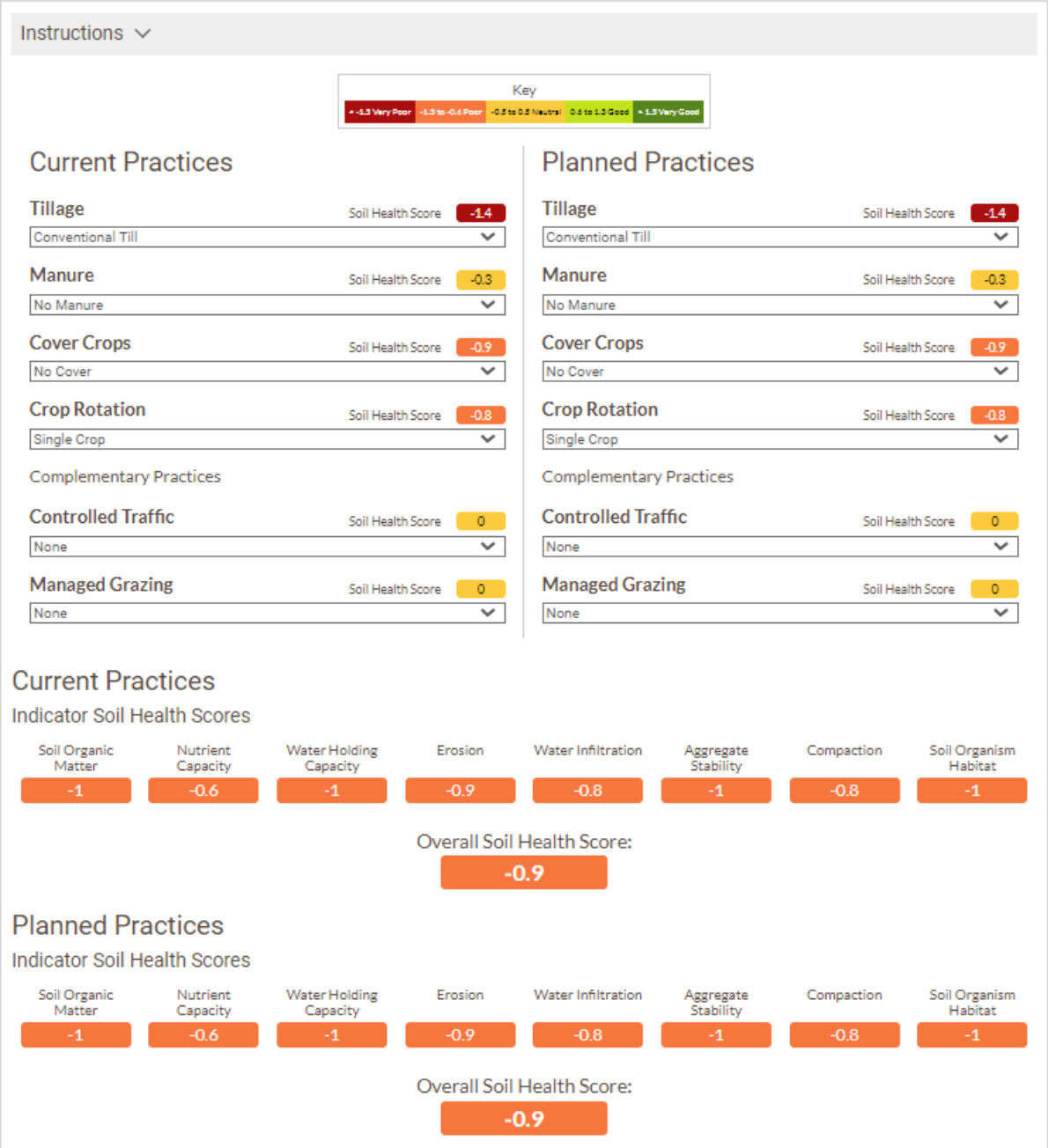

Figure 1. Snapshot of the Soil Health Matrix Decision-Tool

The tool includes four practices – tillage, manure, cover crops, and crop rotation – and two complementary practices – controlled traffic and managed grazing – and eight soil health indicators.

Users can select their current practices and then select any future planned practices that they are currently considering implementing on their operation. From there, you users can explore their soil health score for their current practices and compare those with the scores for future planned practices they are considering.

The tool provides three scores: an indicator, practice, and an overall score. The indicator scores are based on how a practice affects each of the soil health indicators and the practice score is the score

for a particular practice across all the soil health indicators. The overall score is the average of all the indicator scores allowing users to easily compare how different combinations of practices impact soil health.

It is important to note that the score values are not meant to serve as quantitative values producers can use on the farm. Instead, they are directional scores – that result from averaging the scores of research and extension representatives from across the region. The tool is designed to be a conversation starter between producers and their extension educator and allow producers to explore different implementation options to find the choice that makes the most sense to them.

The tool also includes a future considerations table that breaks down the equipment, time and labor, skill level, and cost for implementing new practices. Additionally, the table highlights any ecosystem services a new soil health practice will provide, such as groundwater protection and pollinator habitat,

You can access the tool by visiting the Soil Health Nexus website. There are two versions of the tool: a downloadable Excel version that can be accessed by scrolling to the bottom of the page and the web-based version located directly on the website.

The tool is currently in the pilot phase and the team is looking for feedback on how to refine the tool and improve its function. A short 5-minute survey is accessible on the Soil Health Matrix Decision Tool webpage and thoughts, feedback, and suggestions are encouraged.

For additional information or answers to your questions, you can contact DeAnn Presley, K-State Soil Management Specialist at deann@ksu.edu. Presley was on the team that developed this tool.

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5. Double cropping options after wheat

Double cropping after wheat harvest can be a high-risk venture. The available growing season is relatively short. Heat and/or dry conditions in July and August may cause problems with germination, emergence, seed set, or grain fill. Ample soil moisture this year can aid in establishing a successful crop after wheat harvest.

The most common double crop options are soybean, sorghum, and sunflower. Other possibilities include summer annual forages and specialized crops such as proso millet or other short-season summer crops – even corn. Cover crops are also an option for planting after wheat.

Be aware of herbicide carryover potential

One major consideration before deciding to plant a double crop or cover crop after wheat is the potential for herbicide carryover. Many herbicides applied to wheat are in Group 2 herbicides in the sulfonyl urea family and have the potential to remain in the soil after harvest. If a herbicide such as chlorsulfuron (Glean, Finesse, others) or metsulfuron (Ally) has been used, the most tolerant double crop will be sulfonylurea-resistant varieties of soybean (STS, SR, Bolt) or other crops. If you chose to use herbicide-resistant varieties, be sure to match the resistance trait with the specific herbicide (not just the herbicide group) that you used.

Less information is available regarding herbicide carry over potential of wheat herbicides to cover crops. There is little or no mention of rotational restrictions for specific cover crops on the labels of most herbicides. However, this does not mean there are no restrictions. Generally, there will be a statement that indicates “no other crops” should be planted for a specified amount of time, or that a bioassay must be conducted prior to planting the crop.

Burndown of summer annual weeds present at planting is essential for successful double-cropping. Glyphosate used to be effective, but if glyphosate-resistant kochia and pigweeds are present, alternative treatments such as paraquat may be required. Dicamba or 2,4-D may also be considered, if the soybean varieties with appropriate herbicide resistance traits are planted.

Management, production costs, and yield outlooks for double crop options are discussed below.

Soybeans

Soybeans are probably the most commonly used crop for double cropping, especially in central and eastern Kansas (Figure 1). With glyphosate-resistant varieties, often the only production cost for planting double crop soybeans in recent years has been the seed, an application of glyphosate, and the fuel and equipment costs associated with planting, spraying, and harvesting. However, with the development of glyphosate-resistant weeds, additional herbicides may be required to achieve acceptable control and minimize the risk of further development of resistant weeds.

Figure 1. Soybeans planted as a double crop following wheat at the Ashland Bottoms Research Farm in Manhattan. Photo by Kraig Roozeboom, K-State Research and Extension.

Weed control. The cost for weed control cannot really be counted against the soybeans, since that cost should occur whether or not a soybean crop is present. In fact, having soybeans on the field may reduce herbicide costs compared to leaving the field fallow. Still, it is recommended to apply a pre-emergence residual herbicide before or at planting time. Later in the summer, a healthy soybean canopy may suppress weeds enough that a late-summer post-emergence application may not be needed.

Variety selection for double cropping is important. Soybeans flower in response to a combination of temperature and day length, so shifting to an earlier-maturing variety when planting late in a double crop situation will result in very short plants with pods that are close to the ground. Planting a variety with the same or perhaps even slightly later maturity rating (compared to soybeans planted at a typical planting date) will allow the plant to develop a larger canopy before flowering. Planting a variety that is too much later in maturity, however, increases the risk that the beans may not mature before frost, especially if long periods of drought slow growth. The goal is to maximize the length of the growing season of the crop, so prompt planting after wheat harvest time is critical. The earlier you can plant, the higher the yield potential of the crop if moisture is not a limiting factor.

Fertilizer considerations. Adding some nitrogen (N) to double crop soybeans may be beneficial if the previous wheat yield was high and depleted soil N. A soil test before wheat harvest for N levels is recommended. Use no more than 30 lbs./acre of N. It would be ideal to knife-in the fertilizer. If that is not possible, banding it on the soil surface would be acceptable. Do not apply N in the furrow with soybean seed as severe stand loss can occur.

Seeding rates and row spacing. Seeding rate can be slightly increased if soybeans are planted too late in order to increase canopy development. Narrow row spacing (15-inch or less) has often resulted in a yield advantage compared to 30-inch rows in late plantings. Soybeans planted in narrow rows will canopy over more quickly than in wide rows, which is important when the length of the growing season is shortened. Narrow rows also offer the benefits of increasing early-season light capture, suppressing weeds and reducing erosion. On the other hand, the advantage of planting in wide rows is that the bottom pods will usually be slightly higher off the soil surface to aid harvest.

The other consideration is planting equipment. Often no-till planters will handle wheat residue better and place seeds more precisely than drills, although the difference has narrowed in recent years.

What are typical yield expectations for double crop soybeans? It varies considerably depending on moisture and temperature, but yields are usually several bushels less than full-season soybeans. A long-term average of 20 bushels per acre is often mentioned when discussing double crop soybeans in central and northeast Kansas. Rainfall amount and distribution can cause a wide variation in yields from year to year. Double crop soybean yields typically are much better as you move farther southeast in Kansas, often ranging from 20 to 40 bushels per acre.

A recent publication explores the potential yield of double crop soybeans relative to wheat yield and the most limiting factors affecting the yields for double-crop soybeans. The link to this article is: **https://bookstore.ksre.ksu.edu/pubs/MF3461.pdf**

Sorghum

Sorghum is another double crop option. Unlike soybeans, sorghum hybrids for double cropping should be earlier maturing. Sorghum development is primarily driven by accumulation of heat units and the double crop growing season is too short to allow medium-late or late hybrids to mature before the first frost in most of Kansas.

Late-planted sorghum likely will not tiller as much as early plantings and can benefit from slightly higher seeding rates than would be used for sorghum planted at an earlier date. Narrow row spacing is advised, especially if the outlook for rainfall is good.

A key component for estimation of N application rates is the yield potential. This will largely determine the N needs. It is also important to consider potential residual N from the wheat crop. This can be particularly important when wheat yields are lower than expected. In that situation, additional available N may be present in the soil.

Double crop sorghum planted into average or greater-than-average amounts of wheat residue can result in a challenging amount of residue to deal with when planting next year's crop. Nitrogen fertilizer can be tied up by wheat residue, so use application methods to minimize tie-up, such as knifing into the soil below the residue.

Weed control can be important in double crop sorghum. Warm-season annual grasses, such as crabgrass, can reduce double crop sorghum yields. Using a chloroacetamide-and-atrazine pre-emergence product may be key to successful double crop sorghum production. Herbicide-resistant grain sorghum varieties will allow use of additional herbicides that are effective on summer annual grasses.

No-till studies at Hesston documented 4-year average double crop sorghum yields of 75 bushels per acre compared to about 90 bushels per acre for full-season sorghum. A different 10-year study that did not have double crop planting but did compare early- and late-planting dates averaged 73 bushels per acre for May planting vs. 68 bushels per acre for June planting.

Sunflowers

Sunflowers can be a successful double crop option anywhere in the state, provided there is enough moisture at planting time to get a stand. Sunflowers need more moisture than any other crop to germinate and emerge, so the biggest hurdle to sunflower production is getting a successful stand. Once that hurdle is overcome, sunflowers are more drought-tolerant than most crops so the chances of having a yield in any kind of environment are good.

When double cropping sunflowers, producers should use slightly lower seeding rates to reflect the lower yield expectations compared to full-season sunflowers. It is also necessary to use shorter-season hybrids so they bloom and mature before frost.

Weed control can be an issue with double crop sunflowers since herbicide options are limited, especially post-emergence. Thus, controlling weeds prior to sunflower planting is critical and may be complicated by the presence of glyphosate-resistant weeds and pre-plant restrictions with other herbicides. Consequently, double crop sunflowers may be most successful where glyphosate-resistant weeds are not present. Planting Clearfield or Express Sun sunflowers will provide additional post-emergence herbicide options, but ALS-resistant kochia and pigweeds still won't be controlled. Beyond, the product used in Clearfield sunflower, does have activity on small annual grasses as well as broadleaves (except for ALS-resistant biotypes).

Summer annual forages

With mid-July plantings, and where herbicide carryover issues are not a concern, summer annual sorghum-type forages are also a good double crop option. A study planted July 21, 2008 near Holton, when summer rainfall was very favorable, provided yields of 2.5 to 3 tons dry matter/acre for hybrid pearl millet and sudangrass at the low end to 4 to 5 tons dry matter/acre for forage sorghum, BMR forage sorghum, photoperiod sensitive forage sorghum, and sorghum x sudangrass hybrids. Earlier plantings may produce even more tonnage, as long as there is adequate August rainfall.

One challenge with late-planted summer annual forages is getting them to dry down when harvest is delayed until mid- to late-September. Wrapping bales or bagging to make silage are good ways to deal with the higher moisture forage this late in the year.

Corn

Is double crop corn a viable option? Corn is typically not recommended for June or July plantings because yield is usually substantially less than when planted earlier.

Typically, corn planted in mid-July has a difficult time pollinating and seldom receives sufficient heat units to fill grain before frost. Very short-season corn hybrids (80 to 95 RM) have the greatest chance of maturing before frost in double crop plantings, but generally have less yield potential than hybrids that are 100 RM or more used for full-season plantings. Short-season hybrids often will set the ear fairly close to the ground, increasing the difficulty of harvest. Glyphosate-resistant hybrids will make weed control easier with double crop corn, but there may still be problems with late-emerging summer weeds such as pigweeds, velvetleaf, and large crabgrass. Keep in mind that corn is very susceptible to carryover of most residual ALS herbicides used in wheat.

Volunteer wheat control

One of the issues with double cropping often overlooked by producers is the potential for volunteer

wheat in the crop following wheat. If volunteer wheat emerges and goes uncontrolled, it can cause serious problems for nearby wheat fields in the fall.

Volunteer wheat can generally be controlled fairly well with glyphosate in Roundup Ready crops. It can also be controlled in sunflowers and soybeans post-emergence with Group 1 herbicides such as quizalofop (Assure II, others), clethodim (Select Max, others), or sethodydim (Poast Plus, others); but control is reduced during times of drought stress. Atrazine can provide control of volunteer wheat in corn and sorghum, but can be erratic depending on rainfall patterns.

For more detailed information about herbicides, see the "2022 Chemical Weed Control for Field Crops, Pastures, and Noncropland" guide available online at https://www.bookstore.ksre.ksu.edu/pubs/CHEMWEEDGUIDE.pdf or check with your local K-State Research and Extension office for a paper copy. The use of trade names is for clarity to readers and does not imply endorsement of a particular product, nor does exclusion imply non-approval. Always consult the herbicide label for the most current use requirements.

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6. Wheat Tour Schedule 2022

The Department of Agronomy and K-State Research and Extension will host several more winter wheat variety plot tours this week. Make plans to attend a plot tour near you to see and learn about the newest available and upcoming wheat varieties, their agronomics, and disease reactions.

A list of plot tour locations, dates, times, and directions is provided below. Stay tuned to the eUpdate in the coming weeks as this list is updated.

Date	Time	County/District	Location	Direction	Agent
6/6	1:00 pm	Edwards	Kinsley	North of intersection of 140th Ave and H Rd	Marty Gleason
6/6	6:00 pm	Pawnee	Rozel	From Rozel, go 3 mi west on 156 Hwy to 310th Ave, then 2 ¾ mi north on the west side of road	Kyle Grant
6/7	7:00 am	Twin Creeks District	Oberlin	3 mi west of Oberlin on Hwy 36	Keith VanSkike
6/7	7:30 am (MT)	Wallace	Sharon Springs	Mai Farms, 9 mi south of Sharon Springs on Hwy 25 to Field Road, 4 mi east and ¼ mi south	Jeanne Falk Jones
6/7	10:00 am (MT)	Wallace	Weskan	Purvis Farms, 3 mi west of Weskan on Hwy 40 to Road 3 and south 5 ½ mi (south of intersection of Gooseberry Rd and Road 3)	Jeanne Falk Jones
6/7	5:30 pm (MT)	Sherman	Goodland	F&J Farms, 7 mi north of Goodland on	Jeanne Falk Jones

				Hwy 27, east of the scale house	
6/7	7:00 pm	Twin Creeks District	Dresden	From Dresden, at intersection of Hwys 383 and 123 go south to Hwys 9 and 123 junction, then go east on Hwy 9 to about 1900 Rd	Keith VanSkike
6/8	5:30 pm	Cheyenne	St. Francis	Hingst Farm, 13 mi west of St. Francis on Hwy 36 to Road 2, 4 mi north	Jeanne Falk Jones

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