Issue 876

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Extension Agronomy

eUpdate

10/07/2021

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.

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1. Wheat planting conditions in Kansas: Early October 2021

Much warmer-than-normal temperatures during September, combined with windy conditions, rapidly worsened drought conditions across Kansas. Thankfully, a precipitation event occurred at the end of the month which provided much needed moisture across the state and particularly wheat growing areas (Figure 1). Consequently, topsoil moisture at the 4-inch depth has rebounded in places where the heaviest rains occurred (50% saturated and higher), however many areas are still dry (less than 50%) (Figure 2).

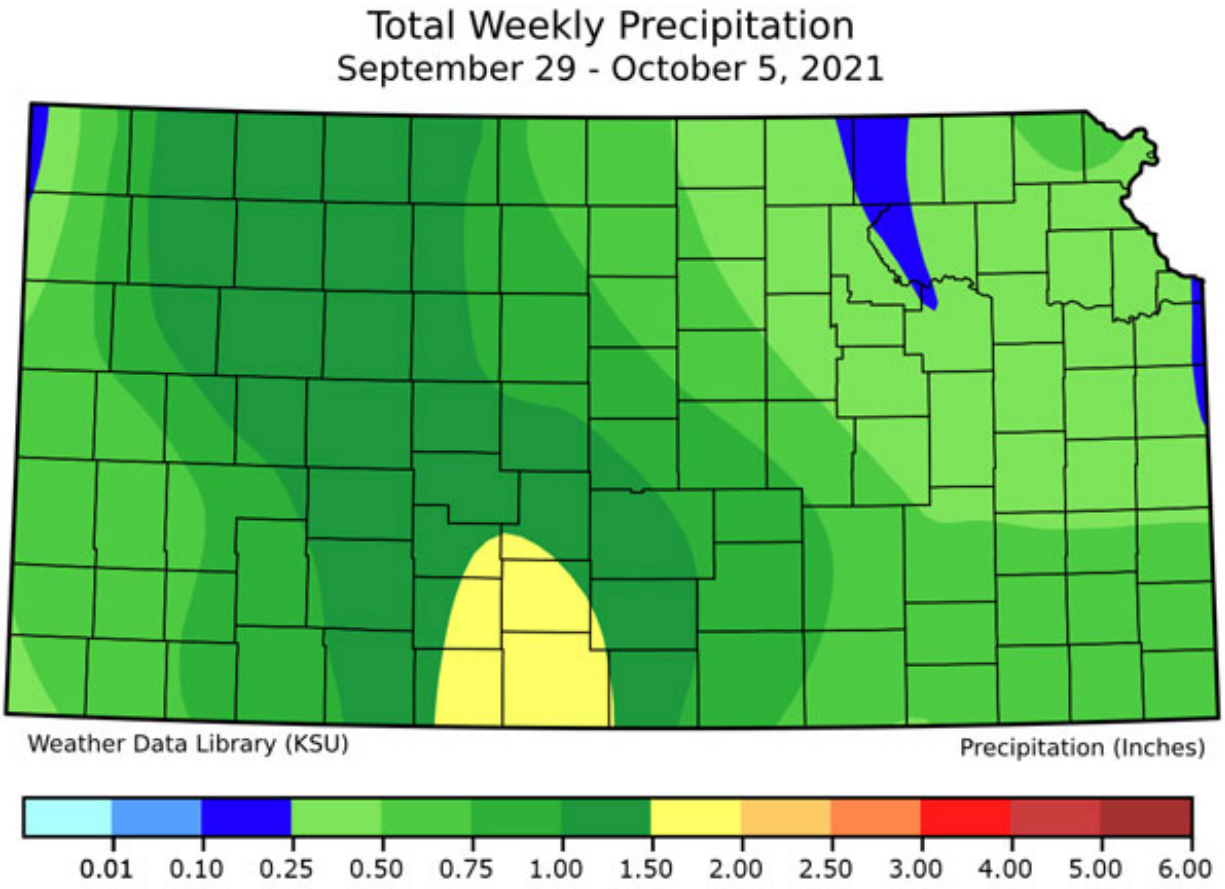

Figure 1. Total cumulative precipitation for the period between September 29 and October 5, 2021. Map by K-State Weather Data Library.

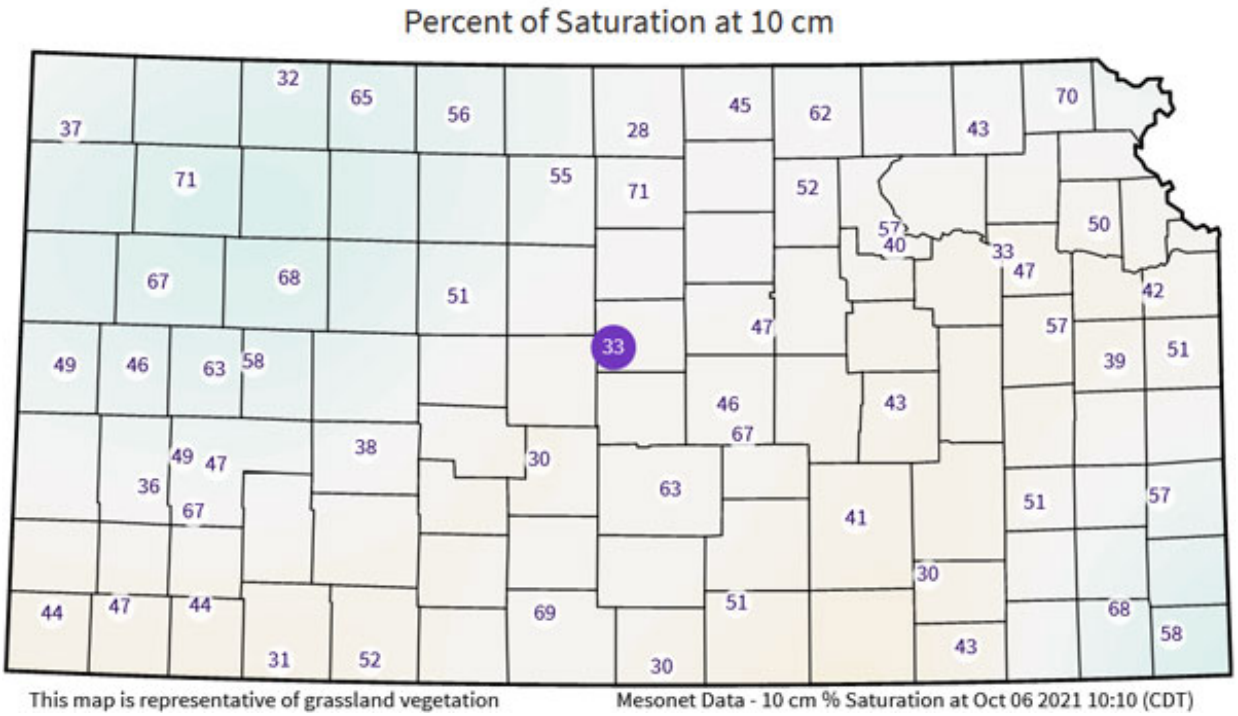

Figure 2. Percent saturation at the 4-inch soil depth (10 cm) as of October 5, 2021. Map by the Kansas Mesonet.

Weather Forecast

The next 7-day precipitation forecast for Kansas indicates that rainfall is expected to be focused in eastern Kansas. Highest amounts are expected to reach the 1.00 – 1.25 inches in the southeast (Figure 3). The 8- to 14-day forecast (Figure 4) favors increased probability of above-normal precipitation, especially for east and central Kansas. Though highest amounts will vary with thunderstorm activity, conditions appear favorable for wheat except for western Kansas.

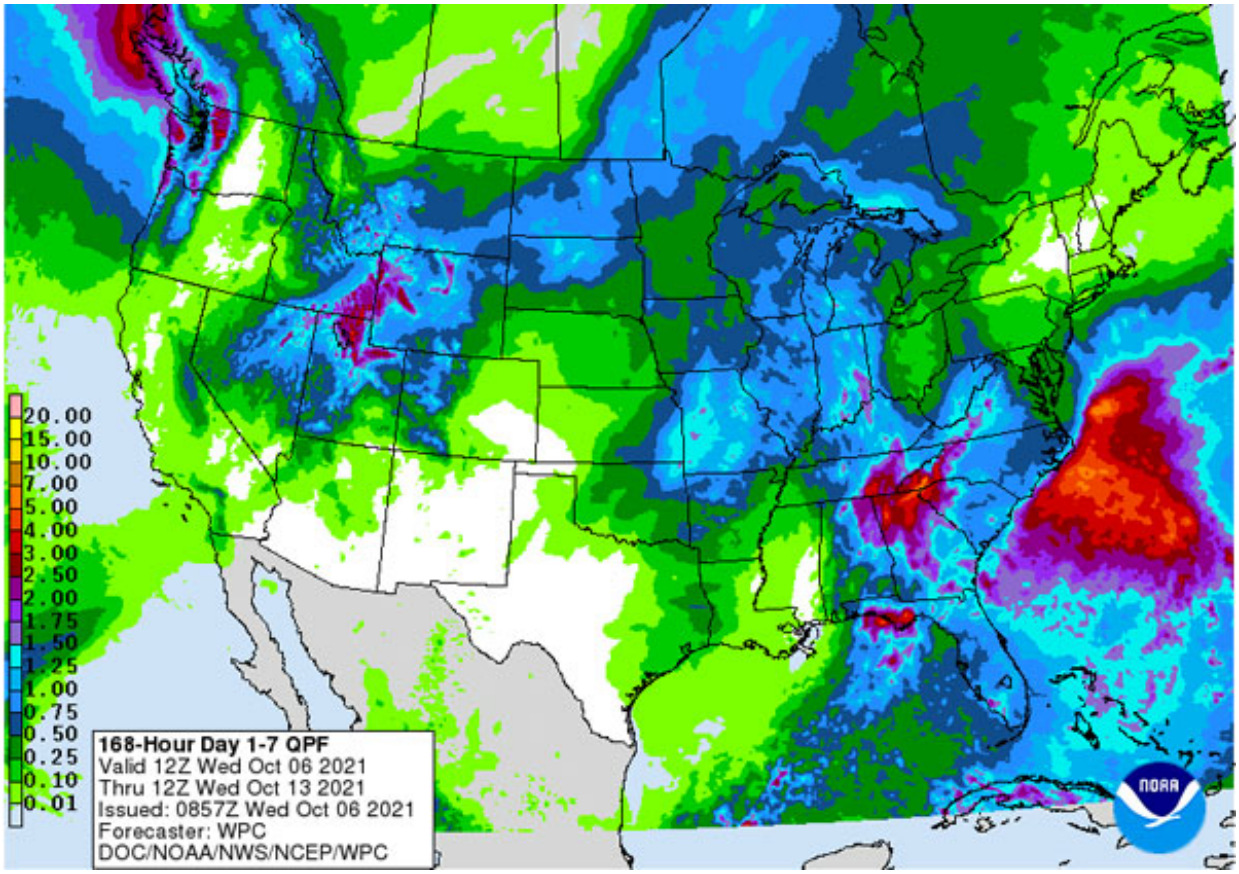

Figure 3. Weekly precipitation forecast as of October 5, 2021 by the National Weather Service Weather Prediction Center (NOAA). Precipitation probabilities in Kansas for the next 7 days range from 0.00 to 1+ inches.

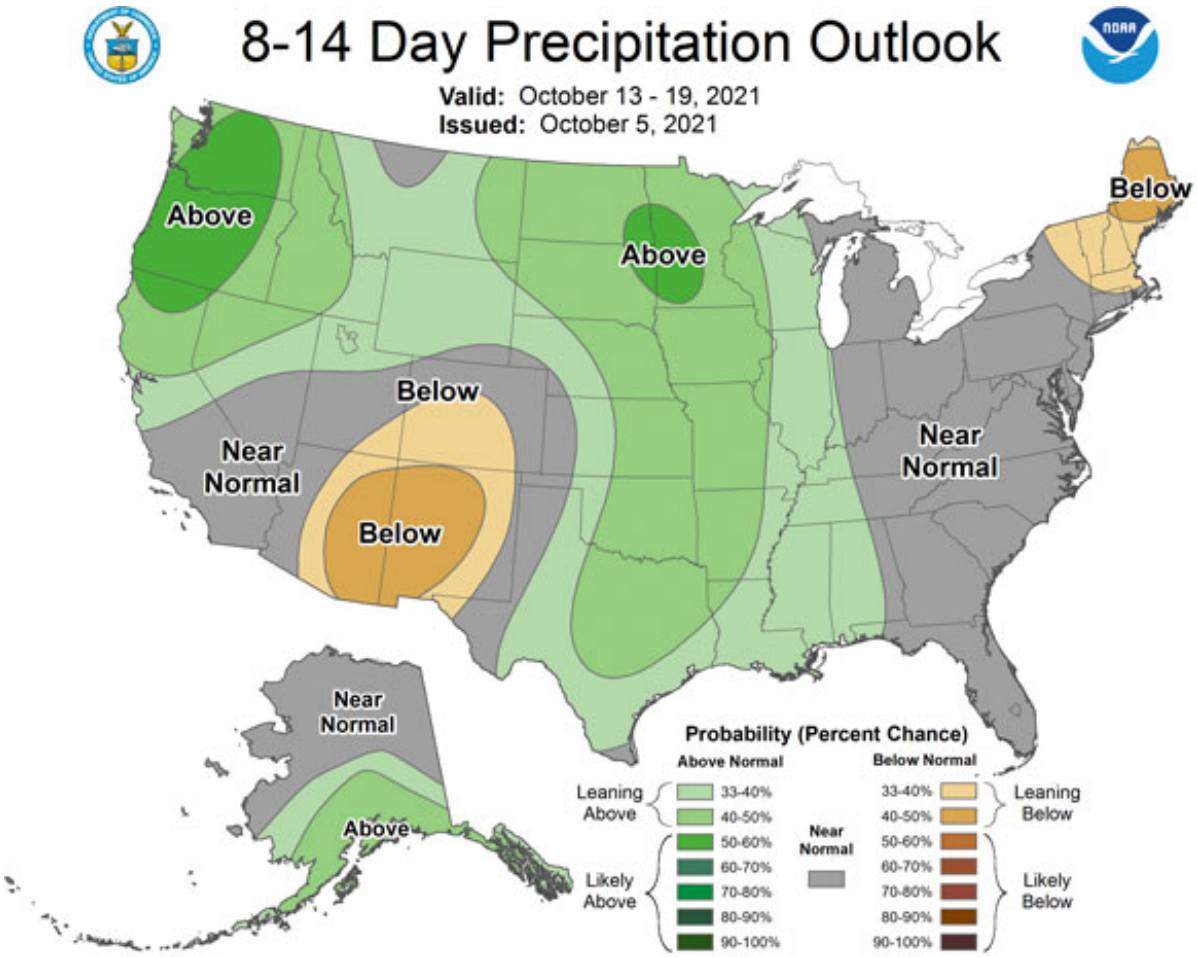

Figure 4. The 8- to 14-day precipitation forecast as of October 4, 2021 by the National Weather Service Weather Prediction Center (NOAA).

Wait for rain or continue with planting progress?

The current wheat-planted acreage in Kansas, according to the USDA-NASS crop progress report, was 42% as of October 4, 2021. While this is near the 5-year average of 41%, only 16% of the crop has emerged so far (which is behind the 5-year term average of 19%).

The biggest question in growers' minds at the moment is: Should I continue planting the crop, or should I wait for rain?

Each grower must consider his or her own situation to take this decision, as the rainfall distribution shown in Figure 1 is interpolated across weather stations and might not represent the reality for a few fields that were far from a given weather station. Advantages of progressing with crop planting now is to take advantage of the available moisture where recent rainfall occurred, and also a good seed distribution in dryer soils where rainfall did not occur. In this situation, growers also have the opportunity to plant a large number of acres before it rains. However, if no rain occurs in the near future, the crop might not emerge until it rains later in the fall or even winter, delaying the "effective planting date" to whenever the rain actually occurs. Thus, at this point in time, growers should start

to treat these fields as if they were sowing late, where increases in seeding rate and applications of in-furrow starter fertilizer are recommended. These might also be situations in which seed treatments can be beneficial, as the seeds will be exposed to weather in the fields for several days.

The worst-case scenario would include planting into a limited amount of moisture, just enough for emergence of some plants but not enough to maintain these seedlings after they emerge. This situation can result in uneven stands and high stand variability within the field (Figure 5), or even crop failure. Thus, if good moisture cannot be reached in about the top 1.5-2 inches of soil, growers would likely be better off sowing it shallower and waiting for rain. The description above is true for north-central and most of western Kansas, where the upcoming rainfall chances are lower than in other parts of the state.

In south central and eastern Kansas, where the rain forecast is more favorable, growers could still maintain their original seeding rate for optimal sowing time.

For more information on planting wheat into dry soils, please see a previous eUpdate article from September 23, 2021: *Considerations when planting wheat into dry soils*

Figure 5. Uneven wheat stands resultant from sowing into dry soils. Photo by Romulo Lollato, K-State Research and Extension.

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2. Testing methods for nitrates in forages

In last week's eUpdate, we discussed nitrate poisoning and prussic acid (hydrocyanic acid) poisoning when feeding cattle certain types of forages. In this follow-up article, we share information on the different tests available and how to collect a representative sample.

When making harvesting or feeding decisions for forages that have potentially accumulated nitrates, our human tendency is to want immediate answers. A representative sample sent for laboratory analysis is by far the best test of nitrate toxicity. However, while shipping and laboratory turnaround times are really very good, it will take several days to get results. Two types of quick tests exist, and it is important to understand the limitations of these tests when considering their use.

Quick Tests

Diphenylamine Quick Test– This solution of concentrated sulfuric acid is available from some county extension offices. Appropriate precautions must be taken in handling and storing the solution. This solution is most useful for evaluating standing green forage. The green stem can be split open and when drops of the solution are placed on the stem, a color change occurs when nitrate is present. Because nitrates accumulate in the base of the plant, testing from the base upwards until no color change occurs can be helpful in determining a harvest plan. An Oklahoma State University study comparing the diphenylamine test to a standard laboratory test indicated a large percentage of false positives (46%), this dropped to 24% if two stems were positive. The rate of false negative readings was 5.1%. In this study, the relative color change after 10 seconds had a low relationship (r=0.38) to the laboratory nitrate values. A Montana State University field study found 71% of samples correctly categorized with 23% false positives and 6% false negatives.

Test strips – Nitrate test strips have primarily been used to test nitrates in water or soil or to assess the need for additional fertilization in growing plants. Various types of test strips or kits are available. Some require you to press the test strip to the moist surface of a cut plant, or squeeze sap from the plant with pliers, a garlic press or hydraulic press, and others suggest a dried and ground sample. Testing may require additional solutions and several steps to get to the final step of a color change (red-violet dye). Reading the color change with a reflectometer or other tool provides more consistent results than the human eye. Smart phones have been tested as a possible way to read the color change but there are some consistency issues across phones and platforms. Researchers at Montana State (Meccage et al.) compared the test strips to laboratory values and found 71% correctly categorized, 13% false positive and 16% false negative. If using this type of test be sure to understand any expiration date on the materials and appropriate storage conditions for unused portions.

Sample collection for nitrate testing

Nitrate concentrations within a given field can be highly variable. In one Kansas study, nitrate concentration of 23 large round bales of sudan from a single field averaged 2764 ppm, but ranged from 1525 to 6250 ppm on an as-fed basis. This is similar to other reports of "hotspots" within fields and wide variability.

When collecting samples for nitrate determination more samples are needed to represent the potential variation. In some cases, segregating and testing bales from different locations in the field may be warranted. The rule of thumb is to sample 10-20% of bales of a given forage lot for nutrient

analysis. A forage lot should represent the same field, cutting, maturity and harvest condition and usually is less than 100 tons. When nitrate toxicity is a concern, sampling 20% of bales would be a minimum and some have suggested to sample up to 40%. Knowledge of actual field conditions should be used in planning for sampling.

When collecting samples from a large round bale use a bale corer, start from the wrapped side (with net wrap or twine) of the bale and core toward the center. Approximately 75% of the hay is in the outside 18" of the bale and sampling in this direction will maximize the number of layers within the bale that are sampled to get a representative sample.

If sampling standing forage, the sample collected should represent the grazed or harvested portion. No need to sample the base of a corn stalk unless cattle will be forced to eat that far down on the stalk. Sampling standing forage is more awkward. One approach is to sample every 50 to 100 feet in diagonals across the field. Chop up samples into smaller pieces, mix well in a large bucket or tub. Use a quartering method to create a subsample for analysis.

For more information refer to KSU publication MF3029 *Nitrate Toxicity*.

There is a short video that discusses and demonstrates forage sampling. It addresses all types of testing, including nitrate testing. The video can be viewed at: https://bit.ly/3FsgJoI

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3. Get control of fall-emerged marestail before next spring

Marestail or horseweed (*Erigeron canadensis*) is a challenging weed to manage in no-till or minimum till soybeans systems. This weed is classified as a winter annual, but it germinates well into spring and summer making it even more difficult to manage. In addition to an extended germination window, marestail can produce an up to 200,000 seeds/plant with approximately 80% of those seeds being able to germinate immediately after maturation. Seeds can germinate on the soil surface, which is why this weed is so troublesome in minimum tillage operations. Kansas producers also face the added difficulty of trying manage glyphosate-resistant (GR) marestail. Due to the extended germination window of marestail, it is important to scout for and control marestail in both the fall and spring (Figure 1).

Figure 1. Fall-emerged marestail in the rosette stage in wheat stubble in Manhattan, KS. Photo by Tyler Meyeres, K-State Research and Extension.

Fall-emerged marestail can be difficult to control if allowed to grow until planting in the following spring. Acceptable control of fall-emerged marestail with herbicide applications at planting will be unlikely because the marestail are generally too large. Control can be achieved with both fall and early spring herbicide applications, but due to inconsistent weather conditions it may be advantageous to opt for a fall application. Other control options include tillage and cover crops.

Herbicides

Glyphosate resistance adds another layer of complexity to managing marestail. It is generally recommended to include group 4 herbicides such as 2,4-D, dicamba, fluroxypyr (Starane Ultra) or haluxifen (Elevore) in a tank mix to control GR marestail. Control of marestail in the rosette stage (Figure 1) is similar among the Group 4 herbicides, but dicamba controls bolted marestail better than 2,4-D. Glufosinate (Liberty, others) applied at 32 fl oz/ac Liberty can control of bolted marestail.

Residual herbicides in fall applications may be beneficial if there has been a history of marestail infestation in a field. Effective residual herbicides include: chlorimuron (Classic, others), flumioxazin (Valor, others), sulfentrazone (Spartan, others), and metribuzin products. Saflufenacil (Sharpen) is also effective in controlling marestail as a part of fall or spring burndown but has no residual activity. In addition to GR marestail, there are also confirmed populations of ALS-resistant marestail in Kansas, which may reduce the utility of ALS herbicides for controlling marestail. It is important to consider rotation restrictions with some of these herbicides.

Tillage

Fall and spring tillage has been shown to be effective in controlling marestail for a spring-planted crop. When tillage is not utilized in the fall, marestail will establish and be present in the spring. If implementing a minimum tillage system is the goal, marestail can be controlled when a fall herbicide application is followed by shallow tillage in the spring or vice versa (Chahlal and Jhala 2019).

Cover Crops

Utilizing cover crops can result in fewer and smaller marestail plants in a field. Research in Kansas has shown complete suppression of marestail with a cereal rye cover crop paired with spring herbicide applications (McCall 2018). This strategy is especially important for producers struggling with herbicide-resistant marestail populations, as it will reduce the selection pressure on the herbicides. The key to achieving effective suppression of marestail with cover crops is early planting. Early planting allows the cover crop to emerge and produce high amounts of biomass before marestail emergence.

For additional information, see the "2021 Chemical Weed Control for Field Crops, Pastures, and Noncropland" guide available online at https://bookstore.ksre.ksu.edu/pubs/SRP1162.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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References

Chahlal PS and Jhala AJ (2019) Integrated management of glyphosate-resistant horseweed (*Erigeron canadensi*) with tillage and herbicides in soybean. Weed Technol. 33: 859-866.

McCall CM (2020) Integrating cover crops and herbicides for horseweed and Palmer amaranth management in no-till soybean. Master's Thesis, Kansas State University. https://krex.k-state.edu/dspace/handle/2097/38561

4. Control annual weeds with fall-applied herbicides ahead of corn and sorghum

With row crop harvest well underway, it is time to start planning fall herbicide applications. Herbicide applications in late October through November can improve control of difficult winter annual weeds. Fall weed control is associated with warmer soils and easier planting in the spring, however, it is important to remember that fall-applied herbicides may limit your crop options in the spring. Also remember that herbicides should not be applied to frozen ground.

Some of the key herbicides to consider for fall herbicide applications include chlorimuron (Classic, others), flumioxazin (Valor, others), suflentrazone (Spartan, others), and Autumn Super, for residual activity. One thing to keep in mind about residual activity from fall herbicide applications is that weather conditions will influence the length of residual control and the weed emergence patterns. So, even though they provide some residual activity, additional spring application pre-emergence herbicides will likely be needed for season-long weed control.

For burndown activity, glyphosate, 2,4-D or dicamba are good options to consider. However, recent glyphosate price increases may make other products more attractive. Alternatives for grass control include Group 1 herbicides like clethodim (Select, others) or quizalofop (Assure II, others). Alternatives for controlling broadleaf weeds include paraquat (Gramoxone, others) or saflufenacil (Sharpen).

Some of the key weeds to target with fall herbicide applications are marestail, henbit, dandelion, prickly lettuce, pepperweed, field pansy, evening primrose, and recently-emerged cool-season grasses. When higher rates of herbicides are used, some suppression of early spring-germinating summer annual broadleaf weeds such as kochia, common lambsquarters, wild buckwheat, and Pennsylvania smartweed can be achieved. Recent data comparing kochia control with fall and spring applications are included in Figure 1.

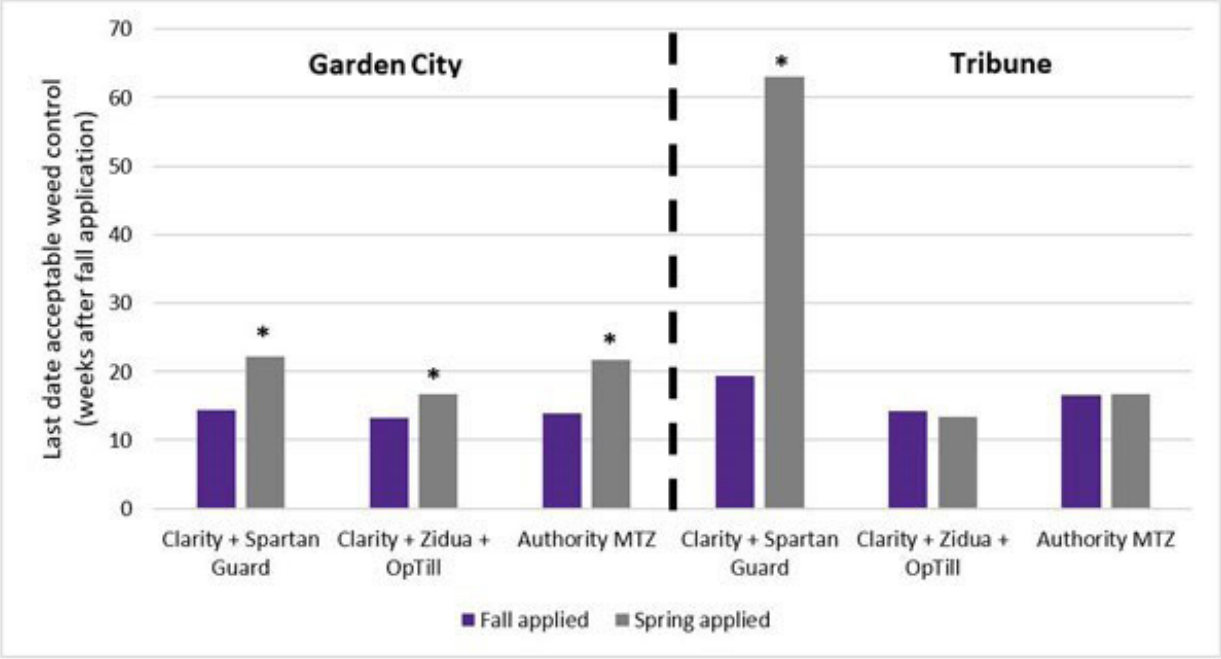

Figure 1. Estimated weeks of kochia control greater than 80% following fall (early December

2014) and spring (early February 2015) herbicide applications at Garden City and Tribune, KS. An asterisk (*) indicates that the spring application provided acceptable weed control at a later date than a fall application. Data from Kumar et al.,2019.

Marestail is a problem that merits special attention. Marestail is much easier to control in fall or early spring while it is still in the rosette growth stage (Figure 2). Additional information about marestail control can be found in a companion article in this eUpdate issue.

Figure 2. Marestail rosettes in a recently harvested soybean field. Photo from Dallas Peterson.

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.

For more information on controlling bindweed, see 2021 Chemical Weed Control for Field Crops, Pastures, Rangeland, and Noncropland, K-State publication SRP-1162.

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5. Free soybean cyst nematode testing 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.

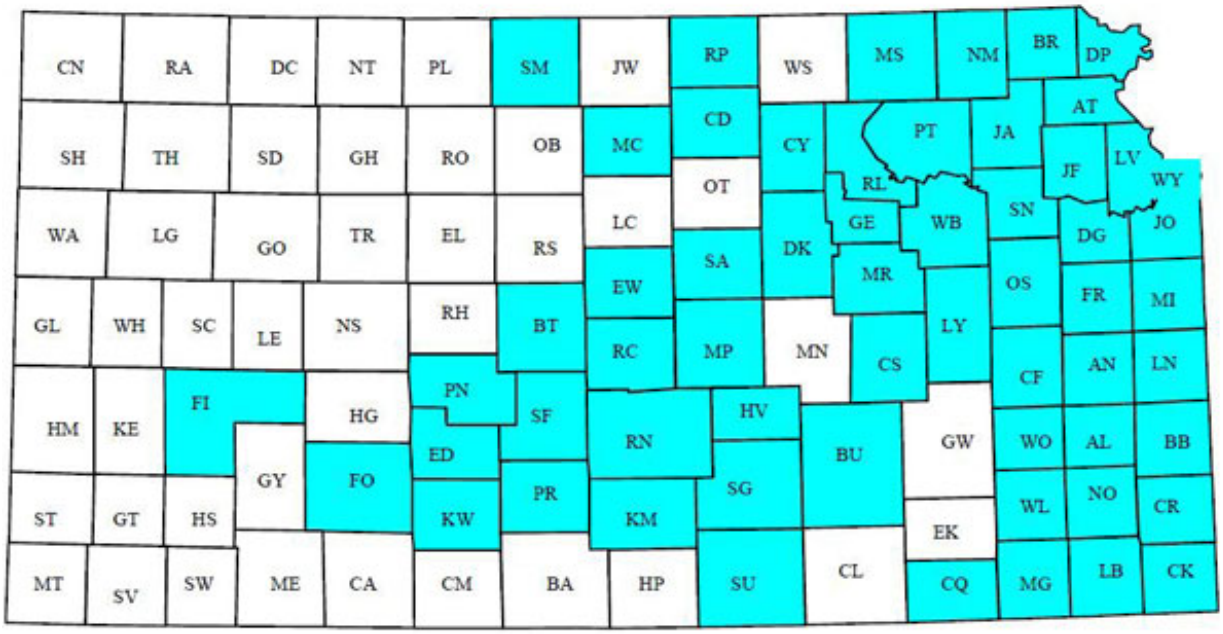

Figure 1. As of September 1, 2021, SCN was identified in 59 Kansas counties that produce >85% of Kansas soybeans. Map courtesy of Timothy Todd.

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.

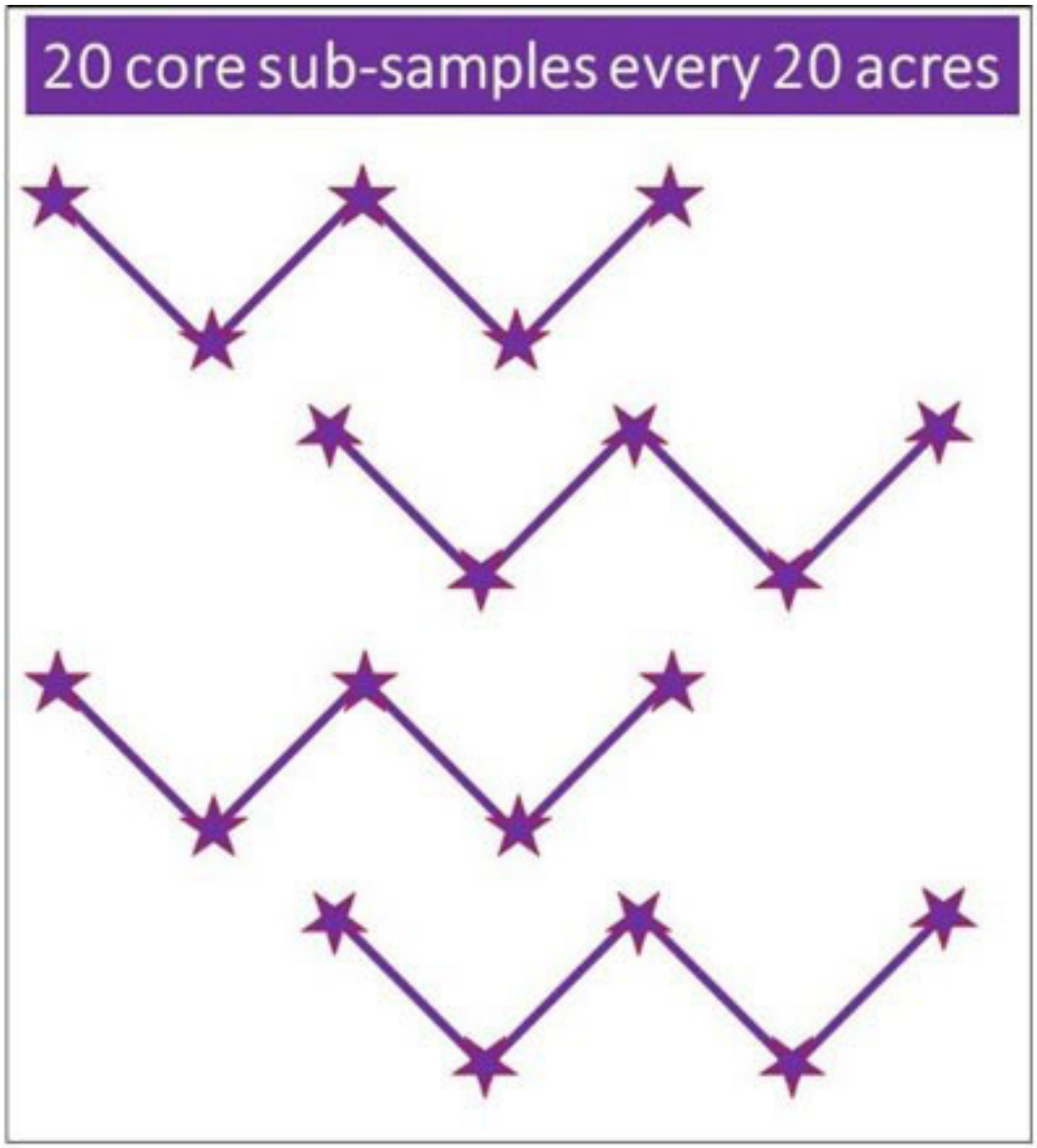

Figure 2. Example of a good sampling pattern for collecting soil to test for SCN.

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.

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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.

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7. Kansas Bankers Association Conservation Awards - Nominations due Dec. 3

Nominate a deserving Kansas producer or landowner for the 2021 Kansas Bankers Association Conservation Awards Program. This year, the Kansas Bankers Association, K-State Research and Extension, and the Kansas Department of Wildlife and Parks have announced six award categories:

- **Energy Conservation**
- **Water Quality**
- **Water Conservation**
- **Soil Conservation**
- **Windbreaks**
- **Wildlife Habitat**

The purpose of this program is to stimulate a greater interest in the conservation of the agricultural and natural resources of Kansas by giving recognition to those farmers and landowners who have made outstanding progress in practicing conservation on their farms. In 2020, 197 Kansas producers and landowners were recognized through this program.

Nominations can be made by any person in the county. They should be sent to the County Extension Agricultural Agent or the Kansas Department of Wildlife, Parks, and Tourism District Biologist by December 3, 2021.

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

For more information, see:
http://www.agronomy.k-state.edu/extension/kansasbankersaward/kansas-bankers-awards.html

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