Issue 864

K-STATE Research and Extension

Extension Agronomy

# eUpdate

*07/15/2021*

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. Palmer amaranth control in grain sorghum

Pre-emergence herbicides are critical for successful weed management in grain sorghum, especially for difficult to control species like Palmer amaranth. However, difficult weather conditions this spring resulted in poorer than expected weed control from pre-emergence herbicides in some locations in Kansas (Figure 1). This situation has resulted in questions asking how to control rapidly-growing Palmer amaranth in grain sorghum fields.

**Figure 1. Palmer amaranth in a well-advanced grain sorghum field that escaped effective treatment earlier in the growing season. Photo by Sarah Lancaster, K-State Research and Extension.**

Unfortunately, post-emergence herbicide options in grain sorghum are limited. All of the available options are most effective when small (under 4 inches tall) weeds are targeted. This article will review the pros and cons of key post-emergence herbicides that control Palmer amaranth in grain sorghum. Combinations of the herbicides listed here will generally improve control.

**Atrazine** can control sensitive populations of Palmer amaranth and can be combined with other herbicides to enhance effectiveness. Recommended rates range from 0.25 to 2.0 pounds of atrazine (0.5 to 4 pints). Atrazine should be applied with crop oil or surfactant to control emerged weeds. Atrazine can be applied to grain sorghum between 3-leaf and 12 inches or between 6 and 12 inches in western Kansas. Observe rate limits for your area.

**Aim** (carfentrazone) is a Group 14 herbicide that can be applied to grain sorghum between 4 inches and boot stage. It is less effective than some of the other herbicides in this article and requires good coverage for maximum effectiveness. Aim can be tank-mixed with atrazine, 2,4-D, dicamba, bromoxynil, and Huskie. Aim is likely to burn grain sorghum leaves, especially if applied in very hot, humid weather or if applied with crop oil. Leaf burn will also be greater if Aim is applied with bromoxynil.

**2,4-D** is an effective herbicide option to control Palmer amaranth. However, crop response should be expected, especially if applied in hot, humid conditions. Crop responses can include rolled leaves, lodging, and brittle stems. Grain sorghum is most tolerant of 2,4-D applications when it is 5 to 10 inches tall. Drop nozzles should be used when applying 2,4-D to grain sorghum greater than 8 inches. To reduce crop response, apply lower rates (2/3 pint) with atrazine, Aim, bromoxynil, or Huskie. Using crop oil in tank mixes with 2,4-D, will increase crop injury.

**Dicamba**, at the rates used in grain sorghum (0.5 pint), may be less effective on Palmer amaranth than 2,4-D. It can be applied to grain sorghum between 2 and 15 inches. Drop nozzles should be used if grain sorghum is 8 inches or taller to avoid damaging seed heads. Crop response, including rolled leaves and lodging should be expected, especially if applied in hot, humid conditions. Dicamba can be tank-mixed with Aim, atrazine, and bromoxynil.

**Bromoxynil** can be applied from the 3-leaf stage through boot stage. Crop response will be less with bromoxynil than other herbicides, but bromoxynil alone will not control Palmer amaranth larger than 4-leaf. Adequate spray coverage is needed for maximum effectiveness.

**Huskie** (pyrasulfutole+bromoxynil) is most effective when mixed with atrazine (up to 1 pound). When used alone, it can be applied between 3-leaf and 30 inches and should be applied with HSOC (high surfactant oil concentrate) or AMS + NIS. Huskie will cause leaf burn, which can be greater in fields where mesotrione was applied pre-emergence. Huskie plus atrazine may be tank-mixed with phenoxy broadleaf herbicides such as 2,4-D or dicamba as needed.

Additional information can be found in the 2021 Chemical Weed Control for Field Crops, Pastures, Rangeland, and Noncropland, *K-State publication SRP-1162* - https://bookstore.ksre.ksu.edu/pubs/SRP1162.pdf

*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.*

Sarah Lancaster, Weed Science Extension Specialist
slancaster@ksu.edu

Jeanne Falk Jones, Multi-County Agronomist
jfalkjones@ksu.edu

## 2. Southern rust has been reported in additional counties in Kansas

Southern rust was just confirmed in Reno and Sedgwick counties in Kansas (Figure 1). Southern rust was first detected in southeast Kansas on July 2, and we continue to monitor the spread. At present, levels have remained low, however recent weather has been favorable for the disease in some parts of the state. Early detection of southern rust is crucial for successful management. Once pustules have been observed, the pathogen can reproduce rapidly if temperatures and humidity are high. Late-planted corn should be monitored closely, as the crop will be exposed to southern rust for a longer period than corn that was planted earlier.

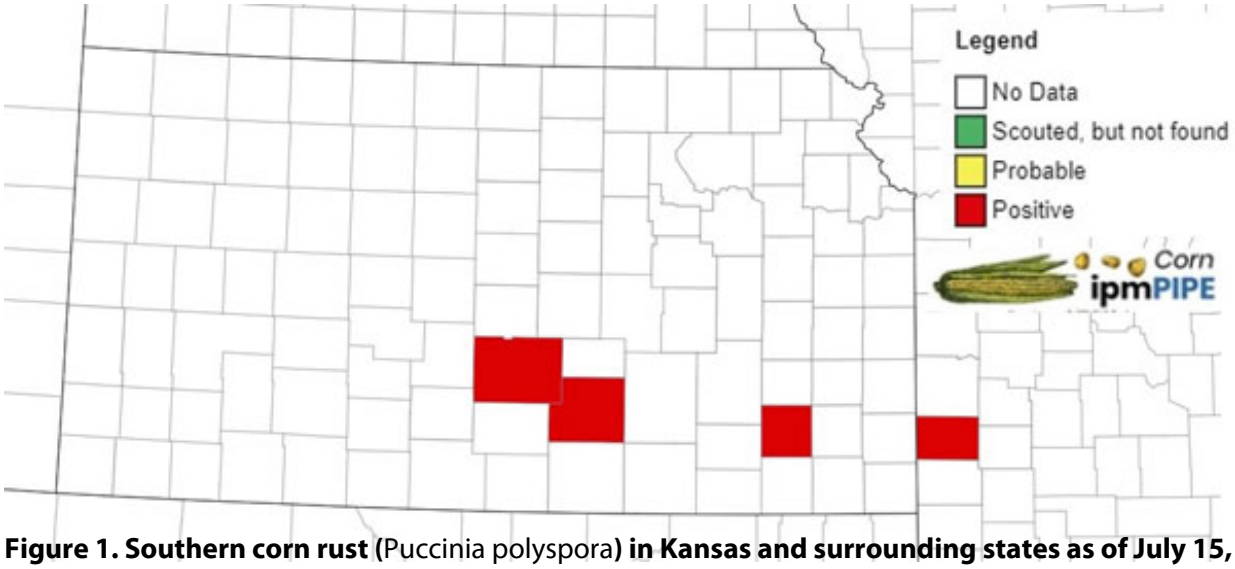


**Figure 1. Southern corn rust** (Puccinia polyspora) **in Kansas and surrounding states as of July 15, 2021. Source: https://corn.ipmpipe.org/southerncornrust/.**

**Considerations for treatment of southern rust**

When deciding to spray for southern rust it is important to consider hybrid susceptibility, disease incidence (how many plants are affected), and corn growth stage. Infection early in the season on a susceptible hybrid, coupled with conducive weather conditions, pose the highest risk for yield loss.

Research has suggested that applications between VT to R3 have great potential for protecting corn yield, however if fungicide is applied between VT and R1, a second spray may be required to protect end of season yields. Most fungicides that are labeled for southern rust are also effective for gray leaf spot and will have residual activity for approximately three weeks after application, depending on the product. Application at dent (R5) are unlikely to provide yield benefit and the pre-harvest interval should be carefully observed. Fields that have not yet been sprayed should be monitored for disease development.

Efficacy ratings for corn fungicide management of southern rust have been compiled by a working group of corn researchers and can be found here: https://cropprotectionnetwork.org/resources/publications/fungicide-efficacy-for-control-of-corn-diseases

**Identification of southern rust**

Southern rust produces characteristic orange pustules filed with spores, primarily on the upper side of the leaf (Figure 2). If you run your finger across the pustules, the orange spores will be visible on your hand. The Kansas State Plant Diagnostic Lab (clinic@ksu.edu) can also confirm southern rust by observing spores under the microscope. Additional information about sending in a sample can be found here: https://www.plantpath.k-state.edu/extension/diagnostic-lab/.

**Figure 2. Southern rust on corn. Photo courtesy of University of Nebraska,** https://cropwatch.unl.edu/plantdisease/corn/southern-rust

For more information on identifying corn rusts, see K-State Research and Extension Bulletin MF3016, Corn Rust Identification and Management in Kansas.

Rodrigo Borba Onofre, Postdoctoral Research & Plant Pathology Extension Fellow
onofre@ksu.edu

## 3. Germination testing of wheat seed

The 2021 wheat crop had a conducive environment for the development of Fusarium head blight (head scab) in many areas of Kansas. This disease can reduce germination dramatically in some cases, as well as makes reading and understanding a germination test much more difficult. Having your seed professionally tested for germination is always a good practice, but in this instance, it is highly recommended.

To have an official germination test on the seed, send a two-pound sample to:

**Kansas Crop Improvement Association**
**2000 Kimball Ave.**
**Manhattan, KS 66502**

A germination test will cost $19.00 and a sample submittal form can be printed off from the KCIA website: www.kscrop.org/seed-lab.html

**Home testing**

If producers want to test their seed for germination at home, it needs to be done correctly to be of value. The following detailed procedure is taken (and slightly modified) from K-State Extension publication AF-82, "Seed Germination Test Methods."

- Place two moistened paper towels (on top of each other) on a flat surface. The towels should not have free water in them.
- Arrange fifty (50) seeds on the towels leaving approximately an inch border around the edges.
- Place two more moistened towels over the seeds.
- Make a ½ to ¾ inch fold at the bottom of the four paper towels. This will keep the seed from falling out.
- Starting on one side, loosely roll the paper towels toward the other side (like rolling up a rug) and place a rubber band around the roll(s).

Place the roll in a plastic bag. Seal, but not completely, so as to keep moisture in but still allow some air into the bag.

For newly harvested seed:

- Place the bag upright in the refrigerator for 5 days and then remove and place upright at room temperature for an additional 5 to 7 days.
- Remove the sample from the bag and unroll the towels.
- Count and record the number of healthy seedlings (adequate root and shoot development and NOT overtaken by disease.)

For carryover seed, or after September 1:

- Place the bag upright at room temperature for 5 to 7 days.
- Remove the sample from the bag and unroll the towels.

- Count and record the number of healthy seedlings (adequate root and shoot development and NOT overtaken by disease).

To calculate the germination percentage: divide the number of healthy seedlings by the number of seed tested and multiply by 100.

Example: 42 healthy seedlings X 100 = 84% germination

50 seed tested

This may be repeated more times for each sample in order to obtain more accurate results, testing up to 400 seed.

Eric Fabrizius, Kansas Crop Improvement Association, Seed Laboratory Manager
efkcia@kansas.net

## 4. World of Weeds - Johnsongrass

Questions about johnsongrass (*Sorghum halepense*) control are starting to come in, making it a good species to feature in the July World of Weeds article.

Ecology of johnsongrass

Johnsongrass is a warm-season, perennial plant native to the Mediterranean region. It was introduced in the southern states as a forage crop during the early 1800s. Johnsongrass can be found throughout the United States. It is a noxious weed in Kansas, as well as neighboring states Colorado and Missouri. Johnsongrass grows in fields, pastures, rights of way, and many other sites. It does produce substantial forage, but can accumulate prussic acid and nitrates that are harmful to livestock. In addition, johnsongrass can be a source of insects and diseases that affect corn and sorghum crops.

Identification

Johnsongrass leaves are generally 7 to 24 inches long and 0.25 to 1.25 inches wide with a prominent white midrib. They are usually hairless, but some plants do have a few hairs at the base of the leaf. The ligule is relatively large, about 0.1 to 0.2 inches tall. It is a membrane topped with a fringe of hairs (Figure 1). Leaf sheaths have no hairs and do not touch. Stems grow upright and can reach heights over 10 feet.

**Figure 1. Johnsongrass ligule. Photo by Sarah Lancaster, K-State Research and Extension.**

Johnsongrass seed heads are open panicles (Figure 2) that emerge throughout the summer. Panicles are 5 to 20 inches long with many branches that are arranged in whorls. Seeds are reddish-brown, about 0.1 to 0.25 inches long and football-shaped. In addition to seeds, johnsongrass can spread by rhizomes (Figure 3). Johnsongrass growing from rhizomes will typically emerge earlier in the spring than seedling johnsongrass.

**Figure 2. Johnsongrass panicle. Photo by Sarah Lancaster, K-State Research and Extension.**

**Figure 3. Johnsongrass rhizome. Photo by Sarah Lancaster, K-State Research and Extension.**

Johnsongrass, especially seedling johnsongrass, can be confused with shattercane (*Sorghum bicolor*). Carefully digging the plant to look at attached seeds is helpful for telling the two apart. Shattercane seeds are generally more round in shape and less red in color than johnsongrass. Mature plants can be distinguished by the more either looking for rhizomes, which are absent in shattercane, or based on differences in the seeds/seed head.

Management

Johnsongrass can cause significant yield loss in row crops if not controlled. Glyphosate is effective on seedling and rhizome johnsongrass and can be used in glyphosate-resistant corn hybrids and soybean varieties. Group 1 herbicides, such as clethodim (Select Max, others), fluazifop (Fusilade DX), quizalofop (Assure II, others), or sethoxydim (Poast Plus) can also be used in soybeans. Johnsongrass management in grain sorghum is more difficult. Rotation to a crop where effective herbicides can be used is generally the best practice to manage johnsongrass in grain sorghum. Products used in some herbicide-resistant grain sorghum hybrids are effective on johnsongrass; however, product stewardship concerns prevent their use in fields where johnsongrass is prominent.

In pastures, spot sprays of glyphosate can help manage johnsongrass. Imazapic (Plateau, others) may be used to manage johnsongrass in some native and introduced grasses; however, desirable grass species have varying degrees of sensitive to imazapic, so it is important to carefully read the product label to find the appropriate rate for your situation.

Resistance to glyphosate, as well as Group 1 and Group 2 (ALS-inhibiting) herbicides has been confirmed in johnsongrass in many southern states, as well as Indiana. Additional johnsongrass populations resistant to nicosulfuron (Accent, Zest, others) have been reported in Kansas and

Nebraska.

**References**

Werle et al., 2016

*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, see* 2021 Chemical Weed Control for Field Crops, Pastures, Rangeland, and Noncropland*, K-State publication SRP-1162.*

Sarah Lancaster, Extension Weed Management Specialist
slancaster@ksu.edu

## 5. K-State North Central Experiment Field Fall Field Day, August 17

All interested individuals are invited to attend the **2021 North Central Experiment Field Day** on **Tuesday, August 17, at 6:00 p.m**. The event will be held at the Scandia Experiment Field headquarters (2 miles west of Scandia and 2 miles north of Hwy 36).

This is a free event and no pre-registration is required. There will be a catered meal at the end of the program. CCA/CEU credits will be available.

Topics and speakers:

**Row-spacing and layered residual herbicides in soybeans** – Sarah Lancaster, Weed Science

**How do field peas fit in north central Kansas crop rotations?** – Kraig Roozeboom, Cropping Systems

**The hidden half: Corn root development, water, and nutrients** – Colby Moorberg, Root Ecology, and Dorivar Ruiz Diaz, Soil Fertility and Nutrient Management

Dr. Raj Khosla, Head of the Agronomy Department, and Scott Dooley, will also provide updates on the department and the North Central Experiment Field.

For questions about the event, please contact Rebecca Zach at 785-541-0283 or zrebecca@ksu.edu

# NCK FALL FIELD DAY

K-STATE
Research and Extension

## TUESDAY AUGUST 17
## 6 PM AT SCANDIA HEADQUARTER

**Tour Topics**

**Row-spacing and layered residual herbicides in soybean**
**Dr. Sarah Lancaster**

**How do field peas fit in North Central Kansas crop rotations?**
**Dr. Kraig Roozeboom**

**The hidden half: Corn root development, water and nutrients**
**Dr. Colby Moorberg and Dr. Dorivar Ruiz Diaz**

**Dinner to Follow**

Contact Rebecca Zach if you have any questions. 785-541-0283 or email at zrebecca@ksu.edu