Issue 811

K-STATE
Research and Extension

Extension Agronomy

eUpdate

07/24/2020

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 | 07/24/2020 | Issue 811

1. Critical timing in Kansas: High temperatures and corn development

The recent high temperatures came at a particularly critical period for the Kansas corn crop (silking/tasseling). According to the USDA National Agricultural Statistics, as of July 12, 47% of the corn was silking. By July 19, that amount had jumped to 66%. Temperatures during the weeklong period were generally unfavorable, particularly with the warm minimum temperatures (Figure 1). For the 7-day window of July 12-19, parts of eastern Kansas had lows above 70 °F more the 40 percent of the time. Only the western third of the state and a small area along the Missouri river had two or less nights with minimum temperatures above 70 °F.

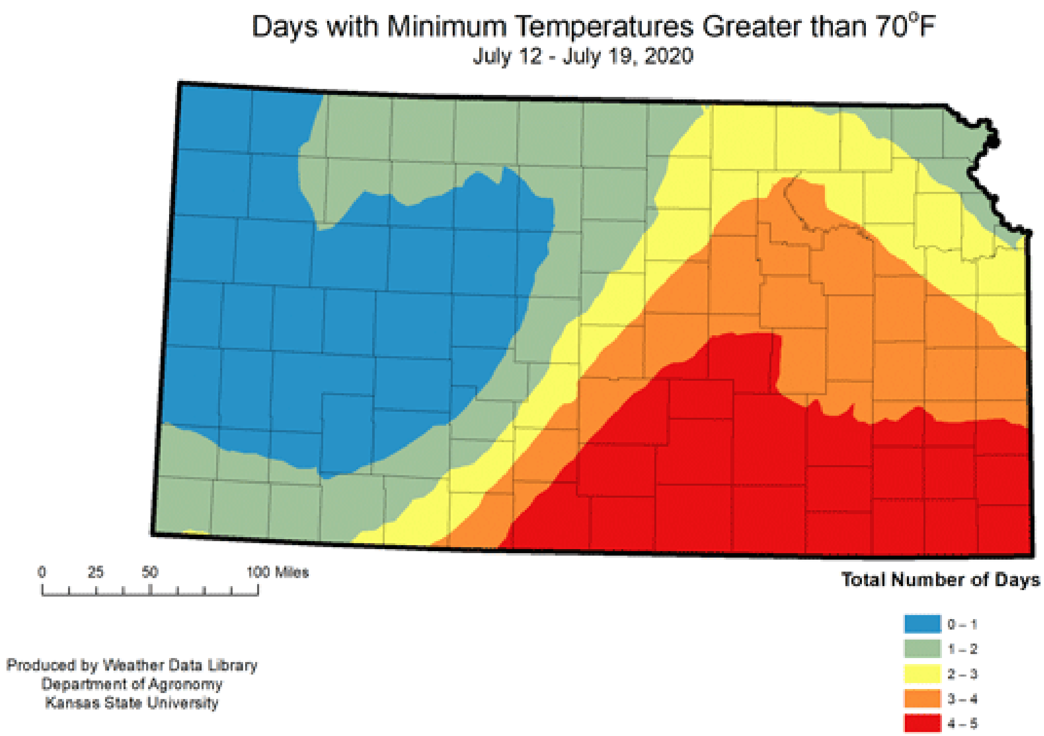


Figure 1. Total days with minimum temperature greater than 70 °F. Source: Weather Data Library

Heat stress will have more of an impact on corn at this stage of growth when combined with drought stress. Even in the absence of drought stress, heat stress alone can still increase the asynchrony between pollen shed and silk extrusion when corn reaches flowering time, ultimately reducing the final number of kernels (Figure 2). In addition, if stress conditions are prolonged, those effects will be reflected in a larger kernel abortion and impacts of the final size, kernel weight, negatively impacting final yields.

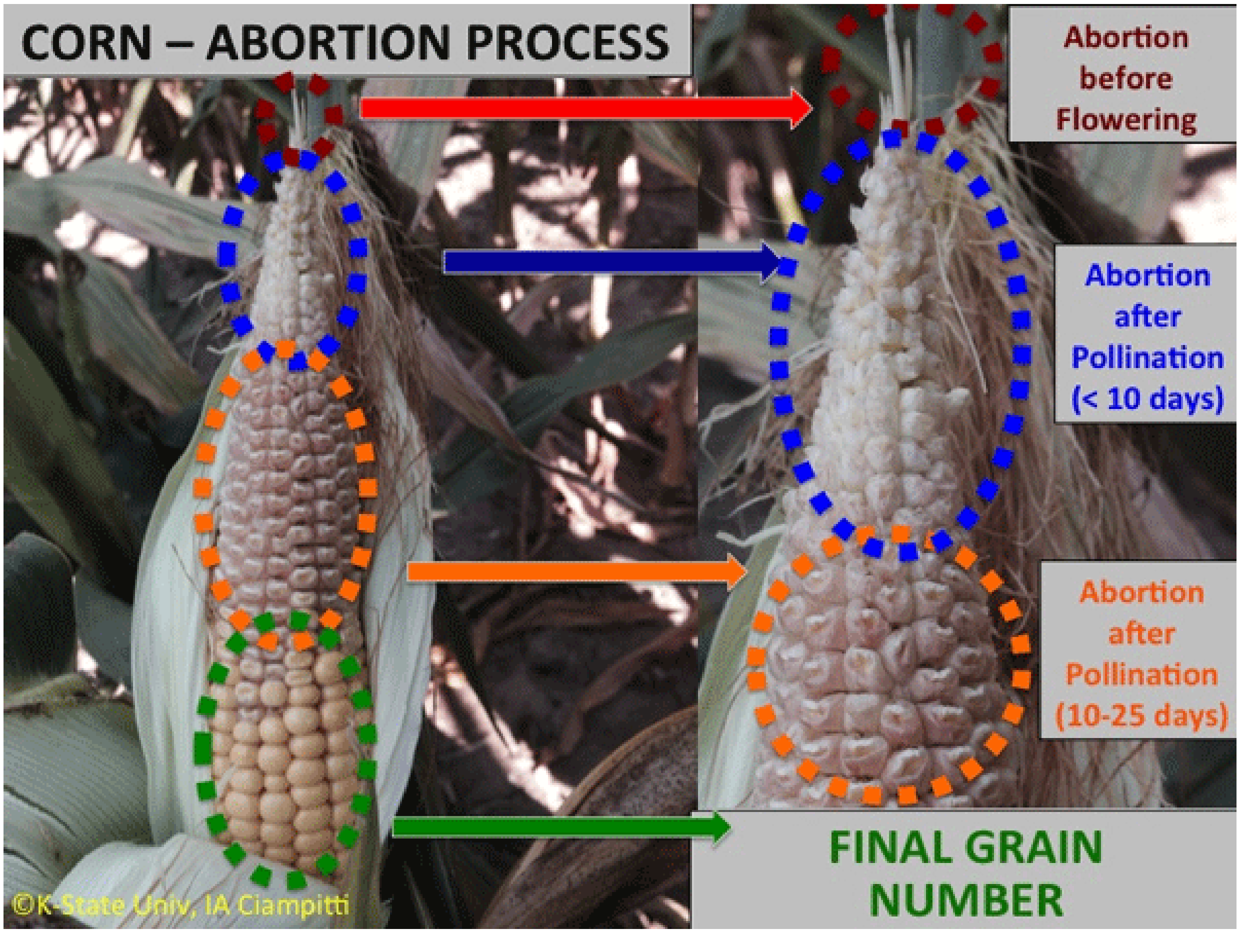


Figure 2. Ear abortion in corn from the combined effect of heat and drought stresses at the critical period around flowering. Photo by Ignacio Ciampitti, K-State Research and Extension.

Growing degree day tool on Kansas Mesonet

The Kansas Mesonet has a useful tool that tracks growing degree accumulation for multiple crops. With this tool, you can pick the planting/emergence date for the start of the interval. Selecting the graph will illustrate the growing degree accumulation for this season versus normal and the plant stage. You can access the page at: http://mesonet.k-state.edu/agriculture/degreedays/

The data updates every five minutes when you refresh the page and is available for all 65 stations.

Christopher Redmond, Mesonet Network Manager
Christopherredmond@ksu.edu

Mary Knapp, Weather Data Library
mknapp@ksu.edu

Ignacio Ciampitti, Crop Production and Cropping Systems Specialist
ciampitti@ksu.edu

2. Learn how to estimate corn yield potential

Once tasseling, silking, and pollination are complete, or nearly complete, producers can begin to estimate corn yield potential. To get a reasonable yield estimate, corn should be in the milk, dough, or dent stage. Before the milk stage, it is difficult to tell which kernels will develop and which ones have been aborted.

Producers can get some estimate of the success of pollination by examining ear silks. With successful pollination, the exposed silks should be turning brown and should easily separate from the ear when the husks are removed. Silks that have not been successfully pollinated will stay green, possibly growing to several inches in length (Figure 1). Unpollinated silks also will be connected securely to the ovaries (the undeveloped kernels) when the husks are removed.

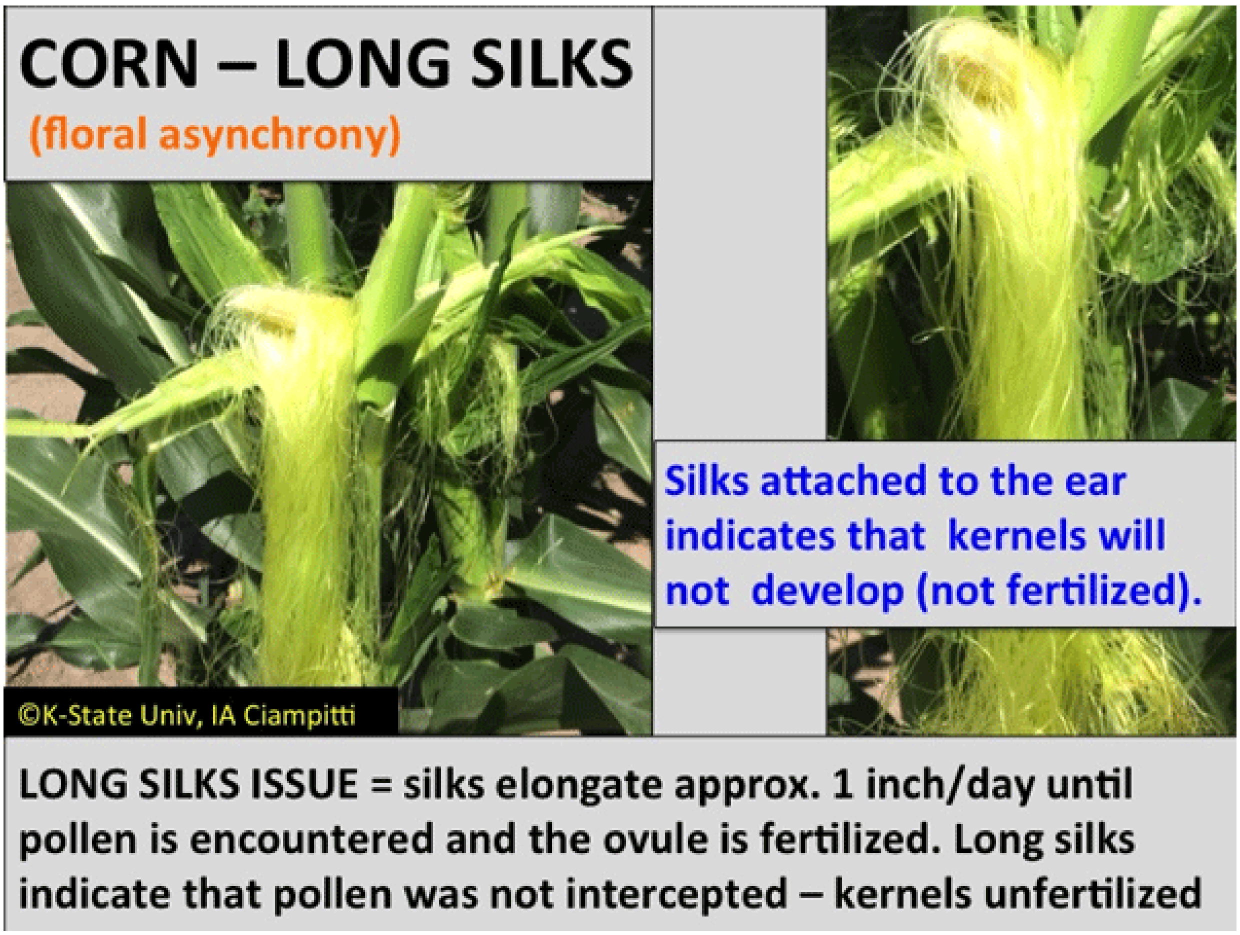


Figure 1. Long silks primarily reflecting floral asynchrony. Silks that have not been successfully pollinated will stay green. Infographic by Ignacio Ciampitti, K-State Research and Extension.

Estimating corn yield

Yield estimates can be made using the yield component method. This method uses a combination of known and projected yield components of corn to calculate an estimate of the potential yield. It is “potential” yield because one of the critical yield components, kernel size, will not be known until physiological maturity. Before then, one can use only an estimate of predicted yield based on what you think the grain filling period might be like (e.g. favorable, average, or poor). Estimating potential corn yield using yield components uses the following elements:

1. Ears per acre: This is determined by counting the number of ears in a known area. With 30-inch rows, 17.4 feet of row = 1,000th of an acre. This is probably the minimum area that should be used. The number of ears in 17.4 feet of row x 1,000 = the number of ears per acre. Counting a longer length of row is fine, just be sure to convert it to the correct portion of an acre when determining the number of ears per acre. Make ear counts in 10 to 15 representative parts of the field or management zones to get a good average estimate. The more ear counts you make (assuming they accurately represent the field or zone of interest), the more confidence you have in the yield estimate.

2. Kernels per ear: This is determined by counting the number of ear rows and number of kernels in each row. Multiply those two items to arrive at kernels per ear (number of rows x kernels per row). Do not count aborted kernels or the kernels on the butt of the ear; count only kernels that are in complete rings around the ear. Do this for every 5th or 6th plant in each of your ear count areas. Avoid odd, non-representative ears.

3. Kernels per acre = Ears per acre x kernels per ear

4. Kernels per bushel: This will have to be estimated until the plants reach physiological maturity. Common values range from 75,000 to 80,000 for excellent, 85,000 to 90,000 for average, and 95,000 to 105,000 for poor grain filling conditions. The best you can do at this point is estimate a range of potential yields depending on expectations for the rest of the season.

Example:

Ears per acre: (30-inch rows)

- 10 different 17.4-foot lengths of row offered counts: 25, 24, 22, 21, 24, 26, 20, 21, 22, 20
- average of these counts is (25 + 24 + 22 + 21 + 24 + 26 + 20 + 21 + 22 + 20)/10 = 225/10 = 22.5
- scaling up to an acre gives 22.5 x 1,000 = **22,500 ears per acre**

Kernels per ear:

- The 4 or 5 ears from each 17.4-foot area had an average of 14 rows and 27 kernels per row
- 14 x 27 = **378 kernels per ear**

Kernels per acre:

- 22,500 ears per acre x 378 kernels per ear = **8,505,000 kernels per acre**

Kernels per bushel:

- Given that this field has been exposed to 100° F and above with no significant precipitation for the past couple of weeks and the prediction for the next 7-10 days is for triple digits every day and no rain, it may not hurt to assume below-average fill conditions and use a fairly large number of kernels per bushel (because kernels will be small). Based on the ranges mentioned above, a reasonable value might be **105,000 kernels per bushel.**

Bushels per acre:

- 8,505,000 kernels per acre ÷ 105,000 kernels per bushel = about **81 bushels per acre**

If these estimates are close to correct, the field in this example is probably worth taking to grain harvest provided it is still living and likely to keep filling grain. Past experience indicates that this method of estimating yield usually provides fairly optimistic estimates. Use a larger number for kernels per bushel if you want the process to be a bit more "pessimistic."

Further details on corn growth and development can be found at:

http://www.bookstore.ksre.ksu.edu/pubs/MF3305.pdf

Ignacio Ciampitti, Crop Production and Cropping Systems Specialist
ciampitti@ksu.edu

3. In-season Palmer amaranth control in grain sorghum

Frequent rainfall over the past couple of weeks in various parts of Kansas has aggravated the problem of Palmer amaranth in grain sorghum. Several sorghum fields have been observed with a heavy infestation of Palmer amaranth (Figure 1). With adequate moisture and high temperatures, these Palmer amaranth populations are rapidly growing and causing concern for some sorghum producers. Palmer amaranth can quickly exceed labeled sizes, especially in fields where no pre-emergence (PRE) herbicide was used. *It is important to note that post-emergence (POST) applied herbicide options are very limited in grain sorghum. In addition, the majority of the grain sorghum and Palmer amaranth populations have already passed the growth stage when these POST herbicides can be effective.*

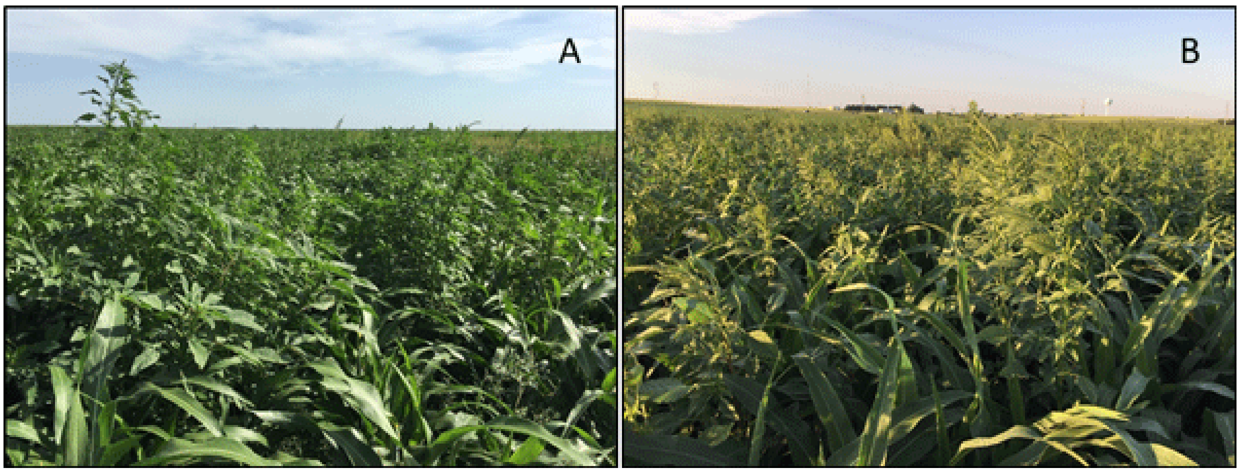


Figure 1. Palmer amaranth infestation in grain sorghum fields near Russell (A) and Hays (B) on July 20, 2020. Photos by Vipan Kumar, K-State Research and Extension.

POST-applied herbicides for Palmer amaranth control in sorghum

A study sponsored by the United Sorghum Checkoff Program was conducted in 2019 at K-State Ag Research Center near Hays, KS to evaluate the effectiveness of POST-applied herbicides for Palmer amaranth control in grain sorghum. The study site had a natural infestation of Palmer amaranth and grain sorghum was planted on June 13, 2019. The test plots were sprayed with AAtrex (atrazine) applied PRE at 32 oz/a rate. The tested POST programs included AAtrex, Clarity, Huskie, AAtrex + Clarity, Huskie + Clarity, Huskie + AAtrex (see Table 1). All POST programs were applied on July 10, 2019 (grain sorghum was 8-to-10 inches tall and Palmer amaranth was 6-to-8 inches tall).

Results indicated that AAtrex + Huskie applied POST had up to 95% control of Palmer amaranth at 49 DAT, whereas control ranged from 82 to 89% with POST applied AAtrex, Clarity, Huskie alone or tankmixture of AAtrex + Clarity and Huskie + Clarity (Figure 2). However, it is important to note that 5 to 17% crop injury was also observed with all Clarity based programs (data not shown).

Important note: Do not make any POST application of Clarity if the sorghum is more than 10 inches tall or sorghum will be severely injured or produce damaged seed heads.

Table 1. List of POST herbicides evaluated for Palmer amaranth control in grain sorghum.

Herbicide	Rate (oz/A)	Active Ingredients
AAtrex[1]	32	Atrazine
AAtrex + Clarity[1]	32 + 2	Atrazine + dicamba
AAtrex + Clarity[1]	32 + 4	Atrazine + dicamba
Clarity[2]	8	Atrazine + dicamba
Huskie[3]	13	Bromxynil + pyrasulfotole
Huskie + Clarity[3]	13 + 4	(Bromxynil + pyrasulfotole) + dicamba
Huskie + AAtrex[3]	13 + 16	(Bromxynil + pyrasulfotole) + atrazine

[1] Included crop oil concentrate (COC) at 32 oz/a.
[2] Included nonionic surfactant (NIS) at 16 oz/a.
[3] Included nonionic surfactant (NIS) at 0.25 % v/v and ammonium sulfate (AMS) at 16 oz/a.

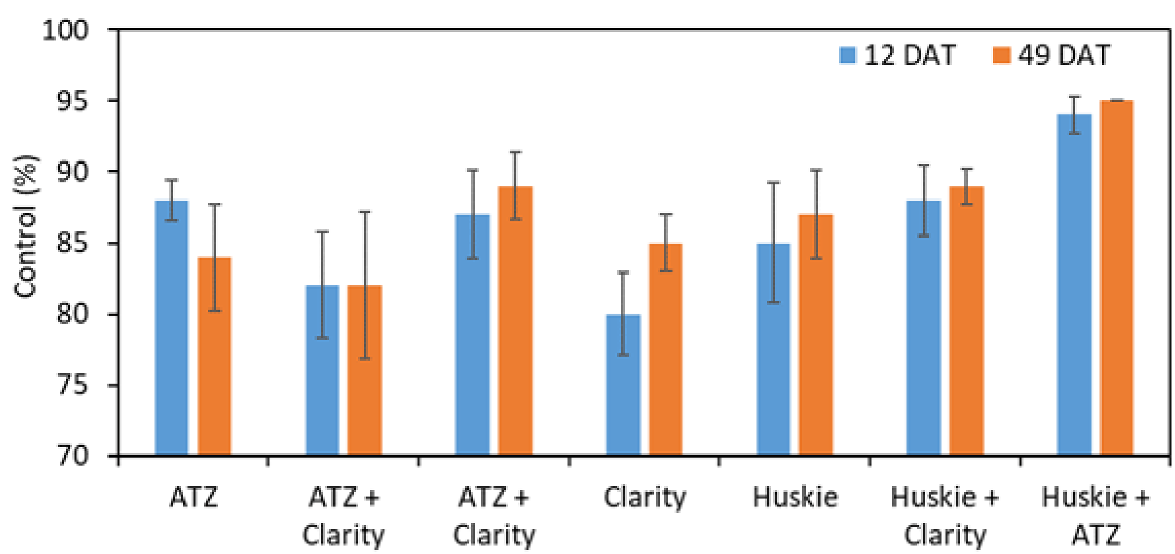


Figure 2. Palmer amaranth control with POST herbicides at 12 and 49 days after treatment in

grain sorghum. Graph by Vipan Kumar, K-State Research and Extension.

General strategies for Palmer amaranth control in grain sorghum

- **Start clean:** Due to limited herbicide options for in-season weed control in grain sorghum, producers should allow enough time for Palmer amaranth to emerge and be controlled with before sorghum planting.
- **Use effective soil-residual herbicides:** Producers should utilize a PRE herbicide program with multiple effective sites of action as a foundation for Palmer amaranth control in grain sorghum.
- **In-season control with POST herbicides:** Scout fields regularly to check for any new flushes of Palmer amaranth.
    - Be mindful of label restrictions for sorghum size and/or growth stage at the time of POST application.
    - Split atrazine applications (2/3rd of total atrazine in PRE treatment and 1/3rd in POST treatment) to maximize control without exceeding the allowed total application rate (2.5 lb/a per calendar year).
- Consult the *K-State 2020 Chemical Weed Control Guide* or call your local county agent for assistance. Always read and follow the instructions found on herbicide labels.

Brand names appearing in this publication are for product identification purposes only. No endorsement is intended, nor is criticism implied of similar products not mentioned. Persons using such products assume responsibility for their use in accordance with current label directions of the manufacturer.

Vipan Kumar, Weed Management Specialist, Agricultural Research Center – Hays
vkumar@ksu.edu

Brent Bean, Agronomist, United Sorghum Checkoff Program
brentb@sorghumcheckoff.com

4. New cover crop publication discusses planting cereal rye after corn harvest

A new publication from K-State and the Midwest Cover Crop Council has been released and provides helpful information for producers looking to incorporate a cereal rye cover crop following corn harvest. This factsheet is an excellent resource for farmers that are new to cover crops.

Cereal rye can be part of an effective weed management program in soybean production. The growing cover crop competes with weeds that emerge early in the spring and residue from the terminated cereal rye can suppress weed growth. Cereal rye residue can also reduce evaporation from the soil during the growing season and (Figure 1). With corn harvest coming, producers need to get their cereal rye seed ordered so that the cover crop can be planted quickly following harvest.

Figure 1. "Clean" soybeans - the heavy residue mat from the terminated cereal rye cover crop is helping control weeds throughout the growing season. Photo by DeAnn Presley, K-State Research and Extension.

This publication covers a variety of topics that are summarized in this article. The complete factsheet can be viewed at: https://bookstore.ksre.ksu.edu/pubs/MF3504.pdf

Planning and Preparation

- **Residual corn herbicides**—Fall-seeded cereal rye can be established successfully following application of most herbicides used in corn production; but, success is influenced by herbicide rate and environmental conditions that followed the herbicide application. If cereal rye will be grazed or fed to livestock, there are some restrictions. See the USDA-NRCS Cover Crop Termination Guidelines, or consult your agricultural chemical supplier or agronomist for potential carryover herbicide concerns, and always read and follow the instruction on the herbicide label.
- **Seed purchase**—Order cereal rye seed early. Named varieties can produce substantially more growth or more predictable growth and maturity but are more expensive than VNS (variety not stated) seed. Start with VNS seed with a good germination rate that is purchased from a reputable seed dealer. This means seed has been cleaned, tested for germination, and has a seed tag even though it is VNS.

Fall Work

- **Corn harvest**—Harvest the crop as early as possible in fields to be planted to cereal rye.
- **Tillage or no-tillage**—To allow for adequate cover crop growth, it is best or easier if no full-width tillage is planned for after rye planting or before intended rye termination date. Thus, it is easier to integrate cover crops into no-till or strip-till systems.
- **Timing of planting**—Plant cereal rye as soon after corn harvest as possible. Use the Cover Crop Selector Tool (in Resources) to find planting dates for your county. For most of Kansas, plant no later than November 1.
- **Seeding rate**—The recommended drilled seeding rate is 55 to 60 pounds per acre; if seeded with an airplane, the rates should be 1.5 times the drilled rate (required if participating in USDA-NRCS programs). These rates are based on high-quality seed with germination rates of 85 to 98%. Increase rates with later plantings.
- **Planting method**—Drill seed 0.75 to 1.50 inches deep or broadcast with shallow incorporation.

Helpful resources

Cover Crop Selector Tool – http://mccc.msu.edu/selector-tool/, available from Midwest Cover Crops Council, www.mccc.msu.edu

USDA-NRCS Cover Crop Termination Guidelines – https://www.rma.usda.gov/en/Topics/Cover-Crops

DeAnn Presley, Soil Management Specialist
deann@ksu.edu

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

5. Updated 2020 Wheat Variety Disease and Insect Rating publication

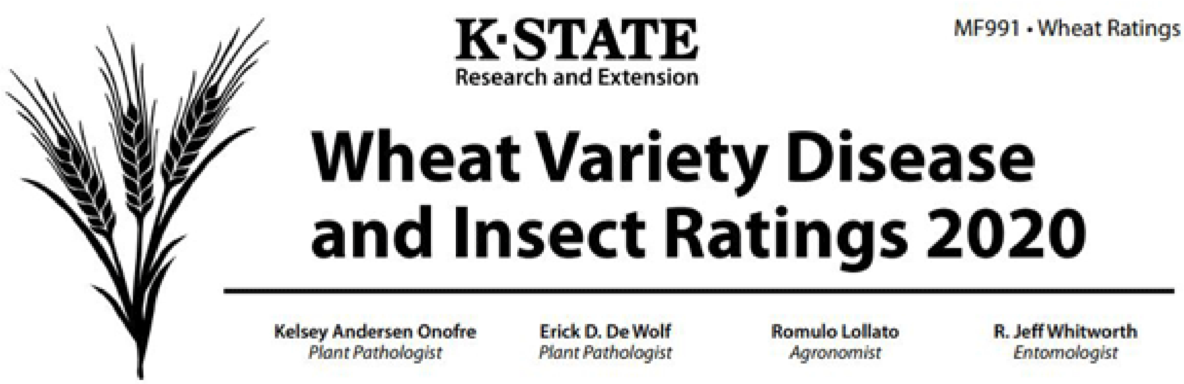
Variety selection is one of the most important decisions that a grower can make to ensure success on their farm. Now is the time when wheat producers across Kansas are reviewing yield data and making decisions about the varieties they will plant in the fall. Although yield is always a top priority, disease and insect resistance, along with appropriate agronomic traits, can buffer against crop losses. In addition, genetic resistance to diseases and insect pests can be the most effective, economical, and environmentally sound method for control.

Wheat Variety Disease and Insect Ratings 2020, from K-State Research and Extension, has now been released for this year. Agronomic characteristics, disease, and pest resistance information is included, as well as profiles that highlight some more common or new varieties for the state of Kansas.

Updates this year include the addition of variety profiles for varieties KS Dallas, KS Western Star, Showdown, WB4267, and WB4792, as well as disease, insect, and agronomic ratings for several other new varieties. As many producers are looking for tools to manage weed pressure, we have added a section to the document with information specifically about varieties with Clearfield and CoAXium herbicide resistance traits.

Ratings in this publication represent results from field and greenhouse evaluations by public and private wheat researchers at multiple locations over multiple years.

An electronic version of the *Wheat Variety Disease and Insect Ratings 2020* publication MF991 can be found here: https://www.bookstore.ksre.ksu.edu/pubs/MF991.pdf


K·STATE
Research and Extension
MF991 • Wheat Ratings
Wheat Variety Disease and Insect Ratings 2020
Kelsey Andersen Onofre, Plant Pathologist
Erick D. De Wolf, Plant Pathologist
Romulo Lollato, Agronomist
R. Jeff Whitworth, Entomologist

Kelsey Andersen Onofre, Extension Plant Pathologist
andersenk@ksu.edu

Erick De Wolf, Plant Pathologist
dewolf1@ksu.edu

Romulo Lollato, Wheat and Forages Specialist
lollato@ksu.edu

Jeff Whitworth, Extension Entomology
jwhitwor@ksu.edu

6. 2019 Kansas Summer Annual Forage Hay and Silage Variety Trial final report

In 2019, summer annual forage variety trials were conducted across Kansas near Garden City, Hays, and Scandia. All sites evaluated hay and silage entries. Companies were able to enter varieties into any possible combinations of research sites, so not all sites had all varieties. Across the sites, a total of 95 hay varieties, 99 sorghum silage varieties, and 12 corn silage varieties were evaluated. The full 2019 Kansas Forage Report can be accessed online at https://newprairiepress.org/kaesrr/vol6/iss6/1/.

Introduction

In Kansas, there were 2,400,000 acres of hay and haylage harvested with an average yield of 2.24 dry matter tons per acre. Of this total, 650,000 acres were alfalfa with an average yield of 3.72 dry matter tons per acre, and 1,770,000 acres were crops other than alfalfa with an average yield of 1.69 dry matter tons/a. Kansas ranked 6th in the U.S. for hay and haylage production. This largely supports the state dairy (ranked 19th in the U.S. and valued at $483,000,000) and cattle (feedlot, background, and cow/calf) industries (ranked second in the U.S. and valued at $10,200,000,000). Dairy and beef cattle represented 58% of the total agricultural product of Kansas. Hay and grain commodities that support these two industries are critical for the state.

Study Objectives

The objectives of the Kansas Summer Annual Forage Hay and Silage Variety Trial are to evaluate the performance of released and experimental varieties, determine where these varieties are best adapted, and increase the visibility of summer annual forages in Kansas. Breeders, marketers, and producers use data collected from the trials to make informed variety selections. The Summer Annual Forage Trial is planted at locations across Kansas based on the interest of those entering varieties into the test.

This work was funded in part by the Kansas Agricultural Experiment Station and seed suppliers. Sincere appreciation is expressed to all participating researchers and seed suppliers who have a vested interest in expanding and promoting annual forage production in the U.S.

Inestimable differences in soil type, weather, and environmental conditions play a part in increasing experimental error, therefore one should use more than one location and one year of data to make an informed variety selection decision. Please refer to previous years' forage reports to see how a variety performed across years.

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

Augustine Obour, Agricultural Research Center – Hays
aobour@ksu.edu

Jane Lingenfelser, Assistant Agronomist, Crop Performance Testing
jling@ksu.edu