Issue 758

K-STATE Research and Extension

Extension Agronomy

eUpdate

07/19/2019

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 | 07/19/2019 | Issue 758

1. Southern rust detected on corn in Kansas

Southern rust is now active on corn from Kansas to Indiana and southward (Figure 1). This disease used to arrive in Kansas around the first of August, but since 2015, it has been arriving much earlier. The first positive field in 2019 was discovered on July 11, but based on the age of the pustules, it has been here since sometime in mid-June. This, combined with very late-planted corn in many areas of the state, increases the threat that this disease will cause significant yield loss problems in 2019. The severity is dependent on the weather. The 10-day forecast indicates that weather will remain favorable for disease development. Southern rust likes 90-degree days, warm nights, and high humidity.

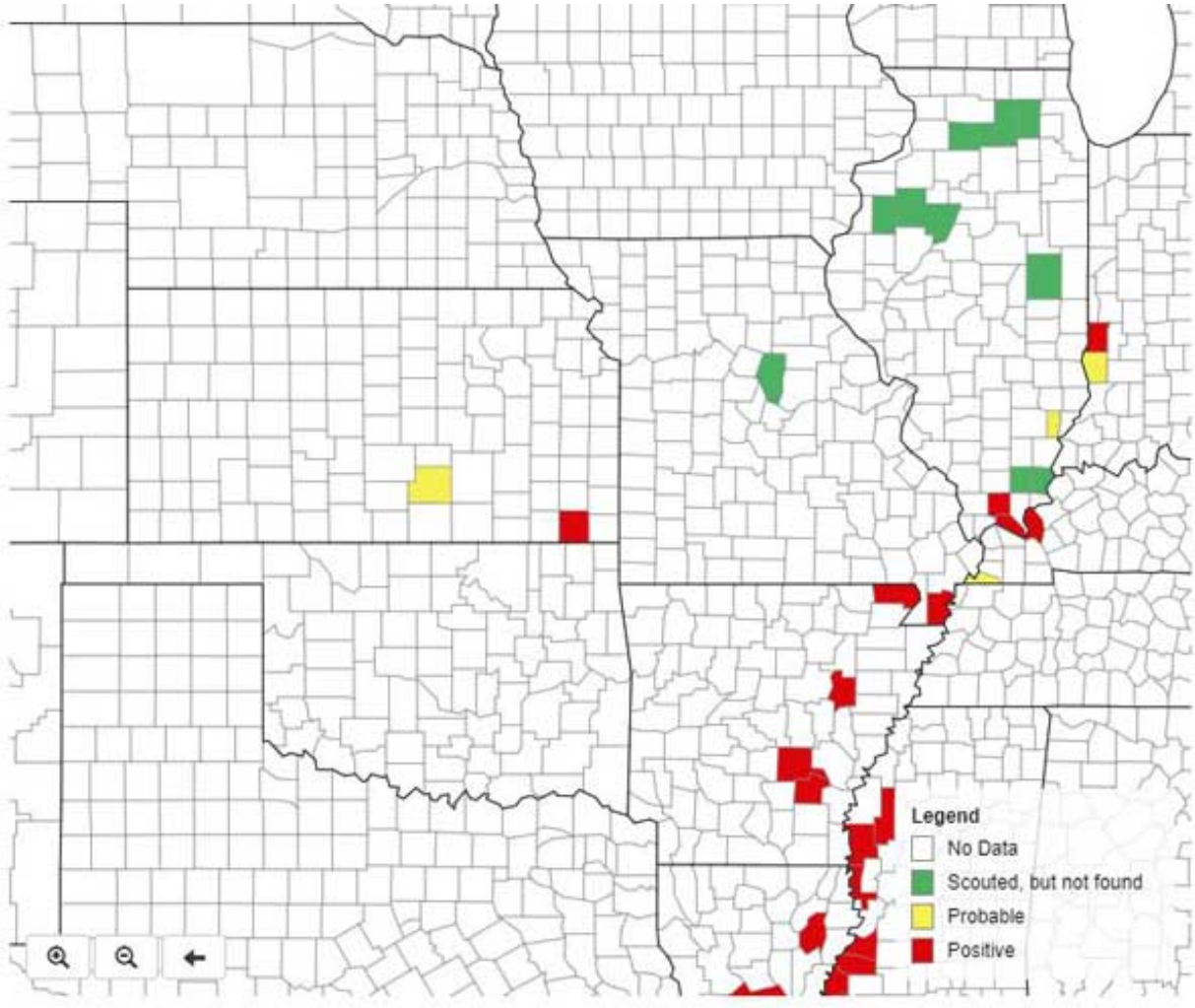

Figure 1. Southern corn rust (Puccinia polyspora) in Kansas and surrounding states for 2019.
Source: https://corn.ipmpipe.org/southerncornrust/

Symptoms of southern rust include pustules that are usually circular to oval, with a diameter of 0.2 to 2.0 millimeters. They typically are densely scattered on the upper leaf surface (Figures 2 and 3). When severity levels are high, pustules are occasionally seen on the underside of the leaf near the midrib; however, they are normally confined to the top side of the leaf.

Sporulation can be so heavy that the leaf surface becomes covered with a layer of "spore dust" that transfers easily to clothing as a person walks through an infected field. Light-colored clothing will quickly take on an orange-brown color (Figure 4). Southern rust can sometimes be confused with common rust.

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

Figure 2. Southern rust on corn. Photo courtesy of Doug Jardine, K-State Research and Extension.

Figure 3. Close-up of southern rust on corn. Photo courtesy of Tom Allen, Mississippi State University.

Figure 4. Clothing can become covered with spores while walking through heavily infested fields. Photo courtesy of Doug Jardine. K-State Research and Extension.

Treatment recommendations

Fields that have already been sprayed for gray leaf spot should also be protected from southern rust for three to four weeks after application, depending on the product used. Fields that have not received a fungicide application at tasseling should be regularly monitored for the build-up of southern rust. Fungicide applications as late as hard dough have been reported to provide economic returns in some instances. Efficacy ratings for corn fungicide management of southern rust can be found at https://cropprotectionnetwork.org/download/5214/.

Doug Jardine, Extension Plant Pathology
jardine@ksu.edu

2. Estimating corn yield potential

Where tassel, silking, and pollination are complete, or nearly complete, producers can begin to get some idea of what the potential yield might be. 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.

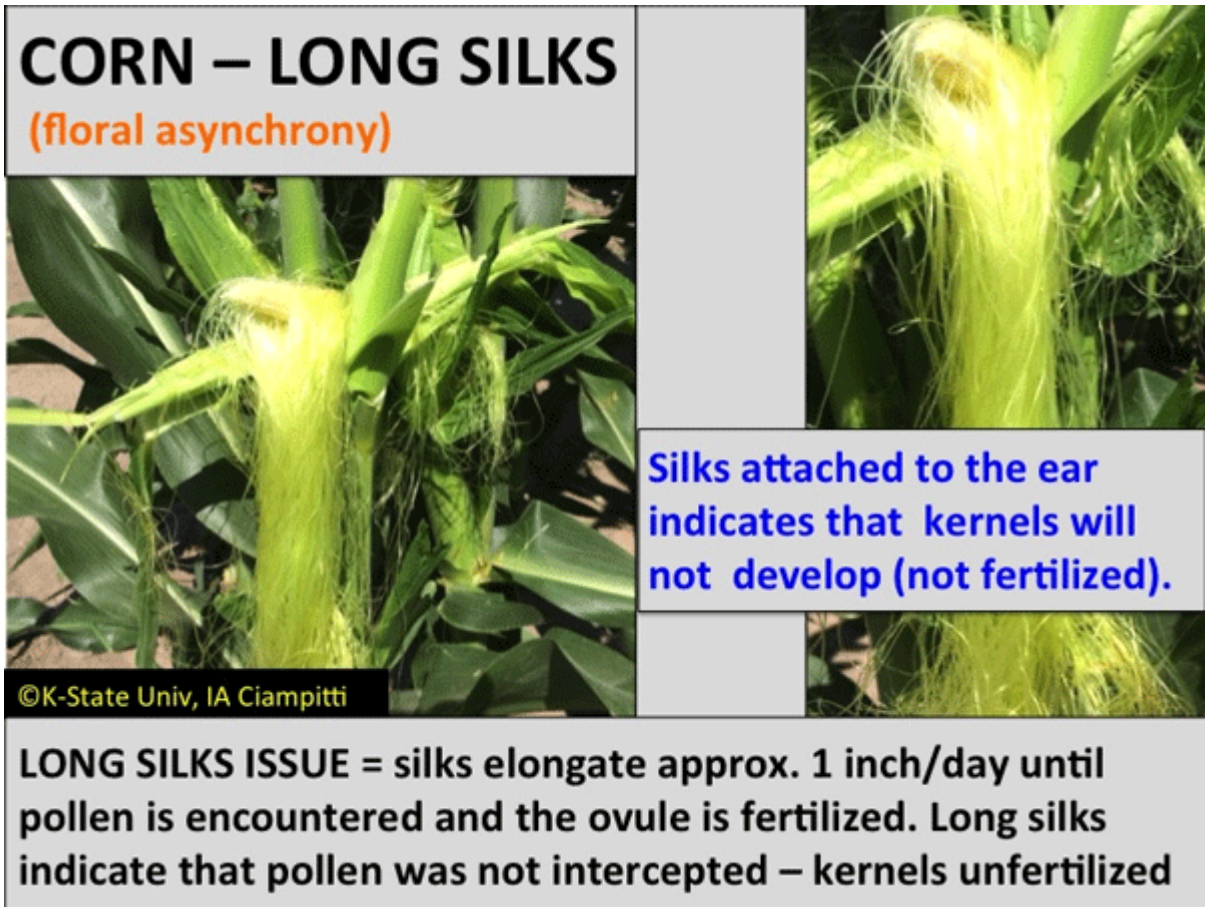

Figure 1. Long silks primarily reflecting floral asynchrony. Silks that have not been successfully pollinated will stay green. Infographic by Ignacio Ciampitti, K-State Research and Extension.

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 provided counts of 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. When a heat wave hits, utilize the Animal Comfort Index from the Kansas Mesonet

With extreme heat impacting much of Kansas this week, do not forget about the Kansas Mesonet's animal comfort index. Extreme temperatures, both hot and cold, can negatively impact animals. It is important to keep in mind that actual animal response to temperature stress will be dependent on a number of factors not accounted for in the index. Those include, but are not limited to: age, hair coat (winter vs summer; wet vs dry), health, body condition, micro-environment, and acclimatization.

Users can access this new tool from either the main Mesonet page by selecting from the drop down menu, Agriculture, then Comfort Index (Figure 1); or directly from this link: [http://mesonet.k-state.edu/agriculture/animal/.](http://mesonet.k-state.edu/agriculture/animal/)

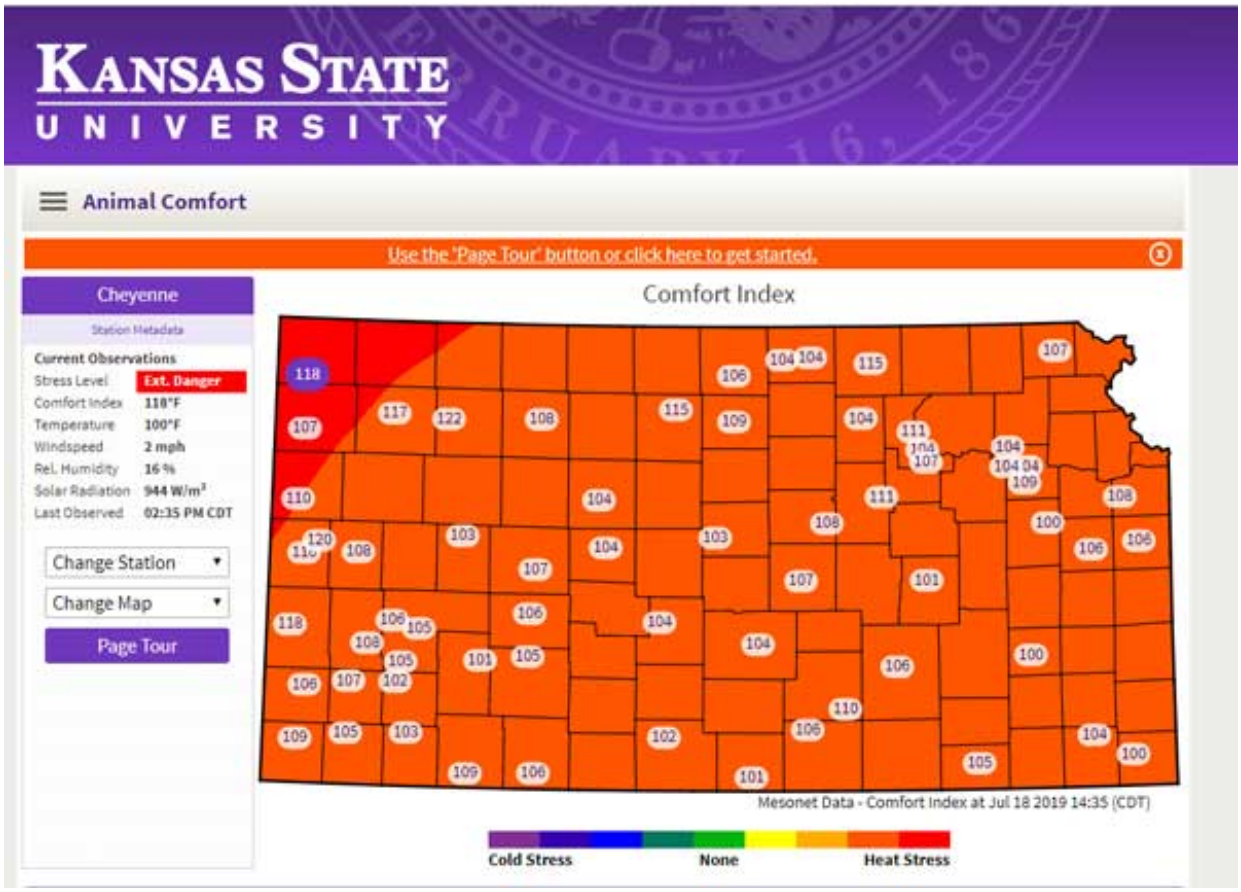

Figure 1. Animal comfort values on July 18, 2019 at 2:35 pm (CDT). The Cheyenne station is selected in this example. Stress level at this location was "Extreme Danger". Graphic from Kansas Mesonet.

Animal Comfort Index

Building on the Comprehensive Comfort Index, produced at University of Nebraska, the tool illustrates the impact of both extremes of hot and cold. The index is unique in that it includes, in addition to air temperature and relative humidity, effects of wind speed and solar radiation. Development and validation of the index used data from beef and dairy cattle. The map indicates

where current conditions fit on the scale. On the "About" page, there is a description of the values on the scale and their potential impact (Figure 2).

Heat and cold stress level categories for the cattle comfort advisor:

Comfort level	Map indicator	Index Value, °F	General Interpretation
Heat Danger		> 105	Animal deaths may exceed 5%
Heat Caution		> 95 to 105	Decreased production, 20% or more Reduced conception , as low as 0%
Heat Caution		> 85 to 95	Decreased production, 20% or more Reduced conception , as low as 0%
Comfortable		77 to 85	
Comfortable		32 to 77	
Comfortable		15 to 32	
Cold Caution		< 15 to -20	18 to 36% increase in dry matter intake
Cold Danger		< -20 to -40	
Cold Danger		< -40	

Figure 2. Cattle comfort ranges. Graphic from Kansas Mesonet.

Understanding the Webpage

The "About" section contains information about the comfort index. There is also a link to the publications used to produce page. For more information on navigating this resource, users can select a page tour from the main soil moisture page located at the top of the featured map.

Figure 3. Cattle on a pasture near the Sedan Mesonet station. Photo by Chip Redmond, K-State Research and Extension.

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

Mary Knapp, Weather Data Library
mknapp@ksu.edu

4. Learn about the bluestems species in Kansas

There are several species in Kansas referred to as "bluestems". Two of our native bluestems, big bluestem [*Andropogon gerardii* Vitman] and little bluestem [Schizachyrium scoparium (Michx.) Nash] occur throughout Kansas and are important constituents in the mid- and tallgrass prairies of central and eastern Kansas. Sand bluestem [*Andropogon hallii* Hack.] is found on sandy soils in Kansas. A less widely distributed species is splitbeard bluestem [*Andropogon ternarius* Michx.] found in a few counties in southeast Kansas. Another species found throughout Kansas is silver bluestem [*Bothriochloa laguroides* (DC.) Herter]. Broomsedge bluestem [Andropogon virginicus L.] is found primarily in eastern Kansas.

Two introduced species referred to as Old World Bluestems are Caucasian bluestem [*Bothriochloa bladhii* (Retz.) S.T. Blake] and yellow bluestem (*Bothriochloa ischaemum* (L.) Keng]. Old World Bluestem has been found in nearly every county in Kansas.

Identification

Big bluestem is a native, perennial, warm-season grass. It can grow up to 6-8 feet and has short, scaly rhizomes. In a vegetative stage, big bluestem can be identified by the fuzzy hairs located on the lower sheath and leaf blades. Seed heads typically have 3 racemes that appear like a "turkey foot". Plants are leafy at the base and are very palatable to livestock (Figure 1).

Figure 1. Big bluestem

Sand bluestem is a native, perennial, warm-season grass. It resembles big bluestem, but the stems are bluish in color. Sand bluestem produces long creeping rhizomes and grows taller than 6 feet. The seed head has 2-7 racemes (Figure 2). The grazing value of sand bluestem is good to excellent.

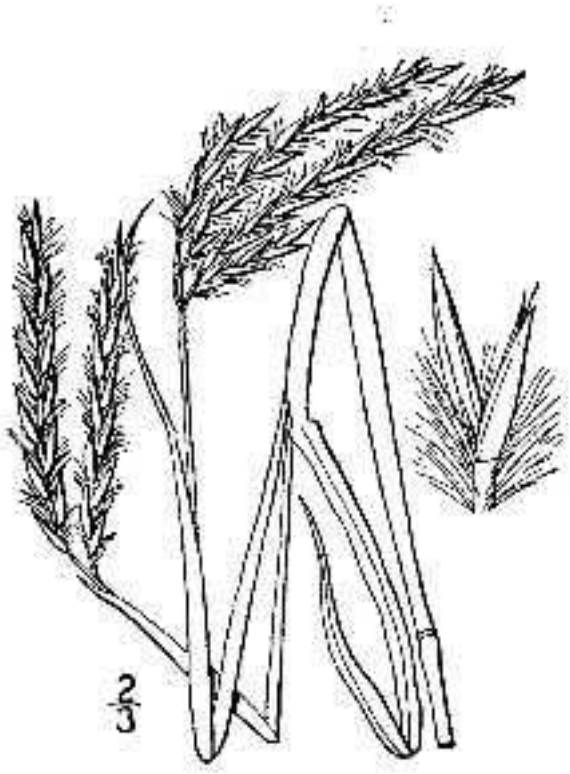

Figure 2. Sand bluestem

Little bluestem is a native, perennial, warm-season bunchgrass. Stem bases are flat and the vegetation turns reddish-brown when mature. Plants are 2-4 feet tall and will grow on a wide range of soils including well-drained sands. The seed heads have small fuzzy seeds with a twisted awn (Figure 3). It has fair-to-good forage value, especially in the early-season before stem elongation. Fun fact: Little bluestem is the official state grass of Kansas.

Figure 3. Little bluestem

Splitbeard bluestem is a native, perennial, warm-season bunchgrass that grows 2-4 feet in height (Figure 4). The species resembles little bluestem but has silvery seed heads that open widely at maturity. Splitbeard bluestem is usually ignored by cattle, but may be grazed in early spring.

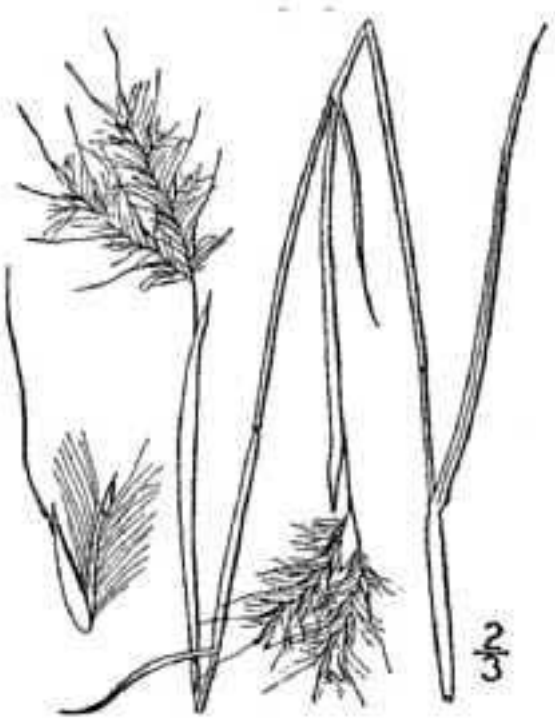

Figure 4. Splitbeard bluestem

Silver bluestem is a native, perennial, bunchgrass (Figure 5). It grows to a height of 1.5 to 3.5 feet. The stems are bent from one node to the next. The nodes appear to be swollen and white in color. The silvery seed heads are borne well above the foliage. Silver bluestem occurs on disturbed sites such as along roadsides and increases in overgrazed areas. Silver bluestem is generally considered undesirable and is grazed only in early stages of growth.

Figure 5. Silver bluestem

Broomsedge bluestem is a native, warm-season, perennial bunchgrass that grows up to 4 feet tall. The stem bases are flat and may or may not have hair. The orange-brown or straw-colored foliage help distinguish broomsedge (Figure 6). The seed heads are partially enclosed by large inflated sheaths. Broomsedge grows well on old fields that are eroded and low in fertility. It is seldom eaten by livestock.

Figure 6. Broomsedge bluestem

Caucasian bluestem is an introduced, perennial, warm-season bunchgrass. The species was introduced from Australia and southern Asia. It grows to a height of 2 to 3 feet. Leaves and sheaths usually lack hairs, but a few hairs occur at the leaf collar. Stems are grooved on one side. The seed heads are 2.5 to 6 inches long, much branched, and purplish in color (Figure 7). Caucasian bluestem will be grazed during vegetative growth, but is used little by livestock when animals are given a choice.

Figure 7. Caucasian bluestem

Yellow bluestem is an introduced, perennial, warm-season bunchgrass. Other common names include Turkestan bluestem and King Ranch bluestem. Yellow bluestem originates from northern Africa, Eurasian and the Mediterranean. It reaches about 3 feet in height. The leaves and sheaths usually have hairs. The vegetation resembles Caucasian bluestem. The stems can be decumbent and bent and conspicuously yellow in color (Figure 8). The seed head consists of 4 to 12 finger-like branches. Like Caucasian bluestem, yellow bluestems are consumed little by livestock if given a choice.

Figure 8. Yellow bluestem

The bluestems in Kansas are not all alike. Some of our native species, such as big, little, and sand bluestem are palatable to grazing animals. Other species such as broomsedge bluestem and the Old World Bluestems can be invasive and less desirable for grazing.

Sources:

Haddock, Mike. 1997-2019. Kansas Wildflowers & Grasses. http://www.kswildflowers.org.

USDA, NRCS. 2019. The PLANTS Database (http://plants.usda.gov, 17 July 2019). National Plant Data Team, Greensboro, NC 27401-4901 USA.

USDA-NRCS PLANTS Database / Britton, N.L., and A. Brown. 1913. *An illustrated flora of the northern United States, Canada and the British Possessions. 3 vols.* Charles Scribner's Sons, New York. Vol. 1: 115.

USDA-NRCS PLANTS Database / Britton, N.L., and A. Brown. 1913. *An illustrated flora of the northern United States, Canada and the British Possessions. 3 vols.* Charles Scribner's Sons, New York. Vol. 1: 117.

USDA-NRCS PLANTS Database / Britton, N.L., and A. Brown. 1913. *An illustrated flora of the northern United States, Canada and the British Possessions. 3 vols.* Charles Scribner's Sons, New York. Vol. 1: 118.

USDA-NRCS PLANTS Database / Hitchcock, A.S. (rev. A. Chase). 1950. *Manual of the grasses of the United States*. USDA Miscellaneous Publication No. 200. Washington, DC.

Walt Fick, Rangeland Management Specialist
whfick@ksu.edu

5. 2019 Range Management Schools scheduled for August at two locations

Two adult range management schools organized by the Kansas Grazing Lands Coalition will be offered in 2019. The first school will be held August 6-8 at Ringneck Ranch near Tipton, KS. The second school, the Tallgrass School, will be August 20-22 at Camp Wood, near Elmdale, KS.

Although topics are similar from year to year, the theme changes. For 2019, presenters will emphasize managing outside of "normal" conditions. An invited speaker and a rancher panel will discuss the theme. Other topics covered will include plant physiology, soil health, plant identification, measuring and monitoring, stocking rates, adaptive management, and prescribed burn associations.

To enroll go to http://www.kglc.org or contact Barth Crouch at 785-452-0780 or barth.crouch@gmail.com.

Walt Fick, Rangeland Management Specialist
whfick@ksu.edu

6. North Central Experiment Fall Field Day, August 20, Scandia

All interested individuals are invited to attend the **2019 North Central Experiment Field Day** on **Tuesday, August 20, at 6:00 p.m**. The event will be held at the South Unit experiment field located approximately 2.5 miles west of Scandia on 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 will include:

Corn planting date considerations – Stu Duncan, K-State Northeast Area Agronomist

In-furrow fertilizer with soybeans and soybean stand issues – Dorivar Ruiz Diaz, K-State Soil Fertility and Nutrient Management Specialist

Long-term fertility research and trends – Dorivar Ruiz Diaz and Andrew Esser, Agronomist-in-charge, North Central Kansas Experiment Field

For questions about the event, please call Andrew Esser at 785-335-2836

K-STATE Research and Extension

KSU NCK Experiment Field
Fall Field Day

August 20, 2019
KSU Experiment Field South Unit Location
2.5 miles west of Scandia on Hwy 36
6:00 P.M. Sharp

Tour Topics:

-Corn Planting Date Considerations
Dr. Stu Duncan, KSU Northeast Regional Agronomist

-In-furrow Fertilizer with Soybeans and Soybean Stand Issues
Dr. Dorivar Ruiz-Diaz, Soil Fertility and Nutrient Management Professor K-State

-Long-Term Fertility Research and Trends
Dr. Dorivar Ruiz-Diaz and Andrew Esser, Agronomist-in-Charge NCK-Exp. Fields

Free Event

No registration required
Catered Dinner to Follow Program
Questions Call: 785-335-2836
Andrew Esser, Agronomist-in-Charge

Meeting sponsored by: K-STATE Research and Extension

CCA CEU's available

7. Kansas River Valley Fall Field Day - August 13

All crop producers are invited to attend the **2019 Kansas River Valley Experiment Field Day** on **Tuesday, August 13 at 5:00 p.m**. The field day will be held at the Rossville field located 1 mile east of Rossville on Hwy. 24 on the south side of the road.

This is free event for all and will included a barbeque meal sponsored by Wilbur-Ellis. Presentations will be geared to having a more profitable and efficient crop production operation. Topics and speakers will include:

- **Dr. Stu Duncan and Dr. Dallas Peterson – Weed management in soybeans**
- **Dr. Dorivar Ruiz Diaz – Effect of split late N application in corn on yield and nitrogen use efficiency**
- **Malynda O'Day – Cover crop management for weed suppression**
- **Chip Redmond – Making the most of the Mesonet: A resource to aid herbicide application**

To pre-register for the catered meal sponsored by Wilbur-Ellis, please call Jolene Savage at the Shawnee County Extension office at 785-232-0062, Ext. 100, by **5:00 p.m. on Monday, August 12**. Additional field day sponsorship includes the Kansas Corn Commission. Certified Crop Advisor and Commercial Pesticide Applicator credits have been applied for.

Kansas State University Agricultural Experiment Station and Cooperative Extension Service. K-State Research and Extension is an equal opportunity provider and employer. Kansas State University is committed to making its services, activities and programs accessible to all participants. If you have special requirements due to a physical, vision, or hearing disability, or a dietary restriction please contact Leroy Russell at 785-232-0062, ext. 108.

Kansas State Research & Extension

KSU Agronomy

Kansas River Valley Experiment Field
2019 Fall Field Day

Tuesday, August 13 - **5:00 p.m. Sharp!**

Rossville Field — 1 mile east of Rossville on U.S. Highway 24 on the south side of the road

Dr. Dallas Peterson and Dr. Stewart Duncan- Weed management in soybeans.

Dr. Dorivar Ruiz Diaz – Effect of split late N application in corn on yield and nitrogen use efficiency.

Malynda O'Day- Cover crop management for weed suppression.

Chip Redmond- Making the most of the Mesonet: a resource to aid herbicide application.

To pre-register for the catered BBQ meal sponsored by Wilbur-Ellis, call Jolene Savage at the Shawnee County Extension Office at 785-232-0062 — Ext. 100 by 5:00 p.m. on Monday, August 12. Additional Field Day sponsorship in-part by the Kansas Corn Commission. **Certified Crop Advisor and Commercial Pesticide Applicator Credits have been applied for.**

8. East Central Experiment Field fall field day - August 21

The East Central Experiment Field in Ottawa will host its fall field day on **Wednesday, August 21**. The event will begin at 9:00 a.m. with registration, coffee, and doughnuts. The field day program will begin at 9:30 a.m. A complimentary lunch will be served at noon to conclude the event.

Field day topics and speakers include:

- **Dr. Dallas Peterson – Dicamba injury to non-Xtend soybeans**
- **Dr. Dorivar Ruiz Diaz – Effect of split late N application to corn on yield and nitrogen use efficiency**
- **Malynda O'Day – Cover crop management for weed suppression**
- **Chip Redmond – Making the most of the Mesonet: A resource to aid herbicide application**

The field day is located at the East-Central Experiment field near Ottawa. From I-35 at the Ottawa exit, go south 1.7 miles on Hwy 59, then east 1 mile, and south 0.75 mile.

Certified Crop Advisor and Commercial Pesticide Applicator credits have been applied for. Please contact the East-Central Research Station at 785-242-5616 at least two days prior to the event if accommodations are needed for persons with disabilities or special requirements. The field day is sponsored in part by the Kansas Corn Commission.

Kansas State Research & Extension

KSU Agronomy Ottawa Field Day

Wednesday, August 21th, 2019

East-Central Experiment Field

Ottawa, KS

From I-35 at Ottawa: South 1.7 miles on 59 Hwy, East 1.0 mile, South 0.75 mile

9:00..... Registration, coffee, and doughnuts

9:30..... Program begins

Dr. Dallas Peterson- "Dicamba injury to non-Xtend soybeans".

Dr. Dorivar Ruiz Diaz – Effect of split late N application in corn on yield and nitrogen use efficiency.

Malynda O'Day- Cover crop management for weed suppression.

Chip Redmond- Making the most of the Mesonet: a resource to aid herbicide application.

12:00..... Lunch

Certified Crop Advisor and Commercial Pesticide Applicator Credits have been applied for. Please contact the East-Central Research Station at 785-242-5616 at least two days prior to this event if accommodations are needed for persons with disabilities or special requirements. Field Day sponsored in-part by the Kansas Corn Commission.

Kansas State University Research & Extension is an Equal Opportunity Provider and Employer

9. 2019 Soil Health Summer Tour Field Day, August 12 in Spring Hill

The Soil Health Partnership, K-State, Kansas Corn, and Guetterman Brothers' Farms are hosting a Soil Health Field on Monday, August 12 from 4:00 to 6:00 p.m. The event will be held at the Guetterman Brothers' Family Farms, 14633 West 239th Street, Spring Hill.

The focus of the on-farm research is evaluating the impact of cover crops on crop production and soil health through precision agriculture tools. Topic areas that will be featured include: soil health partnership, soil health data, cover crop garden, principles of soil health, and fertility of healthy soils. This field day portion will be followed with the District 8 East Central Listening Tour and dinner by Jack Stack Barbeque.

Interested individuals can register online at https://kscorn.com/tour.

Kansas State University Department of Agronomy
2004 Throckmorton Plant Sciences Center | Manhattan, KS 66506
www.agronomy.ksu.edu | www.facebook.com/KState.Agron | www.twitter.com/KStateAgron

10. Winter canola 2019 season wrap-up meeting July 30 in Anthony

The winter cropping season in Kansas was full of ups and downs in 2019. On **Tuesday, July 30**, producers can learn more about the specific challenges from this year and how canola performed in the south central part of the state.

The meeting will be held at the BancCentral meeting room, 203 W. Main Street, Anthony, KS, beginning at 10:00 a.m. The event is free but those interested in attending should RSVP to the Harper County Extension Office by calling 620-842-5445 or jlcarr@ksu.edu by **Friday, July 26** so that an accurate count can be made for lunch.

The challenges of fluctuating winter temperatures and overly saturated soils were evident in much of Kansas. Despite the challenging weather, the canola trials that were harvested across the state had exceptional yields. Grain fill conditions were ideal for high yields. This certainly wasn't the case for all producers. It can be hard to overcome the extreme ups and downs with the weather recently, but through these experiences we have come to understand a great deal about why we still need canola in our rotations.

Topics for discussion at the meeting include what went right and wrong in 2019, canola variety performance, and variety selection. Information on marketing and insuring the crop will also be available.