Issue 810

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eUpdate

07/17/2020

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.

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1. First report of southern rust in Kansas for 2020

Southern rust has now been detected in Kansas and Nebraska (Figure 1). Unlike some other corn diseases, such as gray leaf spot, southern rust does not survive in Kansas during winter months and blows in annually from more tropical regions. The earlier it arrives, the higher the risk to the Kansas corn crop.

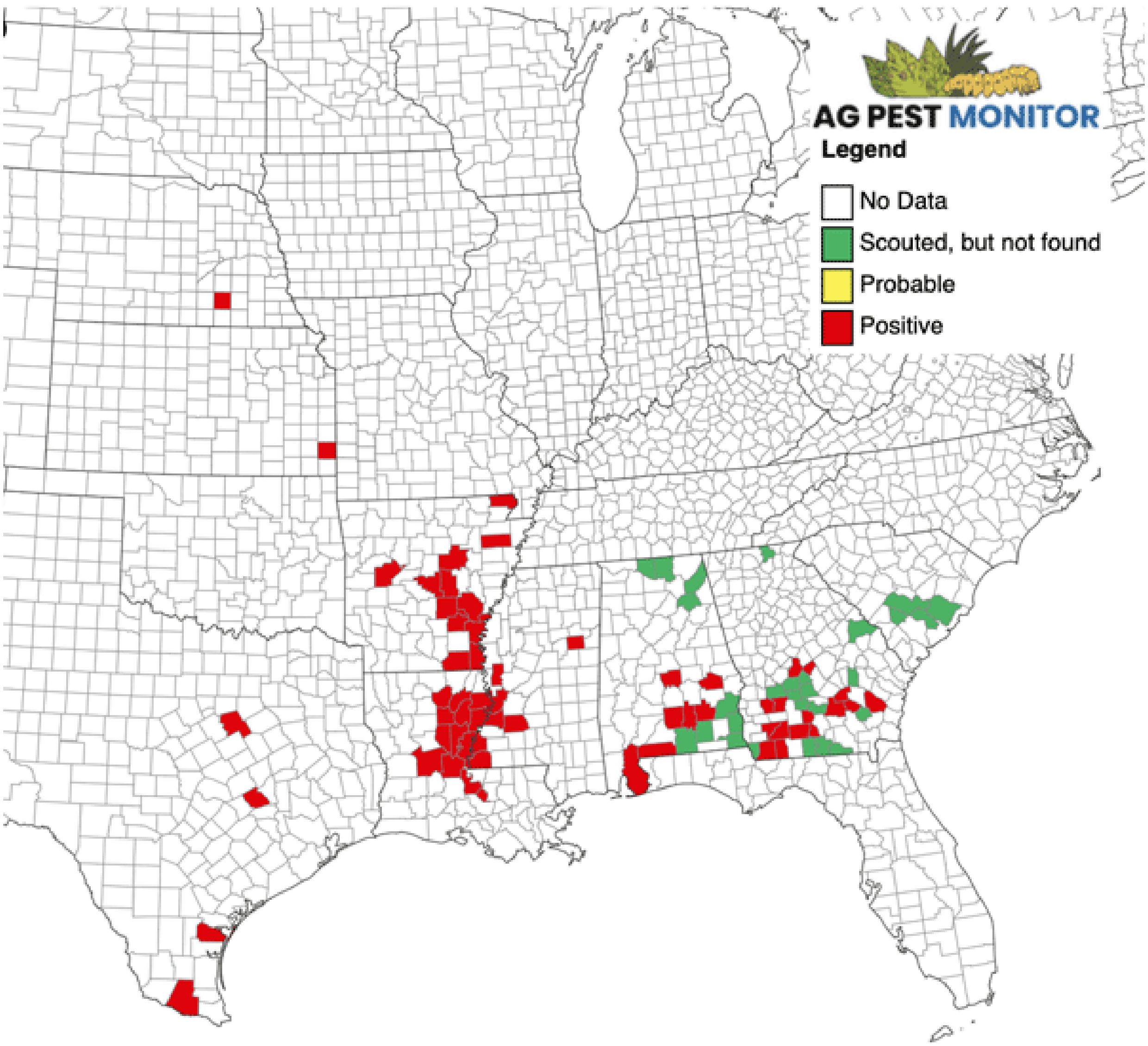

Figure 1. Southern corn rust (Puccinia polyspora**) in Kansas and surrounding states as of July 16, 2020. Source:** https://corn.ipmpipe.org/southerncornrust/**.**

Here are some common questions related to managing southern rust in Kansas:

Q1. Should I apply a fungicide prior to observing southern rust?

A1. It is not recommended to apply a fungicide to control southern rust unless disease has been observed in the canopy. Now that southern rust has "arrived" in Kansas, it is time to be out scouting. Once pustules are observed, the pathogen can reproduce rapidly if temperatures and humidity are high.

Q2. What factors should I consider when making the decision to spray for southern rust?

A2. It is important to consider hybrid susceptibility, disease incidence (how many plants are affected), and the growth stage of the crop. Infection early in the season on a susceptible hybrid, coupled with conducive weather conditions, pose the highest risk for yield loss.

Q3. If I applied a foliar fungicide at tasseling (VT) or silking (R1) to control gray leaf spot, will this application have efficacy against common rust?

A3. Yes. Most fungicides that are labeled for gray leaf spot are also effective for southern rust and will have residual activity for approximately three weeks after application, depending on the product. Fields that have not yet been sprayed should be carefully monitored for disease development. Research has suggested that applications can be effective at preserving yield up until dent (R5) when dealing with a susceptible hybrid and high disease pressure.

Q4. What fungicides are best to control southern rust?

A4. 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/download/5214/

Q5. How do I know if what I'm seeing is southern rust?

A5. Southern rust produces characteristic orange pustules of 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 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.

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2. Post-wheat harvest weed control in dryland cropping systems

In order to maximize the benefits of stubble and no-till dryland cropping systems, weeds must be controlled. A multi-year study was conducted at the Southwest Research-Extension Center at Tribune, Kansas to evaluate the effects of weed control timing after wheat harvest. In this study weeds were terminated after harvest in mid-July and the third week of August.

Timing of post-wheat harvest weed control affected plant-available soil water at the October fallow, corn planting, and July in-season measurements. A numerical trend was evident at the August fallow measurement (Figure 1).

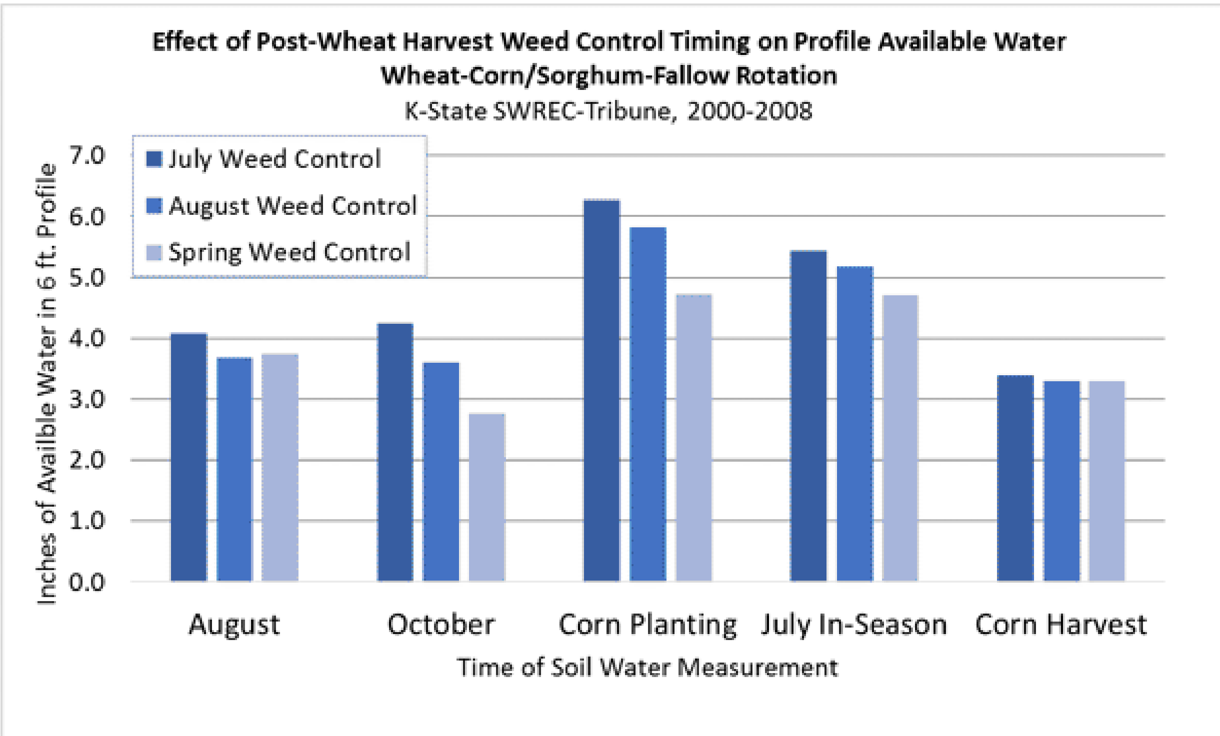

Figure 1. Effect of post-wheat harvest weed control timing on profile available water in a wheat-corn -fallow rotation, Tribune, Kansas.

Depletion of soil water by weeds allowed to grow from July through August was evident at the August sampling, at which the July control treatment had an average of 0.4 in additional soil water. The effect of growing weeds was evidenced by the greatest depletion of soil water occurring from the surface through the 1.5 ft. depth (Figure 2, Panel A). During this time period, the July control treatment had a fallow efficiency of 25.2%, whereas the August and spring control treatments produced efficiencies of 14.7 and 14.6% respectively. Allowing weed growth through October in the spring control treatment resulted in further soil water depletion as evidenced by a profile soil water advantage for the July control of 0.6 in. over the August control and 1.4 in over the spring timing treatment. The difference among weed control timings when measured in October was evident to a depth of 4 ft. (Figure 2, Panel B). Within the August to October fallow period, fallow efficiencies for the July and August control timings were both positive at 19.4 and 16.3%, respectively, whereas the spring treatment with uncontrolled weeds produced a fallow efficiency of -24.0%.

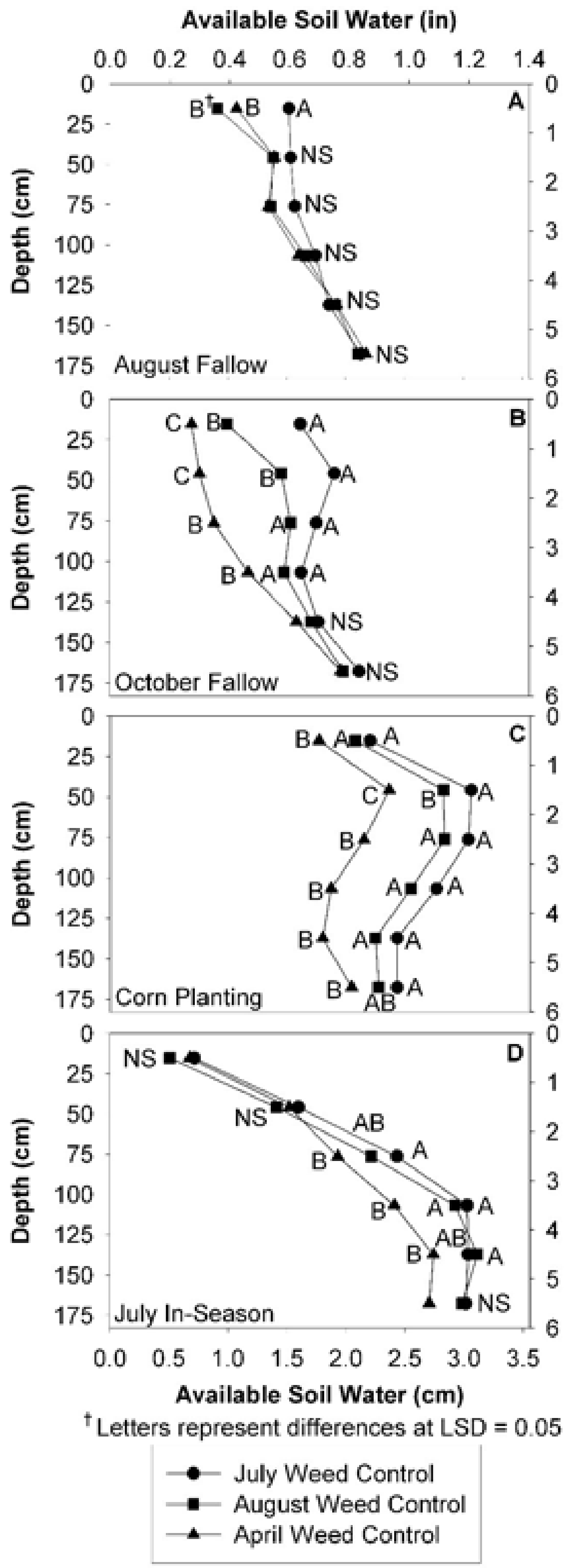

Figure 2. Effect of post-wheat harvest weed control timing on available soil water by depth and time of measurement in a wheat-corn-fallow rotation, Tribune, Kansas.

Weed control timing resulted in available soil water differences at corn planting (Figure 1). At corn planting, the July and August control treatments had 1.6 and 1.1 in., respectively, additional available soil water than when weed control was delayed until the spring. Over the entire wheat harvest to row-crop planting period, fallow accumulations were 3.47, 3.09, and 1.89 in. when weed control was performed in July, August, and spring, respectively. This translated into fallow efficiencies ranging from 30.1% for July control to 16.4% for spring control.

July, August, and spring weed control timings resulted in row-crop grain yields of 51, 47, and 36 bu/ac, respectively, when analyzed across years, Figure 3. Both the July and August treatments produced higher grain yields than the spring treatment.

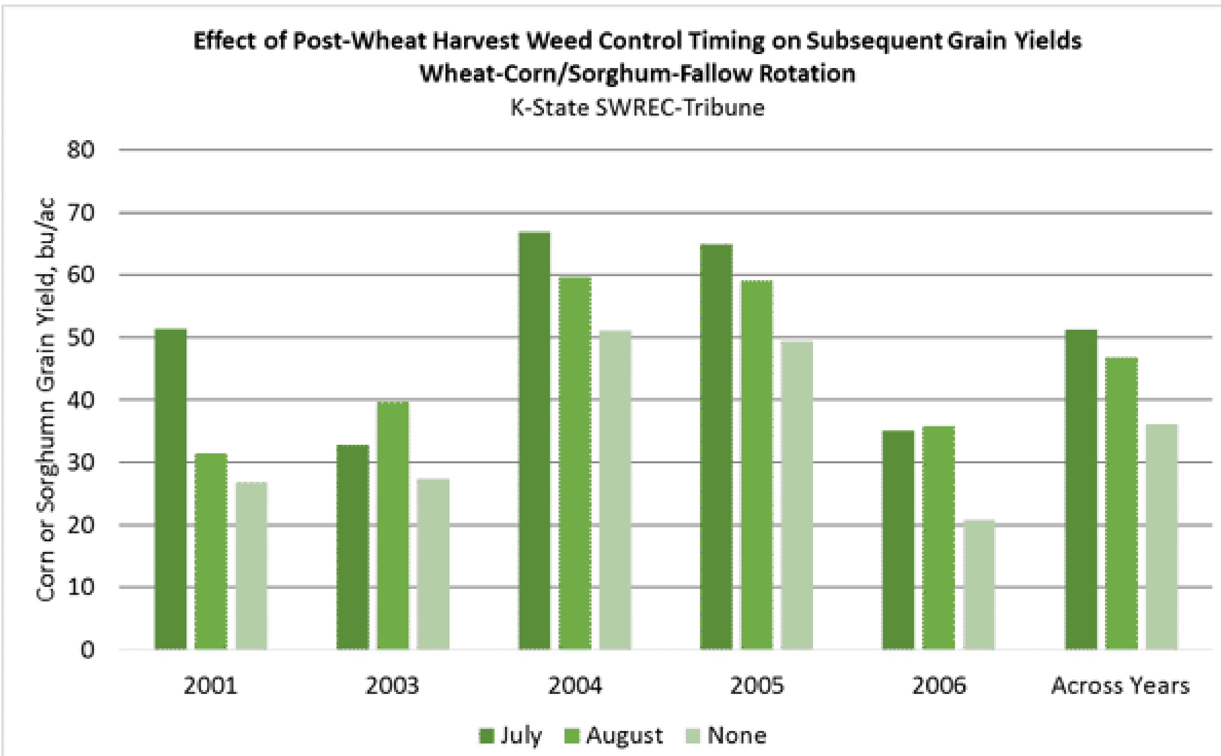

Figure 3. Effect of post-wheat harvest weed control timing on subsequent corn yields (2004 crop is grain sorghum) in a wheat-corn-fallow rotation, Tribune, Kansas.

In the subsequent corn crop, plant stands were unaffected by weed control timing, whereas the ears per acre yield component declined with delayed weed control, indicating increased barrenness. Spring timing of weed control resulted in the lowest values for water use and water use efficiency. The reduced plant-available water in the spring weed control timing was evident at row-crop planting and this shortfall continued to be present even at the July in-season measurement (Figure 2, Panel D), obviously limiting water use and grain yield potential. By using the differences in plant-available water at planting and grain yields among the treatments in this study, 1 inch of plant-available water was worth an average of 9.4 bu/ac in corn grain yield.

Summary

Delaying weed control in a wheat-corn/sorghum-fallow rotation until spring resulted in soil water depletion that was evident at the first measurement in August. This additional depletion due to weed growth was never recovered, resulting in reduced available soil water at corn/sorghum planting and persisting throughout the growing season. Differences in plant-available water were clearly reflected in grain yields. Delaying weed control resulted in reductions in grain yields, biomass production, water use, and water use efficiency.

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3. Western Bean Cutworm in corn - Scouting tips and treatment options

As the corn in northwest Kansas continues to move through the final vegetative stages of growth and tassels have just started to emerge, Western Bean Cutworm (WBC) is a pest to monitor. Reports of western bean cutworm egg masses in northwest and west central Kansas began over the last week and scouting has begun.

Life cycle of Western Bean Cutworm

The life cycle for the western bean cutworm includes the adults emerging from the soil in late June and early July, then they mate and begin to lay eggs. Western bean cutworm moths (Figure 1) lay eggs in clusters of 5 to 200 on the top surface of the upper 1/3 of a corn plant, near the whorl (Figure 2). The eggs require five to seven days to develop. During this time, the egg color changes from a cream-tan color to purple just prior to hatching. After hatching, the larva first feed on the tassels and pollen and then they migrate to the silks and ear of the plant (Figure 3). In addition, open wounds on the ear from feeding can result in secondary infections. After about a month of development and several instars, they drop to the soil surface, burrow 3 to 6 inches in the soil and create an overwintering cell. They will remain in this cell until emergence the following June.

Figure 1. Adult western bean cutworm found on upper 1/3 of corn plant in Cheyenne Co. Front wings are brown with distinctive pattern (shown). The bottom wings are solid cream colored (not shown). Photo by Jeanne Falk Jones, K-State Research and Extension.

Figure 2. Western bean cutworm egg mass, found on upper corn leaf surface near the stalk. Photo by Jeanne Falk Jones, K-State Research and Extension.

Figure 3. Hatching western bean cutworm egg mass. The larvae will feed on pollen and migrate to the tassel. Photo by Jeanne Falk Jones, K-State Research and Extension.

Scouting tips

When scouting for western bean cutworms in corn, check 20 plants in at least five areas of each field. Look for eggs on the top surface of the upper most leaves or look for larvae in the tassel. Western bean cutworm moths prefer to lay eggs in corn plants that are in the late whorl stage compared to those that have completely tasseled, so keep this in mind when scouting.

If you have Bt corn, you might think that you do not need to monitor the western bean cutworm pressure. However, there is just one type of Bt protein that provides reliable protection against western bean cutworm: VIP3A. Products that express the VIP3A protein, such as Agrisure Viptera, Leptra, and Trecepta, provide effective control and should not need to be treated, although it is always advised to scout.

The Cry1F protein, present in products such as Herculex 1, Herculex XTRA, AcreMax, and SmartStax is not labeled for western bean cutworm. Although, it has provided protection against WBC in previous years, with approximately 80% control of western bean cutworm when it was first released in 2003. However, this protein has lost efficacy in the last 10 years due to the development of resistance. It is recommended that fields with Cry1F products be scouted for western bean cutworm and insecticide treatment considered, if above the economic threshold.

If you are unsure of the Bt protein in your corn, check out 'The Handy Bt Trait Table' found here: https://agrilife.org/lubbock/files/2020/02/BtTraitTable_FEB_2020.pdf

Treatment decisions – Know the threshold

When making insecticide treatment decisions, it is important to know the threshold of the western bean cutworm. For corn hybrids that do not provide Bt control of western bean cutworm, consider applying an insecticide if 5-8% of the corn plants have egg masses or larvae. This is the threshold for both dryland and irrigated corn, although keep yield potential in mind.

If an insecticide treatment is warranted in corn, it should be made when 95% of the plants in a field have tasseled. This application timing increases the chance that the worms will be feeding on the new pollen and they exposed to the insecticide, resulting in better control. If larvae have already moved into the ears, they will be protected from insecticide by the husks and cannot be effectively controlled. Insecticide application via chemigation has provided very good control of this insect, as long as the nozzles are above the ear height.

There are many treatments labeled for control of western bean cutworm. They include Carbamates (Sevin), organophosphates (Chlorpyrifos), spinosyns (Spinosad), methoxyfenozides (Intrepid), diamides (Prevathon), indoxacarb (Steward) and many pyrethroids (>50 commercial products) are labeled for control of western bean cutworm. Be sure to follow insecticide labels for application details. Consider rotating insecticide active ingredients to help prevent resistance, especially in areas where pyrethroids have been used for control in prior years or for control of western corn rootworm. Some insecticides, such as Prevathon and Steward, have been shown to have a lower impact on beneficial insects (such as lady beetles and lacewings). Preserving these predators in the field can provide some natural control of WBC eggs and larvae.

Resources for western bean cutworm

- K-State Corn Pests - Western Bean Cutworm: https://entomology.k-state.edu/extension/insect-information/crop-pests/corn/western-bean-cutworm.html
- University of Nebraska – Western Bean Cutworm Central: https://entomology.unl.edu/agroecosystems/western-bean-cutworm-central

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4. World of Weed: Morningglory

Morningglories (*Ipomoea spp*) are troublesome weeds that often escape pre-emergent herbicide applications and have the ability to reduce yields and harvest efficiency. This month, we will take a look at some of the morningglory species found in Kansas cropping systems.

Ecology of morningglory

Morningglories are categorized in the genus Ipomoea. Morningglory species commonly found in Kansas include ivyleaf morningglory, pitted morningglory, and tall morningglory (Figure 1). They can be found in a variety of places, including fields, pastures, gardens, and roadsides. These species are native to tropical and subtropical regions of the Americas. Their distribution has been aided by the horticultural appeal of the flowers.

Figure 1. Ivyleaf morningglory climbing cornstalks. Photo by Dallas Peterson, K-State Research and Extension.

Identification

Morningglories are vining plants that can reach up to 10 feet long. The cotyledons of morningglories resemble butterfly wings (ivyleaf and tall morningglory) or a 'V' (pitted morningglory). The leaves are alternate. Pitted and tall morningglory have heart-shaped leaves (Figure 2), but ivyleaf morningglory leaves can be three-lobed or heart-shaped. Pitted morningglory leaves do not have hairs, but tall morningglory has hairs that lie flat against the leaf surface and ivyleaf morningglory leaves have hairs that stick out. Flowers are trumpet-shaped and generally light blue, purple, pink, or white. Each flower forms a round capsule that contains 2-6 seeds. Seeds are dark brown or black and resemble and orange slice.

Figure 2. Pitted morningglory seedling. Photo by Dallas Peterson, K-State Research and Extension.

Management

Morningglories can be difficult to control with pre-emergence herbicides due to their large seed size and thick seed coat. They may also escape control by pre-emergence herbicide by germinating later in the growing season. Herbicides that contain atrazine, or Group 14 herbicides, such as Sharpen, Spartan, or Valor can provide pre-emergence control. Emerged morningglories are typically not well controlled by glyphosate, but can be controlled by timely applications of glufosinate (Liberty), dicamba, or 2,4-D.

Stay tuned for the next World of Weeds article coming out soon! Feel free to send Dr. Lancaster or Kathy Gehl (kgehl@ksu.edu) an email if you have a special request for a future article.

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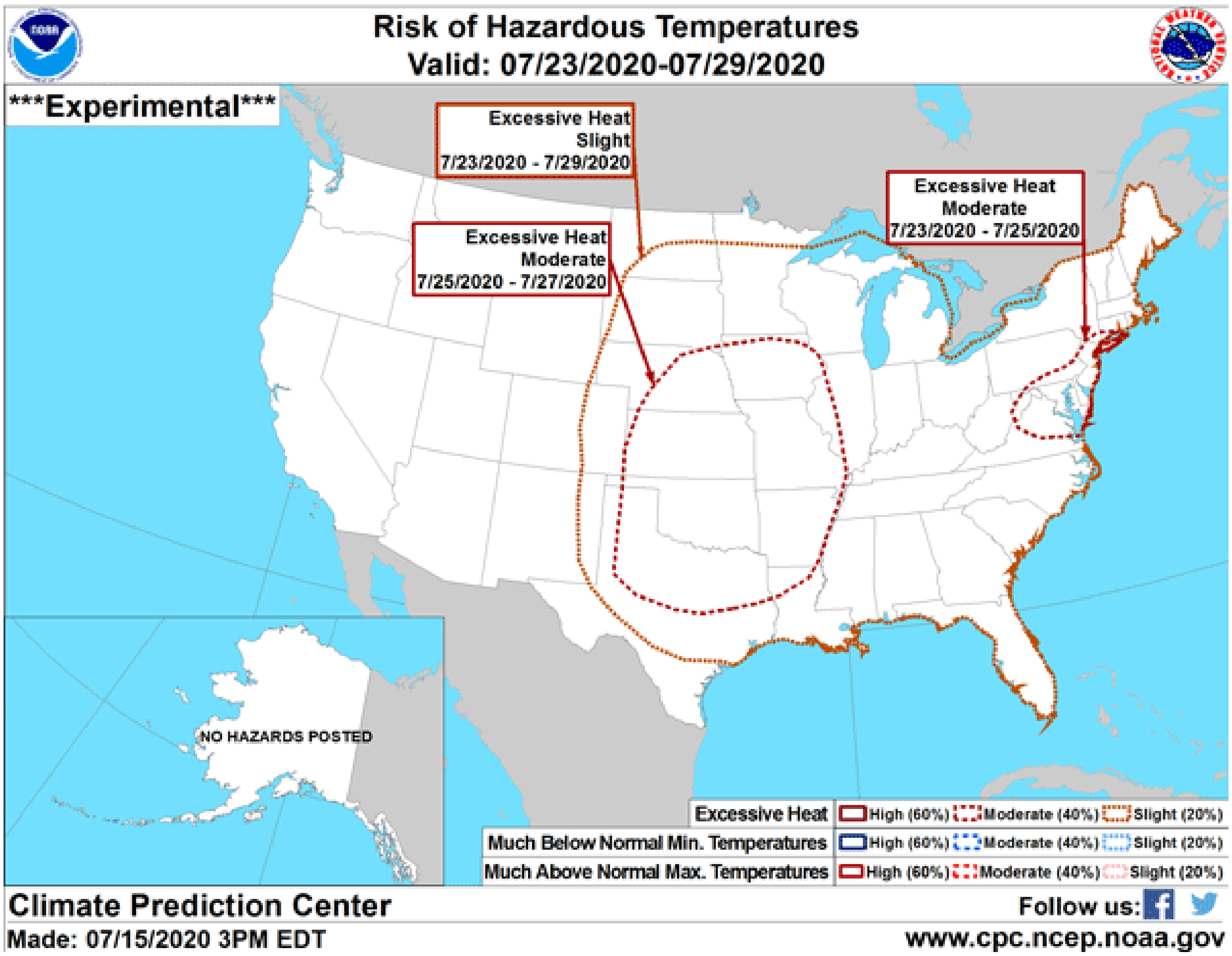
5. Heat wave for the weekend: Update on high temperatures and heat stress

The Climate Prediction Center and the National Weather Service have issued heat outlooks for the weekend and continuing through the end of July (Figure 1). With the recent rain, even western portions of the state can expect elevated dew points and increased low temperatures. Nighttime temperatures in excess of 70° F for more than two consecutive days will increase the risk of stress to livestock. As with people, the stress is cumulative.



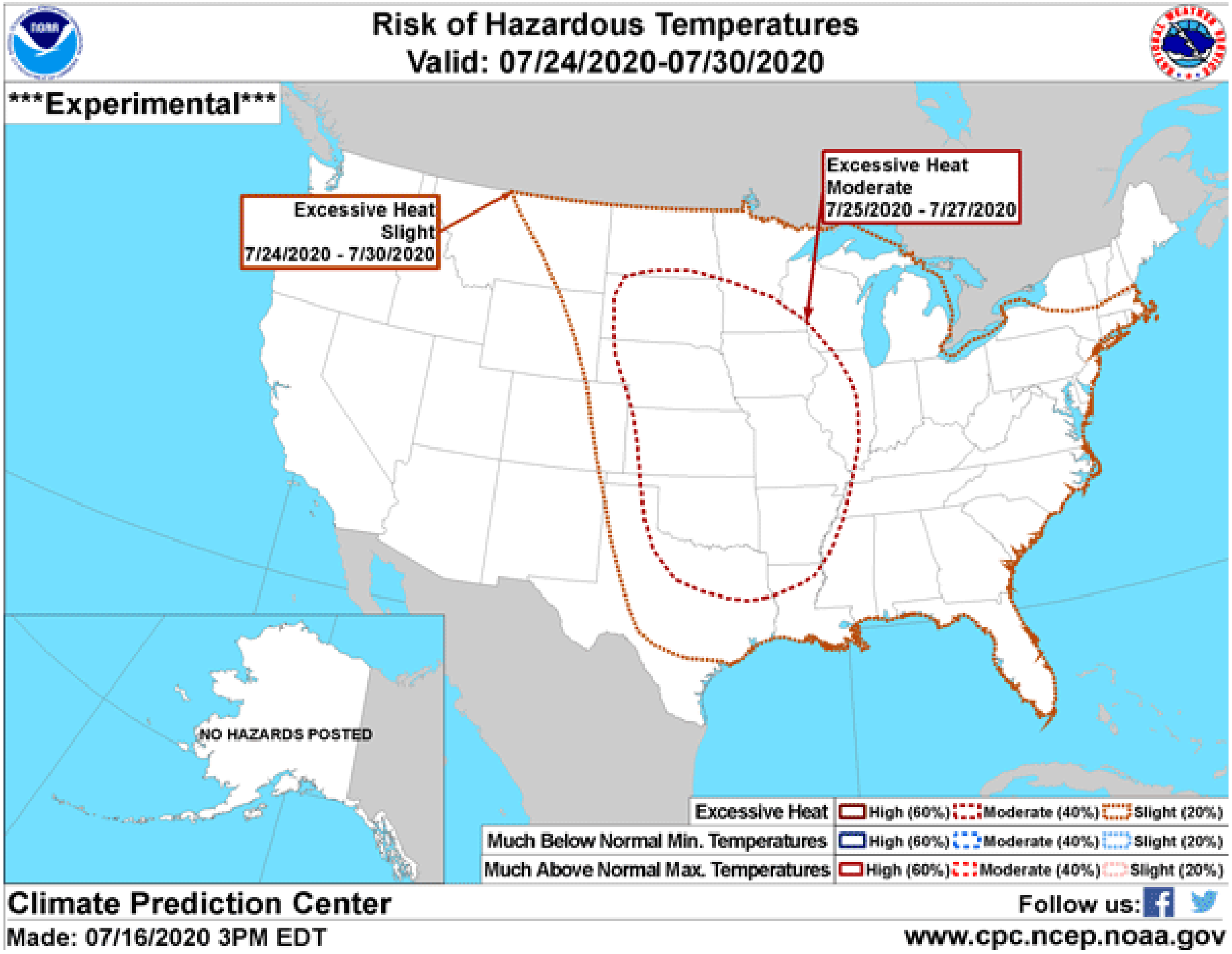


Figure 1. Risk of Hazardous Temperatures. Source: Climate Prediction Center

The heat can also cause problems for corn in Kansas (Figure 2). The effect of combined heat and drought stresses can reduce plant size, primarily when the plant is entering the stem elongation process. When the crop is approaching flowering and reproductive stages, nutrient and water demands (0.3-0.2 inch/day) are high. At these stages, a combination of heat plus drought stresses will affect final number of kernels and kernel size. Overall mean temperatures above 90 degrees F, and more importantly, lower variations between day and night temperatures, will produce critical impacts on plant productivity, affecting number of kernels (via changes in kernel abortion rate) and kernel size (final grain weight).

Heat stress will have more of an impact on corn at this stage of growth when combined with drought stress. But even in the absence of drought stress, heat stress alone can still hasten tasseling, potentially increasing the asynchrony between pollen shed and silk extrusion when corn reaches flowering time, and during reproductive stages hastening maturity. The potential for yield reductions from stress is high as it is occurring right around pollination or right after (2-weeks after flowering).

Figure 2. Leaf rolling in corn from the combined effect of heat and drought. Photo by Ignacio Ciampitti, K-State Research and Extension.

The K-State Mesonet web site has a special page that tracks the current heat index at: http://mesonet.k-state.edu/weather/heat/ and for animal comfort at http://mesonet.k-state.edu/agriculture/animal/

There is also a page 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 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.

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6. Kansas weather - Early fall 2020 outlook

Highlights

- August's outlook is for warmer-than-normal temperatures and equal chances of above/below/average precipitation.
- Typically, August sees high temperatures in the 90s and normally between 4.2" (northeast) to 2.5" (northwest) of rain during the month.
- For the fall (August through October), the temperature outlook suggests warmer-than-normal temperatures and below-normal precipitation.

The first outlooks for the early Fall 2020 season have been released. Drought continues to be an issue across more than two thirds of the state. The outlook for August calls for continuation of that pattern with an increased chance of drier-than-normal conditions across the southern third of the state, and neutral conditions for the remainder. The combination of warmer and drier conditions would be favorable for fall harvest, but less favorable for establishment of fall-seeded crops such as winter wheat. Degree-day accumulation with the warmer temperatures would also be favorable, as late-planted crops are still lagging in maturity as long as minimum temperatures remain seasonal.

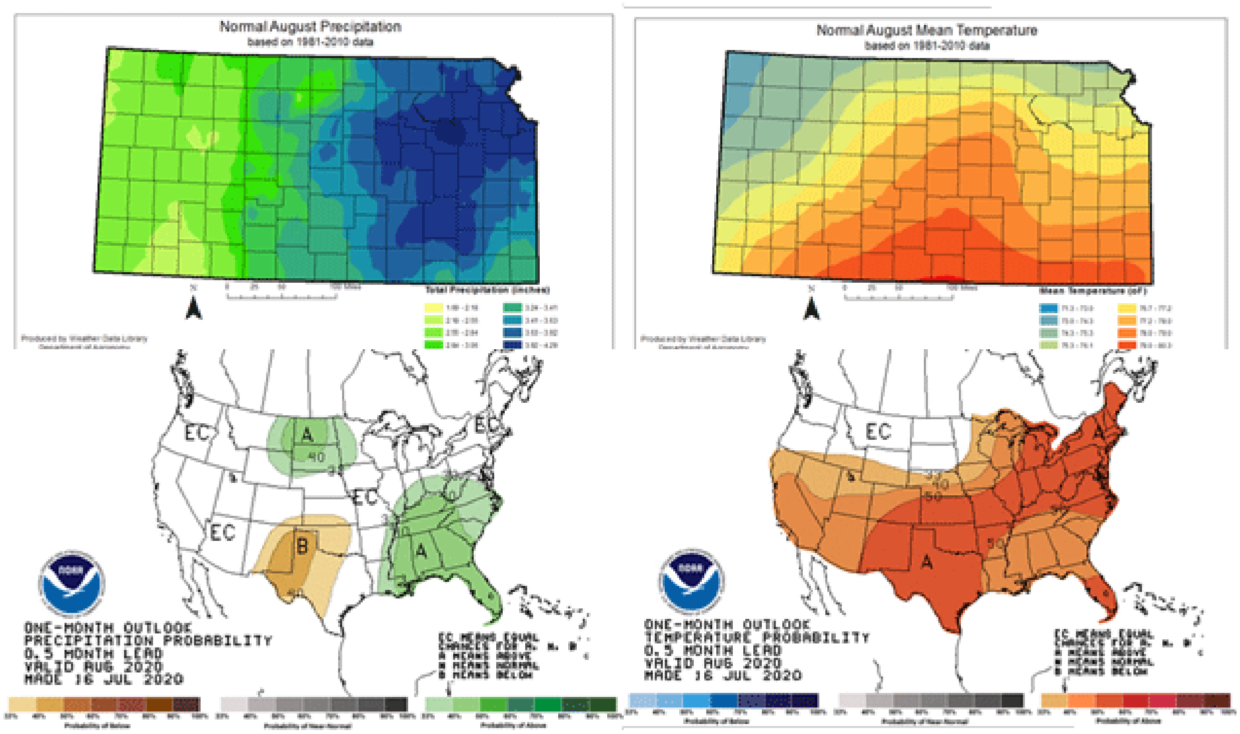

Figure 1. August outlooks and averages for precipitation and temperature (Kansas Weather Data Library, top; and CPC, bottom).

As the outlook is extended to the fall season, the temperature outlook continues with warmer-than-normal temperatures across the state. However, this doesn't indicate the magnitude of those temperatures compared to normal. Another consideration is that average temperatures are on the downward slide as we move closer to winter – decreasing each day through August, September, and October. With below-normal precipitation, surface moisture is limited in all but the central regions of the state. With this increased rainfall, central Kansas will see increased evaporation at the surface. As a result, additional moisture is evaporated into the atmosphere increasing humidity and heat index. It won't take as much "heat" to make conditions feel unbearably warm and heat indices will be quite high even with cooler-than-normal temperatures. Keep in mind - normal high temperatures for August typically reach low-to-mid 90s for much of the state.

Chances of precipitation fall into the below normal distribution for much of the state. Still, this does not indicate the degree of departure, nor how the precipitation will be distributed. Even a slightly drier than normal fall, with well-distributed rains could be beneficial. This scenario would provide a window for harvest and planting operations but sufficient moisture for establishment of fall-seeded crops. Crops running late could benefit from a dry pattern allowing for a rapid harvest. The areas of the state still facing drought would benefit more from average or above average precipitation.

Looking at an influential pattern impacting our weather - a La Niña watch has been issued. Unfortunately for Kansas, this has typically meant warmer and drier than normal conditions in the fall. Still other factors, such as antecedent conditions, the Madden-Julian oscillation, and blocking/stagnant patterns can significantly influence conditions.

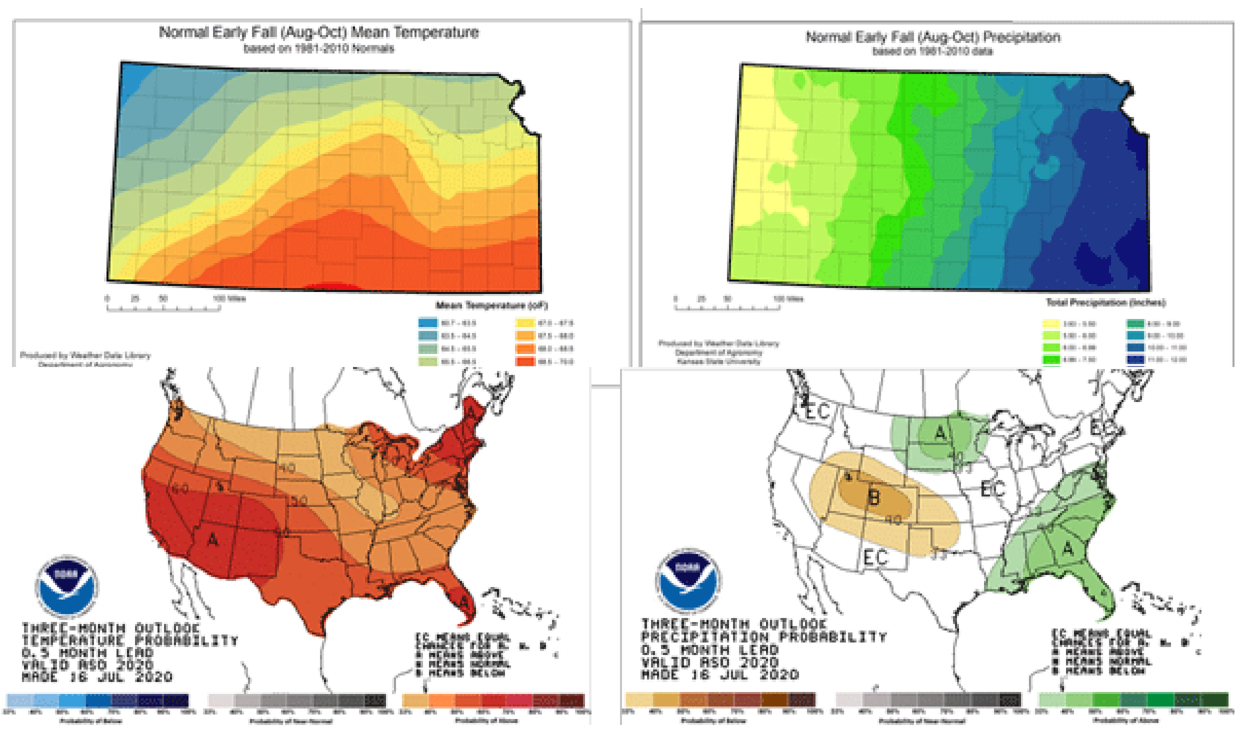

Figure 2. Fall outlooks versus normal for the August, September, October period (Kansas Weather Data Library, top; and CPC, bottom).

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