Issue 755

K-STATE Research and Extension

## Extension Agronomy

# eUpdate

*06/28/2019*

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.

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## 1. Twisted, wrapped whorls, and trapped yellow leaves in corn

Most of the state has had a significant amount of precipitation in recent weeks. This situation, combined with below-normal temperatures for much of the spring, has been causing production issues for corn – some of which have been discussed in previous articles (see "Effect of standing water and saturated soils on corn growth" – Issue 746 and "Diagnosing rootless corn syndrome" – Issue 750).

Aside from agronomic implications for corn planted this late, full crop insurance coverage for corn planted at this point is not available.

Some cornfields are showing early indications of nitrogen (N) deficiency. In other situations, yellow leaves on the top of the canopy ("yellow tops") can be confused with N deficiency. The cause of yellow leaves on the top of the canopy seems to be a combination of previous slow growth and current "good" growing conditions." Still, the main cause is not clearly known.

**Figure 1. Yellow leaf showing symptoms of sun starvation. Plants will recover after being exposed to sunny conditions for a couple of days. Photo by Ignacio A. Ciampitti, K-State Research and Extension.**

Twisted whorls can also be confounded with a herbicide damage issue from post-emergence applications. But in this particular case it is related to the transition from a slow to a rapid growth conditions for corn plants. Leaves within the whorl do not unfurl ("twisted upper leaves"), producing an obstacle to the younger developing leaves for emerging. These younger leaves have been shaded until they finally emerge; thus the yellow appearance. Yellow leaves are accompanied by wrinkle pattern (Fig. 2), condition that will remain for the rest of the season (affected leaves due to "twisted whorls").

**Figure 2. Yellow corn leaf with a wrinkle pattern. Photo by Ignacio A. Ciampitti, K-State Research and Extension.**

In most of the fields inspected, this situation was isolated without affecting the entire field (Fig. 3). As a general pattern, corn presenting this condition was around the V4-V8 (four to eight-leaf) growth stage interval.

**Figure 3. Yellow tops in isolated patterns within the corn field. Photos by Ignacio A. Ciampitti, K-State Research and Extension.**

Yellow-tops will fade away as growing conditions (temperature) resumes to normal at this point in the season and as the leaves accumulate chlorophyll. Previous reports related to this production issue did not document yield impacts. Thus, yield is not likely to be affected if the growing conditions resume to normal in the next days. Just make sure to scout your fields for this corn production issue.

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## 2. Assessing hail damage to corn

*Editor's note: The following is an edited version of an article originally published in conjunction with Kansas Corn. The original article can be found on their website at* http://kscorn.com.

Severe thunderstorms and hail are nothing new to Kansas farmers, and during this time of year our threat level is RED. After every storm the first question that may pop into your mind is, how will this affect my crops?

The first question you need to answer is:

**How far along in development is your corn?**

- If it hasn't emerged or is barely emerging, then you are in good shape. There wasn't really enough of the plant above ground to sustain any damage.
- If the corn has less than five leaves before the hail, then most likely the growing point was still below ground. This is good because young corn has a great capacity to recover from early-season hail damage. The growing point of a corn plant is the top of the stem which contains the actively dividing and elongating cells that will become the tassel. Even if the hail took the leaves off and pounded that little plant into the ground, the plant should grow out of it with few long-term problems.
- If the growing point was out of the ground, there could be major damage. Wait a few days then go back out to look for these signs:
    - If the main stem starts to grow again and new leaves come out of the main stem, then there is little damage.
    - If you start to see tillers, you may be in trouble. Tillers on corn are vegetative or reproductive shoots that grow from the axillary buds on the lower stalk nodes of a corn plant. These tillers will start growing outward from the base of the damaged plant and even though they look okay now, at tasseling and ear forming time the plant will not be productive. This plant should be not counted for stand count when you are evaluating whether to replant.

So let's say you were hit by a hail storm last night, and you go out today to look at your crop. The best thing you can do is get back in the pick-up truck and drive away. Don't make any decisions right away, time is your friend. Wait a few days and then come back to check the signs of growth. Even the little plants need a few days to grow so that you can get a stand count of the field.

An accurate estimate of plant survival should be done in the coming days to more precisely determine damaged plants that will survive vs. missing plants – causing stand reductions. Young corn has a great capacity to recover from early-season hail damage. Scout your fields and check for final number of plants and potential problems associated with these weather events such as lowered disease resistance (Figure 1).

**Figure 1. Corn plants damaged by hail such as this one could be at a greater threat for disease. Photo provided by Kansas Corn.**

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## 3. Application intervals for post-emergence dicamba applications in Xtend crops expanded

Due to weather-related difficulties this year with planting and timely herbicide applications, the Kansas Department of Agriculture (KDA) has approved a special local needs (SLN/24(c)) label to allow for expanded application intervals of Engenia, Xtendimax and FeXapan on Xtend soybeans and cotton. Application to Xtend cotton has been expanded from 60 days after planting to 90 days after planting. Application to Xtend soybeans has been expanded from 45 days after planting to 60 days after planting or the R1 stage of soybean growth, whichever comes first. Below is the announcement from KDA regarding the SLN labels.

A special local needs (SLN/24(c)) for use on dicamba-tolerant cotton and soybeans is now available for growers for the following products - Engenia, Xtendimax with Vapor Grip Technology and DuPont FeXapan Plus Vapor Grip Technology. The SLN labels allow for application up to 90 days after planting in DT cotton and 60days or R1 growth stage, whichever comes first, in DT soybeans. All other restrictions of the Section 3 label apply. The SLN labels are available on the KDA website (https://agriculture.ks.gov/divisions-programs/pesticide-fertilizer/pesticide-product).

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## 4. Fungicide management of gray leaf spot - Don't miss treatment window

Every year is different, but 2019 is turning out to be more different than most. Stages of corn development around the state range from tasseling along the Oklahoma border to very recently emerged near the Nebraska border. There are reports of gray leaf spot lesions on corn as early as the V3-V4 stages. Additionally, bacterial leaf streak, a somewhat "look alike" disease is becoming active. Scouting is highly encouraged as the corn begins to approach the VT stage.

**Factors in corn yield response to fungicide applications**

Years of fungicide application research clearly demonstrates that the single best time to apply a fungicide to corn for gray leaf spot control is from VT to R1. A single application at V7 – V8 will not hold up against late-season pressure. Those who choose to put a fungicide down with their last herbicide treatment will most likely have to apply second cover at VT – R1 if there is any gray leaf spot pressure at all. A VT – R1 application may also provide some suppression of southern rust, should it arrive early enough to cause yield loss.

University fungicide trials also reveal that final disease severity plays a critical role in the magnitude and consistency of yield response to a foliar fungicide application. The tricky part is being able to predict before the VT to R1 stages what the disease pressure will be several weeks later. To make such a prediction, you need to consider "disease risk factors" and to scout for disease.

Disease risk factors include:

Susceptibility level of corn hybrid. Seed companies typically provide information on the susceptibility of their hybrids to gray leaf spot in their catalogs. In general, hybrids that are more susceptible to fungal foliar diseases will have a greater response to a foliar fungicide (if disease pressure is high enough).

Previous crop. Because gray leaf spot survives in corn residue, the risk of disease increases when corn is planted back into a field that was in corn the previous year.

Weather. Rainy and/or humid weather generally is most favorable to gray leaf spot. In growing seasons when these conditions prevail, the risk for disease development increases.

Field history. Some field locations may have a history of high foliar disease severity. Fields in river bottoms or low areas or surrounded by trees may be more prone to having gray leaf spot.

Begin scouting for gray leaf spot in corn about two weeks before expected tassel emergence. Gray leaf spot is characterized by rectangular lesions that are 1-2 inches in length and cover the entire area between the leaf veins. Early lesions are small, necrotic spots with yellow halos that gradually expand to full-sized lesions. Lesions are usually tan in color but may turn gray during foggy or rainy conditions. The key diagnostic feature is that the lesions are usually very rectangular in shape.

**Figure 1. Early development of gray leaf spot lesions showing a distinct yellow halo. Photo courtesy of Doug Jardine, K-State Research and Extension.**

Current disease management guidelines suggest the following criteria for considering an application of foliar fungicide:

- For susceptible hybrids (those with the lowest rating within a company's lineup): Fungicide applications should be considered if disease symptoms are present on the third leaf below the ear or higher on 50 percent of the plants examined.
- For intermediate hybrids (those with an average rating within a company's lineup): Fungicide applications should be considered if disease symptoms are present on the third leaf below the ear or higher on 50 percent of the plants examined, if the field is in an area with a history of foliar disease problems, if the previous crop was corn, if there is 35 percent or more surface residue, and if the weather is warm and humid.
- For resistant hybrids (those with the best rating within a company's lineup): Fungicide applications generally are not recommended.

According to the data from Illinois corn fungicide trials, if at least 5 percent of the ear leaf area is affected by disease at the end of the season, a foliar fungicide applied between VT and R1 would likely have been beneficial. Using the disease risk factors and scouting observations collected just before tassel emergence will help you predict how severe disease may be several weeks after the VT to R1 stages, and help you decide whether to apply a foliar fungicide.

If no disease is present or pressure is low, I recommend holding off on the R1 application since efficacy will begin to wane in three to four weeks, just as late season pressure may begin to develop. Data exists that would suggest that if pressure begins to develop later, an R2 application can be economical and will provide protection later into the grain fill period. This later application could also

protect against any late-season southern rust pressure.

**Distinguishing between gray leaf spot and bacterial streak**

Bacterial streak, identified as a new corn disease in the U.S. in 2016, is now active in most of western Kansas. While yield loss potential for this disease remains unknown, we do know that it can be misidentified as gray leaf spot, resulting in unwarranted fungicide applications. Keep in mind that gray leaf spot typically has very sharp edges defined by the leaf veins, whereas bacterial streak will have a wavy edge that can cross the leaf vein (Figure 2). Also, when backlit with light, gray leaf spot lesions will have an opaque appearance while bacterial streak lesions are more translucent (Figure 3).

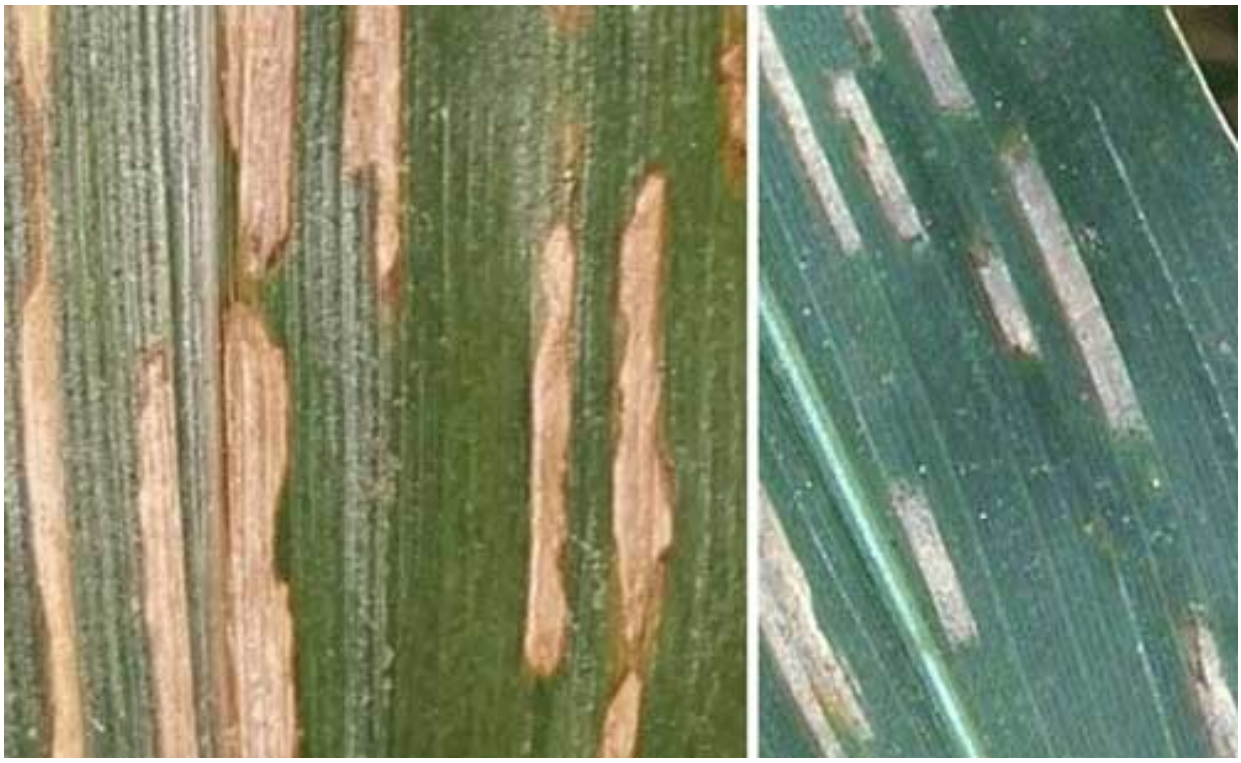

**Figure 2. Comparison of sharp-edged gray leaf spot lesions (right) with wavy-edged bacterial streak lesions (left). Photo courtesy of the University of Nebraska.**

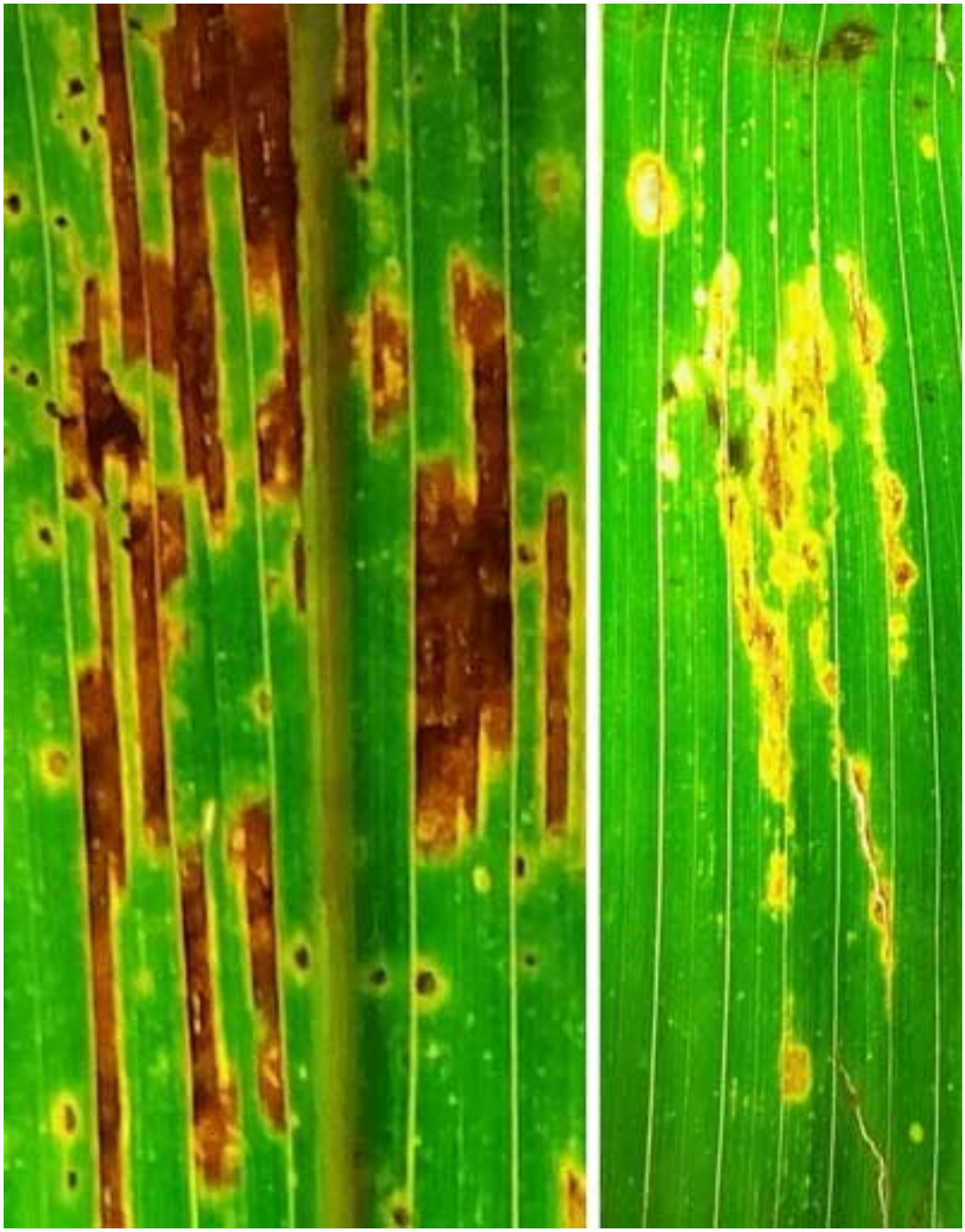

**Figure 3. Gray leaf spot lesions (left) have an opaque appearance whereas as bacterial streak allows light to more easily pass through giving it a translucent appearance (right). Photo by Doug Jardine, K-State Research and Extension.**

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## 5. Evaluating corn fields for root-lesion nematode

There are many disease organisms that can result in the reduction of corn yields in Kansas. One of the most insidious is the root-lesion nematode because it operates below ground on the roots and often has no specific, identifiable symptoms other than yield loss. It is present at some level in nearly all corn fields in the state. Historically, the largest yield losses, which can exceed 40 percent in individual fields, occur in western Kansas, where a no-till, continuous corn production system is common.

Like most nematode problems, visible symptoms, if any, may be limited to patchy areas of the field where growth is stunted. Sometimes yellowing may also occur (Figure 1). Occasionally, roots may have lesions on them or roots may appear to be pruned (Figure 2).

**Figure 1. Yellowing of plants caused by root-lesion and other nematode injury. Yield in the center of these areas was as low as 30 bu/ac. Photo courtesy of Tamra Jackson-Ziems, University of Nebraska-Lincoln.**

**Figure 2. Badly damaged roots near the end of the season with lesions and root pruning. Photo courtesy of Tamra Jackson-Ziems, University of Nebraska-Lincoln.**

The best way to identify a root lesion nematode problem is by a whole-root assay. Optimal time for sampling is 30 – 40 days after emergence. Suspect plants should be dug from the soil – try to keep some of the soil with the roots. Keep samples away from excessive heat. Samples can be taken to any local county Extension office for mailing or mailed directly to the Plant Disease Diagnostic Lab. Specific instructions on sample collection and mailing can be found at https://www.plantpath.k-state.edu/extension/diagnostic-lab/documents/ppechecksheet.pdf.

There are several commercially available seed treatment nematicides currently marketed, but in university trials, results have been inconsistent. In-furrow nematicides may also be used at planting time. Since root lesion nematode has a wide host range, crop rotation has limited benefits. Other plant-parasitic nematodes that occasionally result in losses include the sting, stunt and stubby-root nematodes.

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## 6. Soybean insect update - Bean leaf beetles and webworms

Adult bean leaf beetles (BLB) are still causing some concern for soybean producers throughout north central Kansas. These adults have been chewing round or oval holes in the leaves of seedling plants (Figure 1). However, it seems much of their leaf feeding has slowed and the females are now mostly on the ground around the base of plants depositing eggs. These eggs will hatch in a few days and the larvae will start feeding on soybean roots/root hairs. These larvae resemble corn rootworm larvae but BLB larvae do not feed on corn roots just as corn rootworm larvae do not feed on soybean roots. One other major difference is that the corn rootworms eggs were deposited in fields planted to corn last year, whereas the overwintering adult female BLB deposited these eggs after finding seedling soybean plants this season.

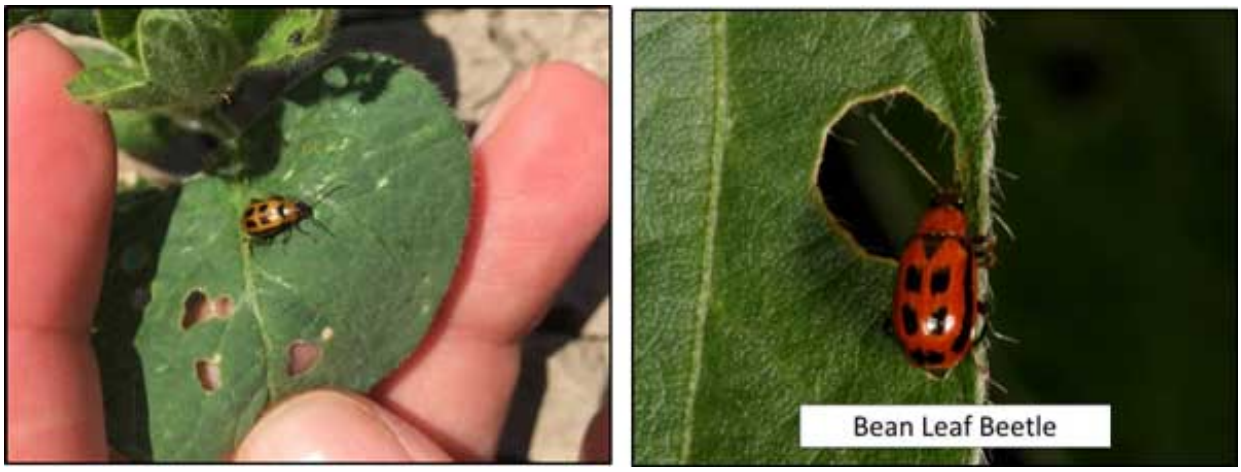


**Figure 1. Bean leaf beetles feeding on soybean plants. Photos by K-State Extension Entomology.**

Garden webworms have been causing concern because of visible defoliation over the last couple of weeks (Figure 2). However, most of these webworms, plus thistle caterpillars (Figure 3), have ceased leaf feeding and are in the process of pupating. The adults will be emerging over the next couple of weeks and the females will be depositing eggs to initiate the next generation. Thus, this first infestation of larvae of both species was just a "springboard" generation for the next one or two generations to come.


**Figure 2. Example of a garden webworm. Photo by K-State Extension Entomology.**


**Figure 3. Examples of thistle caterpillars. Photos by K-State Extension Entomology.**

For more information relative to soybean insect management, please refer to the K-State Soybean Insect Management Guide: https://www.bookstore.ksre.ksu.edu/pubs/MF743.pdf

**Special Note: Insect Diagnostician**

The Department of Entomology at Kansas State University (Manhattan) does not currently have an insect diagnostician. Therefore, all physical samples, phone calls, and emails (containing images) regarding arthropods (insects and mites) should initially be handled by the county extension offices. If the agriculture or horticulture agent is unable to identify a specific arthropod, then the agent will contact an extension entomologist at K-State. This process will help expedite identifying samples and addressing inquiries. The Extension Entomology Team sincerely appreciates your cooperation regarding this matter.

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## 7. Kansas weather outlook: Late summer and early fall 2019

Wet conditions continue to dominate the state. May 2019 was the wettest month on record, leaving saturated soils and full streams, ponds, and reservoirs. The outlook for July calls for a continuation of that pattern with an increased chance of wetter-than-normal conditions across Kansas. The temperature outlook favors a cooler-than-normal pattern across the entire Central Plains. A normal or slightly below normal precipitation pattern for July would be favorable in the eastern divisions, where saturated soils continue to be problematic. Cool temperatures would slow the normal drying pattern. While slightly cooler temperatures could reduce heat stress, it would also increase disease pressure. In addition, with low evaporation rates, flooding could also be an issue due to the fact that streams, ponds, and reservoirs are full.

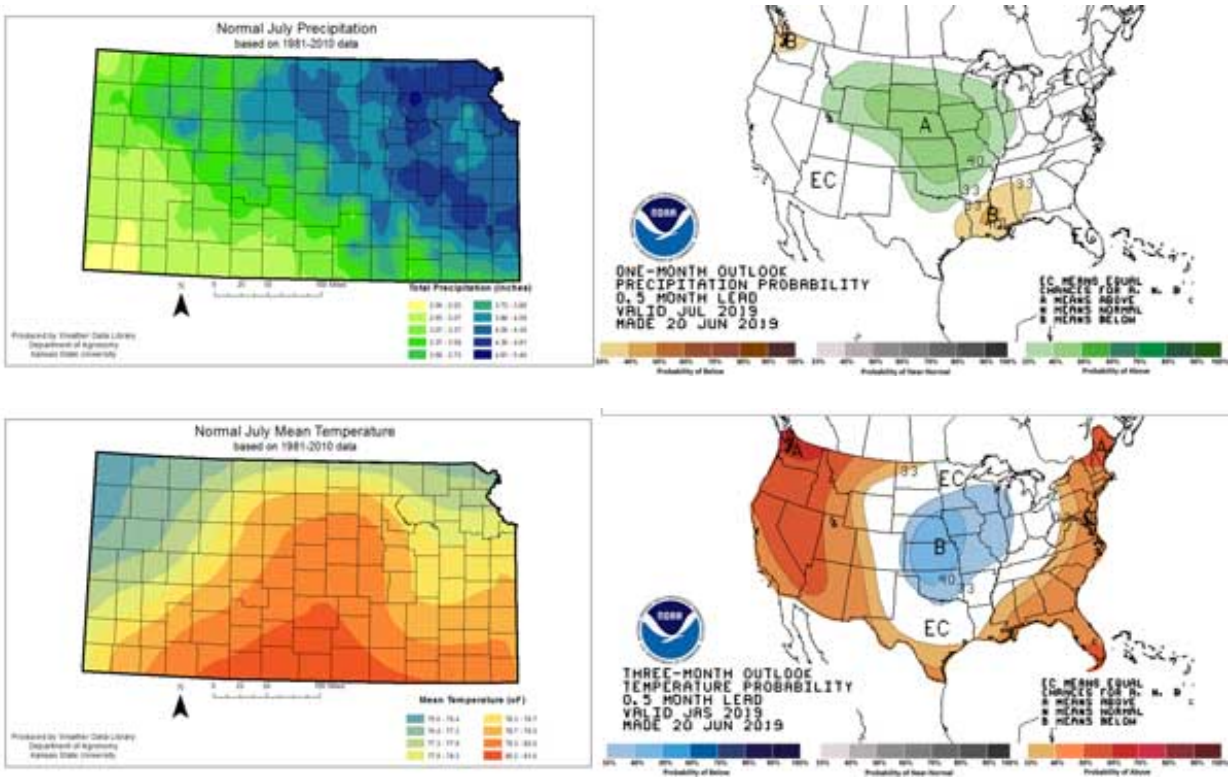



**Figure 1. July 2019 outlooks for precipitation (upper maps) and temperature (lower maps) versus normal (Weather Data Library and CPC).**

### Summer temperature outlook

As the outlook is extended to the late summer season, the temperature outlook continues to favor cooler-than-normal temperatures across the state. However, this does not indicate how those temperatures might be distributed. An untimely period of warm temperatures at flowering/pollination could still create problems. In addition, root development on spring-seeded

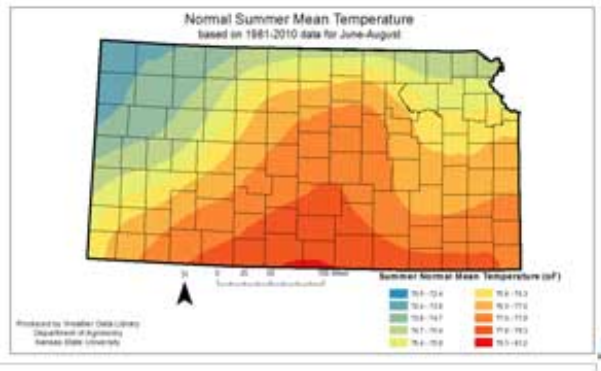
crops is compromised by the cool, wet soils that have dominated the spring. This poor root development will make the crops more vulnerable to a relatively short dry period, particularly when accompanied by warm, windy weather.

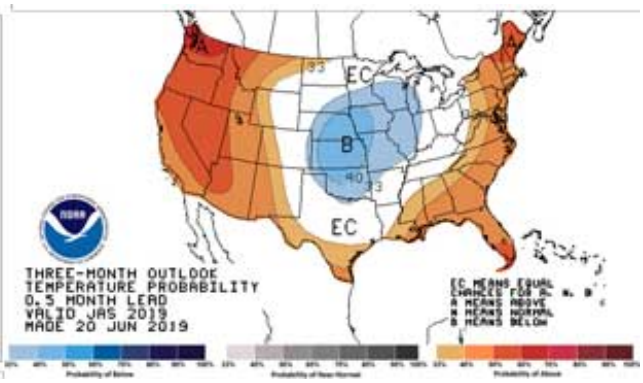
Cooler temperatures in the middle of summer may sound good – but does not mean that it will be comfortable. The result of all the increased moisture the previous months will negate the cooler temperatures. With above normal precipitation, surface moisture is abundant across the region. As a result, there will be increased evaporation at the surface which will inject additional moisture into the atmosphere. This additional moisture increases humidity and thus, the heat index as well. It will not take as much "heat" to make conditions feel unbearably warm and heat indices will be quite high despite cooler-than-normal temperatures (normal high temperatures for July typically reach the low-to-mid 90s for much of the state).

**Summer precipitation outlook**

There is a moderate chance for above-normal precipitation state-wide for the period. Again, as with temperatures, this does not indicate the distribution pattern. A slightly drier-than-normal summer, with well distributed rains would be much more beneficial than a continuation of the rainy pattern. Planting has already been delayed, as well as cutting of alfalfa and other hay crops. The western third of the state has drier soil moistures at the surface and would benefit more from a normal precipitation pattern. With increased evaporation and atmospheric moisture, this would increase the likelihood of additional heavy thunderstorms and rapid rain rates across the region when rainfall does occur. Because of this, flooding risks will remain elevated for much of the summer even if dry periods develop between rain events.

While an El Niño has been officially declared, it remains weak. An El Niño generally favors wetter-than-normal conditions in the Central Plains.



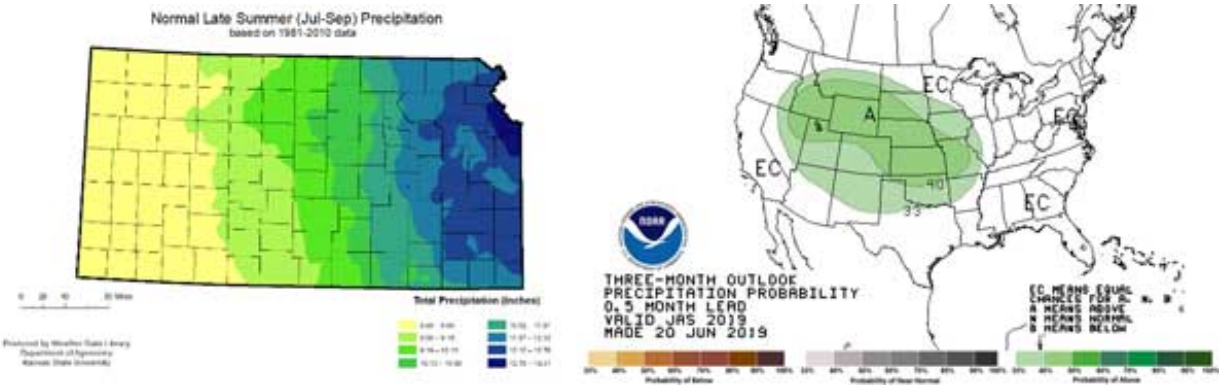



**Figure 2. Summer outlooks for temperature (upper maps) and precipitations (lower maps) versus normal for the July, August, and September period (Weather Data Library and CPC).**

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## 8. 2019 K-State/KARA Summer Field School

Kansas State University and the Kansas Agribusiness Retailers Association (KARA) will be hosting two, two-day hands-on field schools on July 9-10 and July 11-12 at the K-State Agronomy North Farm (2200 Kimball Ave) located just north of the football stadium. This year's program will focus on soybean and cotton production and fertility. In addition, there will be comprehensive training in herbicide efficacy and injury, weed identification, soil and water management, crop diseases, and insects. Agendas for both sessions are included at the end of this article.

The complete program and registration link can be found at https://www.ksagretailers.org/events-training/ksu-field-days/. (Please note: KSRE agents should register via the registration link distributed over the Ag Agent email list serve). The cost for this year's program is $210 and includes lunch on both days and the opportunity to earn 12 CCA credits and multiple 1A credits.

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**Kansas State University/KARA Summer Field Day (Session 1)**

**North Agronomy Farm, Manhattan, KS, July 9-12, 2019**

K-STATE Research and Extension

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|---|---|---|---|
| | **Tuesday 7/9/19** | | |
| 8:00 Registration – **North Agronomy Farm** | **Group A** | **Group B** | **Group C** |
| 8:30 | Herbicide Efficacy ( Peterson & Kumar) | Soil Compaction (Presley) | Soybean Production (Ciampitti) |
| 9:30 | Herbicide Injury (Peterson & Kumar) | Water quality (Tomlinson) | Soybean Fertility (Ruiz Diaz) |
| 10:30 | **Break** | | |
| 10:45 | Weed ID (Dille, Donnelly) | Soybean Production (Ciampitti) | Crop Insect Pests (Whitworth/Davis) Throckmorton 2501 |
| 11:45 | Weed ID (Dille, Donnelly) | Soybean Fertility (Ruiz Diaz) | Crop Diseases (Jardine) Throckmorton 1506 |
| 12:45 | **Lunch – North Agronomy Farm (Welcome)** | | |
| 1:30 | Soybean Production (Ciampitti) | Crop Diseases (Jardine) Throckmorton 1506 | Weed ID (Dille, Donnelly) |
| 2:30 | Soybean Fertility (Ruiz Diaz) | Crop Insect Pests (Whitworth/Davis) Throckmorton 2501 | Weed ID (Dille, Donnelly) |
| 3:30 | **Adjourn** | | |
| | | | |
| | **Wednesday 7/10/19** | | |
| 7:00 Registration – **North Agronomy Farm** | **Group A** | **Group B** | **Group C** |
| 7:30 | Cotton Production (Duncan & Haag) | Herbicide Efficacy ( Peterson & Kumar) | Soil Compaction (Presley) |
| 8:30 | Cotton Fertility (Ruiz Diaz, Haag) | Herbicide Injury (Peterson & Kumar) | Water quality (Tomlinson) |
| 9:30 | **Break** | | |
| 9:45 | Soil Compaction (Presley) | Cotton Production (Duncan & Haag) | Herbicide Efficacy ( Peterson & Kumar) |
| 10:45 | Water quality (Tomlinson) | Cotton Fertility (Ruiz Diaz, Haag) | Herbicide Injury (Peterson & Kumar) |
| 11:45 | **Lunch – North Agronomy Farm** | | |
| 12:30 | Crop Diseases (Jardine) Throckmorton 1506 | Weed ID (Dille, Donnelly) | Cotton Production (Duncan & Haag) |
| 1:30 | Crop Insect Pests (Whitworth/Davis) Throckmorton 2501 | Weed ID (Dille, Donnelly) | Cotton Fertility (Ruiz Diaz, Haag) |
| 2:30 | **Adjourn** | | |

**Kansas State University/KARA Summer Field Day (Session 2)**

**North Agronomy Farm, Manhattan, KS, July 9-12, 2019**

K-STATE Research and Extension

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|---|---|---|---|
| | **Thursday 7/11/19** | | |
| 8:00 Registration – **North Agronomy Farm** | **Group A** | **Group B** | **Group C** |
| 8:30 | Cotton Production (Duncan & Haag) | Herbicide Efficacy ( Peterson & Kumar) | Soil. Compaction (Presley) |
| 9:30 | Cotton Fertility (Ruiz Diaz, Haag) | Herbicide Injury (Peterson & Kumar) | Water quality (Tomlinson) |
| 10:30 | **Break** | | |
| 10:45 | Soil. Compaction (Presley) | Cotton Production (Duncan & Haag) | Herbicide Efficacy ( Peterson & Kumar) |
| 11:45 | Water quality (Tomlinson) | Cotton Fertility (Ruiz Diaz, Haag) | Herbicide Injury (Peterson & Kumar) |
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| 2:30 | Crop Insect Pests (Whitworth/Davis) Throckmorton 2501 | Weed ID (Dille, Donnelly) | Cotton Fertility (Ruiz Diaz, Haag) |
| 3:30 | **Adjourn** | | |
| | | | |
| | **Friday 7/12/19** | | |
| 7:00 Registration – **North Agronomy Farm** | **Group A** | **Group B** | **Group C** |
| 7:30 | Herbicide Efficacy ( Peterson & Kumar) | Soil. Compaction (Presley) | Soybean Production (Ciampitti) |
| 8:30 | Herbicide Injury (Peterson & Kumar) | Water quality (Tomlinson) | Soybean Fertility (Ruiz Diaz) |
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