



K-STATE
Research and Extension

Extension Agronomy

eUpdate

07/12/2019

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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Hail Reports
July 1 - July 10, 2019



Figure 1. Hail reports for June 11 – June 30 (upper panel) and July 1 – July 10 (lower panel). The numbers beside each hail report refer to hail size. Maps prepared by Kansas Weather Data Library.





Figure 1. Upper photo: Wheat in the milk stage of grain development showing symptoms of moderate to severe hail damage, such as twisted, broken, and white heads near Winfield, Sumner County, KS. Photo taken May 21, 2019 by Romulo Lollato, K-State Research and Extension. Lower photo: Wheat field approaching physiological maturity completely hailed out near Sharon Springs, Wallace County, KS. Photo taken on June 23, 2019 by David Schemm, wheat producer.

Considerations for hail-damaged wheat

Where wheat suffered hail damage after heading, volunteer wheat often emerges even before the existing field is harvested – as much as two to three weeks or earlier than it would normally emerge. If volunteer wheat is not controlled throughout the summer and is infested with wheat curl mites, the mites will survive until fall and could infest newly-planted wheat at that time. Wheat curl mite infestations in wheat often lead to wheat streak mosaic infections.

Where wheat was hailed out and volunteer has already emerged at the time of harvest, control should begin immediately after harvest if possible. This is true even for fields that got hailed out relatively early during grain filling, as wheat grain at soft dough or later stages of development already has the potential to germinate. If volunteer has emerged and is still alive shortly after harvest in hailed-out wheat, wheat curl mites could easily build up rapidly and spread to other volunteer wheat that emerges later in the season. On the other hand, if this early-emerging volunteer is controlled shortly after harvest, that will help greatly in breaking the “green bridge”. However, if

more volunteer wheat emerges during the summer, follow-up control will still be needed. While hailed out fields may require one more field passes than normal to control volunteer wheat, it will help prevent even bigger problems down the road. It should be noted that grazing volunteer is not an effective option because there is green wheat material left and the mites can be living in that material.

Considerations for hail-damaged corn

Most of the corn impacted by the last hail events from July were advanced stages of crop development. 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 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.

Do not make any decisions right away. 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 potential problems associated with these weather events.

Goss's bacterial wilt

This disease is caused by a bacterial, not a fungal, infection. Symptoms are gray to light yellow stripes with wavy margins that follow the leaf veins. Within these lesions, dark green to black, water-soaked spots that take on the appearance of freckles usually appear and are an excellent diagnostic symptom (Figure 3).

Goss's wilt is most common in northwest Kansas, northeast Colorado, and southwest Nebraska but has been reported at one time or another from most areas of Kansas. It can be controlled with resistant hybrids and crop rotation.



Figure 3. Example of Goss's wilt. Photo courtesy Crop Protection Network, <https://cropprotectionnetwork.org/resources/publications/goss-bacterial-wilt-and-blight>.

Use of fungicides following a hail event

When strobilurin fungicides (Headline, Quadris, etc) first received a “plant health” label, it was suggested that application of these products following a hail event would help the plants recover from injury and result in increased yields. Many university studies have since shown that there is no benefit from applying a fungicide after a hail event, unless a fungicide application was needed for disease control before the hail event occurred. The following is a quote from an Iowa State University study published in the journal *Plant Health Progress*:

The lack of significant yield response observed between treatments receiving fungicide application after simulated hail and the untreated control in this study are consistent with results from Bradley and Ames (2010) and from other university studies testing fungicide use after actual hail events (Conley et al. 2010; Schleicher and Jackson-Ziems 2014; D. Smith, personal communication). These findings, coupled with the observation that foliar disease severity was lower in plots receiving simulated hail compared to non-hail control plots, supports the assertion from Wise and Mueller (2011) that the best chance for economic profitability from fungicide use in corn results when fungicides are applied for disease management when risk and actual disease occurrence is high. (Sisson, et. Al. 2016. Plant Health Prog. 17:6-12).

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2. Post-harvest weed control in wheat stubble

Post-harvest weed control in wheat stubble is very important to conserve soil moisture and prevent weeds from going to seed and adding to the weed seedbank. Excessively wet weather this spring, particularly in May and early June, will likely require earlier and more intensive weed management efforts this year. Also, where there are bare spots either due to hail damage or flooding, weeds may be growing quickly. Controlling these weeds while there is moisture and active growth, before they set seed, is a good idea.

The standard treatment for many years to control weeds and volunteer wheat in wheat stubble was glyphosate plus 2,4-D LVE. If kochia was present, we may have added some dicamba, but it generally wasn't added in the eastern areas of Kansas because of drift concerns to soybeans. Glyphosate plus 2,4-D and/or dicamba remain a primary option for weed control in stubble, but with the development of glyphosate-resistant weeds, these options certainly don't work as well or quickly as they used to.

Glyphosate used to be fairly foolproof, even on big weeds, but that is no longer the case. Dicamba and 2,4-D probably weren't contributing as much to the weed control in those tank mixes as we may have thought, so now we are struggling to achieve acceptable control. Timing and weed size is much more critical with almost all other herbicides than it was with glyphosate. Consequently, it is very important to try and apply those treatments before the weeds exceed 4 to 6 inches tall, but that often doesn't happen. In addition, treatment before weeds exceed 4 inches tall may require a number of applications to manage multiple flushes of weeds, which adds significantly to the cost of control.

Higher rates of the 2,4-D and dicamba may improve control, but in most cases we probably don't want to exceed 1 qt/acre of 2,4-D or a pint/acre of dicamba. Sharpen is another herbicide tank-mix partner that may help with control of the pigweeds and provide some residual control. Sharpen works best with the addition of methylated seed oil and can provide some pretty good burndown on smaller weeds, but if the weeds are very big, it tends to burn the tops and plants eventually resume growth. Applying 2 or 3 oz/acre of Sharpen instead of 1 oz/acre will improve control of larger weeds and provide longer residual control. Sharpen requires complete coverage so using 15 to 20 gallons/acre spray solution is important.

One herbicide alternative to glyphosate that can work well to control emerged pigweed and kochia is paraquat. Paraquat is a contact herbicide, so spray coverage is critical. Spray volumes of 20 gallons/acre or higher are preferred, especially on larger and thicker weeds. Paraquat also needs to be applied with a nonionic surfactant or oil concentrate to enhance surface coverage of the plant foliage. A tank mix with atrazine will enhance control and provide some residual weed control if planning to plant corn or sorghum next spring. Likewise, metribuzin can be tank-mixed with paraquat if rotating to soybean to enhance control and provide some residual. If planting wheat this fall, a tank mix with Sharpen is an option to provide some residual control. Recent work at K-State suggests that making the paraquat application as soon as possible following wheat harvest allows for better coverage and more effective control especially of the pigweeds.

Another herbicide that can be added to the burndown treatments for residual broadleaf weed

control in wheat stubble is flumioxazin (Valor and others). Flumioxazin has been used as a pre-plant/pre-emergence treatment in soybeans for years, but it hasn't been used much in wheat stubble because of the cost. However, with the recent reduction in flumioxazin prices, it may be worth considering as part of our stubble management treatments for residual weed control, especially the pigweeds. Wheat can be planted 30 days after 2 oz/ac, or 60 days after 3 oz/ac Valor application, if at least one inch of rain occurs between application and planting. Corn, sorghum, cotton, sunflowers, or soybeans can be planted the following spring following flumioxazin treatment. Residual weed control with flumioxazin will depend on rainfall for activation, just as with pre-plant treatment in soybeans.

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3. What factors should be considered before baling or burning wheat residue?

Following wheat harvest there are some producers that might be thinking about baling or burning their wheat stubble. Producers may consider burning for several reasons: as a management practice to control plant diseases or weeds, to improve the seedbed for the subsequent crop, and possibly other reasons. While burning is inexpensive and baling provides additional income, producers should understand the true value of leaving crop residue in the field. Some of the information below comes from K-State Extension publication [MF-2604, The Value of Crop Residue](#).

There are four main factors to consider:

Loss of nutrients

The products of burned wheat stubble are gases and ash. Nutrients such as nitrogen (N) and sulfur (S) are largely combustion products, while phosphorus (P) and potassium (K) remain in the ash. When residue is burned, about one-third to one-half of the N and S will combust. The nutrients in the ash may remain for use by the plants, if it doesn't blow or wash away first (more on that below). Therefore, instead of cycling these important plant nutrients back into the soil, they can essentially become air pollutants when the residue is burned.

Table 1. Amounts of nutrients remaining in wheat stubble when assuming 50 bu/acre yield.

Nutrient	Pounds present in 5,000 lbs of wheat straw
N	27.0
P ₂ O ₅	7.5
K ₂ O	37.5
S	5.0

Protection from soil erosion

Bare soil is subject to wind and water erosion. Without residue, the soil will receive the full impact of raindrops, thus increasing the amount of soil particles that may become detached during a rainfall event. Bare, tilled soils can lose up to 30 tons per acre topsoil annually. In no-till or CRP systems where residue is left, annual soil losses are often less than 1 ton per acre. The detachment of soil particles can lead to crusting of the soil surface, which then contributes to greater amounts of sediment-laden runoff, and thus, reduced water infiltration and drier soils.

Leaving residue on the field also increases surface roughness, which decreases the risk of both wind and water erosion. Most agricultural soils in Kansas have a "T" value, or tolerable amount of soil loss, of between 4 and 5 tons per acre per year, which is about equal to the thickness of a dime. To prevent water erosion, 30% ground cover or greater may be needed to reduce water erosion to "T" or less, especially in fields without erosion-control structures such as terraces.

Standing stubble is more effective at preventing wind erosion than flat stubble. On occasion, accidental residue burns have resulted in devastating wind erosion events that happen over and over again until a new ground cover is established. Once a field begins to erode from wind, it is extremely difficult to stop. During extended droughts the soil profile gets dried out and not even emergency tillage is effective at stopping the wind erosion. Losing topsoil degrades soil productivity, and the long-term effect of this loss is not easy to quantify.

Research results from six locations in western Kansas are shown in Figure 1. In this experiment, crop residue was removed at different levels by cutting the crop residue at different heights. For example, if the residue was 10" after it was combined, the residue would be cut to 5" and removed from the plot, and that would equal 50% removal. The wind erodible fraction is the part of the soil less than 0.84 mm in size.

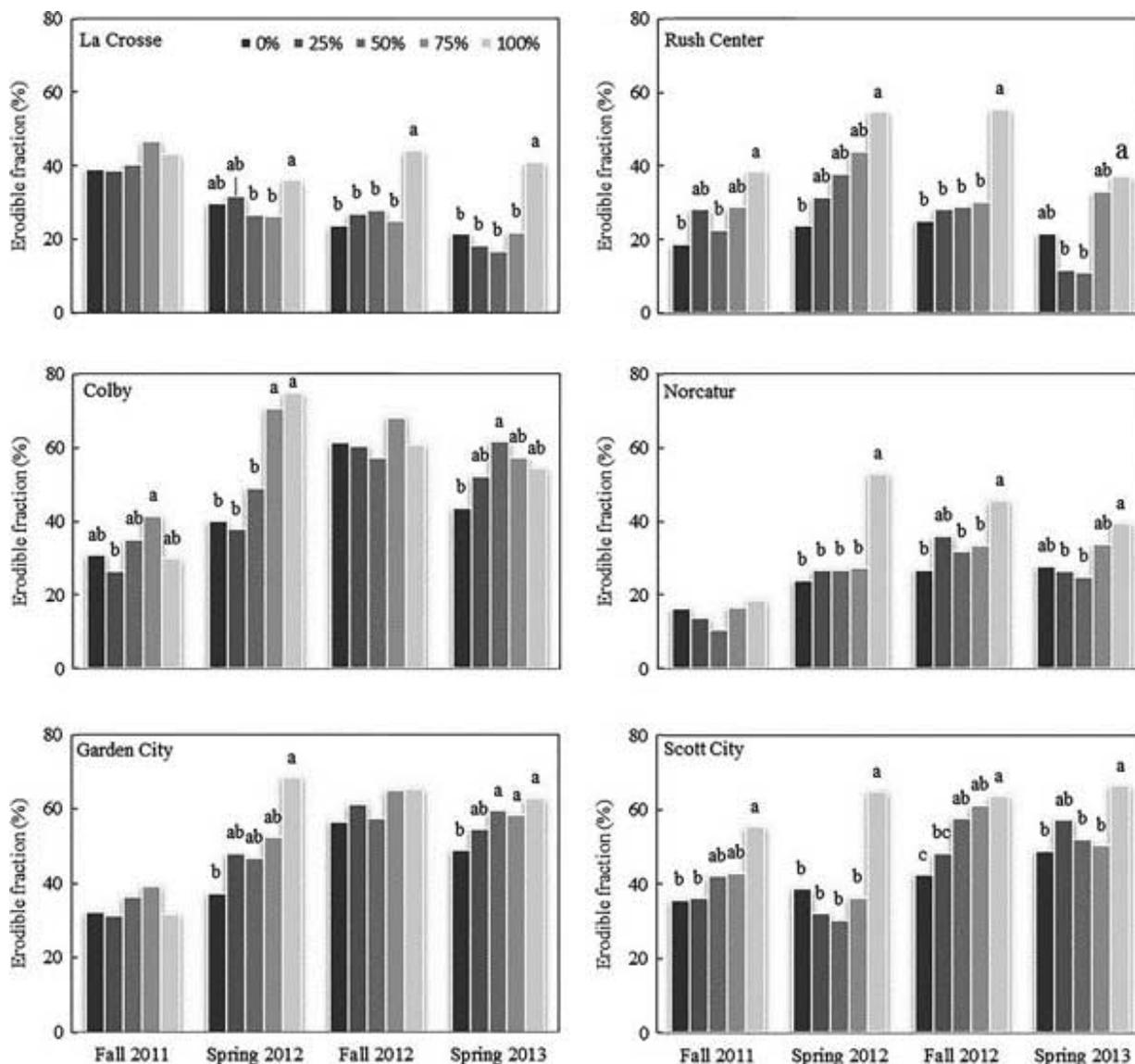


Figure 1. Effects of crop residue removal on the wind erodible fraction of soil, defined as <0.84 mm. Values on the x-axis (different shadings of the bars) refer to the percent residue removed. For example: 0% means no residue was removed, while 100% means that all residue was removed. Lowercase letters indicate treatment differences at p<0.05. From: He et al., 2017, available at: <https://doi.org/10.1111/gcbb.12483>

Soil moisture, infiltration rates, and conservation

Wheat residue enhances soil moisture by increasing rainfall infiltration into the soil and by reducing evaporation. Residues physically protect the soil surface and keep it receptive to water movement into and through the soil surface. Without physical protection, water and soil will run off the surface more quickly.

Ponded infiltration rates were measured at Hesston in September 2007. Very low infiltration rates (1.9 mm/hour) were observed for continuous winter wheat in which the residue was burned each year prior to disking and planting the following crop. In contrast, high infiltration rates (13.3 mm/hour) were observed for a no-till wheat/grain sorghum rotation (Presley, unpublished data).

Another way residue increases soil moisture is by reducing evaporation rates. Residue blocks solar radiation from the sun and keeps the soil surface cooler by several degrees in the summer. Evaporation rates can decline dramatically when the soil is protected with residue. Research from dryland experiments has shown that crop residues are worth 2 to 4 inches of water annually in the central Great Plains states ([Efficient crop water use in Kansas](#), MF3066).

Soil quality concerns

Over time, the continued burning of cropland could significantly degrade soil organic matter levels. By continually burning residue, soil organic matter is not allowed to rebuild. Soil organic matter is beneficial for plant growth as it contributes to water holding capacity and cation exchange capacity. Soil organic matter binds soil particles into aggregates, which increases porosity and soil structure and thus, increases water infiltration and decreases the potential for soil erosion. One burn, however, will not significantly reduce the organic matter content of a soil (unless the field erodes, as discussed above).

If producers do choose to burn or harvest their wheat stubble, timing is important, and should minimize the time that the field will be without residue cover and vulnerable to erosion. Before choosing to burn residue, producers should check with the USDA Natural Resources Conservation Service and/or the Farm Service Agency to find out if this will affect their compliance in any conservation programs.

For more information, see:

- *Efficient crop water use in Kansas*, MF3066, available at: <http://www.ksre.ksu.edu/bookstore/pubs/mf3066.pdf>
- *Emergency wind erosion control*, MF2206, available at: <http://www.ksre.ksu.edu/bookstore/pubs/MF2206.pdf>
- *Crop residue harvest impacts wind erodibility and simulated soil loss in the Central Great Plains*. 2017. Global Change Biology Bioenergy, <https://doi.org/10.1111/gcbb.12483>

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4. Kansas insect activity update - Dectes stem borers and Japanese beetles

Dectes stem borer adults continue to emerge throughout north central Kansas (Figure 1). These adults are currently aggregating mainly around field borders and most commonly on ragweed. They will start dispersing into soybean fields within the next week to 10 days, as they do every year, to begin oviposition. The adult females are relatively mobile and move from plant to plant inserting eggs into, or just below, the petioles of many plants. This oviposition period may last for four weeks or more and may be spread throughout the field! This is one reason why controlling dectes stem borers with an insecticide is so difficult – timing of application.



Figure 1. Examples of dectes stem borer adult, larva, and entry point. Photos by K-State Extension Entomology.

Eggs hatch in the stem and the small larvae start feeding/boring their way to the main stem and then down this stem to the soil surface. They usually reach the soil line in late August and larvae girdle their way around the inside of the stem, weakening the stem and often leading to lodging, especially if there are strong winds. This lodging is responsible for most of the yield loss. For more information regarding dectes stem borers, please see the KSRE publication "Dectes Stem Borer", MF2581: <https://www.bookstore.ksre.ksu.edu/pubs/MF2581.pdf>

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

Japanese Beetles

Japanese beetle adults have also been emerging over the past week or two (Figure 2). These adults will feed on just about any pollen, nectar, or succulent plant source for a few days then disperse to begin ovipositing into the soil. The adults may attack emerging silks in corn or new succulent leaves in soybeans, but typically only around the edges of fields.

Japanese beetles



Figure 2. Japanese beetles on a corn plant. Photo by K-State Extension Entomology.

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5. Ag-Climate Update for June 2019

The [Ag-Climate Update](#) is a joint effort between our climate and extension specialists. Every month the update includes a brief summary of that month, agronomic impacts, relevant maps and graphs, 1-month temperature and precipitation outlooks, monthly extremes, and notable highlights.

June 2019 – Wet areas get wetter but closer to the normal

At the state level, June was just slightly wetter than normal. State-wide average precipitation for June was 4.8 inches, 104% of normal. The western and northern divisions were drier than normal, but the driest (West Central) averaged 2.3 inches, 83% of normal. State-wide average temperature for June was roughly 73 degrees F, 1 degree cooler than normal. This ranks as the 45th coolest on record. Temperature swings were substantial, ranging from 36 degrees F at Syracuse 1NE on the 10th to 105 degrees F at Oakley 4W on the 28th.

Saturated fields continue to cause problems. The cooler and wetter conditions have left wheat about 1 to 3 weeks behind normal depending on sowing date. Many wheat fields in the central and south-central regions have drowned out due to excessive moisture causing extremely variable yields and test weight. Corn, soybeans, and sorghum continue to lag behind normal progress.

Fewer growing degree days (GDD) accumulation across the state is delaying crop development. Wheat harvested was at 61%, well behind 89% last year and the 5-year average of 84%.

View the entire June 2019 Ag-Climate Summary at <http://climate.k-state.edu/ag/updates/>

6. 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.

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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.**

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7. 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

8. 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>.

SUMMER TOUR 2019 – FIELD DAY

SOIL HEALTH

- ⊕ SOIL HEALTH PARTNERSHIP
- ⊕ SOIL HEALTH DATA
- ⊕ COVER CROP GARDEN
- ⊕ SOIL HEALTH PRINCIPLES
- ⊕ SOIL FERTILITY IN HEALTHY SOILS
- ⊕ KANSAS CORN LISTENING TOUR

August 12, 2019 4PM - 6PM
GUETTERMAN BROTHERS FAMILY FARMS
14633 West 239th St, KS 66083
Register at kscorn.com/tour



* Dinner provided by sponsors

9. 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.