



## Extension Agronomy

# eUpdate

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*07/22/2021*

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](mailto:kgehl@ksu.edu), or Dalas Peterson, Extension Agronomy State Leader and Weed Management Specialist 785-532-0405 [dpeterso@ksu.edu](mailto:dpeterso@ksu.edu).

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<b>1. Wheat streak mosaic virus: It is critical to stay on top of volunteer wheat this year.....</b>	<b>3</b>
<b>2. Heat safety awareness: Excessive heat forecasted for Kansas in late July .....</b>	<b>8</b>
<b>3. Summer is a great time to join the CoCoRaHS Network...because every drop counts!.....</b>	<b>12</b>
<b>4. Kansas River Valley Experiment Field Fall Field Day, August 10 .....</b>	<b>16</b>
<b>5. K-State East Central Experiment Field Fall Field Day, August 18 .....</b>	<b>18</b>

## 1. Wheat streak mosaic virus: It is critical to stay on top of volunteer wheat this year

This past season was a bad one for wheat streak mosaic virus (and other viruses vectored by the wheat curl mite) in parts of Kansas. Late summer rainfall in 2020 was favorable for volunteer wheat establishment in some areas. One of the best preventative measures for wheat streak is the control of volunteer wheat early and often after harvest. If volunteer wheat is allowed to stand, it creates a “green bridge”, allowing wheat streak mosaic and wheat curl mites to survive locally. Volunteer wheat should be terminated at least two weeks prior to planting to allow sufficient time for mites to die off.

### **Challenges faced in 2020-21**

This year, the wheat crop faced several challenges that might have increased the amount of seed left behind after harvest, which could also increase the amount of volunteer wheat (Figure 1). These problems included:

- Excessive rainfall delayed wheat harvest in many parts of the state
- Freeze damage during late boot and early heading (which caused many delayed wheat heads to emerge), particularly in parts of south-central and southwest Kansas
- Hailed-out wheat
- A considerable amount of head scab (*Fusarium* head blight) even in western Kansas, where this disease is usually not a problem
- Waterlogged conditions in parts of central Kansas
- Drought-stressed wheat in southwest Kansas



**Figure 1. Volunteer wheat that has emerged in wheat residue. Photo by Sarah Lancaster, K-State Research and Extension.**

### **Breaking the “green bridge”**

Wheat curl mites will move off growing wheat as the green tissue dries down and dies. After moving off the existing wheat at or near harvest time, the mites need to find green tissue of a suitable host soon or they will die (death of the whole population will take approximately 2 weeks).

Producers often like to wait several weeks after harvest before making their first herbicide application to control volunteer wheat. This allows as much volunteer as possible to emerge before spraying it or tilling it the first time. Glyphosate and atrazine are two herbicides that are often used for this purpose. Additional information about controlling volunteer wheat can be found in a recent eUpdate article: “[Considerations for weed control following wheat harvest](#)”. Often, a second application or tillage operation will be needed later in the summer to eliminate the green bridge to fall-planted wheat by making sure all volunteer is dead within ½ mile of wheat being planted in the fall. As we saw in 2020, wet weather through late summer often favors multiple flushes of volunteer wheat (Figure 2) and also favors the growth of other grassy weeds that can also support moderate populations of the curl mites and virus.



**Figure 2. Thick stand of volunteer wheat after wheat harvest (left panel) and detail of volunteer wheat crop development (right panel). Photos taken in Edwards County, KS by Romulo Lollato, K-State Research and Extension.**

### **Other hosts for the wheat curl mite**

Volunteer wheat is not the only host of the wheat curl mite. Over the years, multiple research studies have evaluated the suitability of wild grasses as hosts for both the curl mite and the wheat streak virus. There is considerable range in the ability of a grassy weed species to host the mite and the virus. Barnyardgrass is among the more suitable hosts for both virus and mites, but fortunately it is not that common in wheat fields. In contrast, various foxtails, although a rather poor host, could be an important disease reservoir simply because of their abundance. These grasses may play an important role in allowing the mites and virus to survive during the summer months particularly in the absence of volunteer wheat.

The K-State Research and Extension publication, MF3383 - [Wheat Streak Mosaic](#), includes information about grassy weed hosts of the mite and virus, and the contribution of these hosts to the risk of severe wheat streak mosaic infections. Take note of significant stands of these grasses in marginal areas and control them as you would volunteer wheat.

If volunteer wheat and other hosts are not controlled throughout the summer and are infested with wheat curl mites, the mites will survive until fall and could infest newly planted wheat. Wheat curl mite infestations of wheat often lead to wheat streak mosaic infections (Figures 2 and 3).





**Figure 3. Close-up of wheat showing symptoms of a wheat streak mosaic virus infection in the fall. Photo by Kelsey Andersen Onofre, K-State Research and Extension.**

### **Management with genetic resistance: One tool in the toolbox**

Other than timely control of volunteer, genetic resistance is also an important tool for WSMV control. Genetic resistance to wheat streak mosaic can also reduce the risk of severe disease problems. There are currently a few varieties adapted to Kansas that have wheat streak mosaic resistance, including KS Dallas (red), KS Hamilton (red), Guardian (red), Oakley CL (red), Joe (white), and Clara CL (white). All of these varieties have the same resistance source (a wheat resistance gene named *WSM2*). The OSU variety Breakthrough has the *WSM1* resistance gene. These resistance genes help, but have some serious limitations. For example, they are effective against wheat streak mosaic virus but does not cover triticum mosaic or high plains viruses (two other viral diseases also spread by the wheat curl mites). The resistance conferred by *WSM2* is also temperature sensitive and is much less effective at high temperatures, although the resistance in KS Dallas seem to endure greater temperatures before breaking down. If wheat is planted early for grazing or if high temperatures persist into October, the resistance is much less effective. KS Silverado (white) also has temperature sensitive resistance to wheat streak mosaic, although from a different source other than *WSM2*.

In addition, there are a handful of varieties with resistance to the wheat curl mite, including TAM 112, Byrd, Avery, Langin, KS Western Star, Whistler, Canvas, Guardian, Crescent AX, Incline AX, Fortify SF,

TAM 115, TAM 204, and T158. These varieties are actually susceptible to the viral diseases, but they generally slow the development of the mite populations in the fall. This resistance can help reduce the risk of severe disease but will not provide enough protection if wheat is planted in close proximity to volunteer wheat or other hosts infested with large populations of the curl mites and virus.

Kelsey Andersen Onofre, Extension Wheat Pathologist  
[andersenk@ksu.edu](mailto:andersenk@ksu.edu)

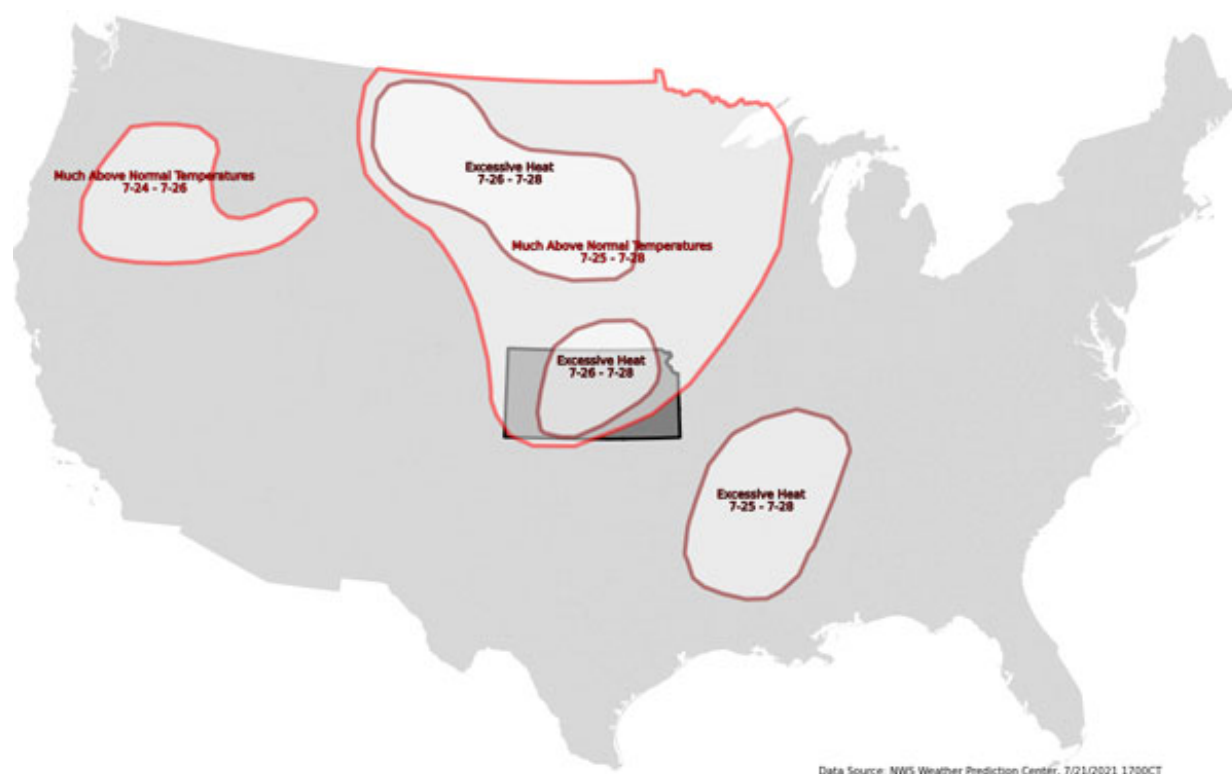
Romulo Lollato, Wheat and Forages Specialist  
[lolato@ksu.edu](mailto:lolato@ksu.edu)

J.P. Michaud, Entomologist, KSU Agricultural Research Center-Hays  
[jpmi@ksu.edu](mailto:jpmi@ksu.edu)

Sarah Lancaster, Extension Weed Science Specialist  
[slancaster@ksu.edu](mailto:slancaster@ksu.edu)

## 2. Heat safety awareness: Excessive heat forecasted for Kansas in late July

After a relatively cool start to July, things are expected to change in early August. Excessive heat is forecasted by the National Weather Service (Figure 1) beginning this weekend, with high likelihood it will continue into early next month. While warm temperatures are expected in the summer, the combination of warmer overnight low temperatures and humid conditions can quickly accumulate on people and develop heat stress.



**Figure 1. Hazard map for July 24-28, 2021 using the National Weather Service Weather Prediction Center data with focus on Kansas.**

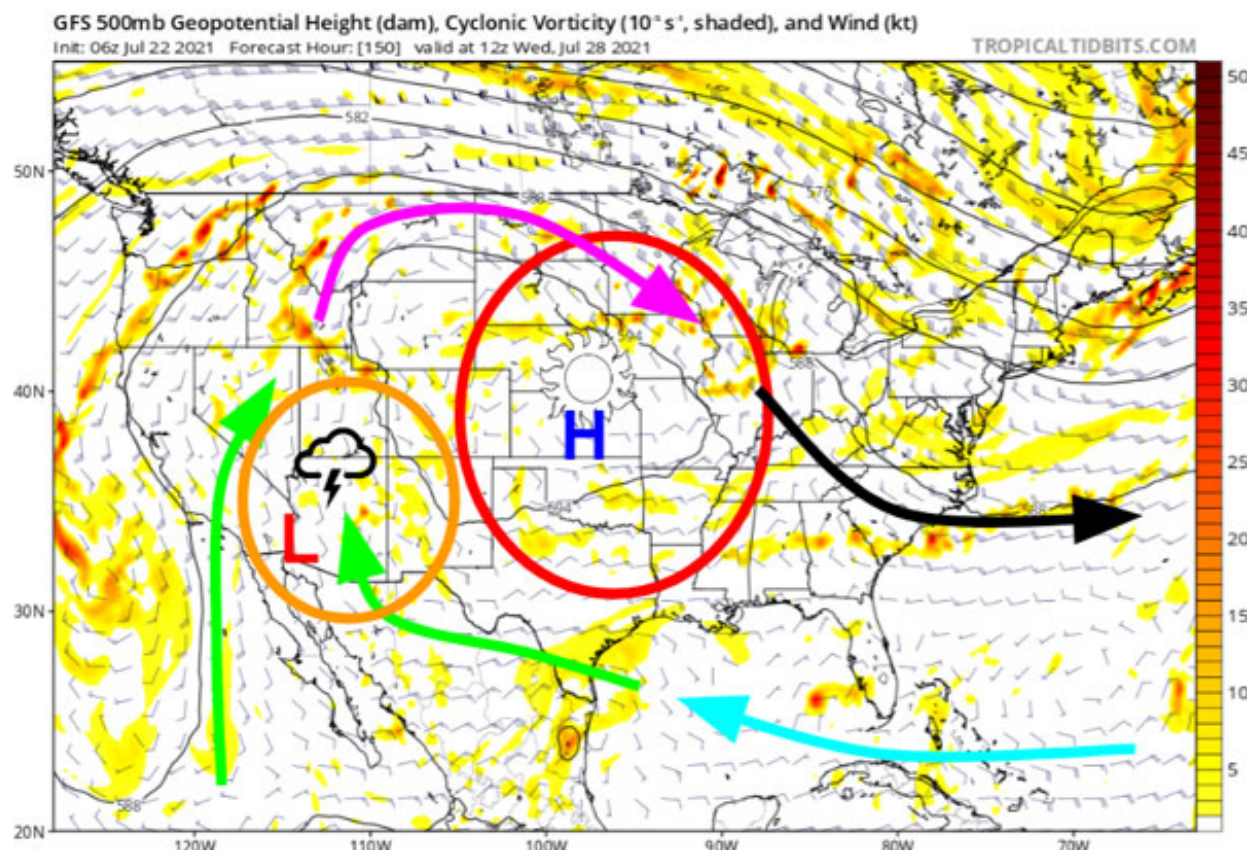
Though much of the state did observe a warm period in mid-June, we were lucky enough to not have high humidity. As a result, temperatures felt cooler than they actually were. For the upcoming week (and likely longer), afternoon dew points are forecasted to remain above 60°F and reach as high as 70-75°F (lower in the west). This will yield much higher humidity than the 15-30% observed in June. In addition, higher moisture content in the air prevents overnight low temperatures from dropping much, as lows won't drop below the dew point. These warmer lows prevent the body from recovering and can rapidly increase heat stress for those without air conditioning.

### **The science behind the heat**

Recent record-setting heat in the northwest US has many wondering if this period of above-normal temperatures is related. The answer is yes and no. That extremely strong high pressure broke down



with the storm system that provided rain to much of Kansas a week ago. As a result, the accumulated heat has been modified significantly (hence why we aren't seeing additional 110°F+ readings. Since then, the focus of the high pressure and its associated air (blue H in Figure 2 and impacts of heat outlined in red) have moved eastward into the central US. The ridge of high pressure is of similar origins, just much cooler air than what was observed in the northwest. Secondly, the once-absent "monsoon season" in the southwest has now appeared with a large broad low pressure (red L in Figure 2 with impacts highlighted in an orange circle). This has helped the ridge remain in place with a stagnant upper level flow. Moisture continues to feed this area from both the Gulf of Mexico (and origins southwest). Any time you see reasonable upper level flow from east to west as occurring to our south, flow is likely stagnant and big weather pattern changes aren't likely in the near future. The only way this pattern would change is if a strong hurricane can impact the flow, either in the Atlantic or Pacific, which is possible mid-August. Otherwise, the doldrums of summer are in full swing.



**Figure 2. Upper level winds forecasted for next week (mid-week). Easterly flow is represented by the blue arrow. Green arrows represent moisture flow into the southwest "monsoons." Purple arrow signifies the overall weak storm track taking occasional moisture to our north. Black is stronger flow to the east associated with increased storminess and cooler weather. Area of high pressure (H) is highlighted in red with broad low pressure (L) highlighted in orange. Image source: tropicaltidbits.com with annotations by author.**

**Be prepared**

In advance of this heat, it is recommended that you begin to prepare now. Some simple ways to counteract these oppressive temperatures and humidity include:

- Check your air conditioning and ensure it is operating properly.
- Reschedule plans of outdoor work/activity in advance to limit exposure during peak afternoon hours.
- Check on your neighbors and sensitive groups (such as expectant mothers, elderly, or children), ensuring they are prepared.
- Increase water intake. Thorough hydration begins days before outdoor activities.
- Locate areas of shelter should you need to cool off.
- Familiarize yourself with the symptoms of heat illness.

For additional information, visit <https://www.weather.gov/wrn/summer-heat-sm> for more graphics and tips!

To monitor current heat indices, visit the Mesonet at: <http://mesonet.k-state.edu/weather/heat/>



**Heat** can escalate quickly.

Warm temperatures can quickly become dangerous. Heat is one of the most deadly weather hazards — don't underestimate it.

-  **NEVER** leave people or pets alone in a closed car
-  Drink plenty of water, even if you don't feel thirsty
-  Wear loose-fitting, light-colored clothing
-  Spend time in air conditioning and in the shade

 weather.gov

Mary Knapp, Assistant State Climatologist  
[mknapp@ksu.edu](mailto:mknapp@ksu.edu)

Christopher "Chip" Redmond, Kansas Mesonet Manager

[christopherredmond@ksu.edu](mailto:christopherredmond@ksu.edu)



### 3. Summer is a great time to join the CoCoRaHS Network...because every drop counts!

Summer rains can vary a great deal across a very short area. An important way to measure that variability is to have dense, on-the-ground observations of that rainfall – or the lack of rain.

CoCoRaHS provides a means by which citizens can contribute to the understanding of precipitation patterns.

#### **What is CoCoRaHS?**

CoCoRaHS is an acronym for the Community Collaborative Rain, Hail and Snow Network. CoCoRaHS is a unique, non-profit, community-based network of volunteers of all ages and backgrounds (Figure 1) working together to measure and map precipitation (rain, hail, and snow). By using low-cost measurement tools, stressing training and education, and utilizing an interactive website, the aim is to provide the highest quality data for natural resource, education, and research applications. CoCoRaHS has been active in Kansas since 2004. More observers are always very welcome.



**Figure 1. Two young scientists in the making! Weed Science Specialist, Sarah Lancaster, sent in this photo of her two sons reading their CoCoRaHS rain gauge following a rain event in late April 2020. Photo by Sarah Lancaster, K-State Research and Extension.**

Each time a storm -- rain, hail, or snow -- crosses your area, volunteers take measurements of





have made an important contribution that helps others. By providing your daily observation, you help to fill in a piece of the weather puzzle that affects many across your area in one way or another.

New observers are welcome any time of the year. In fact, in Kansas we have seen steady increases in observers with June actually being our top month for recruitment. We have also achieved a significant milestone – highest percentage of new recruits actually making their first observation. It is important to make that second step. After you sign up and get your gauge, actually deploy the gauge and send in the observations.

**To join CoCoRaHS**, just go to the website [CoCoRaHS.org](http://CoCoRaHS.org) and click “Join Now”.

If you have questions about the program, contact Mary Knapp at Kansas State University by email at [mknapp@ksu.edu](mailto:mknapp@ksu.edu) or phone at 785-313-1562.



# WANTED!

**VOLUNTEERS OF ALL AGES  
TO HELP SCIENTISTS STUDY STORMS**

***Measure precipitation in your own backyard with CoCoRaHS!***

The **Community Collaborative Rain, Hail and Snow Network (CoCoRaHS)** needs you! Everyone can participate, both young, old, and in-between. The only requirements are an enthusiasm for watching and reporting weather conditions and a desire to learn more about how weather can affect and impact our lives.

***CoCoRaHS needs your help !***



**To learn more or to become a volunteer observer, please visit our web site at:**

**[www.cocorahs.org](http://www.cocorahs.org)**

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CoCoRaHS  
provided by:



Mary Knapp, Assistant State Climatologist  
[mknapp@ksu.edu](mailto:mknapp@ksu.edu)

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

#### 4. Kansas River Valley Experiment Field Fall Field Day, August 10

All interested individuals are invited to attend the **2021 Kansas River Valley Experiment Field Day** on **Tuesday, August 10, at 5:00 p.m.** The event will be held at the Rossville Experiment Field (1 mile east of Rossville on Hwy 24, south side of the road).

This is a free event and pre-registration is requested for the catered BBQ meal. To register, please call Kathy Bartels at the Shawnee County Extension office at 785-232-0062 ext. 100 by 5:00 pm on Monday, August 9. Commercial pesticide applicator credits have been approved.

Topics and speakers:

**Comparing soil health measurements on a long-term tillage study** – Drs. DeAnn Presley and Peter Tomlinson

**Research updates involving strategies to manage weeds in soybean**– Lily Woitaszewski, Tyler Meyeres, and Chad Lammers

**Managing soybeans to increase yield and quality** – Dr. Andres Froes De Borja Reis

**Operation weed eradication** – Katie Stratham

Please contact the Leroy Russel at 785-232-0062 if accommodations are needed for persons with disabilities or special diet requirements.



***Kansas State Research & Extension  
KSU Agronomy***



## **Kansas River Valley Experiment Field 2021 Fall Field Day**

**Tuesday, August 10 - 5:00 p.m. Sharp!**

**Rossville Field** — 1 Mile East of Rossville  
On U.S. Highway 24 on the South Side of the Road

**Comparing Soil Health Measurements on a Long-Term Tillage Study**  
*Drs. Deann Presley and Peter Tomlinson*

**Research Updates Involving Strategies to Manage Weeds In Soybeans**  
*Lily Woitaszewski, Tyler Meyeres and Chad Lammers*

**Managing Soybeans to Increase Yield and Quality**  
*Dr. Andre Froes De Borja Reis*

**Operation Weed Eradication**  
*Katie Strathman*

To pre-register for this event and for the catered BBQ meal sponsored by Wilbur-Ellis, call Kathy Bartels at the Shawnee County Extension Office at 785-232-0062 ext 100, by 5:00 p.m. on Monday, August 9.

**Commercial Pesticide Applicator Credits have been approved.**

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## 5. K-State East Central Experiment Field Fall Field Day, August 18

All interested individuals are invited to attend the **2021 East Central Experiment Field Day** on **Wednesday, August 18, at 9:00 a.m.** The event will be held at the Ottawa Experiment Field (From I-35 at Ottawa proceed south 1.7 miles on 59 Hwy, go east 1 mile, and south 0.75 mile).

This is a free event and no pre-registration is required. Registration will begin at 9 am with coffee and doughnuts provided. The program will start at 9:30 am. There will be a lunch at noon after the conclusion of the program. Commercial pesticide applicator credits have been approved.

Topics and speakers:

**Integrated weed management in current herbicide-resistant soybean systems** – Dr. Sarah Lancaster, Tyler Meyeres, and Chad Lammers

**Soil health measurements in a 12-year crop residue removal study** – Dr. DeAnn Presley

**Managing your corn to increase input efficiency and yields** – Dr. Ignacio Ciampitti

**Managing soybeans to increase yield and quality** – Dr. Andres Froes De Borja Reis

**Operation weed eradication** – Katie Stratham

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.





*Kansas State Research & Extension/*



## **KSU Agronomy Ottawa Field Day**

**Wednesday, August 18<sup>th</sup>, 2021**

**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**

**Integrated weed management in current herbicide resistant soybean  
systems *Dr. Sarah Lancaster, Tyler Meyeres and Chad Lammers***

**Soil health measurements in a 12-year crop residue removal study.**

***Dr. Deann Presley***

**Managing your corn to increase input efficiency and yields.**

***Dr. Ignacio Ciampitti***

**Managing soybeans to increase yield and quality.**

***Dr. Andre Froes De Borja Reis***

**Operation weed eradication.**

***Katie Strathman***

**12:00..... Lunch**

Commercial Pesticide Applicator Credits have approved. 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.

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Kansas State University Department of Agronomy

2004 Throckmorton Plant Sciences Center | Manhattan, KS 66506

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