



Extension Agronomy

eUpdate

02/22/2019

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. Spring weather outlook for Kansas.....	3
2. Summary of 2018 Kansas Corn Yield Contest.....	6
3. Updated resources on the Kansas Climate website.....	11
4. Upcoming workshops on growing cotton and canola in Kansas.....	13
5. Updated - Prescribed burning workshops scheduled for 2019.....	16

1. Spring weather outlook for Kansas

Winter has had a tight hold over February weather. The outlook for March (the first part of the month) calls for an increased chance of cooler-than-normal temperatures across the state (Figure 1). The signal is strongest in the northeast, and weakest in the southwest. The precipitation pattern for March is less clear, with equal chances of above-normal, normal, or below-normal amounts. A normal or slightly below normal precipitation pattern for March would be favorable in the eastern divisions, where saturated soils continue to linger from the excessive fall moisture. Cool temperatures would slow the normal drying pattern. If that is coupled with wetter-than-normal conditions, planting delays could be a problem. In addition, flooding could be an issue as many streams, ponds, and reservoirs are full. We will have more details on soil moisture and possible issues next week.

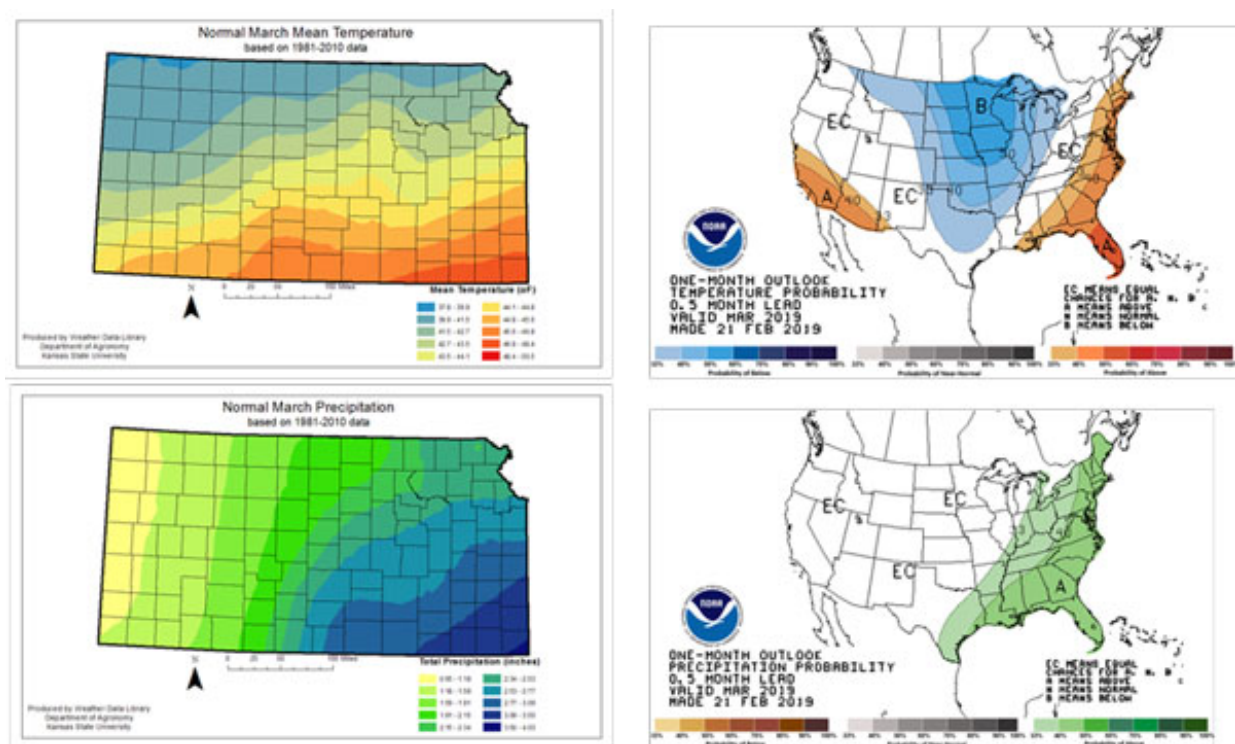


Figure 1. March Outlooks (right panels) versus normal Kansas weather patterns (left panels) in March (Maps from Weather Data Library and Climate Prediction Center).

As the outlook is expanded to include the entire spring season, the temperature outlook switches to a neutral pattern, with equal chances for above-normal, normal or below-normal temperatures (Figure 2). However, this does not indicate how those temperatures might be distributed. A big concern would be a repeat of the 2018 pattern, where much colder-than-normal temperatures prevailed in April, to be quickly replaced by much warmer-than-normal temperatures in May. This

narrowed the reproductive period for winter wheat, with a negative impact on yield.

There is a slight chance for above-normal precipitation state-wide for the period. Again, this does not indicate the distribution pattern. A slightly drier-than-normal March or April that allows for an adequate planting window would actually be favorable in the eastern divisions. The western third of the state has drier soil moistures at the surface, and would benefit more from a normal precipitation pattern.

While an El Niño has been officially declared, it continues to be weak. An El Niño generally favors wetter-than-normal conditions in the Central Plains. However, the El Niño signal has its weakest correlation in the spring season. Impacts are more likely to be the result of an active Madden Julian Oscillation, which results in increased frequency of storm systems. This increases the chance of normal to above-normal precipitation in Kansas. Additionally, there is a positive pattern in the Arctic Oscillation which is forecasted to continue through the next few weeks. This makes cold intrusions into the Plains more likely and is known to phase polar/subtropical jet streams across the U.S. resulting in stronger storm systems.

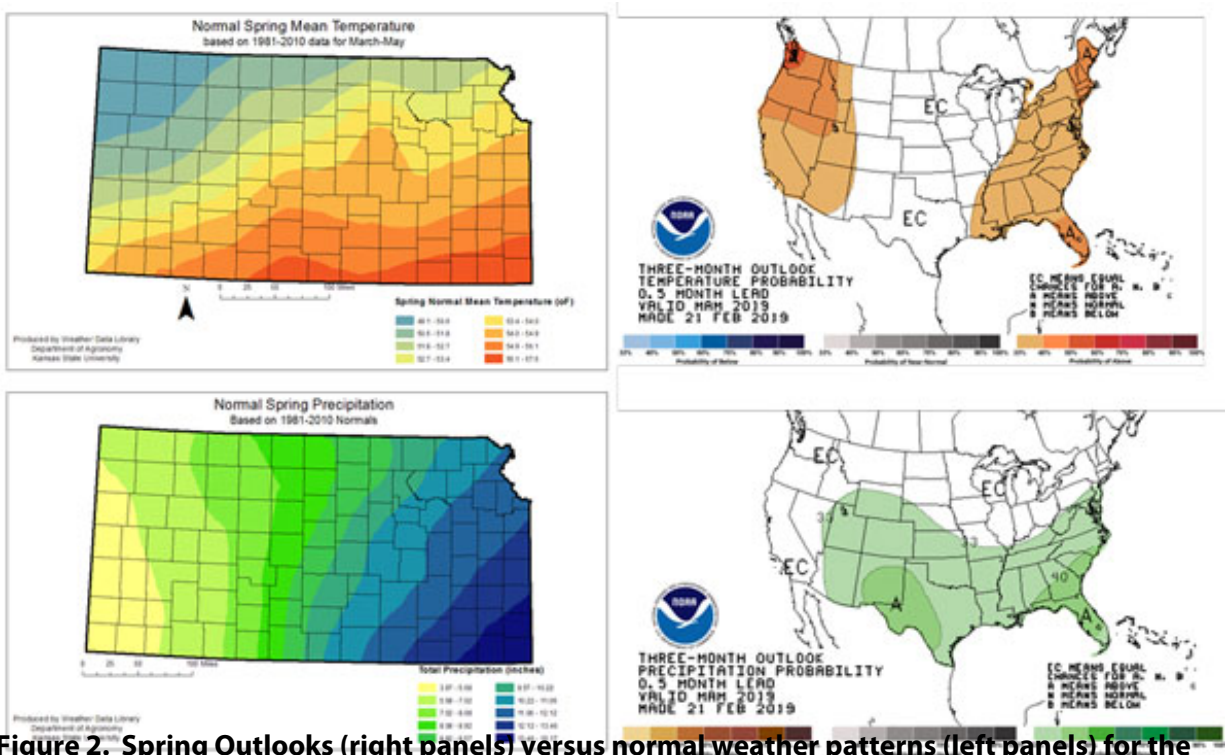


Figure 2. Spring Outlooks (right panels) versus normal weather patterns (left panels) for the entire spring season (March, April, May). (Maps from Weather Data Library and the Climate Prediction Center)

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2. Summary of 2018 Kansas Corn Yield Contest

Kansas Corn, in conjunction with K-State Research and Extension, conducted a Kansas Corn Yield Contest for the 2018 growing season. This contest was free to enter and was open to all corn producers in Kansas that were active members of the Kansas Corn Growers Association. The objectives of the contest were:

- Recognize high-yielding Kansas corn farmers.
- Improve crop management practices and increase efficiency for greater sustainability and profitability.
- Share data collected among Kansas farmers and provide tips for improving management practices.

Field locations

A large concentration of the fields was located in Sheridan, Atchison, and Doniphan counties (Figure 1). Other fields were located in west, south, north central, and southeast Kansas.

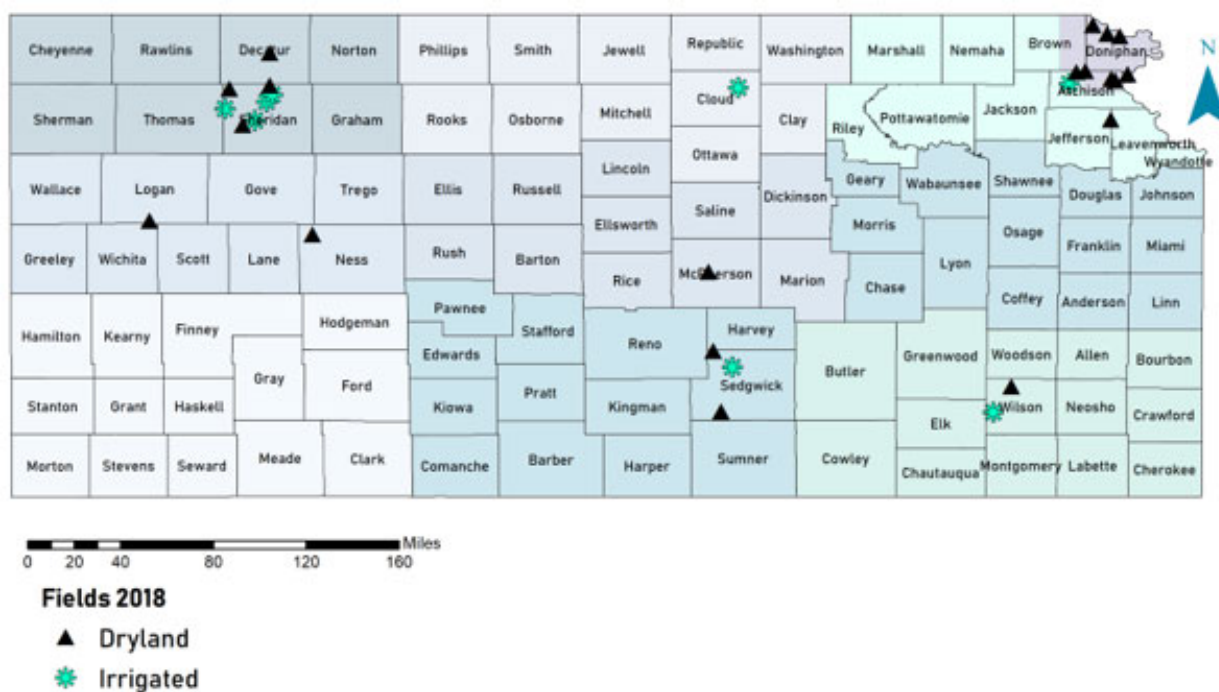


Figure 1. Field locations for high-yield corn contest entries. Dryland (25 entries), Irrigated (9 entries).

Summary of Results

- **Yield**
 - Average yield of the harvested plots was 234.2 bushels per acre (bu/a), ranging from 145.5 to 307.4 bu/a.

- Average yield of the entire fields was 207.4 bu/a, ranging from 108.4 to 272.0 bu/a. This average value was 60% greater than the Kansas average (130 bu/a) for corn yield in 2018.
- **Crop management**
 - Corn hybrids represented four different seed companies.
 - Planting date varied between April 10 and May 25. There was a 2.1 bu/a yield reduction for each day of delayed planting from April 10 (Figure 2A).
 - Average seeding rate was 28,000 seeds/a, varying between 16,000 to 36,000 seeds/a. There was a positive linear relationship between grain yield and seeding rate (Figure 2B) indicated by a 6 bu/a increase in yield per 1,000 seeds/a.
 - 88% of the fields implemented 30-inch row spacing.
 - Soybean was the most frequent previous crop (54%), followed by corn (25%), and wheat (21%).
 - For residue management, 84% of the farms conserved the previous crop residue, 10% grazed the residue, and 6% harvested it.
 - For tillage management, 22% of the farms utilized no-tillage, 44% used strip-tillage, and 34% used other tillage practices (e.g., disk, vertical, chisel).
 - A majority of the corn received (78%) received both pre- and post-emergence herbicide, while 22% only received pre-emergence treatment.
 - For pest management, 53% of the corn received fungicide application, while 9% received only insecticide treatment.

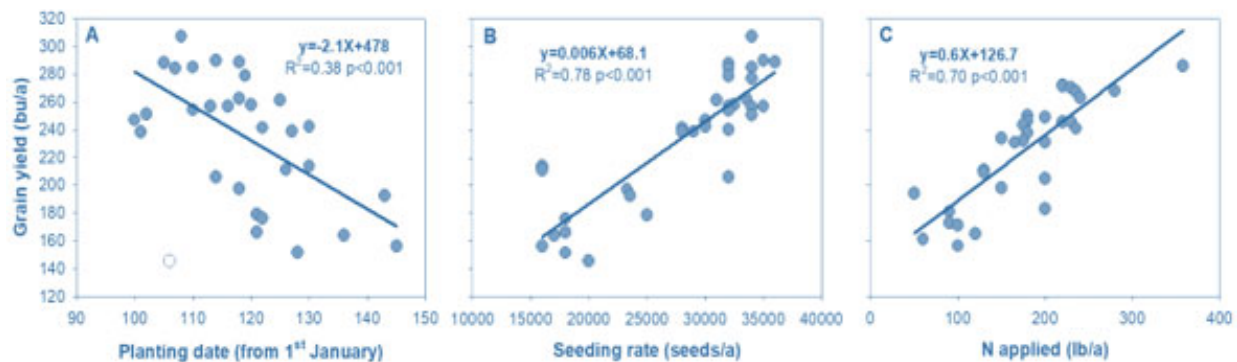


Figure 2. Relationship between grain yield and A) planting date, (B) seeding rate, and (C) amount of fertilizer N applied.

- **Nutrient management**
 - 44% of the corn received starter fertilizer, 90% P fertilizer (averaging 62 lb P_2O_5 /a), 55% K (averaging 65 lb K_2O /a), and all the fields received N fertilization (averaging 117 lb N/a).
 - Grain yield and N fertilization were positively related (Figure 2C), with yields increasing 0.6 bu/a per unit of N applied (lb/a).
 - None of the farmers reported iron deficiency.
 - Lime was applied by 6% of the farmers, with the same for manure application (6%).

Yield Environments Summary

- **Yield**

- Average grain yield increased 37% from low- (<214 bu/a) to medium-yielding environments (214-257 bu/a) and 13% from medium- to high-yielding (>257 bu/a) environments.

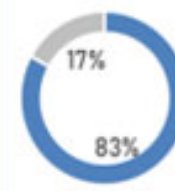
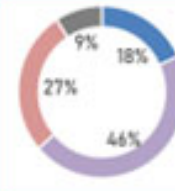
- **Crop management**

- Planting date could be one of the main factors affecting grain yield. Averaging 12 days delayed on planting date for the low versus both the medium- and high-yielding environments (Figure 2A).
- Average seeding rate increased 65% from low to high yielding fields. As was shown in Figure 2B, a positive relationship was observed between yield and seeding rate.
- A 41% irrigation adoption was observed in medium- and high-yielding fields versus no irrigation adopted for the low-yielding environment.
- Most of the medium- and high-yielding fields (~85%) used both pre- and post-emergence herbicides, while a lower proportion (67%) of the low-yielding fields used both herbicides.
- A greater proportion of the fungicide was reported to be applied in both medium- and high-yielding fields compared to low yielding environments (81% vs. 17%, respectively).

- **Fertilization**

- A lower amount of P and K fertilizers were applied in low-yielding fields (33 and 35 lb/a of P₂O₅ and K₂O, respectively) compared to medium- and high-yielding fields (70 and 62 lb/a of P₂O₅ and K₂O, respectively).
- Average rate for fertilizer N application increased by 60% from low- to medium-yielding group and by 23% from medium- to high-yielding corn contest-winner entries. As was shown in Figure 3C, a positive relationship was observed between both variables.

Table 1. Summary of grain yield, crop management, and fertilizer strategies for different yield categories (low, medium, and high yield).

Yield category		Low ($\leq$ 214 bu/a)	Medium (214 - 257 bu/a)	High ($>$ 257 bu/a)
Grain yield (bu/a)	Plot	180	247	278
	Field average	144	209	249
	Field minimum	96	142	181
	Field maximum	237	275	305
Crop management	Planting date	May 6 th	Apr 23 rd	Apr 25 th
	Seeding rate (seeds/a)	20,230	30,900	33,420
	Row width (in)			
	Irrigation (% adopted)	0	40	42
	Tillage			
	Herbicide			
	Fungicide (% adopted)	17	88	73
	Insecticide (% adopted)	0	38	0
	Starter (% adopted)	50	30	42
Fertilizers	P ₂ O ₅ (lb/a)	33	73	66
	K ₂ O (lb/a)	35	70	54
	N (lb/a)	118	189	233
	Manure (% adopted)	0	10	8
	Lime (% adopted)	8	0	8

In summary, different management practices affect corn grain yield. Results from the 2018 Kansas Corn Yield Contest indicated that the use of irrigation, a balanced fertilization program (N, P, and K), mid-to-late April planting date (April 24), seeding rate above 30,000 seeds/a, use of fungicides, and pre- and post-emergence herbicides were all management practices implemented to maximize corn grain yields in Kansas.

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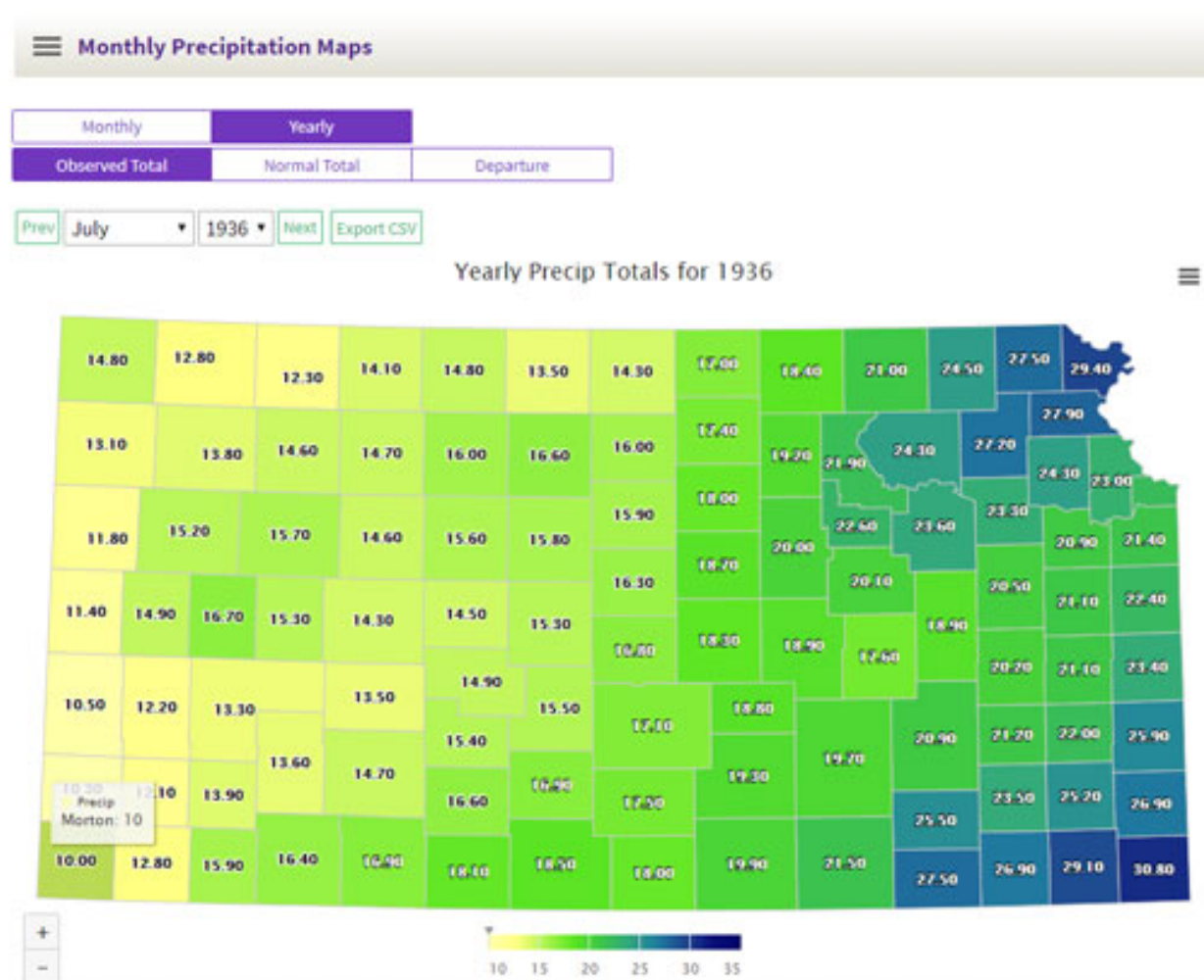
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Rafael Casaroto, Visiting scholar, KSUCROPS lab

3. Updated resources on the Kansas Climate website

For many years, the Kansas Climate web page (climate.k-state.edu) has made precipitation data available by counties, however there were certain limitations. Up until September 2018, data was only averaged from a limited selection of stations. Another limitation was that the data only went back to 1939. Thanks to a new data set available from the National Centers for Environmental Information, we have been able to update this resource. The data set is now based on a gridded product that includes all stations in the Global Historical Climate Network (GHCN). In addition, the dataset has been extended back to 1895. You can select the year or month, as well as the observed, normal, or departure.



Data for the previous year through the current is preliminary, and may show some differences as additional stations are included and as quality control algorithms are applied. More details about how the dataset is developed and updated can be found at <ftp://ftp.ncdc.noaa.gov/pub/data/cirs/climdiv/county-readme.txt>.

Much of the work for this upgrade was due to the efforts of student developer Mark Christiansen, Computer Engineering.

Questions? Problems? Please let us know at kansas-wdl@ksu.edu.

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4. Upcoming workshops on growing cotton and canola in Kansas

K-State Research and Extension is hosting two workshops focusing on cotton production in Kansas. One of the workshops also includes additional programs on canola production and industrial hemp. Details of each workshop are provided below.

Workshop 1 – “What you should know on growing cotton and canola”

February 27 – 10 a.m. to 2 p.m. in Pawnee County
403 East 18th, J.A. Haas Exhibit Building
Larned, KS

Topics include:

- Canola and Cotton
 - Growth and development, heat units, and irrigation
- A brief discussion on industrial hemp
- Five principals of improving soil health

A free meal will be provided by Pawnee County Extension and Kaufman Seeds. There is no fee to attend, but please RSVP by Monday, February 25. Contact the Pawnee County Extension office at 620-285-6901 or email Kyle Grant at kkgrant@ksu.edu.

Workshop 2 – “Cotton Basics”

March 5 – Clark County, program begins at 6:00 p.m. with a meal.
Minneola Civic Connection
130 Main St.
Minneola, KS

Topics include:

- Cotton 101
- Heat units effect on yield potential and cotton irrigation strategies

Please RSVP for the free meal by Friday, March 1, by contacting Brice Gibson at the Clark County Extension office at 620-635-2811 or by email at begibson@ksu.edu.

K-State Research and Extension Pawnee County Kauffman
Seeds

What you should
know on growing
Cotton and Canola.



February 27, 2019
10 a.m. to 2 p.m.

At the J.A. Haas Exhibit
Building
403 East 18th
Larned, Kansas

Speakers:
Lucas Haag
Stewart Duncan
Micheal Stamm
KSU Speakers
Darrin Unruh
Kauffman Seeds

Cotton and Canola

Growth and Development
Heat Units and Irrigation

**A brief discussion on Industrial
Hemp**

**5 Principals of Improving Soil
Health**

**Meal provided by Pawnee County
Extension and Kauffman Seeds**
Pulled Pork and all the fixings

**No fee to attend, but RSVP is
requested by Monday, February 25.**
**Contact the Pawnee County
Extension office at 620-285-6901 or
email Kyle at kkgrant@ksu.edu**

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Kansas State University Department of Agronomy

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Cotton Basics

March 5th

6:00 Meal

6:30 Meeting

Minneola Civic Connection

130 Main St

Minneola, KS

Cotton 101

Stu Duncan, Ph.D.

Northeast Area Crops and Soils Specialist, K-State Research and Extension

Heat Units Effects on Yield Potential and Cotton Irrigation Strategies

Lucas Haag, Ph.D.

Northwest Area Agronomist K-State Research and Extension

To RSVP for the free meal

Call Brice Gibson at the K-State Research and Extension-Clark County office at 620-635-2811 or email at begibson@ksu.edu by March 1st.

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5. Updated - Prescribed burning workshops scheduled for 2019

Several prescribed burning workshops have been scheduled for the months of February and March, with more in the planning stages. Partners involved include K-State Research & Extension, Kansas Forest Service, USDA-NRCS, USDA-FSA, Kansas Conservation Districts, Department of Wildlife, Parks & Tourism, the National Weather Service, Local Fire Departments and Emergency Management Personnel, Pheasants Forever, The Wildlife Society – Kansas Chapter, and Great Plains Fire Science Exchange.

Each workshop lasts about 4-5 hours and includes topics on reasons for burning, regulations, weather considerations, liability, burn contractors, equipment and crew, hazards, fuels, firebreaks, fire types and behavior, ignition techniques, and burn plans.

Contact Walt Fick at 785-532-7223 or whfick@ksu.edu if you have any questions regarding a prescribed burning workshop. Be sure to contact the host to register for a workshop.

Date	County/City	Host/ Contact	Agency	Phone	e-mail
Feb. 25	Washington/ Barnes	Brett Melton	KSRE	785-243-8185	bmelton@ksu.edu
Feb. 27	Cowley/ Winfield	Elizabeth Espino	KSRE	620-221-5450	eespino@ksu.edu
Feb. 28	Lincoln/ Sylvan Grove	Barrett Simon	KSRE	785-378-3174	barrett8@ksu.edu
Mar. 1	Atchison/ Effingham	Tiffany Hoffman	CD	913-833-5740 ext 333	Tiffany.Hoffman@ks.nacdnet.net
Mar. 6	Franklin/ Ottawa	Keri Harris	CD	785-241-7201	frco.conservation@gmail.com
Mar. 8	Logan/Oakley	Dana Charles	CD	785-672-3841	dana.charles@ks.nacdnet.net
Mar. 18	Johnson/ Olathe	Jessica Barnett	KSRE	913-715-7000	jessica.barnett@jocogov.org
Mar. 22	Brown/ Reserve	Taylor Hall		785-742-4704	taylor.hall@sacfoxenviro.org