Issue 751

K-STATE Research and Extension

Extension Agronomy

eUpdate

06/10/2019

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. Adjusting seeding rates for delayed planting of sorghum

Most producers are aware of the recommendation to increase seeding rates for wheat when planting is delayed. We know this is necessary as with later planting the window of opportunity to set fall tillers, the productive tillers in wheat, starts to close. Grain sorghum is a tillering grass crop much like wheat, and as planting is delayed the opportunity for tillers to form and produce productive grain declines.

Research conducted by K-State at St. John, Kansas, demonstrates the relationship between seeding rate, planting date, and the contribution to final yield by tillers. In Figure 1, for each bar, the yellow represents the contribution to final grain yield from tillers, while the green, purple, and white portion of the bar represents the contribution to yield from the main stems for a low, medium, and high seeding rate. At the earliest planting date seeding rate did not affect yield, with tillers contributing a larger amount of grain at the lower seeding rates. However, as planting dates are moved later, the ability of tillers to form and produce grain is limited.

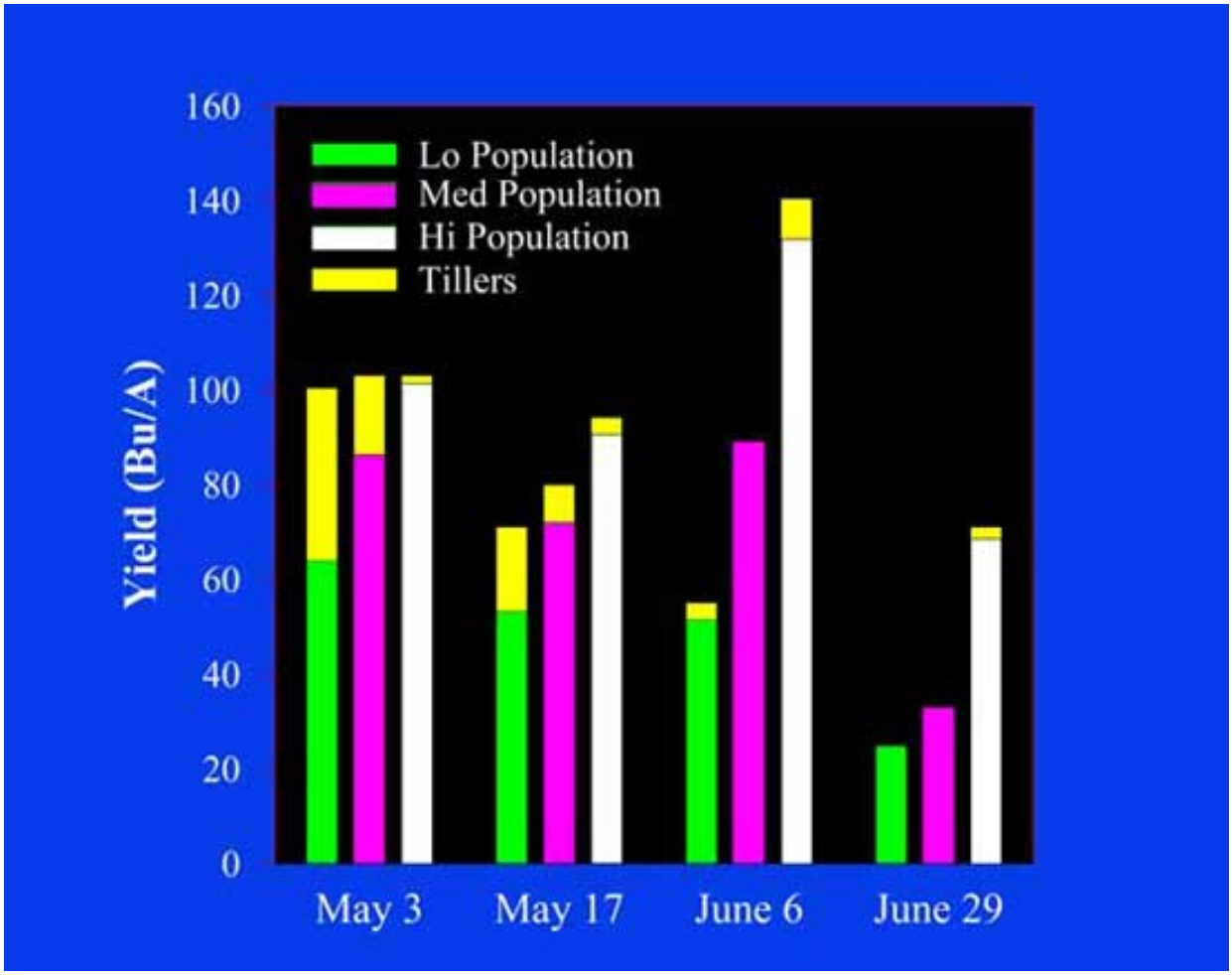

Figure 1. Relationship between seeding rate (low, medium, high), planting date (May 3, May 17, June 6, June 29), and contribution by tillers (yellow bar) to grain sorghum yield (bushels per acre). Graph by Lucas Haag, K-State Research and Extension.

In order to maintain yield potential with later planting dates, higher seeding rates are necessary to provide enough heads per acre. As planting moves later, producers should be seeding at or slightly above the upper end of the seeding rate range presented in Table 1 of the 2019 Sorghum Management Guide, https://www.bookstore.ksre.ksu.edu/pubs/MF3046.pdf.

Table 1. *Grain sorghum recommended plant and seed spacings.*

	Average annual rainfall (inches)				
	<20	20–26	26–32	>32	Irrigated
	Target plants per acre (x 1,000)				
	23-27	25–45	35–55	50–90	80-110
	Seeds/acre (x 1,000; 70% emergence)				
	30–35	35–64	50–80	70–125	110-150
Row Spacing	Within-row seed spacing at planting assuming 70% field emergence				
8-inch	26–22	22–12	16–10	11–6	7–5
10-inch	21–18	18–10	13–8	9–5	5–4
15-inch	14–12	12–7	8–5	6–3	4–3
20-inch	10–9	9–5	6–4	4–2	3–2
30-inch	7–6	6–3	4–3	3–2	2–1

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2. Kansas wheat update: June 10, 2019

Crop development (growth stage estimations)

With below-average temperatures during May, the wheat crop is still behind in development compared to the historical average. Our estimated development for wheat around Kansas ranges from near physiological maturity in the far southeast corner of Kansas, to heading and flowering in the far northwest corner of the state (Figure 1). This ranges from one to three weeks behind, depending on planting date, although these differences are not as apparent when comparing with the 5-yr average percent wheat headed as reported by the USDA (Figure 2). Late-sown fields, such as fields planted after soybeans and after all the rain received during October, are the furthest behind in development. The late development of the crop can induce heat stress during grain fill, potentially decreasing grain yield. Maximum daily temperatures above approximately 81 F during grain filling can start negatively impacting wheat yields.

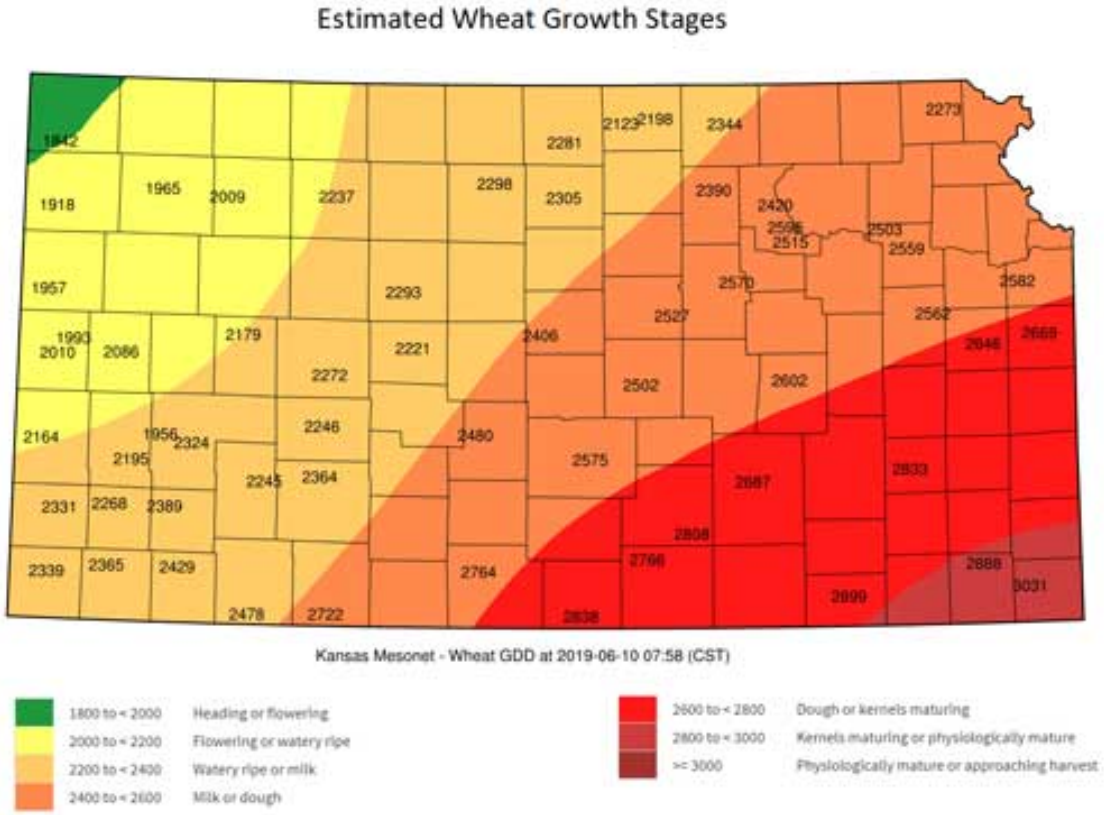
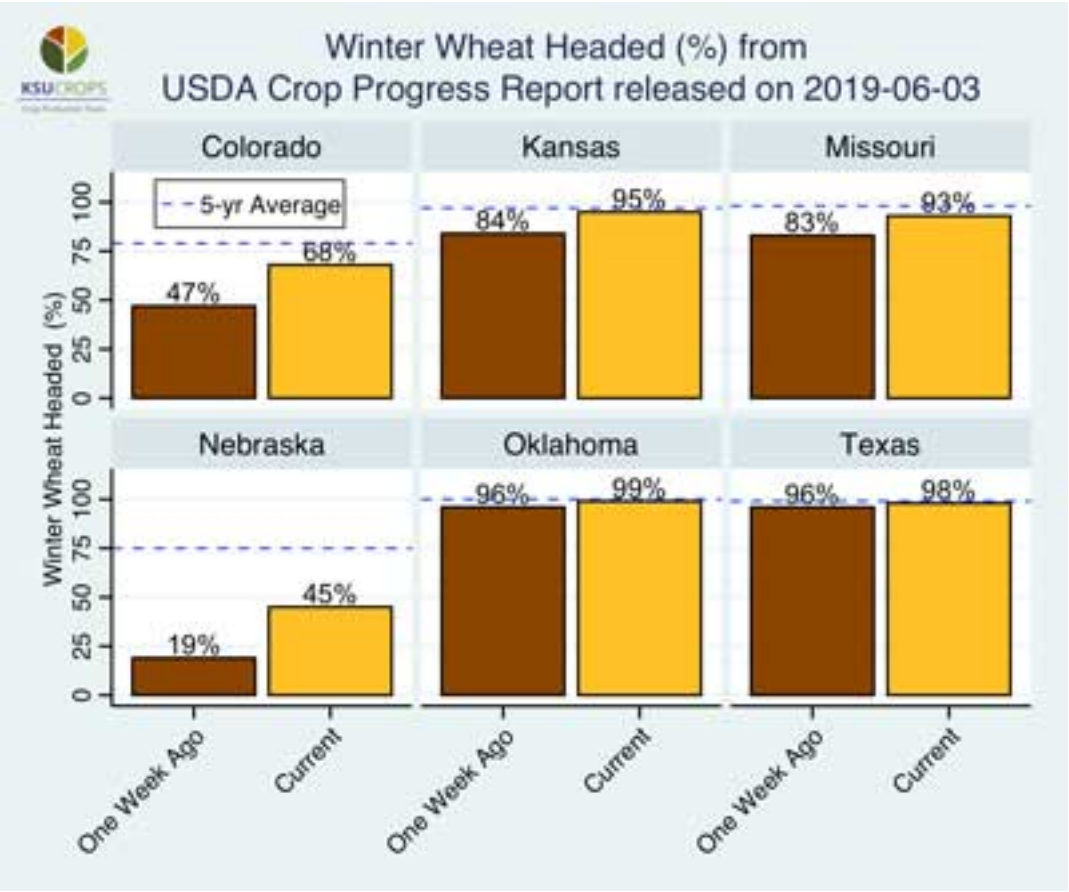


Figure 1. Estimated wheat growth stage based on accumulated temperatures since January 1, 2019.



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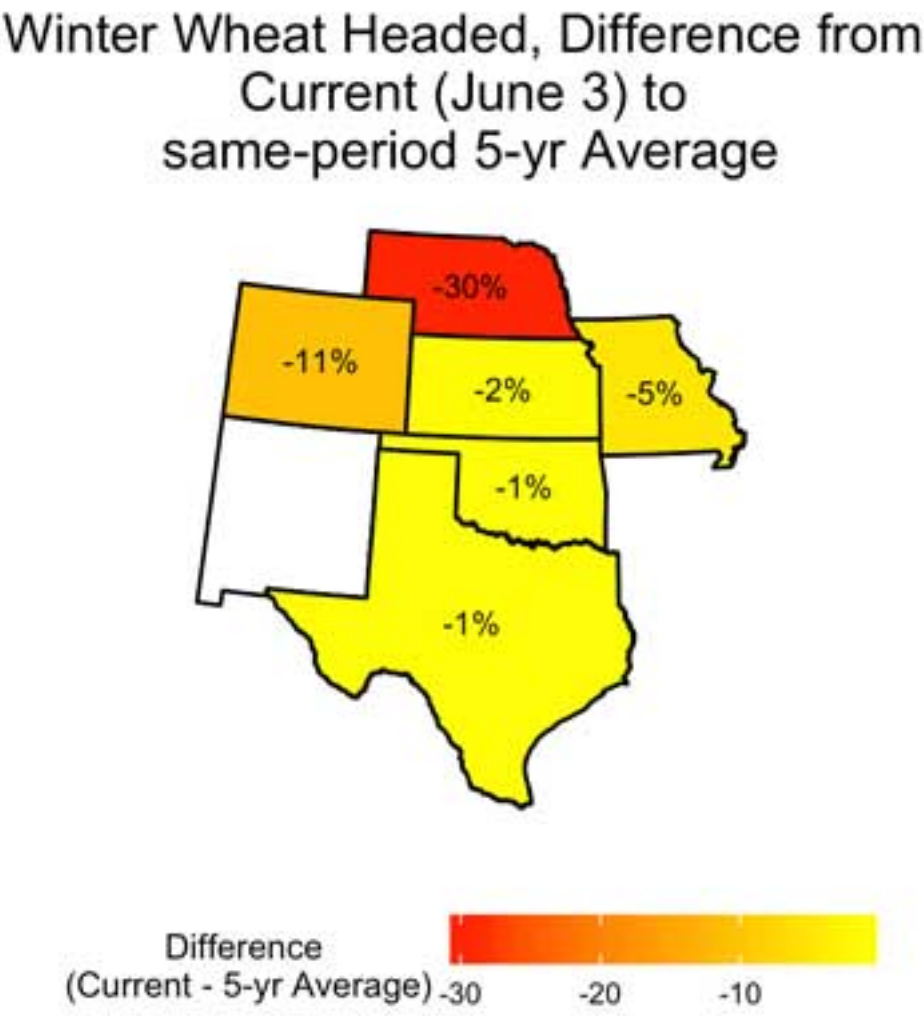

Figure 2. Percent winter wheat headed (current versus 5-yr average, upper panel) and comparison between percent wheat headed in 2019 versus the 5-yr average as reported by the USDA on June 3, 2019 (lower panel). Figures created by Leonardo Bastos, K-State Research and Extension.

Waterlogging

Parts of central Kansas received as much as 30 inches of rainfall since April 1 (Figure 2, upper panel), and as much as 60 inches of precipitation since September 1 (Figure 3, lower panel). This excessive amount of rainfall caused flooded fields in a large portion of the state, ranging from Dickinson/Marion counties down to Sumner county, and as far west as Barton county. These waterlogged conditions are causing several wheat fields to drown out and die prematurely (Figure 4). The actual affected area within each field varies from field-to-field depending on position on the landscape, drainage potential of the field, soil texture, etc. In the extreme cases, more than 80% of the field have prematurely died due to waterlogged conditions (Figure 4).

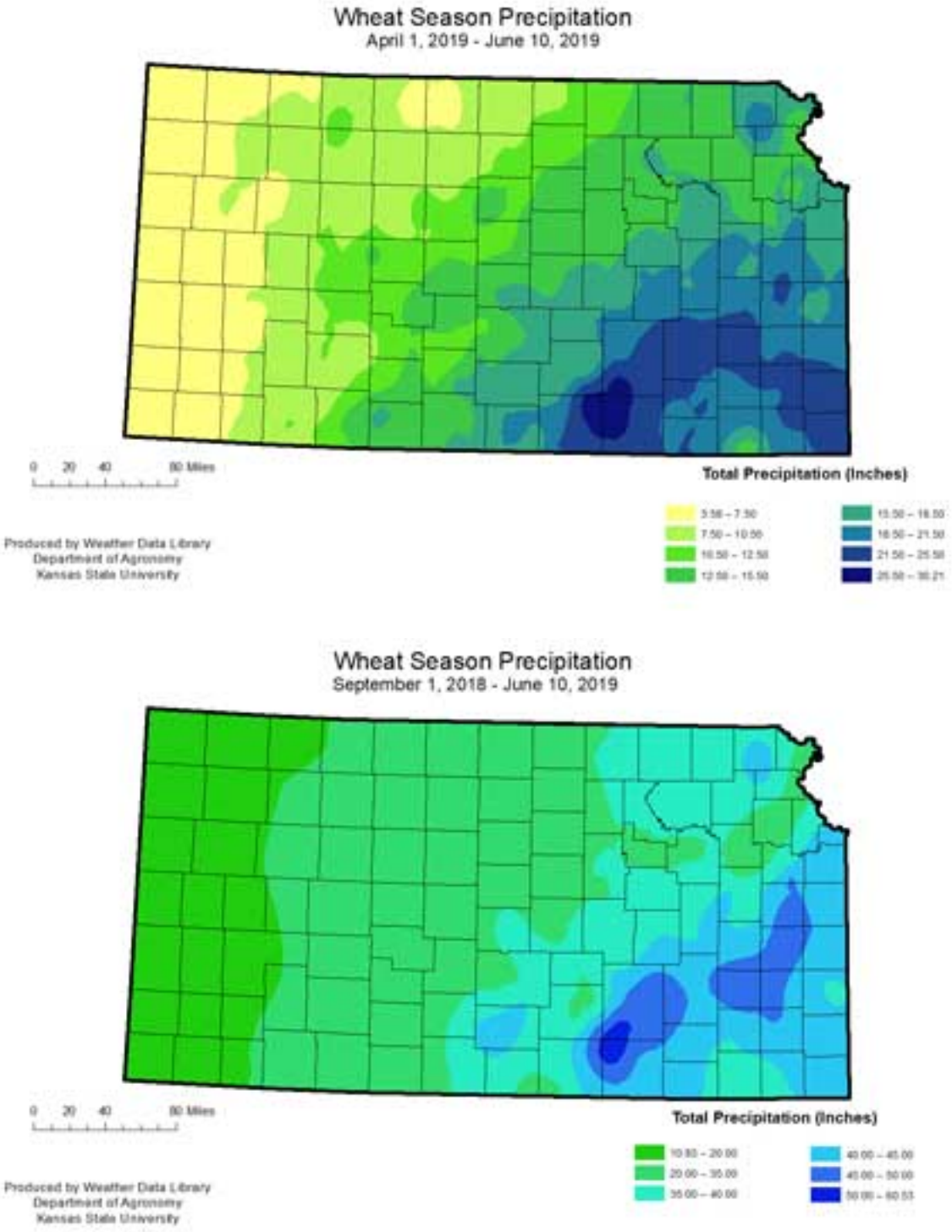

Figure 3. Cumulative precipitation between April 1 and June 10, 2019 (upper panel), and cumulative precipitation for the winter wheat growing season (September 1, 2018 to June 10, 2019, lower panel).

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Figure 4. Wheat fields prematurely dying due to waterlogged conditions. Upper photo is a wheat field in southern Dickinson County in which the areas with some slope, such as the field corners and around the drainage tiles, are still green; but flat areas have drowned out. Photo taken by Jenny Sherbert, Agronomy Department Coordinator with Agri Trails Coop in Hope, KS. Lower photo is a wheat field in Sedgwick County also showing sections of the field dying prematurely due to waterlogging. Photo taken by Jeffrey Seiler, K-State Agricultural Agent.

Wheat that was in later stages of kernel development when saturated soil conditions prematurely killed the crop, such as into the soft dough stage or later, will likely see reduced test weight and an increase in shriveled or shrunken grains. For wheat that was further behind, such as fields that were just starting grain fill or not yet at grain filling, the injury will likely be greater and range from moderate damage to complete loss. Due to excessive moisture conditions, the USDA report slightly increased the percent of acres under poor or very poor conditions in Kansas, Oklahoma, Nebraska, and Missouri in the June 3, 2019 report (Figure 5). It will be interesting to see how these acres that prematurely died will be reflected in future USDA reports.

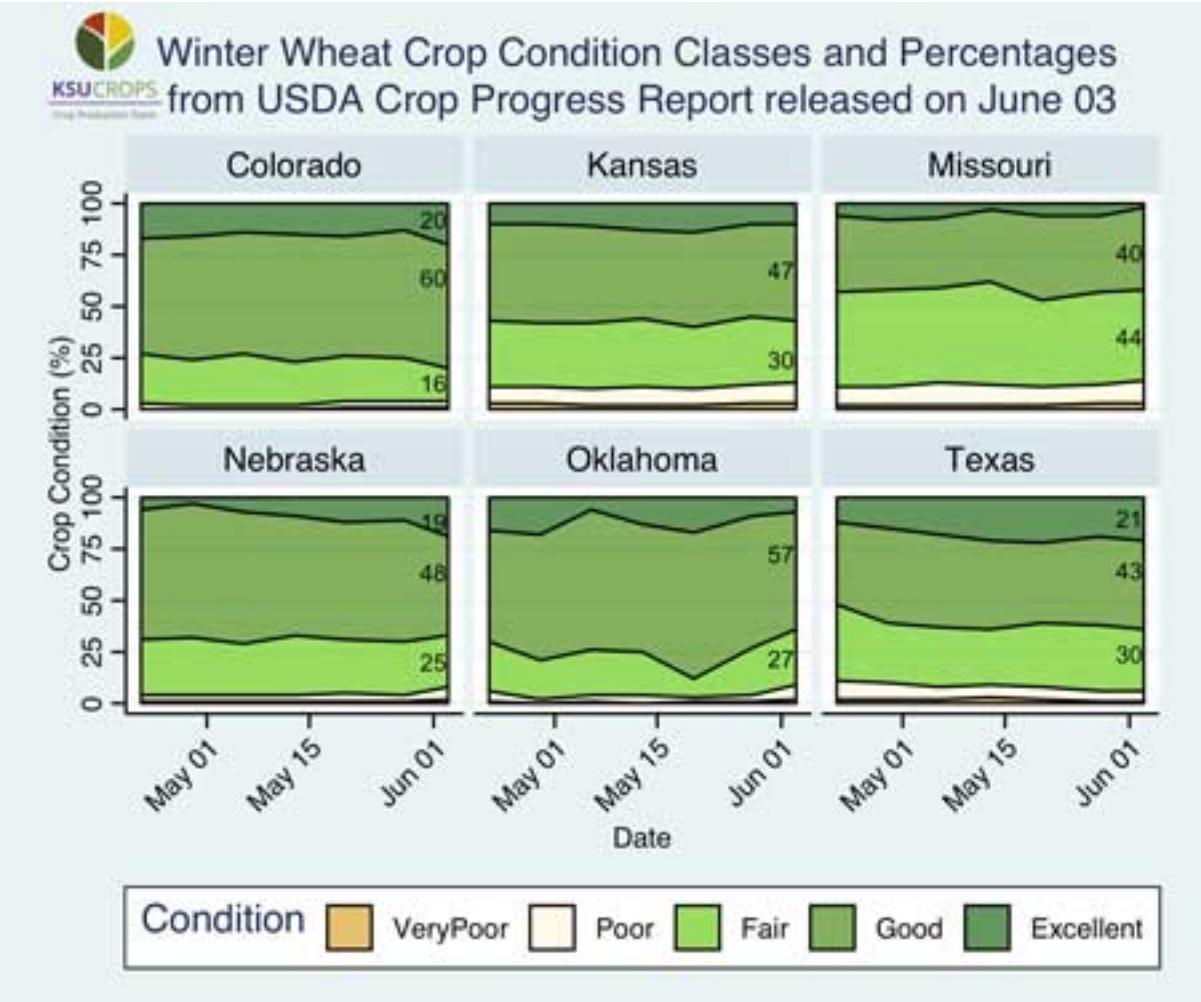

Figure 5. Winter wheat crop condition report from USDA Crop Progress Report released on 3 June 2019 (Figure created by Leonardo Bastos, K-State Research and Extension).

Disease update

Beyond the incidence of stripe and leaf rusts (covered in detail in previous eUpdate articles), head scab is occurring in several fields in central Kansas (Figure 6) due to the cool, wet weather during the critical flowering time (Figure 3). Field conditions were too wet for farmers spray against this disease, which increased the incidence and severity of the disease. Still, even in sprayed fields, the control is far from optimum. Fields planted to more susceptible varieties are showing greater incidence and severity of the disease, but even fields planted to varieties such as Everest, Zenda, or WB4269, which have greater tolerance to the disease, are showing signs of the disease. This disease has several implications: i) yield loss per se, due to blighted or sterile florets and poor grain fill; ii) poor grain quality, as the affected kernels will have low test weight and chalky/tombstone appearance; iii) marketing, storage and utilization concerns, as this fungus can lead to accumulation of vomitoxin (DON) that can lead to discounts in the elevator; and iv) problems with seed germination if saving seed for a next crop.

Figure 6. Symptoms of head scab in a susceptible variety near Belleville (Republic County), KS. Photo taken on June 5, 2019 by Romulo Lollato, K-State Extension Wheat Specialist.

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3. Control strategies for sericea lespedeza

Sericea lespedeza continues to be a major concern on rangeland, pasture, and some CRP acres in Kansas. This state-wide noxious weed infests nearly 500,000 acres in Kansas (Figure 1).

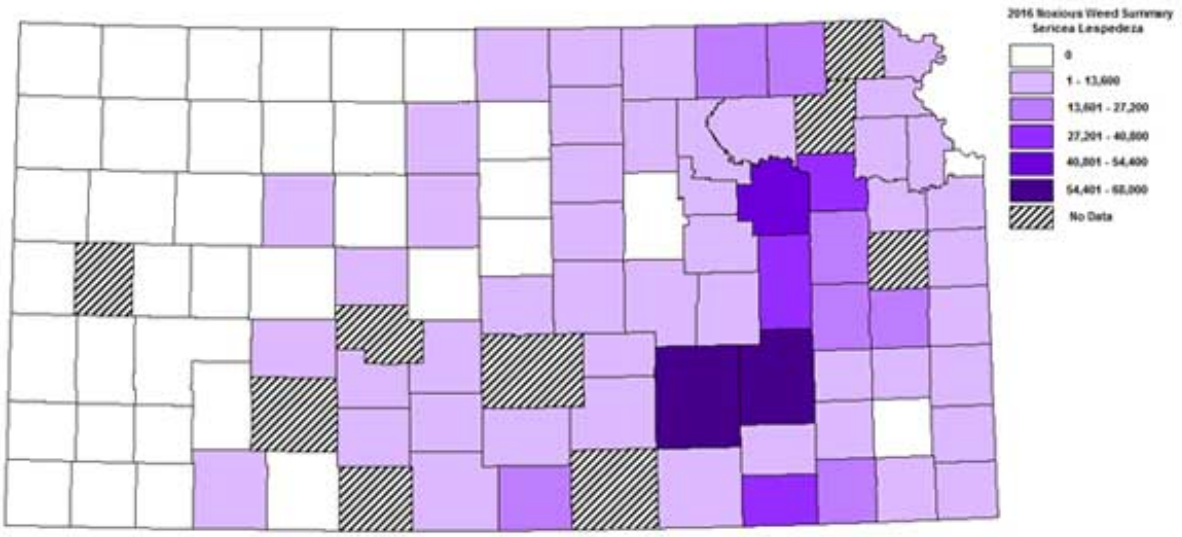

Figure 1. Distribution of sericea lespedeza in Kansas.

Identification is an important first step before initiating a control program. Sericea lespedeza is a perennial legume with trifoliate leaves. The leaves are club or wedged shaped (Figure 2.). Plants are usually about 3 feet tall, but can grow to several feet in height under ideal conditions. Plants will start to bloom in August with white to cream-colored flowers with a purple throat. Most seed production occurs in September.

Figure 2. Trifoliate, wedge-shaped leaflets of sericea lespedeza. Photo by Walt Fick, K-State Research and Extension.

Currently, sericea lespedeza is in a vegetative growth stage (Figure 3) and is rapidly growing. By the end of June plants will begin to branch and become woodier.

Figure 3. Vegetative growth stage of sericea lespedeza. Photo by Walt Fick, K-State Research and Extension

There are no known biological controls that can be effectively used on sericea lespedeza. However, grazing with goats can suppress sericea lespedeza stands and produce a saleable product. It takes 4 to 5 goats per acre (of sericea) to graze the plant heavily enough to eliminate seed production.

Frequent mowing will reduce sericea lespedeza, but is also damaging to plants that might be

growing/competing with sericea. A single mowing in mid- to late-July will eventually reduce stands of sericea lespedeza to some extent. Sericea has not been eliminated, however, even after several years of mowing. A late-summer mowing will eliminate most seed production. Application of appropriate herbicides about 4-6 weeks after mowing will help reduce sericea lespedeza stands, but will also damage other forbs. Prescribed burning in April seems to stimulate seed germination and needs to be followed up with an herbicide application. Burning in August and early September nearly eliminates seed production.

Herbicides applied at the correct time and under favorable environmental conditions can significantly reduce sericea lespedeza. Remedy Ultra (triclopyr) and PastureGard HL (triclopyr + fluroxypyr) can provide effective control when applied during June and into early July when the sericea plants are in a vegetative growth stage. Broadcast applications of Remedy Ultra at 1 to 2 pints/acre and PastureGard HL at 0.75 to 1.5 pints/acre should be applied in spray volumes of 10 to 20 gallons/acre.

Products containing metsulfuron, such as Escort XP, Cimarron Plus, and Chaparral, are generally more effective in the late summer when sericea lespedeza is actively blooming. Recommended rates are 0.5 oz/acre of Escort XP, 0.625 oz/acre Cimarron Plus, and 2.5 to 3 oz/acre Chaparral. Use a non-ionic surfactant with all of these products.

For spot application, mix 0.5 fl oz PastureGard HL per gallon of water, use a 1% solution of Remedy Ultra in water, or 0.3 gram Escort XP per gallon of water. Aerial applications of these products should be done with a minimum spray volume of 3 gallons per acre. Higher volumes, e.g. 5 gallons per acre, will generally be more effective.

Sericea lespedeza is a state-wide noxious weed in Kansas and therefore needs to be controlled. Sericea lespedeza has a tremendous seed bank that helps reestablish stands.

Herbicide treatments will need to be repeated every 2 to 4 years to keep this invasive species in check. Initial treatments should reduce dense stands to the point where spot treatment can be used in future years. Left untreated, sericea lespedeza will dominate a site, greatly reducing forage production and species diversity.

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4. May 2019 - The wettest month ever recorded in Kansas

Yes, you read the title of this article correctly. Many joked that the Central Plains states were a new lake and that is actually fairly accurate assessment. In May, the state of Kansas averaged 10.26 inches across all official weather recording stations. This was over 240% of the 30-year normal of 4.12 inches statewide.

By the numbers

May is historically one of Kansas' wettest months of the year. The warm season consisting of May through August is climatologically the wettest period of the year. Maximums typically occur in one of those months depending on your location in the state. With over 125 years of data, the 10.26 inches of rain averaged across the state in May surpassed the previous 8.79 inches recorded in 1995 (Table 1). Not only did it surpass the record for May, but also the record for the wettest month ever. That previous record was 9.36 inches in June 1951.

Table 1. Top 10 highest rainfall totals for the month of May over the last 125 years. (Source: Kansas Weather Data Library).

Rank	Year	Precipitation Average Statewide (inches)
1	2019	10.26
2	1995	8.79
3	2015	8.28
4	1903	7.78
5	1935	7.35
6	1938	7.22
7	1915	6.71
8	1982	6.63
9	1957	6.52
10	1981	6.43

As mentioned in previous articles, increased moisture has been the story since October 2018. This has not only made it difficult for agriculture but set the stage for historic flooding in many parts of the state. The climatological average precipitation for the year to date from January to the end of May is 10.58 inches. This year for that period Kansas has averaged 16.65 inches, by far the most for this time period on record. For reference, 1993 was the 11th most from January through May with 13.89 inches.

Countless locations in the state, especially in central/eastern areas received tremendous amounts with 20 stations recording over 20 inches (Table 2) in May alone. In most places, this was over half their normal yearly precipitation. The highest daily rainfall was as much over nine inches! Horton recorded 9.42 inches (ASOS) and Rock 3 SW (COOP) had 9.08 inches to take the top daily totals in the state.

Table 2. Stations with May monthly totals over 20 inches of rain in Kansas. (Source: Kansas Weather Data Library).

Rank	Year	Network	Precipitation Total for May (inches)
1	ROSE HILL 2.7 ESE	CoCoRaHS	30.08
2	ROCK 3 SW	COOP	26.14
3	EUREKA 0.9 NW	CoCoRaHS	25.21
4	WINFIELD 7.9 W	CoCoRaHS	24.71
5	AUGUSTA 1.0 S	CoCoRaHS	24.03
6	MULVANE 4.3 WSW	CoCoRaHS	23.02
7	HORTON	COOP	22.00
8	YATES CENTER	COOP	21.93
9	WELLINGTON	COOP	21.80
10	WELLINGTON 1.3 W	CoCoRaHS	21.80
11	BELLE PLAINE 4 W	COOP	21.79
12	POTWIN	COOP	21.75
13	NORTONVILLE	COOP	21.48
14	FARLINGTON 0.8 NNE	CoCoRaHS	20.92
15	MCCUNE 1.6 NW	CoCoRaHS	20.89
16	PITTSBURG	COOP	20.56
17	Haysville	Kansas Mesonet	20.40
18	WINFIELD 5.9 SW	CoCoRaHS	20.38
19	COLUMBUS	COOP	20.17
20	OSAGE CITY 5.2 SW	CoCoRaHS	20.06

A pattern for moisture

Despite spring typically being a dynamic weather pattern with changing weather across the nation, this year was a bit different. A very persistent ridge set up mid-May across the eastern U.S. (Figure 1). This developed a summer-like pattern for those in the southeast. They experienced very dry conditions and an extensive heat wave not typical for this early in the year.

Further west, a persistent ridge across the western U.S. was the result of a strong, buckling jet stream, very anomalously strong for this time of year (120-160 kts), something more typical of February. Unfortunately, the placement of this dip/trough is ideal for advecting moisture northward from the Gulf of Mexico northward into the Central Plains. With the abundance of moisture and persistence in the pattern, widespread flooding (and severe weather resulted).

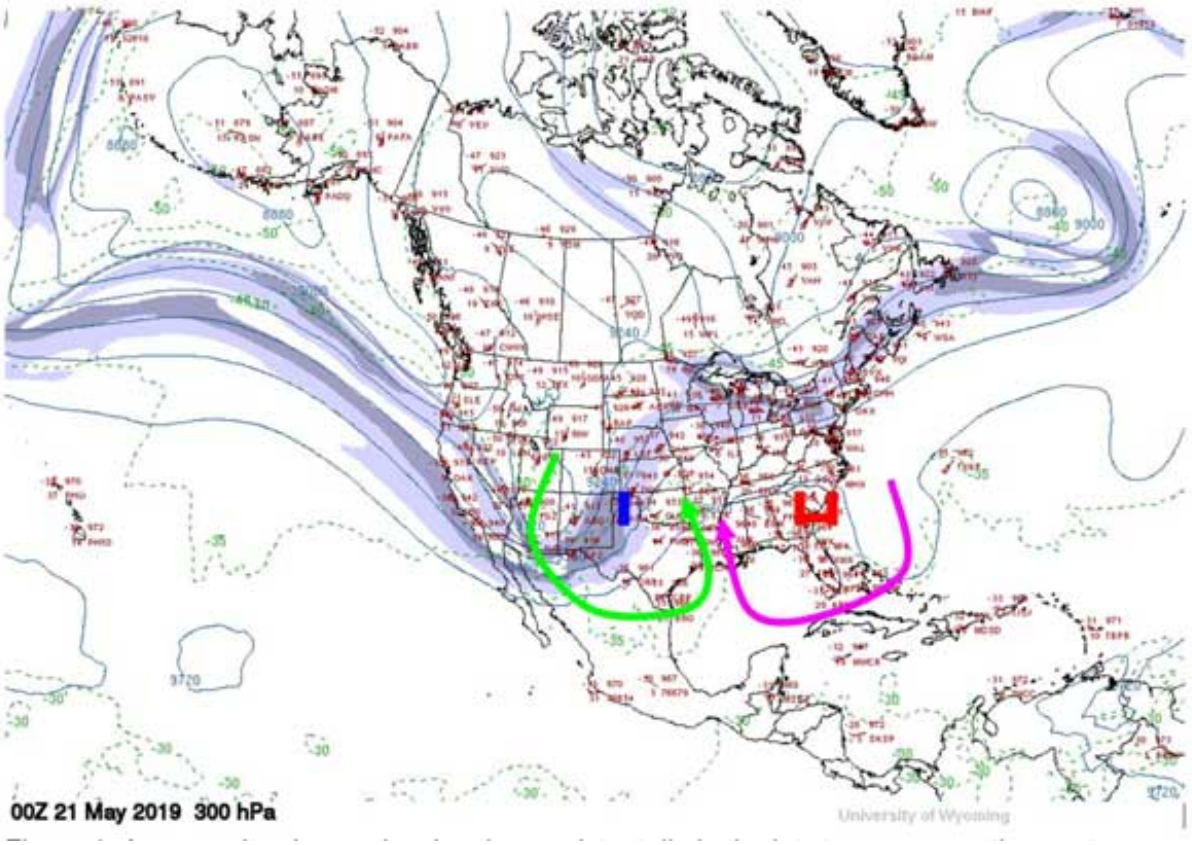

Figure 1. An upper level map showing the persistent dip in the jet stream across the western half of the U.S. and a rise (ridge) over the east. Surface featured a persistent low pressure (blue L) across the southern High Plains and a persistent high pressure (red H) in the southeast. Corresponding flow around these surface features transported Gulf, tropical moisture northward into the Central Plains. (Source: weather.uwyo.edu/upperair/uamap.shtml)

Impacts on rivers and lakes

The overall pattern in Kansas, as well as Nebraska, Iowa, Missouri and Oklahoma, has resulted in widespread flooding. At the end of May, several U.S. Army Corp of Engineer lakes were at or near flood capacity (Figure 2). Despite some dry days to begin June, the hydrological system is still near capacity. Flooding in low-lying areas is likely to continue and river levels are likely to remain high through June and possibly into August. The Climate Prediction Center's outlook for the summer (June, July, and August) continues to favor a wetter-than-normal pattern for the Central Plains.

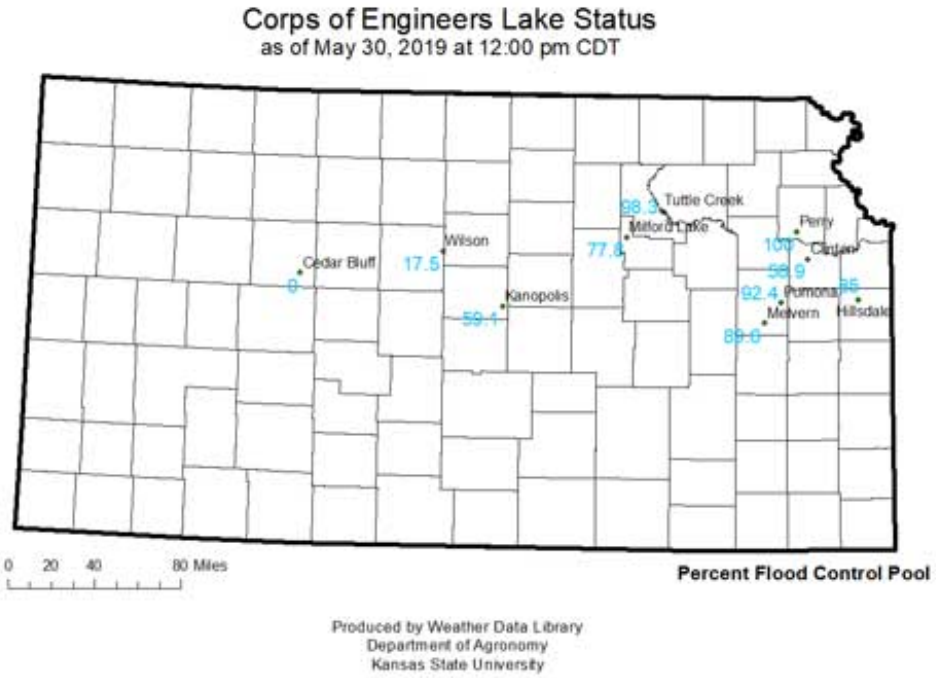

Figure 2. Percent of Flood Control Pool at various lakes/reservoirs in Kansas. Map produced by the Kansas Weather Data Library.

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5. Ag-Climate Update for May 2019

Editor's note: To allow our readers to best view the new format of the Ag-Climate Update, the eUpdate will only feature a short summary each month. The entire 2-page Ag-Climate Update will be posted with much better resolution on the Kansas Climate webpage at http://climate.k-state.edu/ag/updates/. Previous Ag-Climate updates will also be accessible from this same link.

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. The Ag-Climate Update is a joint effort between our climate and extension specialists.

May 2019 – It is not wet but flooded!

At the state level, May 2019 sets the record not only for the wettest May since 1895, but also the wettest month ever for Kansas. State-wide average precipitation for the month was 10.26 inches, 246 % of normal. All divisions averaged above normal for May. State-wide average temperature for the month was roughly 60 degrees F, 3 degrees cooler than normal. This ranks as the 14th coolest on record. The hot spot in both temperature departures and GDD is at Marion Reservoir, where a record warm low temperature for May was set.

The cooler and wetter conditions have left wheat about 1 to 3 weeks behind normal depending on sowing date (see accompanying eUpdate article in this issue for more details). Many wheat fields in the central and south-central portions of the state have drowned out and died due to excessive moisture. By June 2, 79 % of corn had been planted state-wide, and 60 % was emerged. Soybean planting was just 26 % completed. Root zone soil moisture conditions continued wet across Kansas.

View the entire May Ag-Climate Summary at http://climate.k-state.edu/ag/updates/

6. K-State wheat plot tours for June 10-14, 2019

The second week of June features several wheat plot tours in Kansas. These are the last tours this spring. Producers wanting to learn about the different varieties can choose to attend one (or several) plot tours in their county or agricultural district.

The plot tours generally include a discussion of wheat conditions across the state, as well as tips on what to look for when selecting wheat varieties. New and upcoming varieties are discussed, as well as older and more established ones, and a discussion of how all these varieties are responding to this growing season's conditions.

For the week of June 10 - 14, the plot tour locations include:

Tuesday, 6/11/2019, 6:30 am (MT)
Location: Sharon Springs, Wallace Co.
Contact: Jeanne Falk-Jones, jfalkjones@ksu.edu
Directions: 6:30 AM (MT) breakfast at CAB in Sharon Springs (on the fairgrounds). 7:30 AM plot tour at Mai Farms (9 miles south of Sharon Springs on Hwy 27 to Field Rd; 4 miles east and 1/4 mi south)

Tuesday, 6/11/2019, 10:00 am (MT)
Location: Weskan, Wallace Co.
Contact: Jeanne Falk-Jones, jfalkjones@ksu.edu
Directions: 3 mi west of Weskan on Hwy 40 to Rd 3; 5 1/2 mi south at E&H Farms

Tuesday, 6/11/2019, 4:00 pm (MT)
Location: Kanorado, Sherman Co.
Contact: Truman Hooker/Jeanne Falk-Jones, jfalkjones@ksu.edu
Directions: 4-H wheat plot tour. At Kanorado, go west after crossing the RR tracks, north on Locust St. and continue north to the end of the street.

Tuesday, 6/11/2019, 5:30 pm (MT)
Location: Goodland, Sherman Co.
Contact: Jeanne Falk-Jones, jfalkjones@ksu.edu
Directions: 8 mi north of Goodland on Hwy 27; plot is east of scale house at F&J Farms. Supper to follow at the 4-H Building

Wednesday, 6/12/2019, 7:30 am
Location: Levant, Thomas Co.
Contact: Madison Mackley, mmackley@ksu.edu
Directions: 9 miles south of Levant on CR 11. Tour will begin at the Solomon Creek Farms shop where refreshments will be served & then proceed to the plot.

Wednesday, 6/12/2019, 5:30 pm
Location: Wheeler, Cheyenne Co.
Contact: Jeanne Falk-Jones, jfalkjones@ksu.edu
Directions: Sunny Crest Farms (5 mi south of Wheeler on Hwy 27 and 1/4 mi west). Supper to follow

at American Implement in Wheeler.

Thursday, 6/13/2019, 5:30 pm
Location: Atwood, Rawlins Co.
Contact: Stephanie Kramer, smelhus@ksu.edu
Directions: From the intersection of highways 36 and 25 in Atwood, go north on Hwy 25, 4 miles. The plot is located on the east side of the road, just north of Kastens' grain bins.
Refreshments/sandwiches will be served in the field. Please RSVP by June 10 to Stephanie at 785-626-3192 or at the email listed above.

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7. K-State 2019 Field Pea Plot tours

K-STATE
Research and Extension

2019 Field Pea Plot Tours

Rawlins County, June 13, 4:00 PM

- Variety Performance Test
- Wheat plot tour to follow at 5:30 CT with light supper
- From the intersection of Hwy US 36 and K-25 in Atwood go 4 miles north on K-25

Gove County, June 14, 8:30 AM

- Variety Performance Test, seeding rate, seed treatment, and in-furrow fertility studies
- ½ mile south of Park exit (I-70 Exit 99) then ¾ mile west on Gove County Road BB
- Breakfast refreshments sponsored by CHS of Quinter

Thomas Co. / Northwest Research-Extension Center
June 14, 1:00 PM

- Variety Performance Test with 30 entries
- 105 Experiment Farm Road, Colby, KS. Come in the main drive and follow the signs

K-State faculty, industry representatives, and experienced producers will be on hand to discuss pea growth and development, variety selection, herbicide options, production practices, disease management, and producer experiences.

All Times Are Central. For questions or more information contact:

Lucas Haag, K-State Northwest Area Agronomist (785) 462-6281, LHaag@ksu.edu

Field pea information and research results can be found at:
www.northwest.ksu.edu/agronomy

2019 K-State Field Pea Performance Test Entries

Brand	Variety	Location					
		Atwood	Colby	Norcatur	Grainfield	Stockton	Belleville
AAC/Valesco_Genetics	AAC_Profit_(Y)		X			X	
Legume_Logic	AAC_Chrome_(Y)		X			X	
Valesco_Genetics	Salamanca_(Y)		X			X	
Valesco_Genetics	Spider_(Y)		X			X	
PulseUSA	DS_Admiral_(Y)	X	X	X	X		X
PulseUSA	Durwood_(Y)		X	X	X		X
PulseUSA	DL_Apollo	X	X	X	X	X	X
PulseUSA	LG_Amigo_(Y)	X	X	X	X		X
PulseUSA	LG_Sunrise_(Y)	X	X	X	X		X
PulseUSA	Nette_2010_(Y)	X	X	X	X		X
PulseUSA	SW_Midas_(Y)		X	X			X
Meridian_Seeds	Agassiz_(Y)		X	X			X
Meridian_Seeds	Earlystar_(Y)		X	X			X
Meridian_Seeds	AAC_Carver_(Y)		X	X			X
CDC/Meridian_Seeds	CDC_Amarillo_(Y)		X	X			X
CDC/Meridian_Seeds	CDC_Saffron_(Y)		X	X			X
CDC/Meridian_Seeds	CDC_Inca_(Y)		X	X			X
Meridian_Seeds	CDC_Spectrum		X	X			X
Photosyntech	PSTSP27_(Y)		X				X
Photosyntech	PSTSP28_(G)		X				X
Photosyntech	PSTSP31_(G)		X				X
Photosyntech	PSTSPS32_(x)		X				X
Photosyntech	PSTSP34_(Y)		X				X
Photosyntech	PSTSP35_(Y)		X				X
Photosyntech	PSTSPS37_(x)		X				X
Photosyntech	PSTSPS38_(x)		X				X
Legume_Logic	AAC_Asher_(Y)		X				
MonTech	4193_(Y)	X	X	X	X	X	X
USDA-ARS	PS07100925	X	X	X	X	X	X
USDA-ARS	PS08101022	X	X	X	X	X	X
Total Entries		**8**	**30**	**17**	**9**	**8**	**25**

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