Issue 1013

K-STATE Research and Extension

Extension Agronomy

eUpdate

07/25/2024

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. Harvest weed seed destruction - A tool for managing herbicide-resistant weeds

Multiple herbicide-resistant weeds are a threat to crop production in Kansas. Kochia, Palmer amaranth, and waterhemp are the most problematic weeds in the State due to their ability to evolve resistance and their capacity to produce many seeds. Also, downy brome, cereal rye, Italian ryegrass, and jointed goatgrass are other troublesome grass weeds, especially in winter wheat. Effective weed control strategies that target the weakest points of the weed's life cycle are needed. These strategies include the prevention of seedling emergence, prevention of seedling survival, and prevention of seed production and dispersal. This article focuses on the prevention of seed dispersal.

Weed seed retention at harvest and potential for harvest weed seed control

Weeds persist through time because of the soil seedbank in growers' fields. A single isolated female Palmer amaranth plant can produce 600,000 seeds, while an isolated kochia plant can produce more than 100,000 seeds. Once dispersed, these seeds enter the soil seedbank and increase potential weed pressure in the following growing seasons. Previous research showed that, without new seed inputs, seedbanks could be reduced to a small size in just a few years. Therefore, targeting weed seeds at crop harvest represents an opportunity to take proactive action against future weed problems. During harvest, weed seed has either already fallen or is collected by the combine, mixed with the chaff, and redistributed on the soil surface.

Harvest weed seed control (HWSC) practices target weed seeds present on the plant at harvest. They are more effective when weeds have retained a large proportion of seed on the plant at a height that will be collected during harvest. In the Great Plains, downy brome, cereal rye, and jointed goatgrass have 76% seed retained above the harvest cutting height at wheat harvest (6 inches and above) and have intermediate potential for HWSC. Palmer amaranth, common lambsquarters, kochia, and green foxtail have 91, 90, 100, and 94% seed retained and have a very high potential for HWSC.

Weed seed destruction

Destroying weed seeds in the chaff is a potential system for reducing the number of potentially herbicide-resistant weed seeds returned to the soil seed bank in a field. The weed seed in the chaff goes through a mill and gets pulverized, then spread back on the field. Australian farmer Ray Harrington developed the Harrington Seed Destructor (HSD) in 2005. It is a trailer-mounted cage mill with cha? and straw transfer systems powered by a separate diesel motor. However, constraints in using the tow-behind version of the HSD led to the development of the integrated Harrington Seed Destructor (iHSD), where the impact mill is integrated into the rear of the combine, powered by the combine instead of a separate diesel engine (Figure 1). Several companies have developed mills attached to a combine. The most easily accessed in North America is the Redekop mill, manufactured in Canada. Testing of the seed mills in North America suggests that the systems are highly effective at destroying weed seeds that pass through the combine.

In Australia, seed destruction for wild oats, brome grass, rigid ryegrass, and wild radish were 99, 99, 95, and 93%, respectively. Research conducted on soybean in the United States found less than 1% seed survival for Palmer amaranth, morningglory species, johnsongrass, barnyardgrass, hemp sesbania, prickly sida, velvetleaf, sicklepod, giant ragweed, common lambsquarters, and weedy rice. Only common cocklebur had 3% seed survival. In the Great Plains region, weed seed destruction

percentages were at least 98% for downy brome, feral rye, and jointed goatgrass, suggesting that HWSC could be implemented as an integrated strategy for winter annual grass management in winter wheat cropping systems of the Central Great Plains.

Figure 1. A combine with a weed seed control unit is used during wheat harvest. Photo by Jeremie Kouame, K-State Research and Extension

References

Walsh et al. (2018), Schwartz-Lazaro et al. (2017) .

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2. Planting spring oats and turnips in the fall for forage

Enhanced forage allowance in late fall and early winter improves the forage budget in forage-based livestock systems. Spring oats and turnips can be an alternative, especially when farmers want to extend the grazing period.

Most producers plant spring oats in spring. However, spring oats can also be planted in late summer for fall and early winter grazing. Spring oats will die out after the first hard freeze in the mid 20's. Oats are a high-quality forage, almost as good as wheat. Since oats do not have awns, cattle can graze them easily.

Is it possible to plant oats and turnips at the same time? The answer is yes. Some wildlife hunters plant oats and turnips for their deer food plots in the fall. Producers can use the same concept for beef grazing in the fall.

Forage turnip is one of the forage brassicas (forage rape, turnip, kale, and swedes) and has very high nutritive value with 24 - 25% crude protein in leaves and 16-18% crude protein in the bulbs. Forage turnip has a high moisture content, so it's unsuitable for hay. The high moisture content of forage turnips can also be too "washy" for livestock, so it is recommended that animals have free choice of dry hay or dry forage along with the turnips.

Oats and turnips can be planted simultaneously using a grain drill with a second, small seed box for turnip seeds. If a small seed box isn't available, the turnips can be broadcast ahead of oat drilling. The soil disturbance from the drill is generally enough to get the turnip started after a rain. When including a brassica, seeding depth is more limited due to the small seed size. A depth of ½ inch is ideal. If drilling with two boxes, you can dribble the turnips on top of the ground and then drill the oats to a depth of 0.75-1.50 inches. The seeding rate for oats is 50 to 75 pounds per acre, depending on how early it's planted and moisture availability. For example, in eastern Kansas and under irrigation, seeding rates would be at the higher end of this range or even higher. Seeding rates would also be higher when planting dates are later, although at later planting dates, there will be less forage and higher seed costs. For turnip, the seeding rate is 2 pounds per acre.

Turnip is more winter hardy than oats and can continue to grow into winter while maintaining its greenness even under snow cover. To have more growth, about 50 lbs of nitrogen per acre can be applied at planting. If the oats and turnips are planted after a failed corn or sorghum crop, they may not need this much of applied nitrogen. Both oats and turnips can accumulate high nitrates, so be careful. Forage should be tested before grazing. Samples can be submitted for analysis through the local county Extension office.

The potential yield for an oats and turnip mixture might be 2 to 3 tons of dry matter per acre. Depending on the soil moisture, producers can start grazing about 6 to 8 weeks after the oats and turnips are planted.

Figure 1. Spring oats and turnip pasture. Photo by D. Shoup, K-State Research and Extension.

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3. Kansas drought update and climate report: July 17-23, 2024

Temperature Summary

After a five-day run of above-normal temperatures across the state, a return to below-normal temperatures began on the 17th. All seven days averaged below normal based on data from the Kansas Mesonet. Daytime highs averaged in the 80s all seven days, with highs averaging the warmest on the 19th and 23rd at 88°F (Table 1). Highs on the 20th averaged only 82° or 10 degrees below normal. The Overbrook Mesonet site in Osage County had a high that day of only 69°, and the Konza Prairie site in Riley County only made it to 70°. Normal highs for the period are in the low 90s. The week's warmest temperature was recorded at Webster Dam in Rooks County on the 19th at 98°. Average morning lows ranged from 59° to 65° during the period, with the lows on the 22nd averaging the coolest. Normal lows for this period are in the upper 60s. The Decatur County Mesonet site northeast of Oberlin registered the week's coolest temperature on the morning of the 23rd at 52°. This was 12 degrees below the normal low for the date at Oberlin of 64°.

Table 1. Average daily high and low temperatures across the Kansas Mesonet during the 7-day report period. Maximums and minimums listed are the highest and lowest recorded in the state that day.

	Wed		Thu		Fri		Sat		Sun		Mon		Tue	
	Jul 17		Jul 18		Jul 19		Jul 20		Jul 21		Jul 22		Jul 23	
Avg High	**87°**		**86°**		**88°**		**81°**		**82°**		**84°**		**88°**	
Max Min	91°	82°	89°	78°	94°	80°	89°	69°	86°	77°	89°	81°	92°	83°
Normals	**92°**	**67°**	**92°**	**67°**	**92°**	**67°**	**92°**	**67°**	**92°**	**67°**	**92°**	**67°**	**92°**	**67°**
Avg Low	**65°**		**62°**		**62°**		**63°**		**61°**		**59°**		**60°**	
Max Min	72°	59°	67°	55°	67°	55°	67°	53°	67°	57°	65°	56°	69°	52°

The 7-day average temperature across Kansas was 73.8° or 5.7° below normal. All divisions were below normal, with departures ranging from -6.8° in the northeast to -3.9° in northwest Kansas. There was an average of 161 growing degree days across the state (based on Kansas Mesonet data) which is 22 below normal. Divisional totals ranged from 151 in northeast Kansas to 173 in south central Kansas. Departures ranged from -34 in east central to -14 in northwest, west central, and southwest Kansas. For the growing season to date, which began on April 1, there has been an average of 2108 growing degree days in Kansas or 98 above normal. Departures for the growing season range from +87 in north central to +150 in south central Kansas. There was an average of 9 corn stress degree days across the state. This is well below the average of 58 for the period. The average for the state since April 1 is 271, which is 18 below the normal amount of 289 for the growing season to date. Southwest Kansas has the highest average at 353, while northeast Kansas' average is lowest at 130.

Precipitation and Severe Weather Summary

Precipitation early in the period favored southern Kansas. Rainfall totals reported by CoCoRaHS observers for the 24-hour period ending at 7 AM on the 17th exceeded two inches in five counties: Hamilton, Finney, Clark, Barber, and Sumner. When combined with additional rainfall the following

day, two-day totals in Hamilton County were as high as 4.05" northeast of Syracuse. The Colby area received heavy rain on the 20th; all nine CoCoRaHS reporters in Thomas County reported at least an inch of rain. The 1.72" reported by the co-operative observer near Colby was the highest 1-day amount there since May 11, 2023. Not all areas picked up significant rainfall during the period. Locations picking up less than one-quarter of an inch for the week include Salina (0.02"), Chanute (0.02"), Emporia (0.06"), Wichita (0.10"), Garden City (0.11") and Topeka (0.12").

There were no reports of tornadoes during the period. There were 21 reports of severe wind gusts 58 mph or higher. No reports were at or above hurricane force (74 mph); the highest gust was 70 mph, measured by the Mesonet tower in Norton County on the 19th. There were three reports of severe hail 1" or greater in diameter during the period. The largest report was 1.75" in Logan County on the 19th.

The statewide average precipitation for the 7 days was 0.77", or 87% of the weekly normal amount of 0.89" (Figure 1). Five divisions were above normal for the week, led by southwest Kansas, which had the highest total (1.24"), closely followed by west central Kansas (1.19"). The two lowest totals for the week were in east central (0.29") and central (0.30") Kansas. Since April 1st, the average precipitation across Kansas is 13.47", or 92% of the normal amount of 14.62", a departure from normal of -1.25". Three divisions are above normal for the growing season: northeast, east central and southwest Kansas. Central Kansas is the most below normal (-4.21") while northeast Kansas is the most above normal (+2.30") division. Since January 1st, the average statewide precipitation is 16.74". This amount is 91% of normal, or a departure of –1.63". Four divisions are above normal for the year to date. Northeast Kansas is the most above normal (+1.79") but southwest Kansas has the highest percent of normal (111%). Of the five divisions below normal for the year, central Kansas has both the lowest percent of normal (73%) and the largest deficit (-4.79"). South central is the next driest division for the year (86%, -2.56").

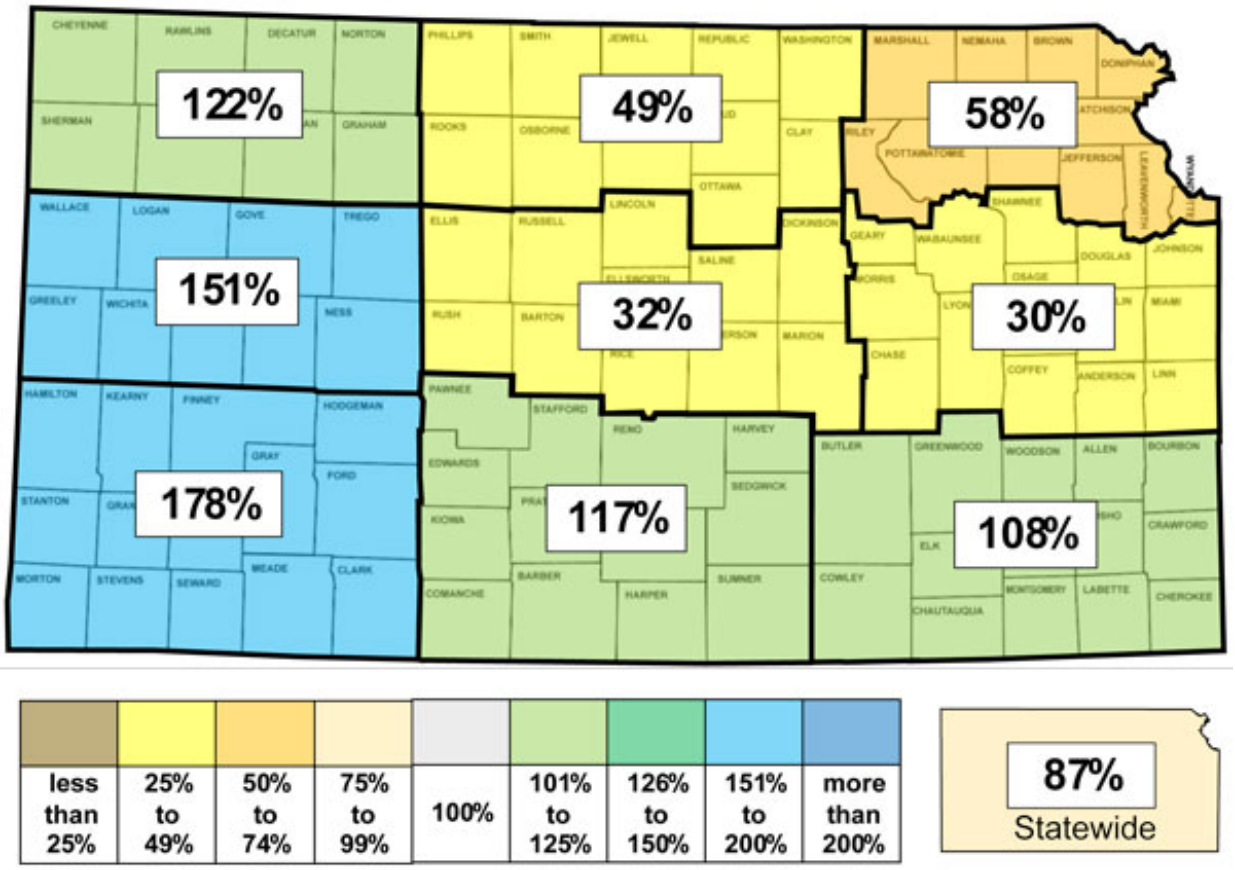

Figure 1. Percent of normal precipitation for the week of July 17-23 for each Kansas climate division. Source: Midwest Regional Climate Center

The average evapotranspiration for grass across the state (based on Kansas Mesonet data) for the week was 1.33". This is 0.35" below the 10-year normal of 1.68" for the period. Divisional averages ranged from 1.17" in east central to 1.46" in south central Kansas. The statewide average 2" soil temperature across the Kansas Mesonet for the period was 78.6°, a decrease of 2.8° from last week. This average is 2.9° below normal.

Drought Status

This week's US Drought Monitor update made one-category improvements to parts of five counties along the Colorado border: Cheyenne, Sherman, Hamilton, Stanton, and Morton. Most adjustments in the state this week were degradations. Parts of 30 counties were degraded by one category, primarily in northwest, north central, and central Kansas. Towns where conditions worsened by one category include Hoxie, WaKeeney, Concordia, Clay Center, and McPherson. The percentage of Kansas in drought-free status fell from 47.5% to 41.9% (Figure 2). The statewide Drought Severity and Coverage Index (DSCI) rose 6 points to 81. The percentage of Kansas in D2 or worse drought status remains at 4 percent.

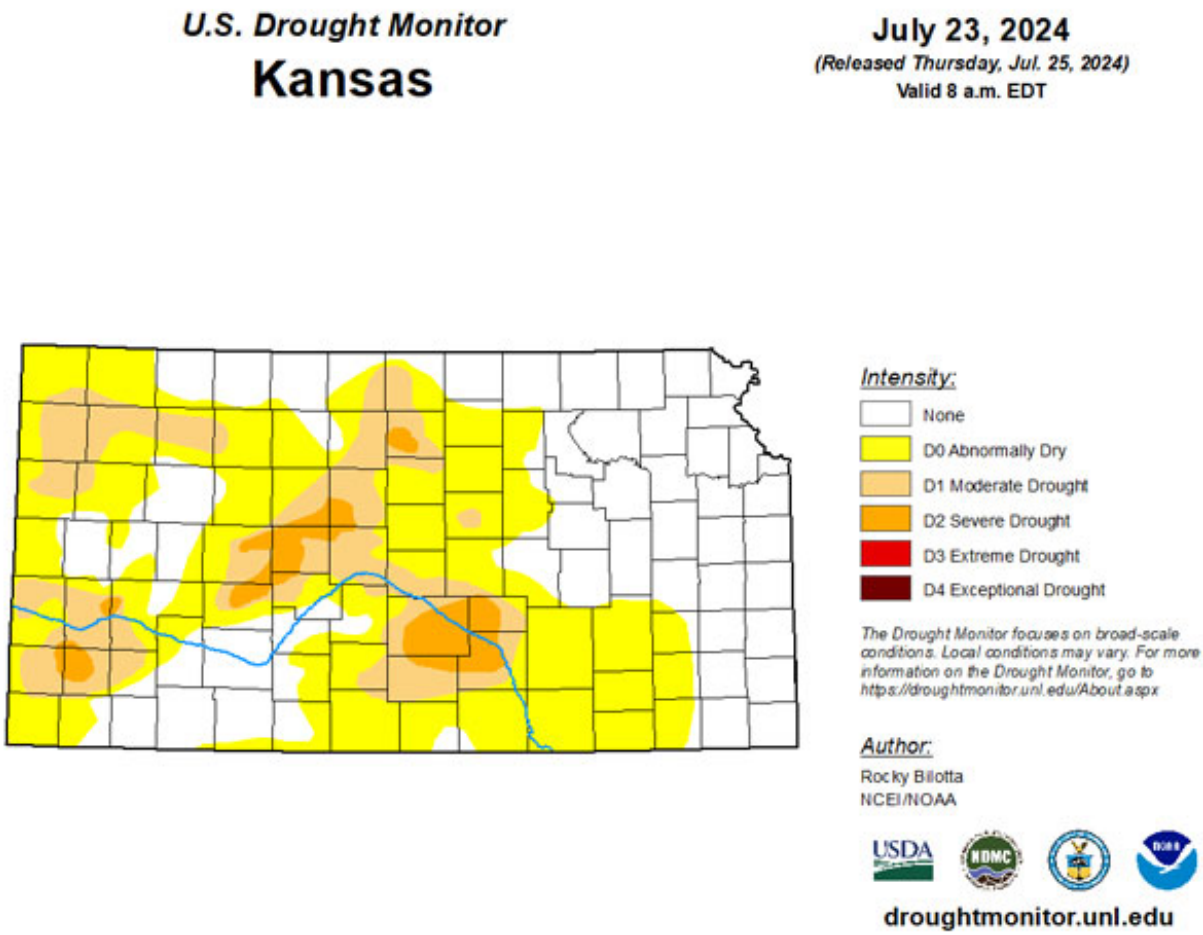

Figure 2. Current drought status for Kansas for the period ending on July 23, 2024.

Weather Forecast

The Weather Prediction Center's 7-day precipitation forecast, valid for July 24 to July 30, calls for little to no precipitation for most areas (Figure 3). As much as half an inch of rain is possible in the Kansas City metropolitan area. Temperatures during the period are expected to average slightly above normal. The average daily high and low across Kansas for this period are 92° and 67°. Average 7-day precipitation is 0.81" in western Kansas and 0.92" in central and eastern Kansas. The 8 to 14-day outlook, valid for July 31 through August 6, highly favors above-normal temperatures statewide, with the probability of above-normal temperatures ranging from a low of 66% in the far southeast to 80% in northwest Kansas (Figure 4). Highs over 100 degrees will be possible in many areas during this period. Below-normal precipitation is also favored, with probabilities ranging from 38 to 46 percent, highest in far southwestern Kansas and lowest along the Missouri border. The combination of these forecasts raises concerns about the rapid development of drought conditions (flash drought) in the drier parts of the state. Looking further ahead, the outlook for the 14 days from August 3 to August 16 says above-normal temperatures will likely continue over most of the state, with increasing probabilities from east to west (Figure 5). There are equal chances of above and below-normal precipitation for nearly the entire state, with slightly elevated chances for below-normal precipitation in far northwestern Kansas.

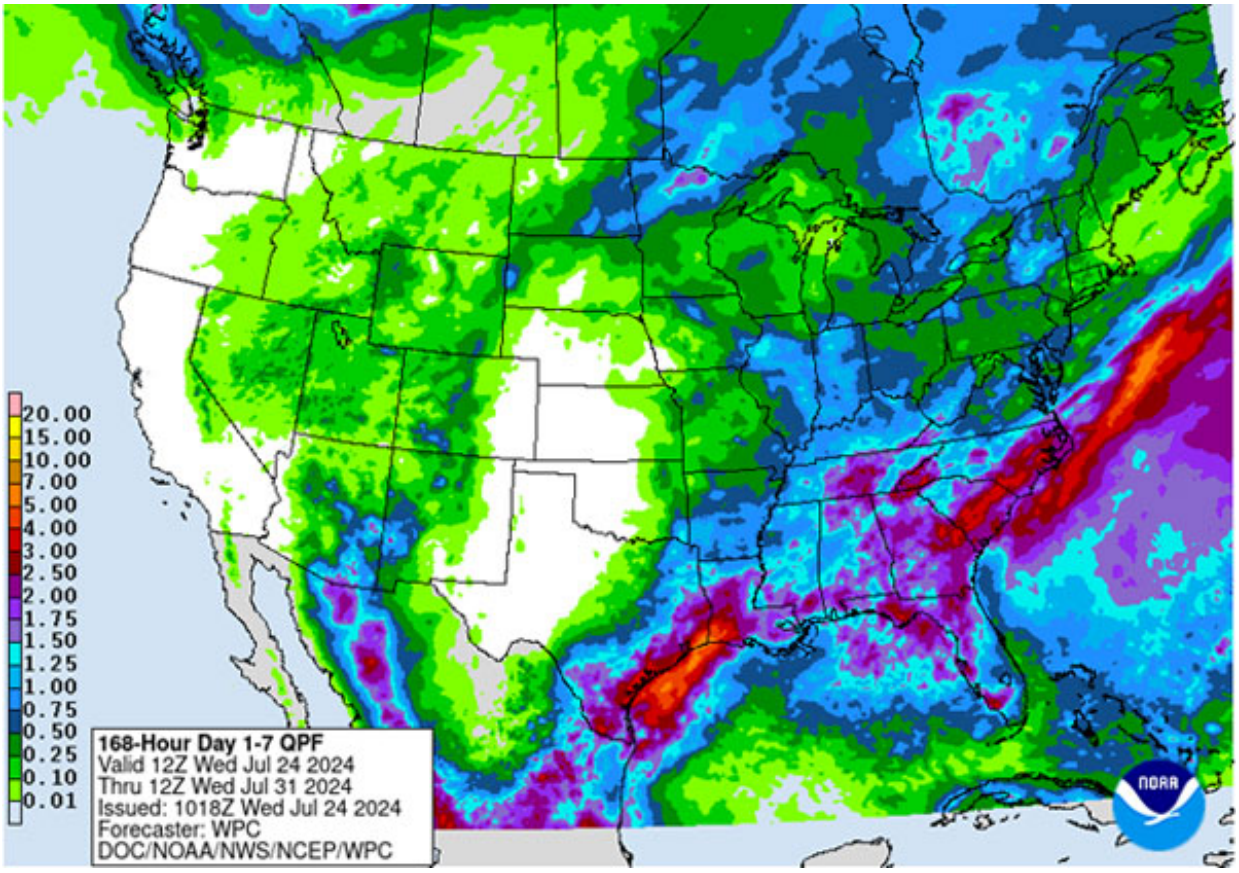

Figure 3. The National Weather Service Weather Prediction Center's 7-day precipitation forecast.

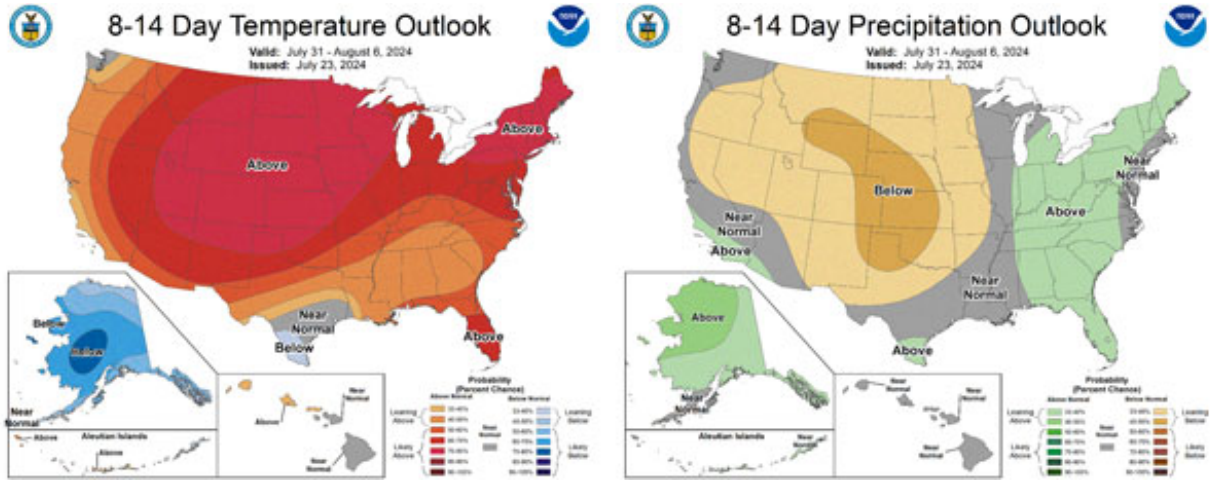

Figure 4. The Climate Predictions Center's 8 to 14-day outlooks (August 3-16, 2024).

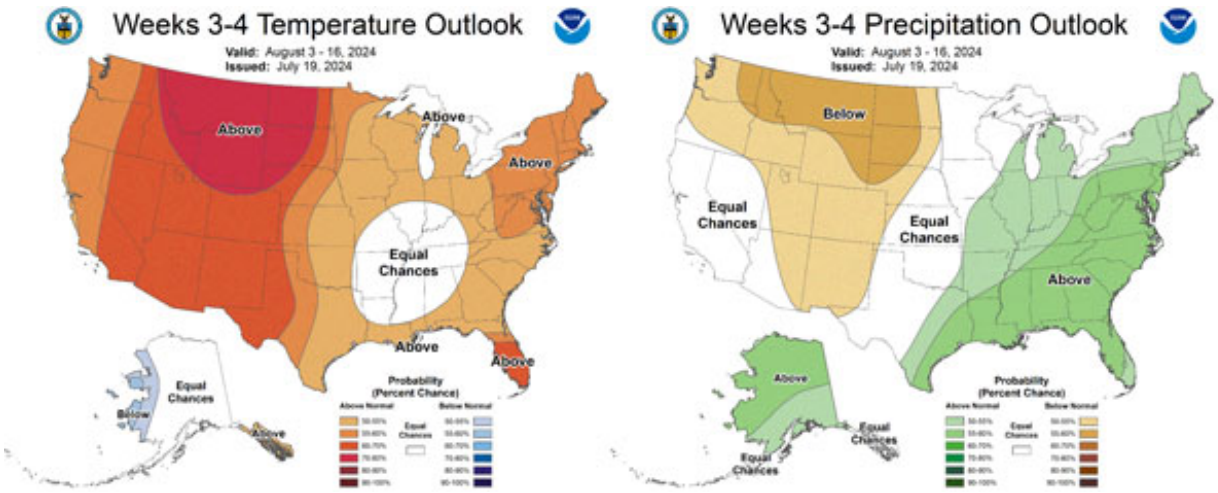

Figure 5. The Climate Prediction Center's weeks 3 and 4 outlooks for temperature and precipitation.

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4. K-State survey of cotton grower perspectives

In 2020, southern Kansas farmers planted 195,000 acres of cotton, which produced 300,000 480-lb bales of cotton lint and 99,000 tons of cottonseed, with a combined economic value of $97,164,000! Cotton has established a place in Kansas, and K-State Research & Extension wants to hear from our cotton growers to better understand the current status of cotton production and emerging challenges in cotton production in Kansas.

This Qualtrics survey of Kansas Cotton Grower Perspectives was developed under the leadership of Dr. Logan Simon, Southwest Area Agronomist, in collaboration with the K-State Extension Cotton Working Group. The survey should take less than 10 minutes to complete and includes questions regarding 1) rotations and tillage, 2) variety selection, 3) planting methods, 4) irrigation strategies, 5) soil fertility, 6) plant growth regulators, 7) weed management, 8) insect management, 9) disease management, and 10) harvest and harvest aids.

The value of survey participation

Responses will help guide cotton research & extension programming at Kansas State University to meet the priorities and concerns of cotton producers. Survey results will potentially be used as justification when seeking funding for research and extension programming for cotton in Kansas. Responses may be shared within the K-State Extension Cotton Working Group and used for quantitative and qualitative analysis to develop extension bulletins, presentations, and scientific

journal articles.

Respondents will have the option to provide their contact information (email address and phone number) for potential follow-up phone conversations and field visits. However, identities will be kept confidential outside the K-State Extension Cotton Working Group. Participant information, even if identities are removed, will not be used or distributed for future research studies.

The survey can be accessed by scanning the QR code below or at
https://kstate.qualtrics.com/jfe/form/SV_3drJeSXR94YPPpA

For questions about the survey, please contact Logan Simon at (620)276-8286 or lsimon@ksu.edu.

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5. North Central Kansas Experiment Field - Fall Field Day

All interested individuals are encouraged to save the date for the North Central Kansas Experiment Field Fall Field Day. The event is scheduled for August 22 at 5:30 p.m. and is free to attend. The specific program is still being finalized, but topics will include updates on corn and soybeans. A free meal will be provided after the program.

Check back next week in the eUpdate for the full program details.

Kansas State University
North Central Kansas Experiment Field
Fall Field Day

Thursday, August 22, 2024 at 5:30 PM

Location:
1300 60 RD, Courtland, KS 66939
-OR-
2 miles N of HWY 36 on 60 RD

Save the date - still finalizing topics

Updates on corn and soybean production

Free dinner provided after presentations

K-STATE
Research and Extension

Please contact Scott Dooley at 785-706-8450 or sjdooley@ksu.edu prior to this event if accommodations are needed for persons with disabilities or special requirements.
K-State Research and Extension is an equal opportunity provider and employer.

6. Save the date - Sorghum Connection: Maximizing Sorghum Yield

Save the dates for a new series of sorghum programs titled "**Sorghum Connection**," consisting of field schools and winter meetings across Kansas. Sorghum Connection is a collaborative effort between the K-State Department of Plant Pathology, K-State Research and Extension, and the Kansas Grain Sorghum Commission. These events aim to bring multi-disciplinary, data-driven information to our Kansas Grain Sorghum producers to help improve on-farm productivity and profitability! Topics will include fertility, breeding, weed management, disease management, marketing, insect management, and more. You don't want to miss out on this series of events!

September Field Schools:

September 4 - Bavaria, KS
Coordinates: 38°47'50.6"N 97°46'44.2"W

September 11 – Dighton, KS
Coordinates: 38°29'44.2"N 100°28'26.2"W

September 18 – Russell, KS
Coordinates: 38°53'36.2"N 98°50'44.9"W

2024 Winter Schools

December 4 – Salina, KS

December 5 – Hays, KS

December 6 – Garden City, KS

More information about these events will be released soon.

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