Issue 972

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eUpdate

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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. Winter canola management considerations

In this article, we outline critical management factors for a successful canola growing season. A companion article in this eUpdate addresses other planting aspects like variety and site selection, and seedbed preparation.

Seeding Date

The general rule is to plant canola six weeks before the average date of the first killing frost (28 degrees F) in central and south central Kansas, or six to eight weeks for southwest and northern Kansas. This allows adequate time for plant canopy development and root growth to improve the chances for winter survival. Planting too late will result in small plants with inadequate reserves to maximize winter survival. Planting too early may result in excessive growth that can deplete soil moisture. Excessive growth may also elevate the growing point or crown too far above the soil surface, increasing the chance of winterkill. This can also be a problem when heavy residue remains in the seed row without correct management.

In northern Kansas, winter canola should be planted by September 15 and in central Kansas by September 25. In far south-central Kansas (Barber, Harper, and Sumner counties), winter canola should be planted by October 1 and in southwest Kansas by September 15 to avoid problems with winterkill.

Monitor short-term and long-term weather forecasts to help gauge planting time decisions. The most recent 8-14 day outlook from NOAA projects that above-normal temperatures and below-normal precipitation are likely. The 3-month outlook is for equal chances of seasonal temperatures

and moisture.

Seeding Rate, Depth, and Row Spacing

Winter canola will compensate for a poor plant stand; however, it is important to obtain as uniform a stand as possible to facilitate optimum plant development, winter survival, weed control, and uniform plant maturity.

A seeding rate of 3.5 to 5 pounds per acre (approximately 350,000 to 500,000 seeds per acre at 100,000 seeds per lb seed size) is recommended for open-pollinated varieties in narrow row spacing. Because hybrids have higher seed costs and a greater ability to branch out, it is recommended to plant them on a pure live seed basis. The recommended seeding rate is 250,000 to 300,000 pure live seeds per acre in narrow rows.

More producers are experimenting with canola planted in 30-inch rows. Producers are able to obtain accurate depth control, precision seed metering, and residue removal from the seed row with row crop planters. Generally, yields may be slightly reduced moving from 15 inches to 30 inches under dryland conditions. However, producers are able to reduce their seeding rate to 1.5 to 3.0 lb per acre (about 135,000 to 270,000 pure live seeds per acre at a 90,000 seed per lb seed weight). Planting an open-pollinated variety or hybrid with prolific branching will also increase the profitability of canola planted in 30-inch rows.

It is important to check drill calibration. Some drills may require a speed reduction kit to obtain the optimum rate without damaging the seed. Some producers planting on 7.5-inch spacing will plug every other row unit and plant on 15-inch spacing, so the drill does not have to be slowed as much.

Seed placement is critical for successful germination, emergence, and stand establishment. Optimal germination occurs with seed placed ½ to 1 inch deep. Under drier conditions, canola may be planted deeper (not greater than 1.5 inches), but delayed emergence and reduced vigor may occur. Soil crusting following a heavy rain can result in a poor stand. Canola emergence can be greatly reduced when using a deep furrow opener followed by heavy rain prior to emergence, since soil can fill in the furrow, resulting in a deeper-than-intended seeding depth. To ensure proper seeding depth, producers must plant slower than when planting wheat (preferably 5 mph or slower). Finally, it is important to check the seeding depth in each field.

Rows spaced between 7.5 and 15 inches allow for rapid canopy closure (improved light interception) and weed control. Yields are similar with row spacings in this range. Plant-to-plant uniformity at emergence is critical for optimum plant development, overwintering, and weed control.

Plant Nutrition and Soil Fertility

Soil testing, including a profile sample for nitrogen (N) and sulfur (S), is an important tool in determining fertilizer needs. If you have questions, contact your local Extension office. Canola fertility recommendation programs, based on soil test levels, can be found at:
http://www.agronomy.ksu.edu/soiltesting/

Fertility needs are similar to winter wheat; however, canola needs slightly higher N and S. Applying high rates of fertilizer in-row at planting is not recommended because canola is sensitive to ammonia and salt damage (phytotoxic effects). However, research by Oklahoma State indicates that a low rate

of DAP or MAP (30 to 40 lb/acre of product) is beneficial and not detrimental to yield. The best management practice for banding fertilizer should separate the fertilizer from the seed by two inches to avoid direct contact. Pre-plant broadcast application is also acceptable.

- **Lime**: Apply lime so that pH is in the range of 5.5-7.0 and early enough so the lime has time to react in the soil.
- **Phosphorus (P) and Potassium (K):** No added P is required if the P soil test is above 30 ppm. Additional K should be applied if soil test levels are less than 125 ppm.
- **Sulfur**: Canola requires S because of its high content of sulfur-containing proteins. Sulfur deficiencies are most common on coarse-textured and low-organic-matter soils; however, a sulfur application is still recommended for all soil types. Sulfur can be applied at any time from pre-plant until the canola plant breaks dormancy in late winter. Apply S based on the soil test recommendation. Sulfate-sulfur (SO_4-S) soil tests should be above 10 ppm or fertilizer should be applied. If no soil test is available, an application of 20 lb/acre S is recommended.
- **Nitrogen**: Pre-plant N applications must be carefully balanced, as too little or too much fall-applied N may negatively affect winter survival. One-third to one-half of total N (based on expected yield) should be fall-applied. At least 30 lb/acre but no more than 80 lb/acre of actual N is the general rule for fall applications. Winter survival, plant vigor, and yield potential can decrease without applying fall N.

Weed Management

A clean seedbed is critical to establishing winter canola. Small canola seedlings compete poorly with established weeds. However, once a good stand and canopy are established, canola suppresses and outcompetes most winter annual weeds. No matter what herbicide program you use, the most important thing to remember is to control weeds early in the fall.

- Trifluralin and ethalfluralin are effective at controlling winter annual weeds pre-plant, but each requires mechanical incorporation.
- Grass herbicides such as clethodim, quizalofop, and sethoxydim are labeled for cool-season grass control in canola.
- Roundup Ready (glyphosate tolerant) canola varieties are available, providing excellent control of many problem weeds. Glyphosate is not labeled for application once the plant has bolted after dormancy.
- Clearfield canola varieties are available and provide another herbicide resistance option for controlling winter annual grasses.
- Before applying any herbicides, care must be taken to ensure there are no traces of problem herbicides, such as sulfonylurea herbicides, in the sprayer equipment.

Insect Management

An insecticide seed treatment is highly recommended for the control of green peach aphids and turnip aphids through fall and early winter. Monitor canola stands for the following fall insect pests: grasshoppers, diamondback moth larvae, flea beetles, aphids, and root maggots. Several products are labeled and provide good to excellent control.

Disease Management

The best control of canola diseases is achieved through careful rotation. Canola should not be

planted on the same field more than once every three years and should never be planted continuously.

Blackleg (*Leptosphaeria maculans*) is the most serious disease threat to canola. Maintaining proper rotation intervals, planting disease-free seed, and using fungicide seed treatments are important management practices to slow the spread of blackleg. Damping-off of young seedlings, which resembles the pinching of the stem at or just below the soil line, is caused by several fungi including *Pythium*, *Fusarium*, and *Rhizoctonia*. A fungicide seed treatment can lessen the effects of these soil-borne diseases.

Additional Resources

Great Plains Canola Production Handbook. Contact your local Extension office for a copy or download it online: https://www.bookstore.ksre.ksu.edu/pubs/mf2734.pdf.

Canola Growth and Development poster, available on the web at: https://www.bookstore.ksre.ksu.edu/pubs/MF3236.pdf.

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2. Winter canola planting considerations

Winter canola varieties exist today that make production possible across much of Kansas. When a winter-hardy variety is planted at the right time in good soil moisture and temperature conditions, plant development is optimized, and the crop will have the best chance at overwintering.

Deciding when to plant canola this fall may be challenging because soil moisture in the planting zone is variable statewide. A dry August, in combination with very high temperatures, has a majority of the state lacking in topsoil moisture. It is often said that it is easier to plant canola after rain than before. Although risky, canola has emerged in October following rainfall and survived the winter in Kansas when fall temperatures remain warmer than normal. However, it may be too dry to plant in some cases because the risks of delayed emergence and loss to an early freeze are too great.

The planting window for winter canola arrives in Kansas by early September. Below we are presenting the most critical aspects ranging from variety selection to seedbed preparation to ensure a successful start to the 2023-2024 growing season. A companion article in this eUpdate addresses other management considerations including variety selection, site and crop management, seeding options, plant nutrition and soil fertility, and pest management.

Variety Selection

Variety selection should be based on the following traits: winter survival, open-pollinated variety or hybrid, yield, oil content, herbicide tolerance, disease resistance, maturity, lodging susceptibility, and shatter tolerance. Winter hardiness should be the number one consideration if the crop is being grown in a new area.

Producers have the option of selecting either open-pollinated varieties or hybrids. The majority of

the varieties grown in the southern Great Plains are open-pollinated. Open-pollinated varieties consistently overwinter and have high yield potential. In addition, producers interested in broad-spectrum weed control can select Roundup Ready open-pollinated varieties.

Hybrids are being grown in the region and tend to have larger seed size for easier seed metering, vigorous fall and spring growth, and greater yield potential without limitation of resources. Clearfield herbicide tolerance is available in hybrids.

Varieties with tolerance to carryover of sulfonylurea (SU) herbicides applied to a previous crop (e.g. Finesse) can be planted in the fall to avoid the long plant-back restrictions these herbicides have for canola. Some varieties that are Roundup Ready also possess SU herbicide carryover tolerance.

Consider selecting two or more varieties with differing relative maturities to spread out harvest operations and reduce risk. If interested in selecting a new variety, consider selecting one variety with known performance in your area in addition to the new variety.

Site Selection

Although canola grows over a wide range of soil textures, well-drained, medium-textured soils are best. Soils where water stands for several days or those prone to waterlogging are poor choices. The soil pH should be between 5.5 and 7.0. Soil pH correction with lime should be considered when growing canola in soil with low pH (less than 5.5).

Be mindful when planting canola following crops like sunflower, soybean, alfalfa, or cotton. These crops share similar diseases with canola. Planting canola continuously is not recommended and it is not insurable. Plant canola after grass crops such as wheat or corn because these crops do not share diseases with canola.

Canola will perform best when adequate time is given after the preceding crop to allow for soil moisture recharge and weed control, and where there is adequate time to get the canola planted early enough to help the plants survive over winter.

Avoid fields with heavy winter annual broadleaf weed pressure if possible. If planting where heavy broadleaf weed pressure exists, consider planting a Roundup Ready variety. Grassy winter annual weeds are easily controlled by using clethodim, quizalofop, or sethoxydim in conventional canola, or by using the Roundup Ready or Clearfield canola systems. Make sure you are aware of the herbicide history of potential sites. Winter canola varieties are sensitive to Group 2 and triazine herbicide carryover. These products may have long plant back restrictions (often 18 months or greater). Be especially cautious about herbicide carryover restrictions when following corn.

Seedbed Preparation

Because of its small seed size, a properly prepared seedbed is critical for successful canola establishment. Open-pollinated varieties typically range from 100,000 to 125,000 seeds per pound and hybrids range from 70,000 to 100,000 seeds per pound.

A level, firm seedbed with adequate moisture within the top inch is preferred. A seedbed with many large clumps results in poor seed placement and seed-to-soil contact. An overworked seedbed may be depleted of moisture and will crust easily, potentially inhibiting emergence. In addition, this could

promote deep placement of the seed.

No-till planting is an option, and some long-term no-till producers have grown canola successfully using this practice. With proper settings, no-till planting can result in very good stands. However, maintaining stands over the winter can be difficult with low soil disturbance in heavy residue cover. This challenge has been overcome by burning surface residue immediately before planting, removing the residue (i.e. baling), vertical tillage, or using a more aggressive residue manager that removes residue from the seed row. Research in south central Kansas indicates that even with good winter survival, no-till canola yields under heavy residue were lower than where residue was burned or where tillage has been performed.

No-till producers should ensure that drills and planters are properly set and consider using a setup that creates a more disturbed seed row. Using a high-disturbance opener (such as a coulter, residue manager, or hoe-type opener) in no-till can improve winter survival and result in yields comparable to those obtained in tilled fields.

If using tillage, perform the most aggressive tillage as early as possible, with each succeeding tillage operation being shallower than the last. Incorporate fertilizer and herbicide with the last tillage operation. Some producers perform one aggressive tillage operation as early as possible and then control newly emerged weeds chemically. Planting into this "stale" seedbed will help ensure adequate moisture for establishment.

Weeds must be controlled chemically, mechanically, or with a combination of both methods prior to planting because canola seedlings are not competitive with established weeds.

Additional Resources

2022 National Winter Canola Variety Trial https://bookstore.ksre.ksu.edu/pubs/SRP1178.pdf

Great Plains Canola Production Handbook. Contact your local Extension office for a copy or download it online: https://www.bookstore.ksre.ksu.edu/pubs/mf2734.pdf.

Canola Growth and Development poster https://www.bookstore.ksre.ksu.edu/pubs/MF3236.pdf.

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3. Tips for fall planting of alfalfa

In 2022, approximately 660,000 acres of alfalfa were harvested in Kansas. Alfalfa is a very important leguminous crop for the dairy and livestock industry in the state. Alfalfa hayfields help to supply forage that is highly digestible and high in protein. Late summer and early fall are often the best times to plant alfalfa in Kansas due to less weed pressure than spring planting.

Figure 1. Alfalfa seedlings. Photo by Doohong Min, K-State Research and Extension.

Available moisture at planting is crucial for alfalfa establishment, but too much moisture can increase seedling disease incidence and reduce alfalfa nodulation and nitrogen fixation.

If soil moisture is available, growers in northwest Kansas can plant as early as August 10. The optimum sowing date occurs later as we move towards southeast Kansas, where growers can plant

until mid- to late-September. In other parts of Kansas, the optimal planting time is late August or early September. Producers just need to plant early enough to have three to five trifoliate leaves before the first frost.

Alfalfa is a four to five-year, or longer, investment, and therefore it is crucial to ensure proper establishment. Some producers shy away from alfalfa because of its high establishment cost and risk of stand failure. In the long run, however, it's relatively inexpensive if amortized over the life of the crop.

If managed properly and given favorable weather conditions, dryland alfalfa can produce 3 to 6 dry matter tons of forage per acre per year. Irrigated fields can produce 6 to 8 dry matter tons per acre per year or more.

When sowing alfalfa, producers should keep the following in mind:

Soil test and correct soil acidity. Alfalfa grows best in well-drained soils with a pH of 6.5 to 7.5 and does not tolerate low soil pH. If the soil is acidic, add lime to raise the soil pH to 6.8 before planting. Ensuring appropriate soil pH levels before planting is essential, especially as lime is relatively immobile in the soil profile and the field will not be worked for the next 3-5 years. Remember, after spread, lime takes a few weeks in the soil to react and increase the pH.

Soil test and meet fertilization needs. Apply the needed phosphorus (P) and potassium (K) amounts according to soil test recommendations. Phosphorus fertilizer will be required if soil test P levels are below 25 ppm, and potassium fertilizer will be required if soil K levels are below 120 ppm. Even soils that test higher than these thresholds may need additional fertilizer. Small amounts of nitrogen fertilizer (15 to 20 lb/acre) as a starter at planting are beneficial for alfalfa establishment. In some fields, sulfur can also bring some yield benefits.

Plant certified, inoculated seed. Ensuring the correct *Rhizobium* inoculation is crucial for alfalfa seedlings to fix available soil nitrogen to meet the needs of growing alfalfa for optimum production.

Plant in firm, moist soil. A firm seedbed ensures good seed-soil contact; therefore, use a press wheel with the drill to firm the soil over the planted seed. No-till planting in small-grain stubble will usually provide a good seedbed.

Don't plant too deeply. Plant one-fourth to one-half inch deep on medium- and fine-textured soils and three-fourths inch deep on sandy soils. Don't plant deeper than 10 times the seed diameter.

Use the right seeding rate. Plant 8 to12 pounds of seed per acre on dryland in western Kansas, 12 to15 pounds per acre on irrigated medium- to fine-textured soils, 15 to 20 pounds per acre on irrigated sandy soils, and 12 to 15 pounds per acre on dryland in central and eastern Kansas.

Check for herbicide carryover that could damage the new alfalfa crop – especially when planting alfalfa no-till into corn or grain sorghum stubble. In areas where row crops were drought-stressed and removed for silage, that sets up a great seedbed for alfalfa but may still bring a risk of herbicide damage.

Choose pest-resistant varieties. Resistance to phytophthora root rot, bacterial wilt, fusarium wilt, verticillium wilt, anthracnose, the pea aphid, and the spotted alfalfa aphid is essential. Some varieties

are resistant to even more diseases and insects, which could contribute to reducing costs.

Purchase alfalfa varieties with a fall dormancy rating ranging from 4 - 6 for Kansas. Fall dormancy relates to how soon an alfalfa variety will stop growing in the fall and how early it will begin growing in the spring or late winter. Simply put, it would be better not to buy a variety with fall dormancy of 9-10, which can be more suitable for California and regions where alfalfa can keep growing year-round under irrigation.

More information about growing alfalfa in Kansas can be found in the *Alfalfa Production Handbook*. That information also is available on the web at: www.ksre.ksu.edu/bookstore/pubs/c683.pdf

Also see *Alfalfa Growth and Development*, available on the web at: https://www.bookstore.ksre.ksu.edu/pubs/MF3348.pdf

Figure 2. Early bloom alfalfa. Photo by Doohong Min, K-State Research and Extension.

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4. World of Weeds - Prairie cupgrass

K-State Weed Science Extension Specialist, Sarah Lancaster, recently received a call asking to identify a grass that was not controlled by glyphosate. The infestation was prairie cupgrass, which is the topic of this article.

Ecology and Identification

Prairie cupgrass (*Eriochloa contracta*) is a summer annual grass that prefers moist areas. It is native to the Great Plains and found throughout Kansas in fallow fields and roadsides.

Prairie cupgrass grows in clumps with hollow stems that are generally upright, but can sometimes curve upward (Figure 1) and root where the nodes touch the ground. Stems can grow up to 2 feet tall. Stems may be hairy, especially at the nodes. Leaf sheaths are usually hairy.

Leaf blades are about 1.5 to 8 inches long and fold lengthwise as they dry. There may be short hairs on the leaf and the midrib is not very obvious. The ligule is a fringe of soft hairs, less than 1/25 of an inch (Figure 2).

Figure 1. A clump of prairie cupgrass. Notice the bend in the stem on the left side of the photo. Photo by Sarah Lancaster, K-State Research and Extension.

Figure 2. Short, hairy ligule of prairie cupgrass. Notice the fine hairs on the stem. Photo by Sarah Lancaster, K-State Research and Extension.

Seeds are produced in a slender, dense panicle (Figure 3, left). Individual spikelets are about 1/8 to 1/5 of an inch long and are hairy (Figure 3, right). One seed is contained in each spikelet. Several spikelets are grouped together on a raceme. There are eight to 22 racemes in a panicle

Management

Greenhouse research conducted at K-State during the early 2000s suggests that glyphosate, clethodim (Select Max, others), or quizalofop (Assure II, others) will easily control seedling plants. However, once plants begin to tiller, they are more difficult to control with glyphosate because glyphosate does not move out of the treated leaf. Even at rates up to 1 pound of glyphosate per acre

(fl oz) provides about 80% control or less. Products that contain quizalofop will likely provide greater control of mature plants compared to glyphosate or clethodim. In the same paper, weed scientists reported data from field research conducted at Hays that suggest products containing acetochlor or S-metolachlor plus atrazine will provide excellent control of prairie cupgrass season-long.

Figure 3. The infloresence of prairie cupgrass is a compressed panicle (left) made up of several racemes (right) that contain hairy seeds. Photos by Sarah Lancaster, K-State Research and Extension.

The use of trade names is for clarity to readers and does not imply endorsement of a particular product, nor does exclusion imply non-approval. Always consult the herbicide label for the most current use requirements.

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5. K-State Western Kansas Agricultural Research Report now available online

Kansas State University conducts research in nearly all areas of agricultural production. The Kansas Agricultural Experiment Station (KAES) Research Reports are the published preliminary results of individual research projects. These reports allow researchers to disseminate their work rapidly to Kansas producers, agricultural industries, and other researchers.

Western Kansas Agricultural Research

The Kansas Agricultural Experiment Station Western Kansas reports include preliminary results of research conducted on field production and management practices for crops in western Kansas. These studies are conducted in the areas of Garden City, Hays, Colby, and Tribune. This report includes research project summaries on cropping and tillage systems, insect control, irrigation, weather, weed science, and wheat.

To access the Western Kansas Agricultural Research Report for 2023, you can scan the QR code below with a cell phone or tablet or by using this link: https://newprairiepress.org/kaesrr/vol9/iss6/

Figure 1. Scan this QR code to access the 2023 Western Kansas Agricultural Research Report

Interested in the historical reports? You can access past years here: https://www.agronomy.k-state.edu/outreach-and-services/kaes-research-reports/western.html

6. A historic heat wave across Kansas: August 19-25, 2023

In the last five weeks, Kansas has endured two stretches of extreme heat. The first occurred during the last 10 days of July. The second heat wave was even hotter than the first. It began with a vengeance on August 19. We detailed the summer superlatives from August 19 in an article last week. For this week, we take a look at the entirety of the 7-day stretch that ended on August 25, when a cold front displaced the persistent ridge of high pressure that had parked itself over the central United States. While not the longest run of 100-degree weather ever recorded, the 7-day stretch was the longest in over a decade at many locations. Table 1 details specifics of the recent heat wave at 24 observing sites across Kansas with over 50 years of data. For three locations, their highs on August 19 were the warmest ever observed, with Manhattan Airport's 115° the hottest temperature observed in the state since June 2012, when Norton Dam reached 118°.

Table 1. Airport, automated, and cooperative sites that recorded 7 consecutive days of highs 100° F or greater from August 19th through August 25th, 2023. Inclusion is limited to stations with at least 50 years of data.

Location	County	Aug 19-25 High (°F) (Date)	Warmest Day Since	Longest Run of 100°+ Days Since	Record Longest Run of 100° Days (Year)	Year in which Records Began
Ashland	Clark	107 (8/19)	7/2022	2015	23 (1954)	1900
Beloit	Mitchell	106 (8/21)	6/2012	2012	14 (1980)	1893
Clay Center	Clay	110 (8/19)	7/1980	2012	21 (1913)	1902
Concordia	Cloud	109 (8/21)	7/2023	2000	18 (1934)	1885
Cottonwood Falls	Chase	112 (8/19)	7/1980	2012	20 (1934)	1902
El Dorado	Butler	111 (8/19)	7/1954	2011	21 (1936)	1893
Emporia	Lyon	112 (8/19)	8/2011	2012	15 (2000)	1950
Healy	Lane	108 (8/25)	8/2023	2023	15 (1913,1934)	1901
Herington	Dickinson	110 (8/19)	7/1980	2003	17 (1980)	1926
Hill City	Graham	107 (8/23)	7/2023	2012	18 (1934)	1907
Hutchinson	Reno	110 (8/19)	8/2011	2012	14 (1954,2000)	1948
Lincoln	Lincoln	109 (8/19)	7/2023	2012	25 (1983)	1912
Manhattan	Riley	115 (8/19)	Highest	2012	11 (2000,2003)	1960
Melvern Lake	Osage	112 (8/19)	Highest	2012	17 (1980)	1973
Milford Lake	Geary	112 (8/19)	Highest	2012	13 (1980)	1965
Minneapolis	Ottawa	108 (8/25)	7/2023	2012	20 (1936)	1892
Plainville	Rooks	110 (8/20)	7/2022	2015	18 (1934)	1904
Russell	Russell	106 (8/19)	7/2023	2012	17 (1980)	1949
Salina	Saline	113 (8/19)	7/2011	2012	20 (1934)	1900
Sedan	Chautauqua	112 (8/20)	8/2011	2022	25 (1934)	1893
Sterling	Rice	107 (8/19)	7/2022	2012	16 (1980)	1893

Topeka	Shawnee	111 (8/19)	8/2011	2011	19 (1901,1936)	1887
Wellington	Sumner	108 (8/19)	8/2012	2012	21 (1934,1936)	1894
Wichita	Sedgwick	111 (8/19)	7/2012	2012	20 (1936)	1888

Summary of Kansas Mesonet Stations

The intensity of the heat wave is also evident in the observations made by the over 80 stations that comprise the Kansas Mesonet. All but two sites exceeded 100° at least once between the 19th and 25th, and over 30 of them reached the 100-degree mark all 7 days, mostly in central and eastern Kansas (Figure 1). The most intense heat was focused in east central and northeast Kansas, where the hottest readings exceeded 110° at ten locations (Figure 2).

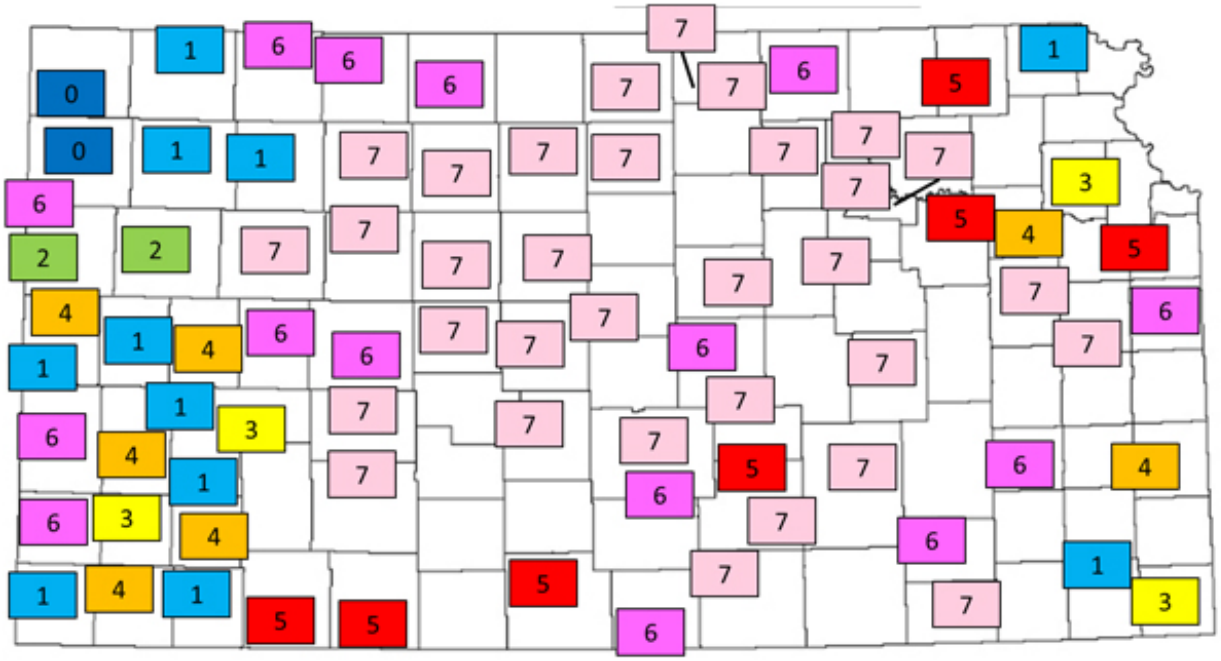

Figure 1. The number of days between August 19 and 25 when the temperature reached at least 100°F across the Kansas Mesonet.

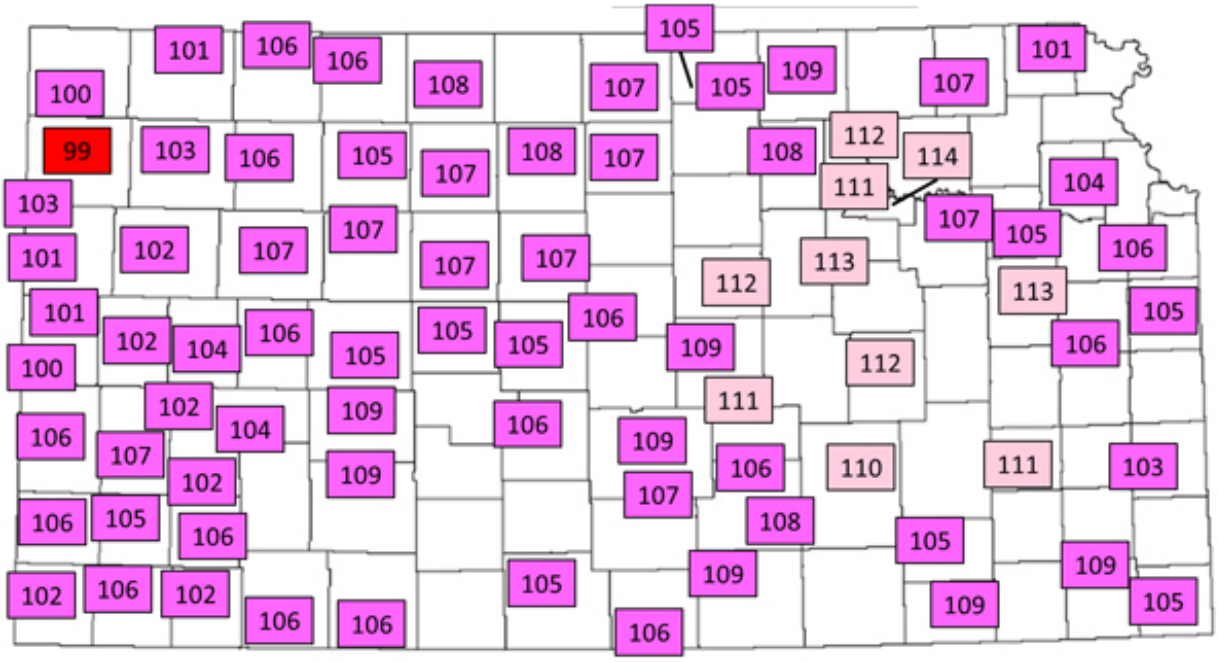

Figure 2. The hottest temperature at each Kansas Mesonet site between August 19 and 25, 2023.

The heat was more manageable in western Kansas, where dew points stayed at slightly more comfortable levels than in the east. Many places in eastern Kansas endured dew points over 80° (Figure 3) which led to dangerously high heat indices (Figure 4). The National Weather Service issued and then extended Excessive Heat Warnings for much of the state over multiple days during the heat wave, as heat indices peaked at over 120° in a few spots in far eastern Kansas.

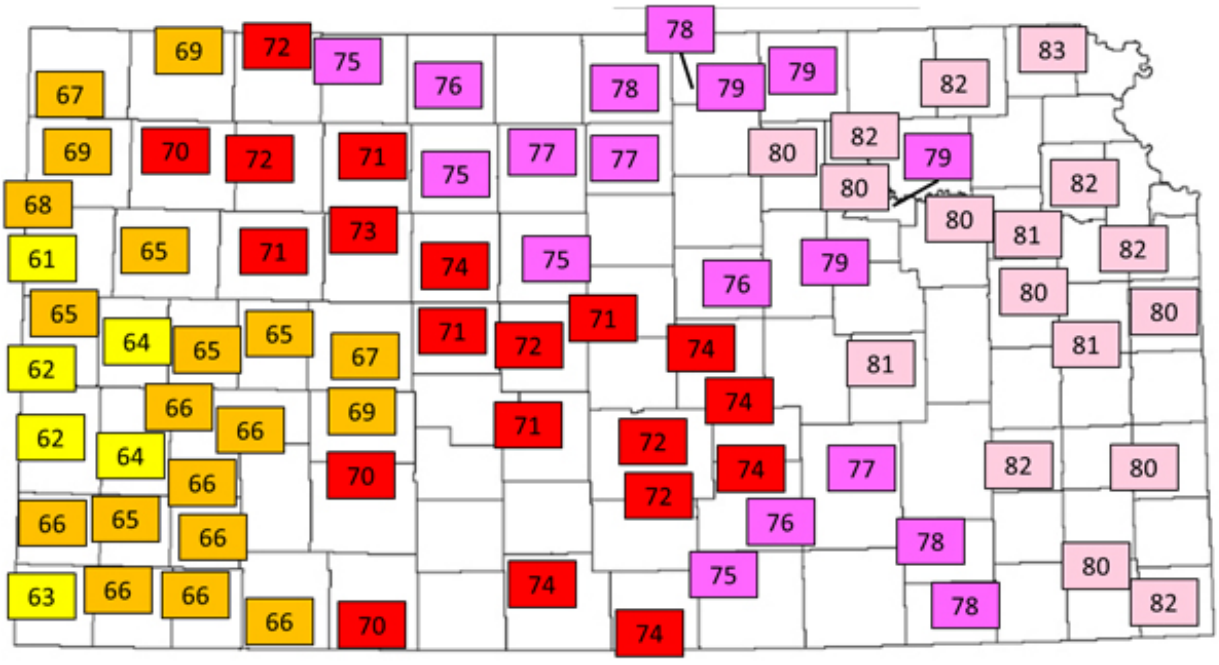

Figure 3. The highest dew point, based on hourly averages, recorded at each Kansas Mesonet

site for August 19 to 25, 2023.

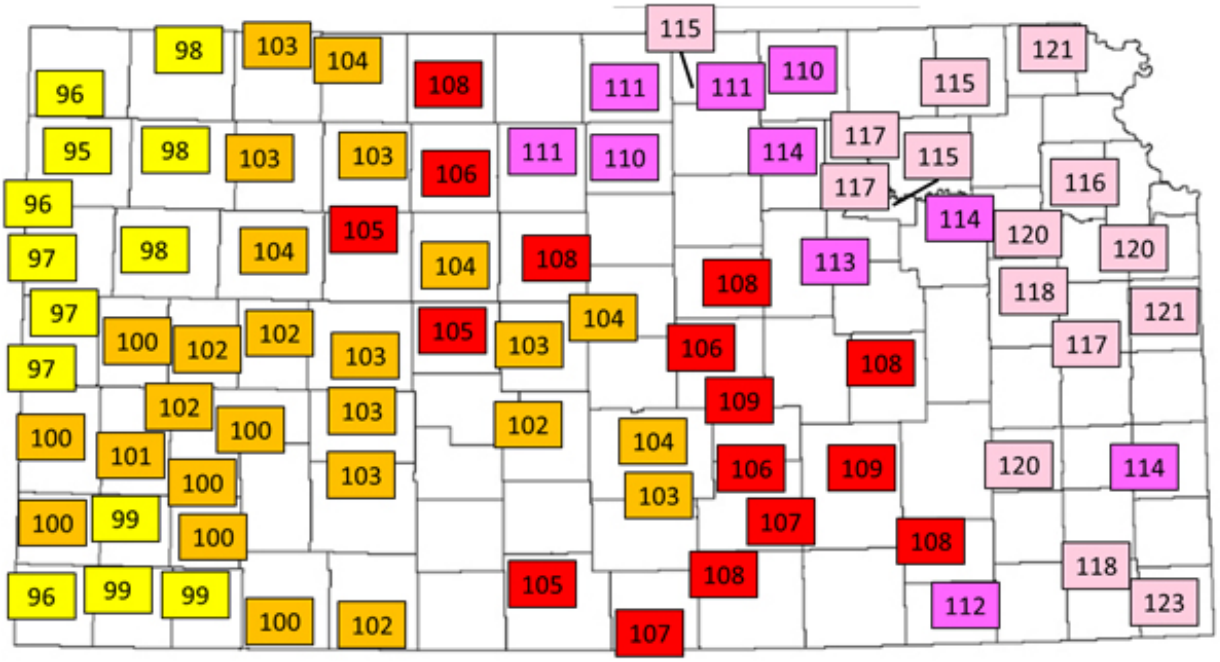

Figure 4. The highest heat index, based on hourly averages, recorded at each Kansas Mesonet site for August 19 to 25, 2023.

Eight Kansas Mesonet sites recorded heat indices at or above heat advisory criteria (105°F) on all 7 days of the heat wave, and five of the eight recorded over 50 hours of heat advisory conditions during the period (Table 2). By contrast, no site in the western third of the state exceeded heat advisory criteria.

Table 2. The Kansas Mesonet sites that recorded the most hours with hourly average heat index greater than or equal to 105° between August 19 and 25, 2023.

Rank	Site	County	Number of Days with Heat Index ≥ 105°F	Number of Hours with Heat Index ≥ 105°F	Hottest Heat Index Reading (°F)
1	Cherokee	Cherokee	7	54	123
2	Olathe	Johnson	7	53	120
3	Hiawatha	Brown	7	52	121
	Silver Lake 4E	Shawnee	7	52	120
	Woodson	Yates	7	52	120
6	Miami	Miami	7	43	121
7	Ottawa 2SE	Franklin	7	38	117
8	Parsons	Labette	7	37	118
	Clay	Clay	5	37	114
10	Manhattan	Riley	6	36	117
	Rocky Ford	Riley	5	36	117

Because of the very hot temperatures during the heat waves, many locations have already had more 100-degree days than normal (Table 3). With two or fewer 100-degree days on average after August 25th, those locations are guaranteed to finish the year with an above-normal count. As for 90-degree days, ten or more such days could still occur this year. A future report will detail the final 2023 counts.

Table 3. The number of days with highs at or above 90° and 100° so far in 2023, as of August 25, along with average counts, for select locations around Kansas.

Location	County	Number of Days with Highs ≥ 90°F			Number of Days with Highs ≥ 100°F		
		2023 (as of Aug. 25)	Average		2023 (as of Aug. 25)	Average	
			Jan. 1 – Aug. 25	Aug. 26 – Dec. 31		Jan. 1 – Aug. 25	Aug. 26 – Dec. 31
Concordia	Cloud	51	41	9	15	6	1
Dodge City	Ford	46	57	14	11	13	1
Emporia	Lyon	52	36	8	15	5	0
Garden City	Finney	37	58	16	2	14	2
Goodland	Sherman	30	43	9	4	6	0
Hutchinson	Reno	60	50	13	21	11	1
Manhattan	Riley	38	47	12	11	9	0
Parsons	Labette	59	38	9	18	4	1
Salina	Saline	55	55	13	17	14	2
Topeka	Shawnee	55	41	9	13	5	1
Tribune	Greeley	30	52	13	4	11	1
Wichita	Sedgwick	46	52	13	20	11	1

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