



K-STATE
Research and Extension

Extension Agronomy

eUpdate

04/10/2020

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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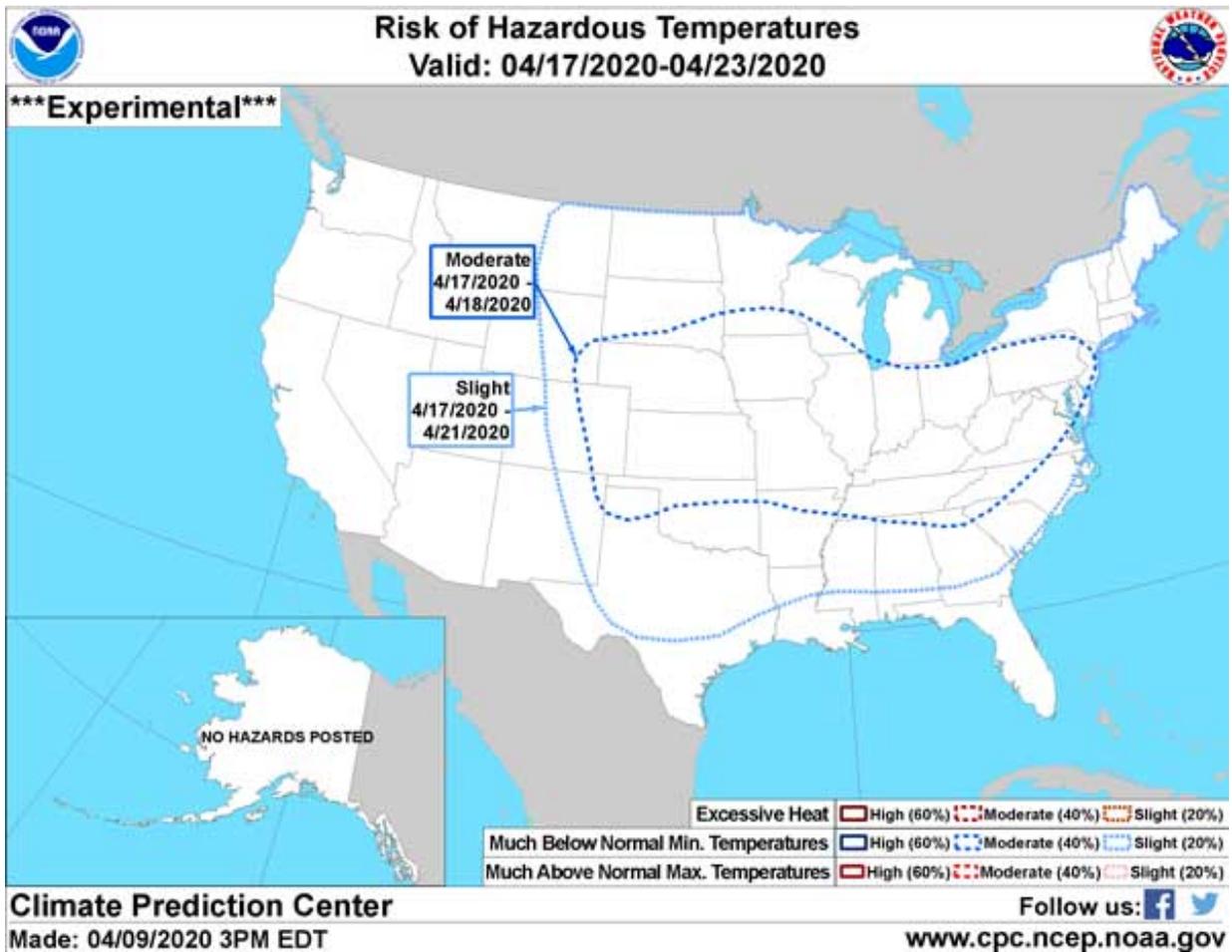


Figure 3. Risk of hazardous temperatures for the next coming weeks, April 17 to 23. (NOAA)

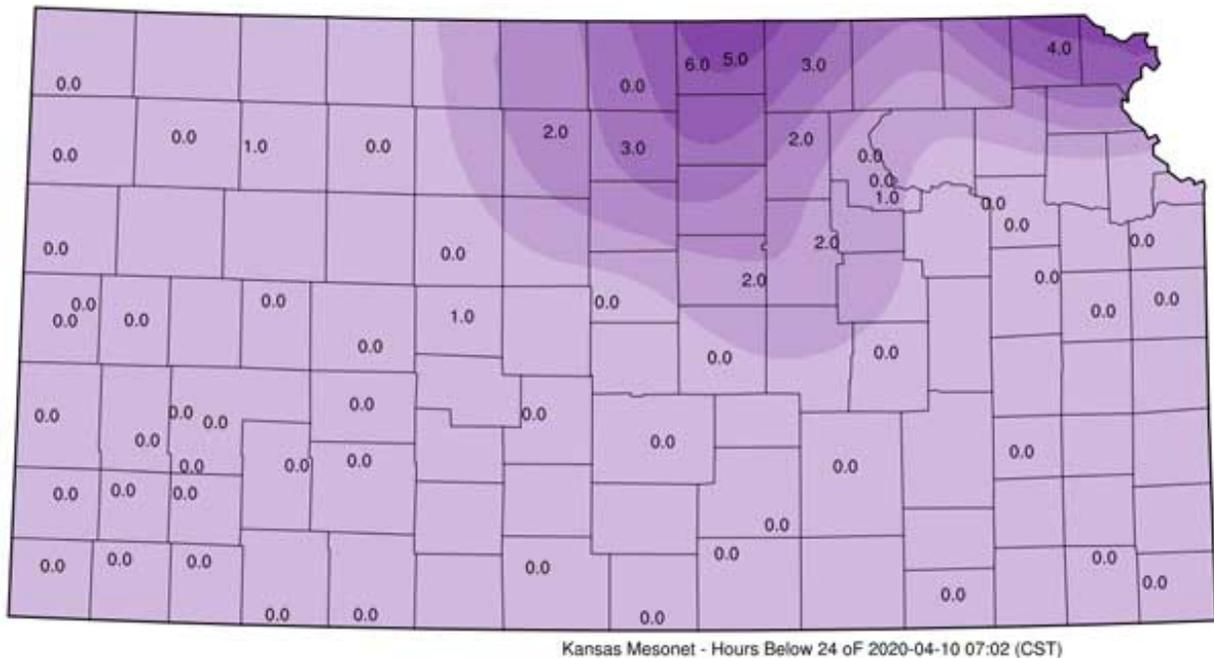


Figure 4. Hours below 24 °F for April 10 at 7:00 am (CST) (<http://mesonet.k-state.edu/>)

Cold air temperatures

Air temperatures have fallen below freezing across most of the state. More importantly, parts of North Central and Northeastern KS had several hours with temperatures below 24 °F (Figure 4). These cold temperatures will translate to cooler soil temperatures. This is particularly true for areas with drier soil surfaces, less residue and if the cold air temperatures persist.

Optimal soil temperature for emergence

Every summer row crop has an optimal soil temperature for emergence. A minimum for corn is 50 °F for germination and early growth. However, uniformity and synchrony in emergence is primarily achieved when soil temperatures are above 55 °F. Uneven soil temperatures around the seed zone can produce non-uniform crop germination and emergence. Lack of uniformity in emergence can greatly impact corn potential yields. This is particularly true for corn, since it is the earliest summer row crop planted. When soil temperatures remain at or below 50 °F after planting, the damage to germinating seed can be particularly severe.

The impacts of a hard freeze on corn are discussed in detail in a previous eUpdate article and can be viewed at the following link: <https://bit.ly/3bQ41k4>

More information about the planting status of summer row crops will be provided in upcoming issues of the Agronomy eUpdate. Stay tuned!

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2. Effect of cold temperatures on field peas

Field peas are an emerging alternative crop for producers in northern Kansas. Field peas are a pulse crop, a cool season grain legume. Currently in northern Kansas, field peas range in growth stage from just germinating to having several above-ground nodes present, depending on planting date and field conditions. Field peas will germinate at soil temperatures of 40° F. Depending on conditions, emergence may take from 10-14 days. A unique feature of field peas, compared to other broadleaf crops typical to Kansas (soybean, cotton, sunflower), is a hypogeal emergence. In other words, the cotyledons remain below the soil surface. This type of emergence provides a higher level of tolerance to freeze events.

Field pea seedlings are generally tolerant to spring frosts into the mid 20's and can survive even lower temperatures if under snow cover (Table 1).

Table 1. Percentage seedling survival for 10 legume species at four seedling ages* and temperatures. Meyer and Badaruddin, 2001. Crop Sci. 41:1838-1842.

Wks after planting	Freezing temperatures, °F															
	28				25				21				17.5			
	1*	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
	----- percent seedling survival -----															
Field pea	100	100	100	94	94	81	50	25	100	6	25	0	0	0	0	0
Alfalfa	100	100	100	100	100	100	100	100	100	66	62	82	25	23	39	18
Red clover	100	100	100	100	100	92	88	92	77	54	64	73	14	8	14	25
Sweetclover	100	100	100	100	100	100	98	98	100	73	81	98	16	16	21	12
Alsike clover	100	100	100	100	100	100	100	98	100	65	94	98	50	40	46	27
White clover	100	100	100	100	100	100	98	98	100	84	92	98	21	20	16	23
Sainfoin	100	100	100	100	100	100	100	98	100	96	75	90	29	8	27	16
Pinto bean	81	94	94	94	37	38	13	68	0	0	13	0	0	0	0	0
Navy bean	88	88	94	100	31	0	44	25	0	13	0	0	0	0	0	0
Soybean	100	94	94	87	81	56	63	44	75	19	0	13	0	0	0	0
LSD(0.05)	19.3															

* Seedling ages were 1, 2, 3, and 4 wk after planting.

In the event that above-ground biomass is damaged by freezing temperatures, field peas have the ability to regrow from the auxiliary or scale buds that are located below the soil surface (Figure 1).

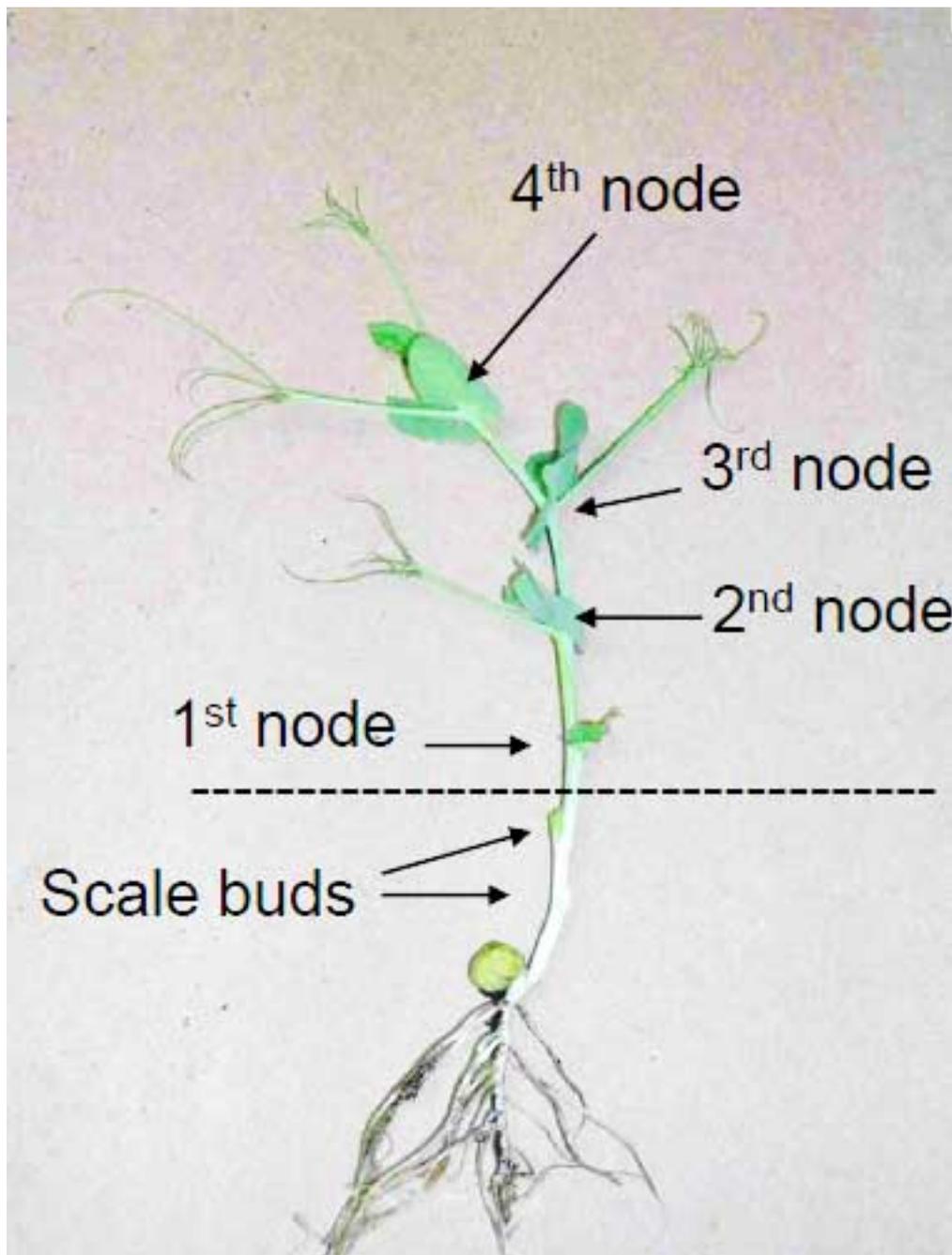


Figure 1. Field pea growth stages. Figure by K. McKay, North Dakota State Univ.

If plants are at or beyond the 7th node stage when freeze occurs, plants are not likely to survive as auxiliary bud initiation will not occur. The ability for regrowth from the auxiliary buds results in relatively minor yield losses in cooler climates. In Kansas, heat stress at flowering and pod fill is the key yield limiting factor. Regrowth from auxiliary buds will be delayed in development and will likely be entering into these critical growth stages at higher temperatures, thus reducing yield potential. Expect significant yield losses in fields that become reliant on regrowth following a freeze event.

If producers have field peas that are injured by frost, they are encouraged to contact Lucas Haag, Northwest Area Agronomist, so that together we can learn more about how peas respond to frost

events in the Central Plains.

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3. Pre-emergence herbicides for grain sorghum

Pre-emergence herbicide programs for corn were discussed in a recent eUpdate. The role of pre-emergence herbicides is similar in both corn and grain sorghum, and some herbicides are similar. A table summarizing weed species response to various grain sorghum herbicides can be found on page 48 of *2020 Chemical Weed Control for Field Crops, Pastures, Rangeland, and Noncropland* (SRP 1155) at: <https://www.bookstore.ksre.ksu.edu/pubs/SRP1155.pdf>

Herbicide groups of soil-applied residual herbicides for grain sorghum

Triazines (Group 5). Atrazine is the most widely used triazine herbicide. It is a common component of many pre-plant and pre-emergence herbicide premixes for sorghum. It controls a wide variety of broadleaf weeds, including pigweeds, ragweeds, morningglories, and mustards, as well as some grasses. However, atrazine resistance has been reported for many weed species. Propazine is another triazine herbicide labeled for use in grain sorghum. Use rates of triazine herbicides are influenced by soil type, soil pH, and organic matter, and use is prohibited in instances where water contamination is likely. Unless your situation prohibits atrazine use, it is recommended to include atrazine when you apply HPPD-inhibitor and acetamide herbicides.

Acetamides (Group 15). The acetamide products used in grain sorghum include dimethamid-P (Outlook), S-metolachlor (Dual II Magnum), metolachlor, acetochlor, and many premix products containing one of these active ingredients. In general, these products are very effective in controlling most annual grasses and small-seeded broadleaf weeds, except kochia. Though resistance to Group 15 herbicides have been reported in other states, there have been no cases reported in Kansas to date. Acetamide products are most effective when applied with atrazine. Several such premixes are available and should be used instead of acetamides alone, unless atrazine is not allowed.

HPPD-inhibitors (Group 27). Mesotrione (Callisto, others) controls kochia, pigweeds, velvetleaf, and many other broadleaf weeds, as well as grasses. Mesotrione should be applied with atrazine, which is often included in premixes (Lexar EZ, Lumax EZ, others). Some mesotrione-resistant weed populations have been identified in Kansas.

PPO-inhibitors (Group 14). Saflufenacil (Sharpen) controls pigweeds well; however, it is marginal on kochia. Verdict (saflufenacil + dimethenamid-P) has excellent activity on pigweeds, kochia, and large-seeded broadleaf weeds. However, the length of residual activity can be shorter than other pre-emergence products.

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4. Opportunities for on-line training certification for dicamba and paraquat

For producers that intend to use Xtend cotton or soybean in 2020, you will need to have an additional dicamba-specific certification to apply dicamba-containing products labeled for use in these crops. This certification must be renewed annually. Certification from last year is no longer effective.

At this time, the recommended way to get that certification is to complete on-line training provided by certain companies. Plan to set aside about 45-60 minutes to complete the training. Several online training options are listed below.

<https://training.roundupreadyxtend.com/>

<https://www.engeniastewardship.com/#/training>

www.corteva.us/products-and-solutions/crop-protection/fexapan.html

<https://syngentaus.docebosaas.com/dicamba/learn/signin>

Paraquat-containing products (Gramoxone SL 2.0, others) will also require additional certification for all handlers and applicators. That training can be completed on-line at the link below.

<https://campus.extension.org/enrol/index.php?id=1660>

Sarah Lancaster, Extension Weed Specialist
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5. Record-setting rainfall for southeast Kansas - How wet is it?

The Missouri River Basin, including eastern and southeastern Kansas, has been much wetter than normal for an extended period. The 2019 annual precipitation totals set all-time records across much of the region (Figure 1). These high rainfall totals have resulted in saturated soil, full reservoirs, and high stream flows.

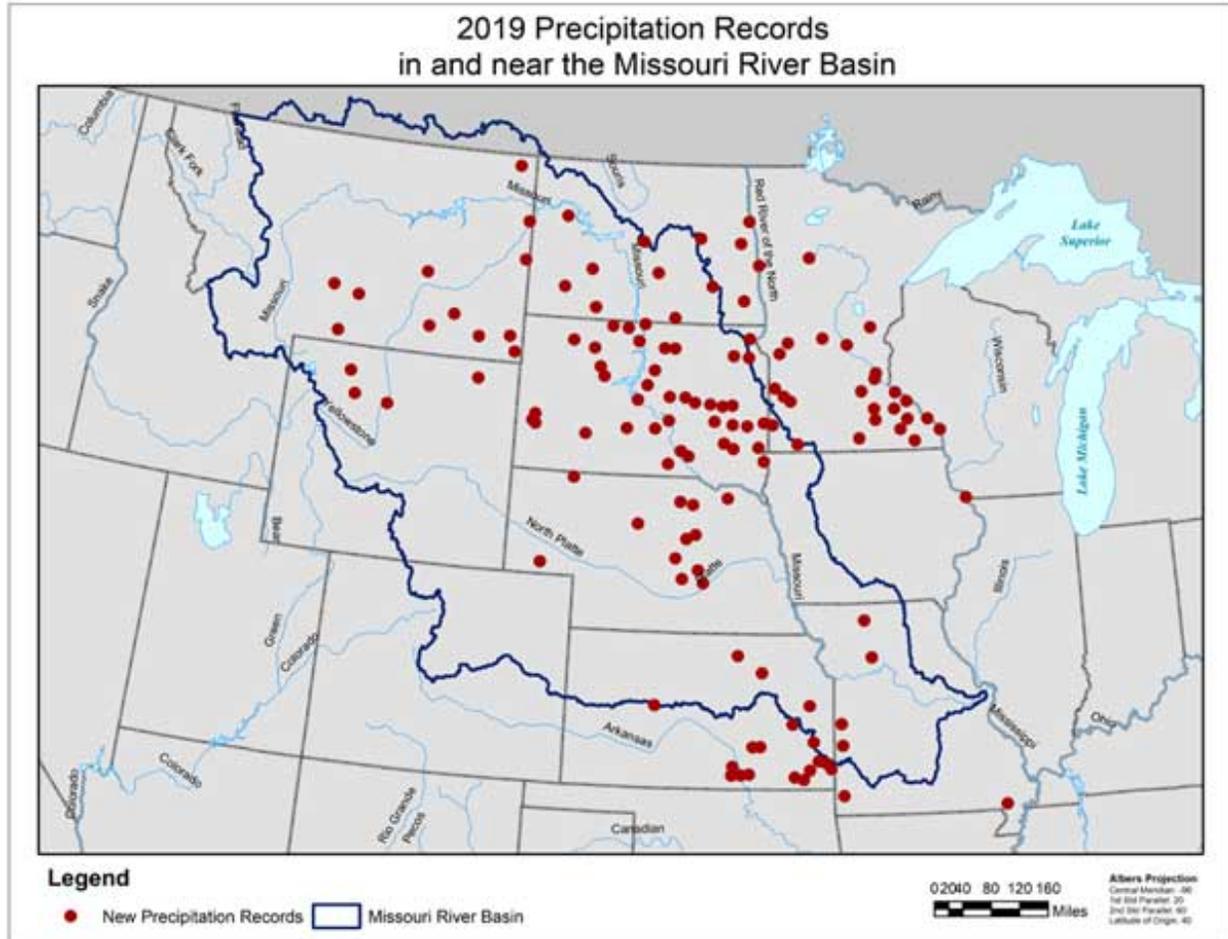


Figure 1. Weather stations that reported record annual precipitation in 2019. Source: NOAA

Wet pattern after wet pattern

The Upper Great Plains, including parts of Kansas, is in a very wet weather pattern. There were multiple weather stations that set two-year record rainfall totals in 2018-19 (Figure 2).

Weather stations in southeast Kansas that set two-year record totals include:

- Ottawa = 104.41 inches
- Parsons = 111.48 inches
- Columbus = 101.86 inches

Even regions in southcentral Kansas had record-setting rainfall during this 2-year period.

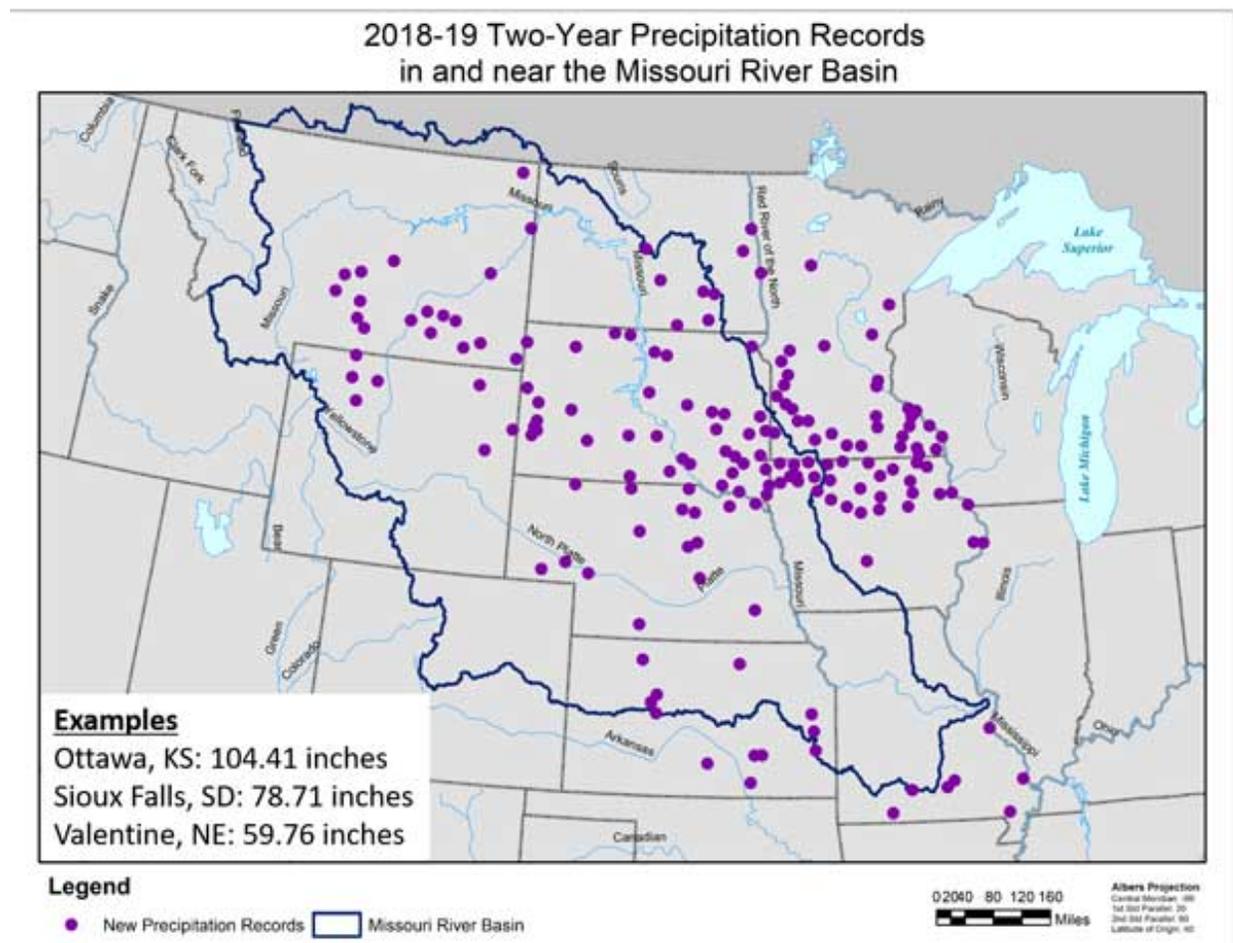


Figure 2. Stations with 2-year record rainfall amounts from 2018-19. Source: NOAA

To determine rainfall trends, meteorologists examine the deviation of total annual rainfall above or below the long-term average (Figure 3). At Parsons, the 126-year annual rainfall average is 37.65 inches, ranging from a record high of 57.6 inches in 2019 to a record low of 21.93 inches in 1963. Plotting a 5-year running average, we can detect trends in rainfall patterns, such as the drought from 1952 to 1956. The current weather pattern is part of a five-year trend of wetter-than-normal conditions in the east and southeast (Figure 3). While much of this century (since 2000) has been wetter than the long-term average, significant dry periods still occur.

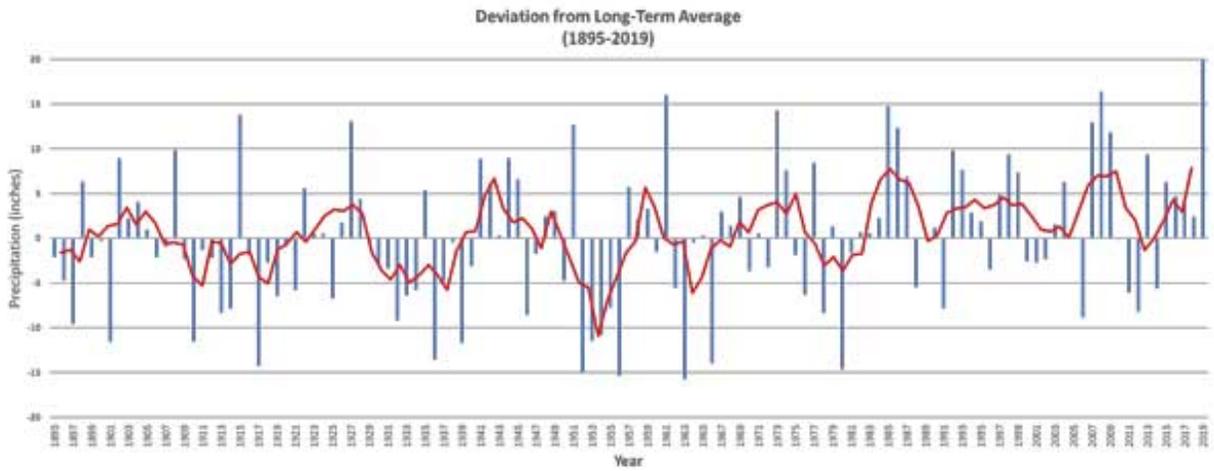


Figure 3. Deviation from the long-term annual precipitation for the Southeast Crop Reporting District. Source: Kansas Weather Data Library

The annual, or even seasonal, precipitation does not tell the whole story. Saturated ground and elevated water tables, stream flows, and reservoirs mean that soils will be slow to dry. Rainy days and saturated soils not only increase flooding, but also delay fieldwork. On average, the number of days with rainfall greater than 0.2 inches at Parsons is 49 (Figure 4). In 2019, there were 66 rainy days, compared to only 23 in 2012. So far in 2020, we have had 28 days with rainfall amounts greater than 0.2 inches, well above the long-term average for this time of year (11 days by April 1, 2020).

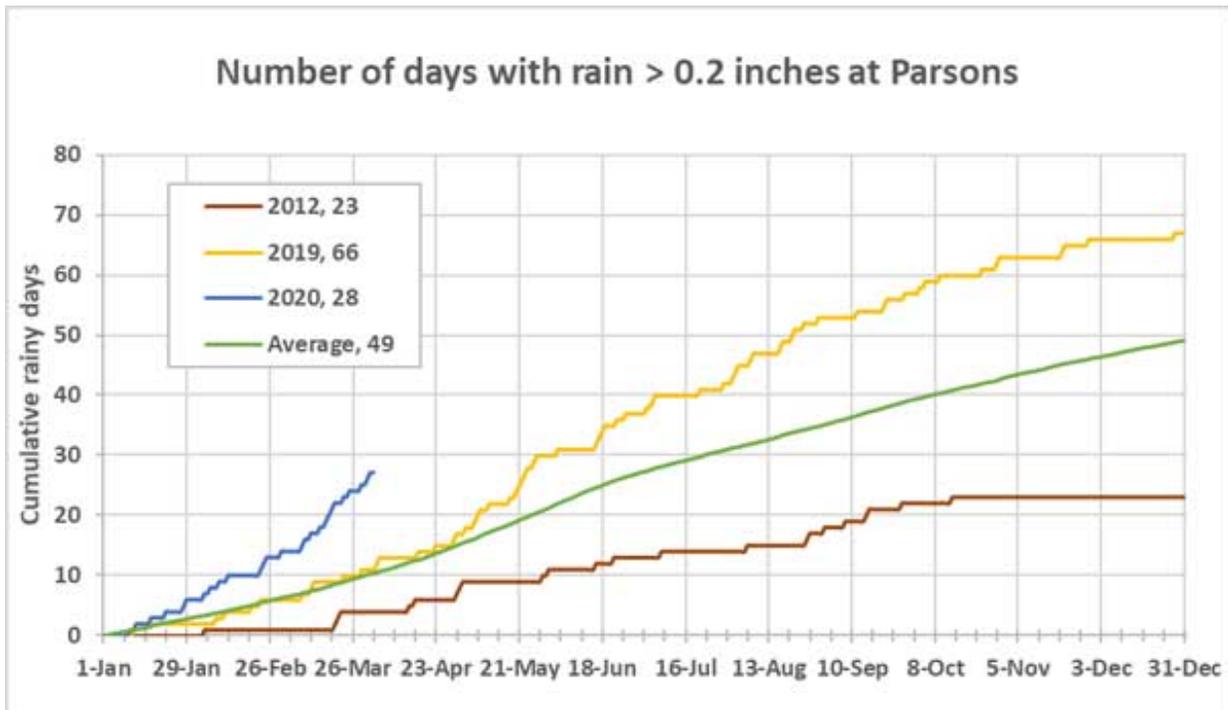


Figure 4. Number of days with rainfall in excess of 0.2 inches at Parson. Source: Kansas Weather Data Library

Looking ahead

We are moving into the wetter part of the year for southeast Kansas. Based on long-term records, there is an 80% probability of receiving two tenths of an inch per week at the beginning of April. There is a 60% probability of receiving 0.60 inches per week by the middle of April (Figure 5). Even a normal rainfall pattern will mean delays in planting and fieldwork. At this time, the April outlook, as well as the April-June outlook (Figure 6), are predicting wetter-than-normal conditions in the southeast.

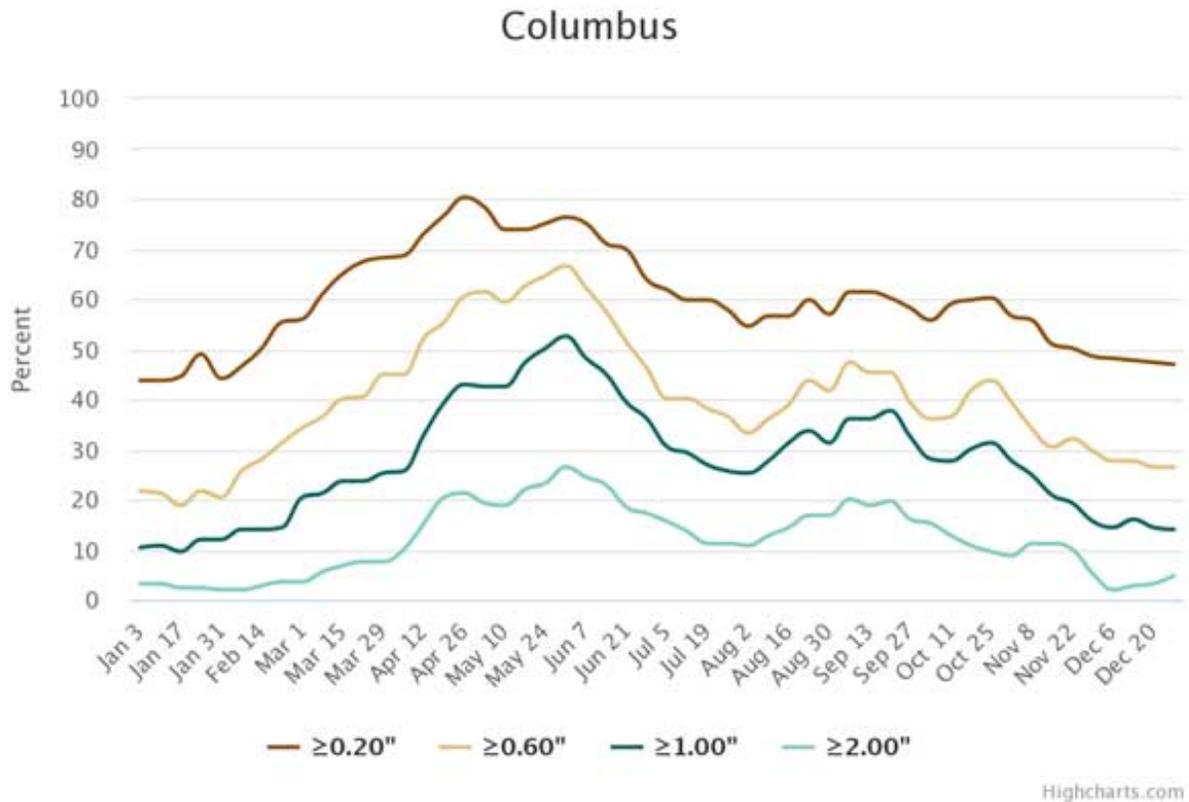


Figure 5. Weekly precipitation probabilities for Columbus, KS. Source: Kansas Climate Office

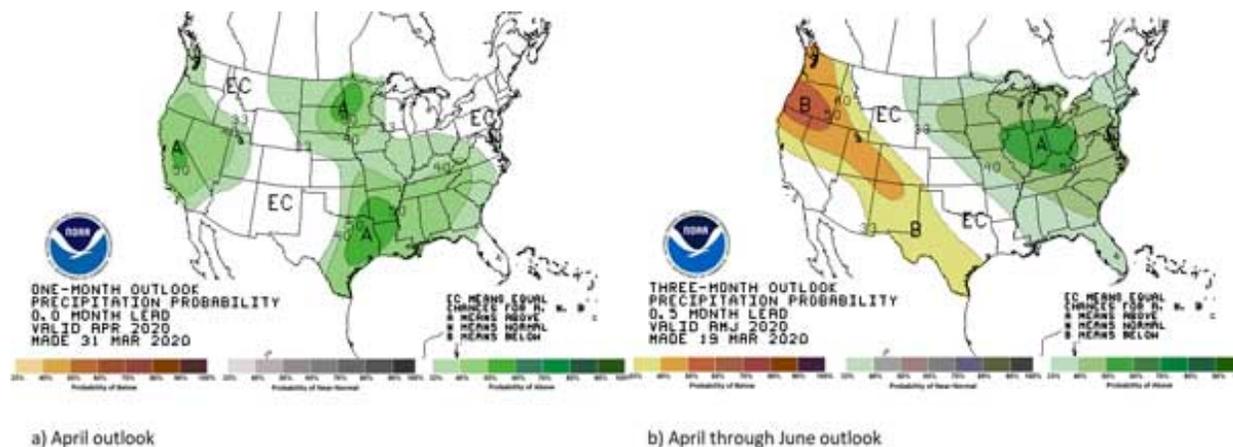


Figure 6. April and April-to-June precipitation outlooks. Source: Climate Prediction Center

Summary

- 2019 was the wettest year since 1895.
- Parsons, Columbus, and Ottawa set all-time annual records for rainfall.
- January – March 2020 is the 3rd wettest start to the year.



Figure 7. Saturated conditions at the Ottawa Mesonet station in 2019. Photo by Chip Redmond, K-State Research and Extension.

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6. Ag-Climate Update for March 2020

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

March 2020: Divided Rainfall

Overall, March was warm and wet. It ranked as the 38th wettest March and the 23rd warmest in 127 years. Statewide, two new daily record highs were recorded, mirrored by two record daily low maximum temperatures. There were seven recorded highs of minimum temperatures. Statewide precipitation averaged slightly below normal, with a much drier-than-normal swath dividing wetter-than-normal conditions in the Northwest and Southeast. The Southeast averaged over 5 inches; 169% of normal, making it the 3rd wettest start to the year in 127 years.

Severe weather was limited. There were no reports of tornadoes, large hail, or damaging wind. There was a path of small hail in west central Kansas large enough to be visible from satellite a day after the event (Figure 1).

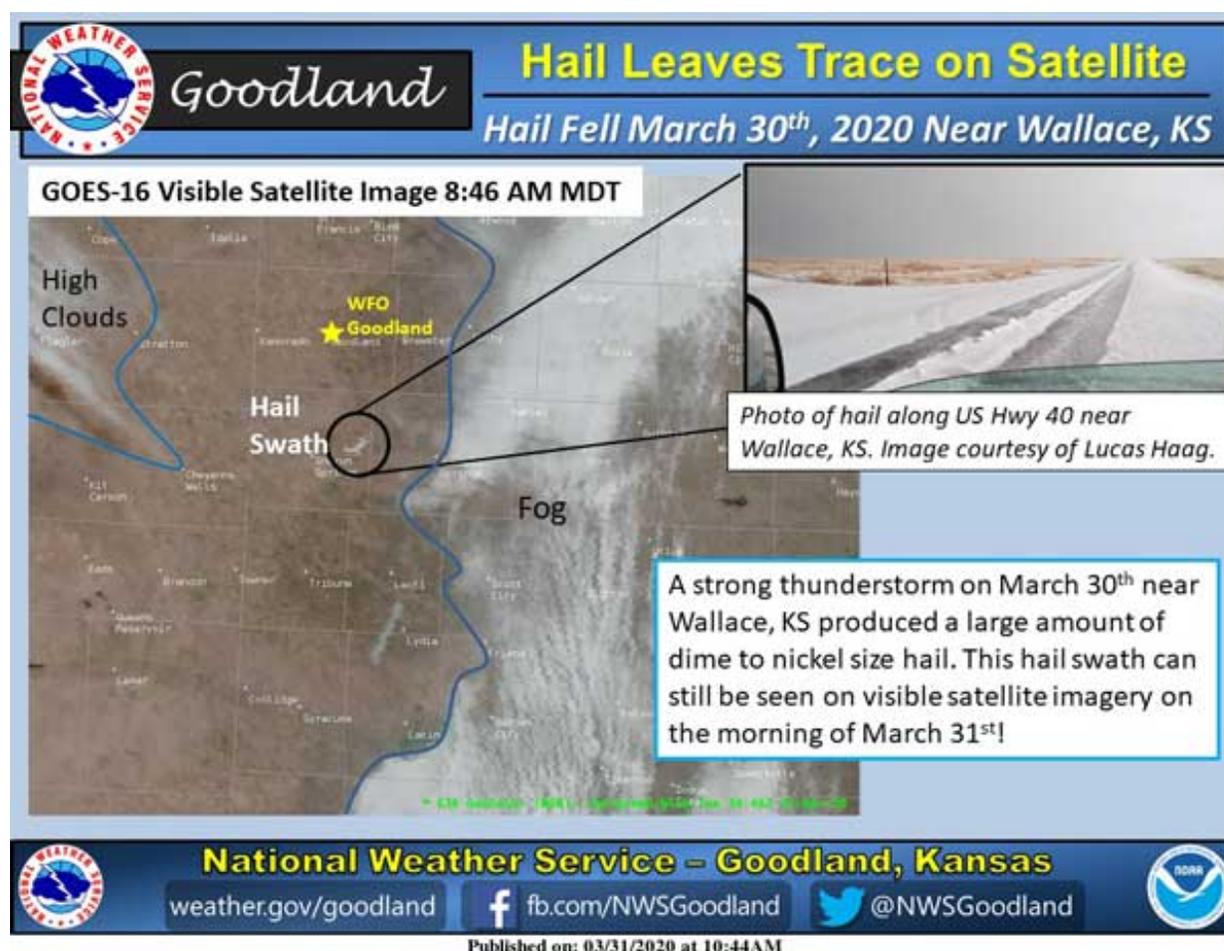


Figure 1. Screenshot from the Goodland, KS National Weather Service Twitter account

describing a hail swatch along U.S. Hwy 40 near Wallace, KS on March 31. The hail was produced by a strong thunderstorm on March 30 and was visible by satellite imagery the next day.

View the entire March Ag-Climate Summary, including the accompanying maps and graphics (not shown in this summary), at <http://climate.k-state.edu/ag/updates/>.

7. K-State's Soil Testing Lab and Plant Disease Diagnostic Lab are OPEN!

During this time of reduced operations at K-State due to COVID-19, there have been questions on the operational status of the Soil Testing and Plant Disease Diagnostic Labs on the Manhattan campus. Both of these labs are open and accepting samples, however submission of samples has been modified to accommodate new distancing guidelines. Please read below for specific instructions on how to submit samples (each lab has their own instructions).

KSU Soil Testing Lab

The Soil Testing Lab is fully staffed and operational. Given that we are able to operate with a full staff, the turnaround time for sample analysis is not expected to change. However, sample submission procedures have been modified and are outlined below.

- **No in-person sample delivery to lab.** However, samples can be left in the **Soil Drop Box** located on the NW side of Throckmorton (1712 Claflin Rd.) There is map on the door of the building or on the Lab website at <https://www.agronomy.k-state.edu/services/soiltesting/> (Figure 1). Samples will be picked up at least twice a day.
- **Samples can be mailed via USPS or UPS.** To create a UPS shipping label, please visit our website and input your mailing address: https://ksusoiltesting.com/ups_form.php. If using the U.S. Postal Service, the mailing address for the lab is:

KSU Soil Testing Lab
2308 Throckmorton Plant Science Center
1712 Claflin Road
Manhattan, KS 66506-5503

- **Samples can be submitted to your local county Extension office.** County offices will forward samples to the lab (postage and handling may be charged). Contact your local office for samples bags, instructions, and if you have questions.



Figure 1. Location of the Soil Sample Drop Box located on the NW side of Throckmorton Plant Sciences Center in Manhattan.

Homeowners and producers are encouraged to contact the lab with any questions. The Soil Testing Lab is working hard to best accommodate the soil testing needs for everyone during this critical time of the year. **Please reach out by phone at 785-532-7897 or by email at soiltesting@ksu.edu.**

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KSU Plant Disease Diagnostic Lab Update

The KSU Plant Disease Diagnostic Lab continues to remain open at this time. However, we are working under limited operations and staff, so turn around may take a little longer than usual. There have been a few changes to our submission procedures. Please read the information below:

- **No in-person sample delivery to lab.** Instead, if you are in **Manhattan** please use the **soil drop box** located on the Northwest side of Throckmorton PSC (Figure 1).
- **USPS sample delivery to 4032 Throckmorton PSC 1712 Claflin Rd Manhattan, KS 66506 is still available**, but will be checked at a minimum of twice a week. Time sensitive samples such as **Wheat should NOT use USPS** and instead use the new temporary address below.

- **The best mailing option for samples to the plant disease diagnostic lab** is BELOW.

Please email us the tracking # so we know that a sample is coming to the lab.

Our NEW TEMPORARY SHIPPING ADDRESS for UPS/FEDEX packages

KSU Plant Disease Diagnostic Lab
1310A Westloop PI #351
Manhattan, KS 66502

The growing season is about to kick off and we want to support Kansas growers and county extension offices. If you have questions, please contact us at clinic@ksu.edu

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