Issue 901

K-STATE Research and Extension

Extension Agronomy

eUpdate

04/07/2022

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. First hollow stem update (7 April 2022)

Cattle should be removed from wheat pastures when the crop reaches first hollow stem (FHS). Grazing past this stage can severely affect wheat yields (for a full explanation, please refer to the eUpdate article "Optimal time to remove cattle from wheat pastures: First hollow stem").

First hollow stem update

In order to screen for FHS during this important time in the growing season, the K-State Extension Wheat and Forages crew measures FHS on a weekly basis in 19 different commonly grown wheat varieties in Kansas. The varieties are in a September-sown replicated trial at the South Central Experiment Field near Hutchinson.

Ten stems are split open per variety per replication (Figure 1), for a total of 40 stems monitored per variety. The average length of hollow stem is reported for each variety in Table 1.

Figure 1. Ten main wheat stems were split open per replication per variety to estimate first hollow stem for this report, for a total of 40 stems split per variety. Photo by Romulo Lollato, K-State Research and Extension.

Table 1. Length of hollow stem measured on 9, 15, 21, 24, and 29 of March, and 4 of April 2022 of 19 wheat varieties sown mid-September 2021 at the South Central Experiment Field near Hutchinson. The critical FHS length is 1.5 cm (about a half-inch or the diameter of a dime). Value(s) in bold indicate the highest FHS group. Values highlighted in yellow indicate varieties that have already passed the 1.5 cm first hollow stem threshold.

	First hollow stem (cm)					
Variety	3/9/2022	3/15/2022	3/21/2022	3/24/2022	3/29/2022	4/4/2022
AP Exp#1	0.2	0.3	1.0	**1.6**	**.**	**.**
AP Roadrunner	**0.7**	**1.0**	1.9	.	.	.
AP18AX	**0.6**	0.6	**2.9**	.	.	.
AM Cartwright	0.3	0.5	0.8	**1.5**	**.**	**.**
Crescent AX	0.4	0.8	2.1	.	.	.
KS Ahearn	0.3	0.3	0.6	**1.2**	1.9	.
KS Hatchett	0.1	0.5	1.0	**1.3**	**2.7**	**.**
KS13DH0041-25	0.2	0.5	1.2	**1.5**	**.**	**.**
LCS Atomic AX	0.5	0.6	1.7	.	.	.
LCS Chrome	0.2	0.5	1.1	**1.4**	**2.7**	**.**
LCS Helix AX	0.3	0.4	1.1	**1.4**	**2.6**	**.**
LCS Julep	0.2	0.3	0.8	1.0	1.4	**3.2**
LCS Photon AX	0.4	0.5	1.3	**1.7**	**.**	**.**
LCS Revere	0.2	0.2	0.5	1.0	1.9	.
LCS Runner	0.2	0.2	0.8	0.8	1.9	.
LCS Steel AX	0.3	0.3	1.0	**1.4**	**2.9**	**.**
LCS Valiant	0.2	0.3	1.1	**1.9**	**.**	**.**
Plains Gold Ray	0.3	0.4	0.9	**1.4**	**2.0**	**.**
Zenda	**0.5**	**1.2**	**2.3**	.	.	.
Average	0.3	0.5	1.3	1.4	2.2	3.2
Min.	0.1	0.2	0.5	0.8	1.4	3.2
Max	0.7	1.2	2.9	1.9	2.9	3.2

All varieties had elongated more than 1.5 cm first hollow stem as of 4 April 2022. The intention of this report is to provide producers an update on the progress of first hollow stem development in different wheat varieties. Producers should use this information as a guide, but it is extremely important to monitor FHS from an ungrazed portion of each individual wheat pasture to make the decision of removing cattle from wheat pastures.

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2. Spring-emerged volunteer wheat: Should producers worry about wheat streak mosaic virus and the green brid

Parts of Kansas may be experiencing spring emerged volunteer wheat (Figure 1). There have been questions about the risk that this wheat poses for wheat streak mosaic virus (WSMV) to the surrounding emerged crop (see Figure 2 for a photo of WSMV symptoms). Here we walk through some considerations, as well as termination strategies.

Figure 1. Volunteer wheat that has emerged in wheat residue. Photo by Sarah Lancaster, K-State Research and Extension.

What is the green bridge?

As a reminder, the term "green bridge" is used to describe the volunteer wheat that emerges in the summer after wheat harvest. That is because at harvest time wheat curl mites are abandoning mature wheat in search of green tissue to survive on. If there is volunteer wheat around, and that wheat is not terminated, the curl mites can hitch a ride on that wheat until the crop emerges after planting in the fall. In the fall, those mites will migrate from volunteer (and other weedy hosts) to the new wheat crop. This cycle completes the green bridge

Volunteer wheat that emerges very close to planting, or in the spring, is technically not considered part of the 'green bridge'. This is because the fall wheat crop has already emerged on a much higher area than volunteer wheat. The fall crop itself can serve as a sufficient host for curl mites that have survived the summer.

Figure 2. Typical symptoms of wheat streak mosaic virus. Photo by Kelsey Andersen Onofre, K-State Research and Extension.

Is spring-emerged volunteer wheat as risky as summer-emerged volunteer wheat for WSMV spread?

No. For the reasons we mentioned above, spring-emerged volunteer wheat is less risky than summer-emerged volunteer wheat, because it essentially acts as a (much smaller) neighboring wheat crop. That being said, if curl mites have survived locally, they can still reproduce on this volunteer wheat, just as they would in wheat production fields. If WSMV is a concern, terminating this volunteer crop can avoid successive cycles of mite reproduction. Volunteer from fields with high WSMV levels in 2020 would be of highest concern. When making the decision to terminate this spring-emerged volunteer, the desire to control curl mite populations should be balanced with other agronomic factors.

Are there other agronomic considerations for volunteer wheat that has emerged in the spring?

Potential uses:

- Depending on the amount of volunteer wheat emerged in the spring, it can serve as a potential grazing option for livestock, as young wheat is a very high quality forage.
- Volunteer wheat that emerged in the spring can be used as a cover crop to help reduce wind or water erosion and increase carbon (organic matter) returning to the soils, if it is terminated prior to a summer crop similar to cereal rye or spring oats.

Potential risks:

- Volunteer wheat may complicate the management of other weed species that may also be present.
- Volunteer wheat may consume use water that could be conserved for a summer crop.

What are the best termination strategies for spring-emerged volunteer, prior to summer crop planting?

Glyphosate is an effective option to control volunteer winter wheat that will have little to no impact on the following summer crop. Applications of a formulation that contains 4.5 pounds per gallon at a rate of 24 to 44 fl oz/A will be effective, assuming weather conditions are appropriate. No herbicides will work well when temperatures are below 60°F during the day and/or 40°F overnight.

Other herbicides that will control volunteer winter wheat include Group 1 herbicides such as Assure II (fluazifop) or Select (clethodim). Group 1 herbicides do have rotation restrictions when applied before corn or grain sorghum. Residual herbicides such as atrazine, Canopy (chlorimuron + metribuzin), or Sharpen (saflufenacil) can also be included. However, these products also have rotation restrictions to various crops. It is important to consult product labels to determine application rates and rotation restrictions for your specific situation.

What should I do if I think I have WSMV?

Contact your local K-State Extension Office. They will work with you to send photos of the problem (close-up, whole plant, field shot) and plant tissue samples to the K-State Plant Disease Diagnostic Lab.

Use this link for the sample submission form:

https://www.plantpath.k-state.edu/extension/diagnostic-lab/documents/DiseaseLabChecksheet.pdf

Here are guidelines that can help get a good sample to the lab:

- Fill out the accompanying Plant Diagnostic Lab Form (PDF) as completely as possible.
- Send a plentiful amount of fresh plant material (including roots). It is best to include the entire plant when possible. Shake off most of the soil.
- Send a plant sample that is characteristic of the problem (exhibits a range of symptoms).
- Dig (do not pull) up the plant, so the roots remain intact.
- Do not add water or wet paper towels to the sample!

- Seal the plant material in an appropriately sized plastic bag and pack in a crush-proof container.
- Put the accompanying information sheet in a separate plastic bag to keep it dry.
- **Note that samples that arrive prior to Thursday will be completed the week they arrive, while those that arrive after Thursday will be placed in the virus testing panel for the following Thursday.**

Shipping address:

K-State Plant Disease Diagnostic Lab
4032 Throckmorton PSC
1712 Claflin Road
Manhattan, KS 66506

Contact information for K-State Plant Disease Diagnostic Lab:
clinic@ksu.edu
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3. 2022 soil moisture and temperature outlook of spring planting in Kansas

Soil moisture and precipitation

Current status

Current moisture status at 2" depth (5 cm) across Kansas is slightly wet on the east side of the state, with severe dry conditions for much of the west (**Figure 1**). The last two weeks have provided little widespread precipitation with below normal amounts for most of the state except a narrow band in the east (**Figure 2**).

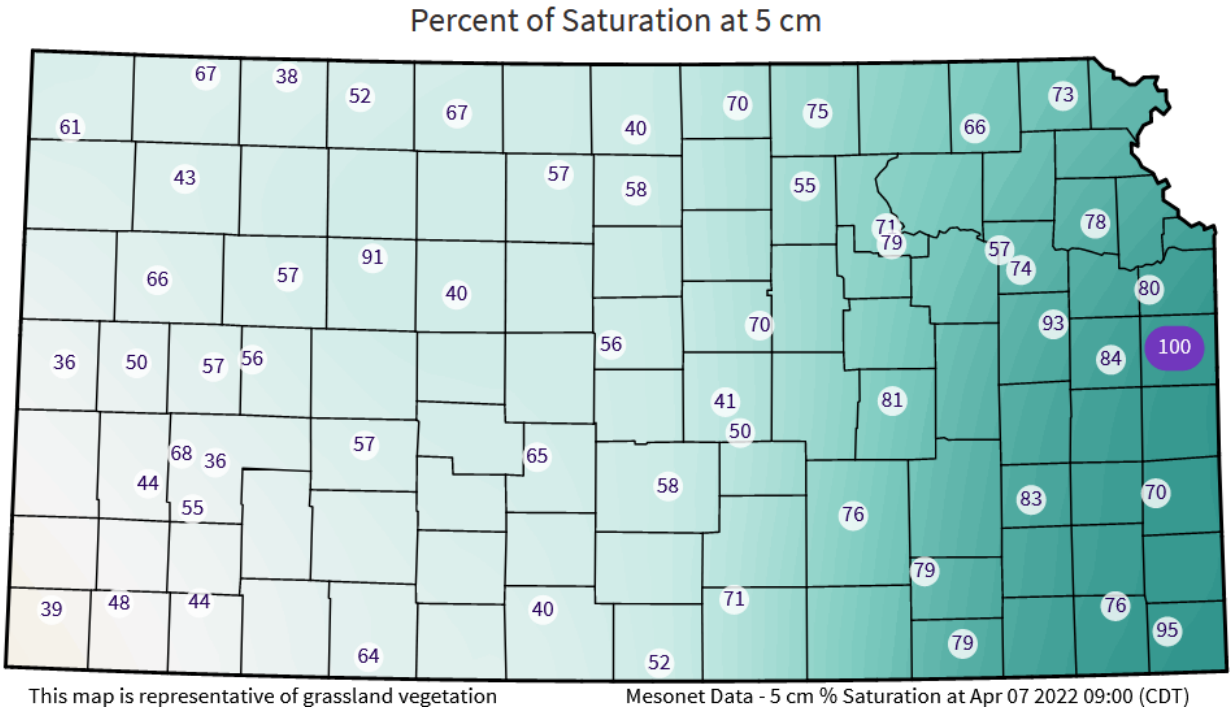

Figure 1. Soil moisture as % of saturation at 0-5 cm layer as of April 7, 2022 (Kansas Mesonet).

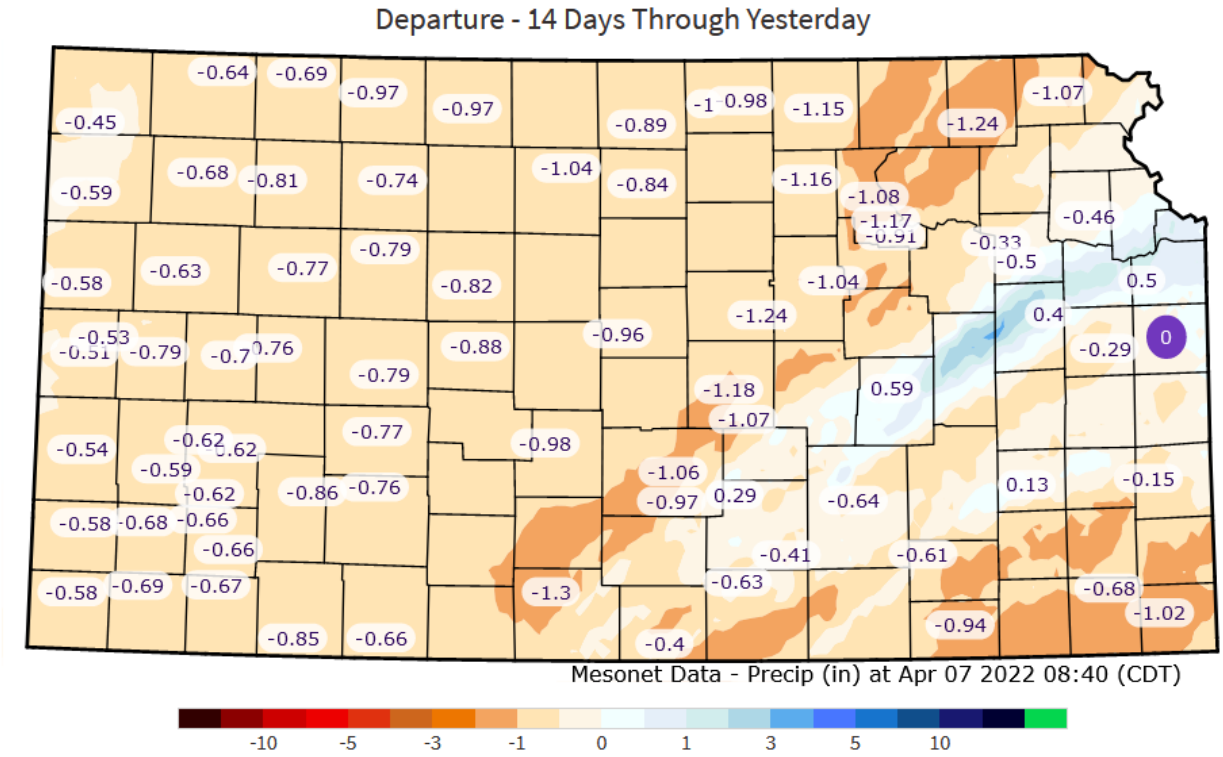

Figure 2. Departure from normal precipitation for the 14 days ending April 7 , 2022.

Precipitation projections

Short-term outlook (8-14 days)

Very dry and windy conditions brought in April. These conditions are notorious for decreasing soil moisture across the state. In addition, dry conditions are favored into mid-late April with a 40% probability of below normal precipitation (**Figure 3**).

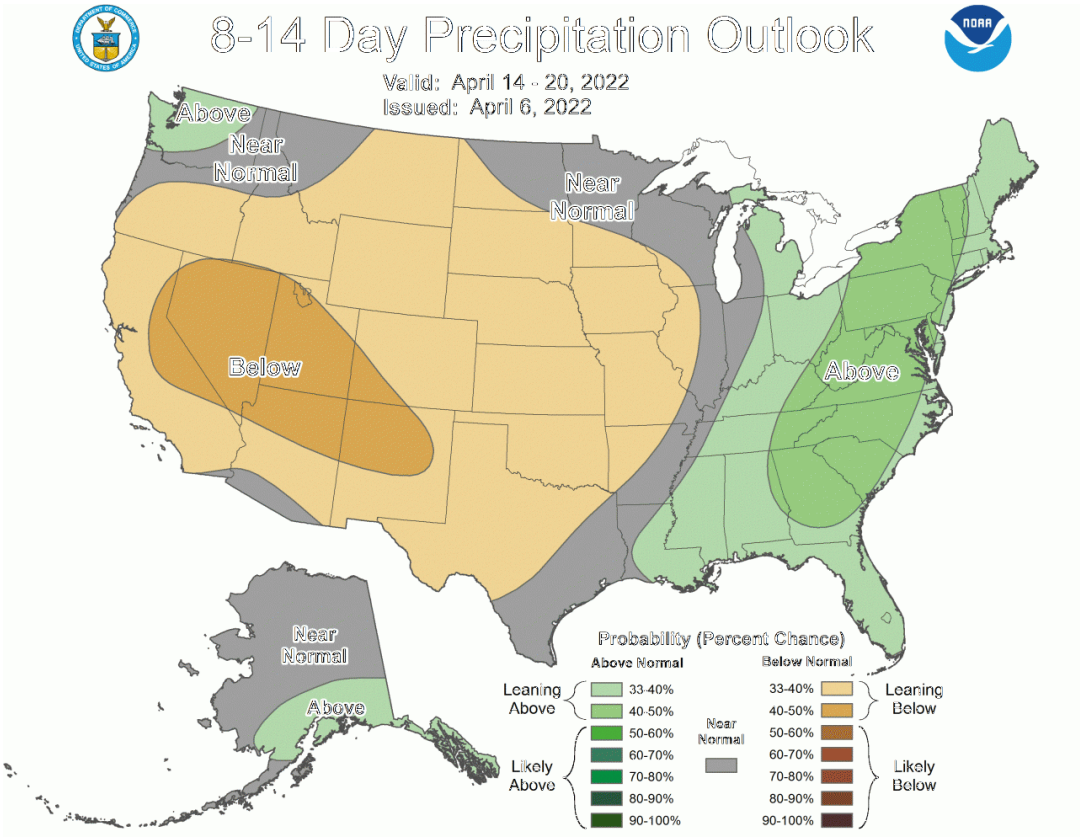

Figure 3. Short-term (8 to 14-day) outlook precipitation probability for April 14 – April 20, 2022. Source: NOAA.

Seasonal outlook (April-May-June)

Following a similar trend, projections for the April-May-Jun period indicate a high probability of below-normal, particularly more likely towards the southwest region of the state (**Figure 4**).

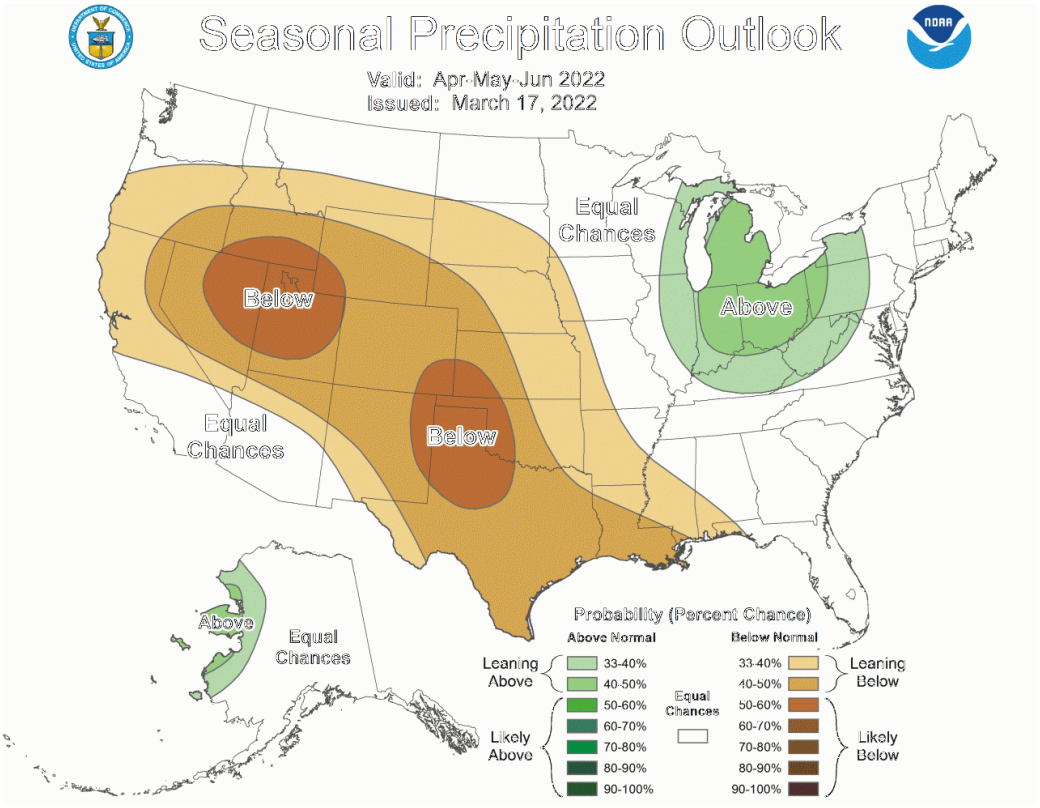

Figure 4. Seasonal outlook precipitation probability for April-May-June 2022. Source: NOAA.

Temperature

Current status

For the first week of April, average soil temperatures at 2 inches among crop reporting districts ranged from 43°F to 56°F, with a trend of the coolest temperatures in the northeast and the warmest towards the southwest corner of the state (**Figure 5**). Soil temperature varies based on local soil moisture, residue, and soil types. For instance, the weekly average at WaKeeney is 50°F, while it is 45°F at the Sheridan Mesonet.

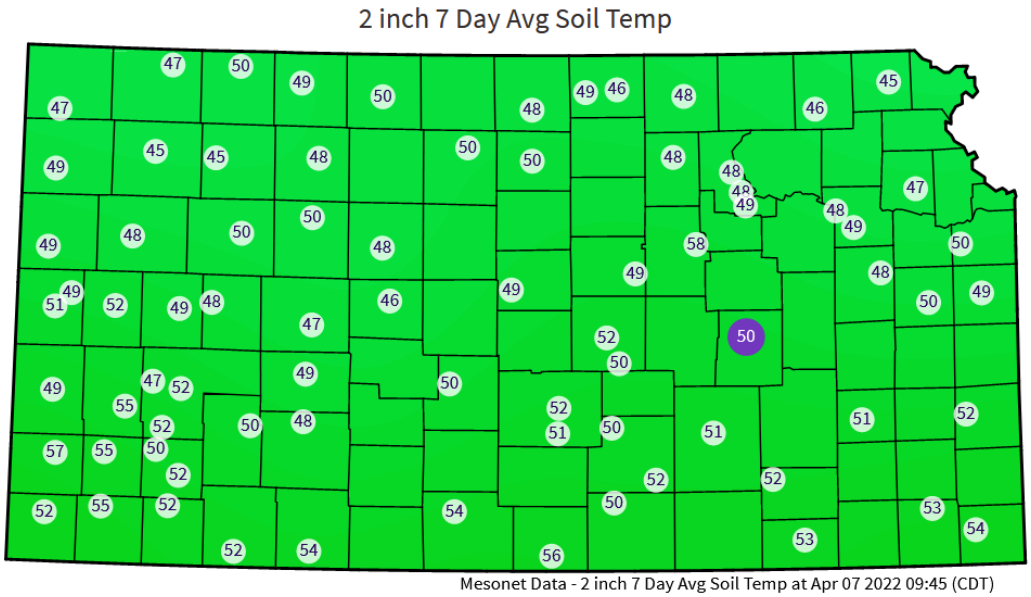

Figure 5. Average soil temperatures at 2-inch soil depth for the week of March 31-April 7, 2022. Source: Kansas Mesonet (http://mesonet.k-state.edu/).

Temperature projections

Short-term outlook (8-14 days)

Temperature projections call for a statewide cooler-than-normal outlook (**Figure 6**). This will slow the process of warming up the soils for planting. Remember that wet soils under a no-tillage system will be slower to warm, while dry soils will fluctuate more rapidly, matching air temperatures, particularly if skies are clear.

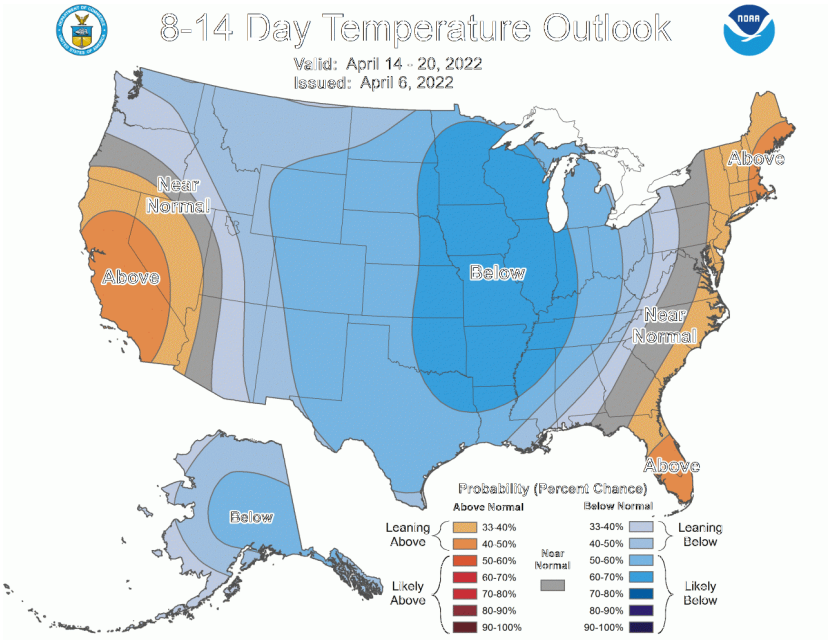

Figure 6. Short-term (8 to 14-day) outlook precipitation probability for April 8 – April 14, 2022. Source: NOAA.

As for the long-term projection on temperatures (April, May, and June), the outlook portrays a situation with most likely above temperatures for the entire state of Kansas (**Figure 7**).

Seasonal outlook (April-May-June)

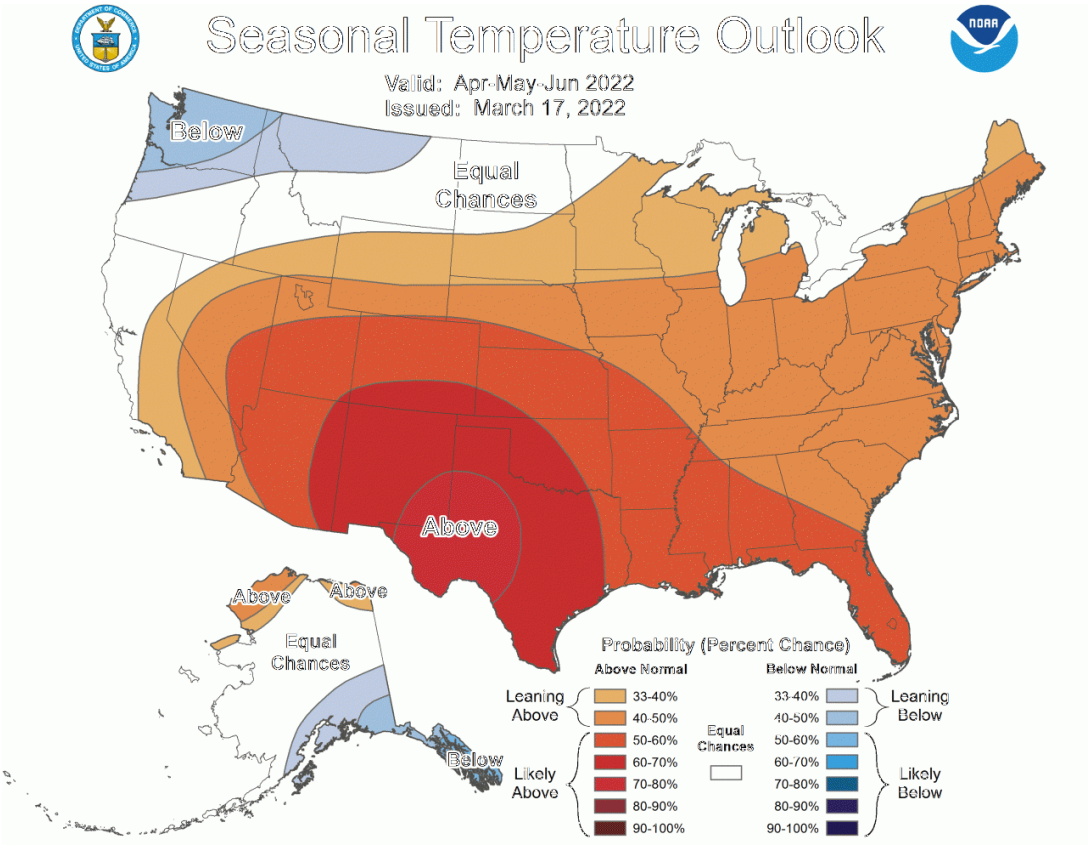

Figure 7. Seasonal outlook precipitation probability for April-May-June 2022. Source: NOAA.

Optimal soil temperature for crop emergence

Every summer row crop has an optimal soil temperature for emergence. A minimum for corn is 50 ^{o}F for germination and early growth. However, uniformity and synchrony in emergence is primarily achieved when soil temperatures are above 55 ^{o}F for corn and above 60 ^{o}F for soybeans. 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 ^{o}F after planting, the damage to germinating seed can be particularly severe.

Impact of a hard freeze on corn

Corn is also more likely than other summer crops to be affected by a hard freeze after emergence if it is planted too early. The impact of a hard freeze on emerged corn will vary depending on how low the temperature gets, the intensity and duration of the low temperatures, field variability and residue distribution, tillage systems, soil type and moisture conditions (more severe under dry conditions), and the growth stage of the plant. Injury is most likely on very young seedlings or on plants beyond the V5-6 growth stage, when the growing point is above the soil surface.

The average day for last spring freeze (32 ^{o}F) is quite variable around the state (Figure 10). The largest variability is from southeast to northwest Kansas; with the earliest last spring freeze date for the southeast region (April 5-15) and latest for the northwest area (>May 3). Corn planting dates before April 15 in the southeast region would increase the likelihood of the crop suffering from a late spring freeze. Similar conditions can be projected for northwest Kansas if corn is planted before May 3 (**Figure 8**).

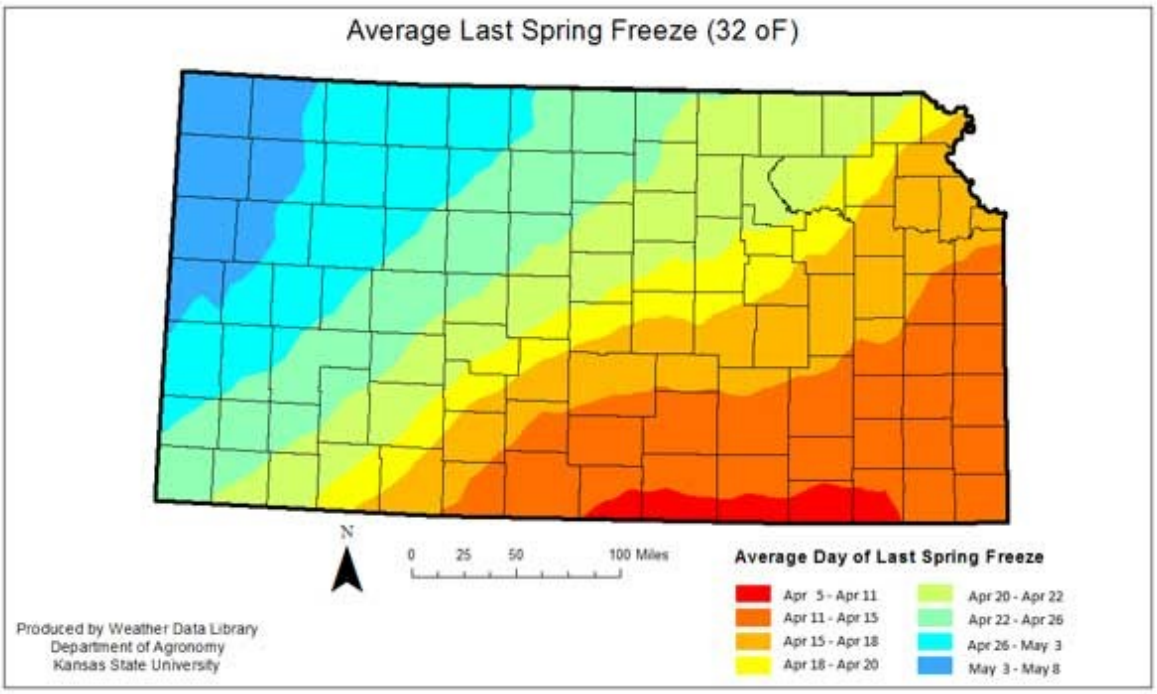

Figure 8. Average last spring freeze (32 degrees F) for Kansas.

Producers should consider all these factors when deciding on the optimal planting time.

'Reminder of the 2012 season'

The above-detailed weather outlook for the 2022 season brings some memories from the 2012 season, one of the driest and warmest during the last decades. Thus, if current weather projections

are realized, yields for summer row crops will be compromised during the coming season. Adjust your use of inputs (seeding rate, fertilizer) based on yield target expectations.

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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