



Extension Agronomy

eUpdate

05/05/2017

These e-Updates are a regular weekly item from K-State Extension Agronomy and Steve Watson, Agronomy e-Update 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 Steve Watson, 785-532-7105 swatson@ksu.edu, or Curtis Thompson, Extension Agronomy State Leader and Weed Management Specialist 785-532-3444 cthompso@ksu.edu.

Subscribe to the eUpdate mailing list: <https://listserv.ksu.edu/cgi-bin?SUBED1=EUPDATE&A=1>

1. Cold injury in corn	3
2. Effect of standing water and saturated soils on corn growth.....	10
3. Considerations for corn planted under wet conditions	18
4. Sidewall compaction from planting into wet soils.....	26
5. 2017 Wheat Quality Tour report.....	28
6. Preliminary assessment of wheat streak mosaic distribution in Kansas	37
7. Update on stripe rust and leaf rust in wheat.....	39
8. 2017 In-Depth Wheat Diagnostic School in Hutchinson, May 10-11	41
9. Four winter canola tours scheduled in May.....	43
10. Cover Crop Field Day planned at K-State HB Ranch in Trego County, May 19.....	45
11. Spring Crops Field Day in Parsons, May 23.....	46
12. Southwest Research-Extension Center Spring Field Day, May 25.....	47
13. Kansas weather summary, April 2017: Epic blizzard.....	48
14. Comparative Vegetation Condition Report: April 25 - May 1	55

1. Cold injury in corn

Plenty of corn acres have been planted in eastern and north central Kansas over the past couple weeks. Since that time, there have been a few freeze events and periods of below-normal temperatures that cooled soils in some areas of eastern and north central Kansas near 50 degrees F or below in the top 4 inches. Some of the freezes in late April had the potential to cause leaf burn and other kinds of damage to recently planted corn. Leaf burn is largely cosmetic, but other effects of the cold temperatures can be more significant and longer lasting even though temperatures have now warmed to more normal levels.

Cold temperatures can result in injury to the germinating seed as it is absorbing moisture – a problem called imbibitional chilling injury. When soil temperatures remain at or below 50 degrees F after planting, the damage to germinating seed can be particularly severe.

Soil temperatures at the 4-inch depth during the first 24-72 hours after seeding, when the kernels imbibe water and begin the germination process, are critical. Kernels naturally swell when hydrating. If the cell tissues of the kernel are too cold, they become less elastic and may rupture during the swelling process, resulting in “leaky” cells. Injury symptoms may include swollen kernels that fail to germinate or aborted growth of the radicle and/or coleoptile after germination has begun.

For example, at the North Central and Irrigation Experiment Field near Scandia going into the last week of April, corn planting was in full swing until rainfall over the weekend of April 29-30. Soil temperatures in the seed zone (two inches) were well below 50° F, and at the four-inch depth, minimums reached well down into the mid-40's and lower.

	2" Soil temperature		4" Soil temperature	
Scandia	Max (degrees F)	Min (degrees F)	Max (degrees F)	Min (degrees F)
April 24	65.6	47.8	66.3	53.5
April 25	54.9	46.3	59.7	52.6
April 26	54.0	42.8	57.6	49.4
April 27	55.5	37.4	58.1	45.3
April 28	44.9	39.7	51.9	47.4
April 29	39.7	36.8	47.4	44.7
April 30	39.0	34.6	45.6	42.4
May 1	51.1	32.9	55.1	41.2

Chilling injury can also occur following germination as the seedlings enter the emergence process, reducing plant metabolism and vigor, potentially causing stunting or death of the seminal roots, deformed elongation (“corkscrewing”) of the mesocotyl, and either delayed or complete failure of emergence, often leafing out underground. Chilled seedlings may also be more sensitive to herbicides and seedling blights.



Figure 1. Seedling corn plant starting to corkscrew in the wrong direction under the soil surface. Photo by Doug Shoup, K-State Research and Extension.



Figure 2. Leaf burn and brown lesion on the upper section of the mesocotyl from freeze damage early after corn emergence. Photo by Ignacio Ciampitti, K-State Research and Extension.



Figure 3. Brown lesions on the first developed leaves from freeze damage early after corn emergence. Photo by Doug Shoup, K-State Research and Extension.

Freeze damage and chilling injury to corn can vary with:

- **Soil type** (as related to water holding capacity) and **soil moisture**. Less freeze injury is expected with wetter soils than dry soils. Dry soils are more sensitive to changes in temperature.
- **Residue**: The effect of residue is not entirely straightforward. The more surface residue, the more the emerging seed and seedlings will be insulated and protected from temperature fluctuations. However, soils with less residue will warm up faster, resulting in less freeze injury when compared with no-till conditions where more residue is on surface.
- **Duration and intensity of cold weather**: More than 2 to 4 hours of soil temperatures in the mid-to-low 40's could result in some injury. Shorter periods of more intense cold or periods of more than 4 hours of soil temperatures in the mid-40's could be equally damaging.
- **Field natural gradient**: Low areas are most sensitive to freeze injury.
- **Growth stage**: On newly planted corn, the emergence process could be affected. On newly

emerged plants (before V4-V6), the first leaves could be burned but plants can recover as long as the growing point remains below the soil surface.

Early planted corn has the risk of facing cold injury, reducing yield potential. However, if the corn emerged uniformly and had good early-season growth then a longer growing season could be expected from these early planting dates – and possibly higher yield potential.

Assuming the plant makes it through the initial cold and or freezing temperature problems, it is still not necessarily out of the woods for cold-related problems. Over the years, we have observed another type of chilling injury that occurs in the crown. It is often referred to as cold weather crown stress or cold weather crown rot.

This condition often develops when young corn plants are exposed to an extended period of cold soils combined with soil moisture levels near saturation. It is not clear if there is an exact stage of growth when the corn is most susceptible to this problem. When this type of chilling injury occurs, plants are usually stunted and may display nutrient deficiency symptoms including nitrogen, phosphorus, or especially potassium. Root development is usually normal, but the crown will have a dark brown or black discoloration in the crown area, which can be seen by splitting the stem (Figure 4).

The plants often survive, but they will be slow to grow and will typically produce a smaller ear. More importantly, if heat and drought stress occur during the later reproductive stages of development, these plants will be more likely to develop stalk rot and lodge. Hybrids that have been developed from “southern” germplasm appear to be more susceptible than those developed from “northern” germplasm.



Figure 4. Cold weather crown injury. Plant in center is healthy. Photo by Doug Jardine, K-State Research and Extension.

Ignacio Ciampitti, Crop Production and Cropping Systems Specialist
ciampitti@ksu.edu

Stu Duncan, Northeast Area Crops and Soils Specialist
sduncan@ksu.edu

Doug Shoup, Southeast Area Crops and Soils Specialist
dshoup@ksu.edu

Doug Jardine, Extension Row Crops Plant Pathologist
jardine@ksu.edu

2. Effect of standing water and saturated soils on corn growth

Where there has been standing water or saturated conditions in areas of a field for a couple of straight days or more, producers may wonder if this will have any effect on corn, either now or as the season progresses. Periods of early-season water saturation can cause immediate problems for small corn plants, and can at times have season-long implications as well. Hopefully, the affected areas are small and confined to spots that are low-lying or poorly drained.

If corn is yet to be planted, please check the companion articles published in this issue of the eUpdate titled "Considerations for corn planted under wet conditions" and "Sidewall compaction from planting into wet soils."

Saturated soils after corn emergence

After corn emerges, saturated soils inhibit root growth, leaf area expansion, and photosynthesis because of the lack of oxygen and cooler soil temperatures. Yellow leaves indicate a slowing of photosynthesis and plant growth. Leaves and sheaths may turn purple from accumulation of sugars if photosynthesis continues but growth is slowed. Corn plants can recover with minimal impact on yield if the plants stay alive and conditions return to normal fairly quickly.



Figure 1. Young corn plants affected by water standing and soil erosion. Photo by Ignacio Ciampitti, K-State Research and Extension.

Although root growth can compensate to some extent later in the season, a saturated profile early in the season can confine the root system to the top several inches of soil, setting up problems later in the season if the root system remains shallow. Corn plants in this situation tend to be prone to late-season root rot if wetness continues throughout the summer, and stalk rots if the plants undergo mid- to late-season drought stress. Plants with shallow root systems also become more susceptible to standability problems during periods of high winds.

Tolerance of young corn plants to full submersion

Young corn plants can tolerate only a few days of full submersion. In some cases, symptoms and stand problems seen late in the season may trace back to flooding when the plants were young. Before V6, when the growing point is at or below the soil surface, corn can survive only 2-4 days of flooding. Chances of plant survival increase dramatically if the growing point was not completely submerged or if it was submerged for less than 48 hours. After 48 hours of soil saturation, soil oxygen is depleted and critical plant functions (photosynthesis, water and nutrient uptake) are impaired.

Thus, young corn plants are more susceptible than corn beyond the V6 stage, when the plants are taller and the growing point is above the surface. Research has demonstrated yield reductions from early-season flooding ranging from 5% to 32% depending on soil nitrogen status and duration of flooding.

Complicating factors

Temperatures can influence the extent of damage from flooding or saturated soils. Cool, cloudy weather limits damage from flooding because growth is slowed and because cool water contains more oxygen than warm water. Luckily, much of the flooded areas in the last couple weeks have stayed relatively cool. Warm temperatures, on the other hand, can increase the chances of long-term damage.

Silt deposition in the whorls of vegetative corn plants can inhibit recovery of flooded corn plants. Enough soil can be deposited in the whorl that emergence of later leaves is inhibited. A heavy layer of silt on leaf surfaces can potentially inhibit photosynthesis or damage the waxy surface layer of the leaf (cuticle), making the leaves subject to drying out. New leaves should not be affected if they can emerge normally. Ironically, what is often best for the silt covered plants is to receive a small shower to help wash off the leaves.

In some instances, the soil in the whorl may contain certain soft-rotting bacteria. These bacteria can cause the top of the plant to rot. The whorl can easily be pulled out of a plant infected with these soft-rotting bacteria. In addition, a rather putrid odor will be present. These plants will not recover.

Disease considerations

Flooding can increase the incidence of moisture-loving diseases like crazy top downy mildew. Saturation for 24 to 48 hours allows the crazy top fungus spores found in the soil to germinate and infect flooded plants. The fungus grows systemically in the plant, often not causing visual symptoms for some time. Symptom expression depends on the timing of infection and amount of fungal growth in the plant. Symptoms include excessive tillering, rolling and twisting of upper leaves, and proliferation of the tassel. Eventually, the both the tassel and ear can resemble a disorganized mass of small leaves, hence the name "crazy top."



Kansas State University Department of Agronomy
2004 Throckmorton Plant Sciences Center | Manhattan, KS 66506
www.agronomy.ksu.edu | www.facebook.com/KStateAgron | www.twitter.com/KStateAgron

Figure 2. Crazy top in corn. Photo by Doug Jardine, K-State Research and Extension.

Other concerns: Denitrification, cold weather crown stress, green snap, root lodging

Saturated soils can also cause loss of nitrogen fertilizer by either denitrification (loss of nitrogen to the atmosphere, mainly as nitrous oxide) or leaching (movement of nitrogen beyond the rooting zone). Thus, under wet spring planting conditions, split N application are more effective in insuring a greater synchrony between crop N demand and soil N supply as compared when all the fertilizer N needed by the crop is applied at planting time. Corn may respond to in-season nitrogen applications if a large portion of early-applied nitrogen is lost to these processes. If corn remains nitrogen deficient later in the season, expect considerably higher levels of stalk rot.

Another condition associated with extended periods of cool, wet soils is commonly referred to as *cold weather crown stress*. Internal stalk cells in the crown nodes can become “leaky” when cell membranes become chilled and oxygen is limited because of the saturated soils. Hybrids with “southern” genetics are more susceptible to this problem than are northern types. Plants may recover from this damage, but they will be much more susceptible to stalk rot later in the season if hot, dry temperatures occur since water and nutrients cannot be efficiently moved through the damaged crown.



Figure 3. Corn plant showing symptoms of cold weather crown stress. Photo by Doug Jardine, K-State Research and Extension.

Stalk breakage (green snap) or root lodging (plants uprooted) can also occur if plants are affected by wind damage, with older corn plants being more susceptible than young plants. Young plants have better ability to straighten up. Stalk breakage and root lodging can be seen later in the season if the roots were inhibited by flooding during early growth stages. Hybrid differences are a factor that can influence the susceptibility to lodging, but no hybrid is immune to this production issue.



Figure 4. Corn showing effects of wind damage, “green snap,” early during the vegetative period. Photo by Ignacio Ciampitti, K-State Research and Extension.

The best advice is to scout your corn after water drains from the fields. Check the appearance of new leaves and the standability of the corn.

Ignacio Ciampitti, Crop Production and Cropping Systems Specialist
ciampitti@ksu.edu

Doug Shoup, Southeast Area Crops and Soils Specialist
dshoup@ksu.edu

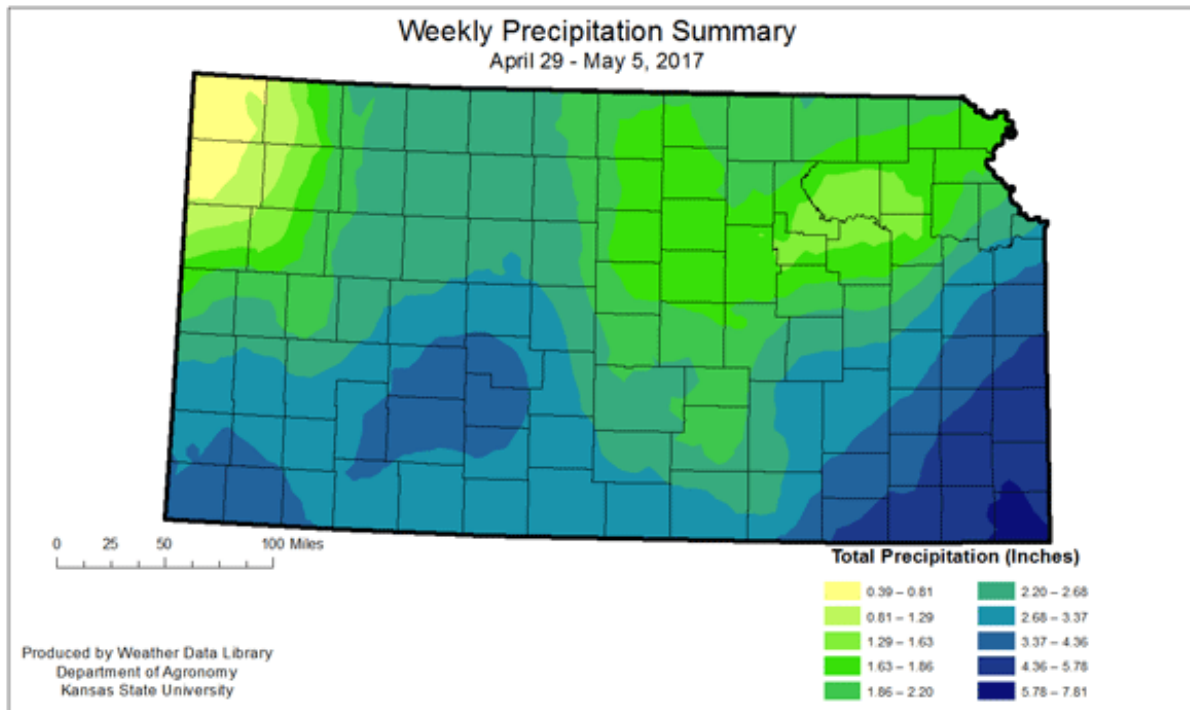
Doug Jardine, Extension Row Crops Plant Pathology
jardine@ksu.edu

Dorivar Ruiz Diaz, Nutrient Management Specialist
ruizdiaz@ksu.edu

Stu Duncan, Northeast Area Crops and Soils Specialist
sduncan@ksu.edu

3. Considerations for corn planted under wet conditions

Recent rains have created very wet soil conditions in parts of Kansas. Some corn remains to be planted (about 38 percent as of April 30, 2017). Weekly and monthly precipitation summaries are presented in Figure 1. The forecast for the coming week is showing potential for drier conditions through about Wednesday May 10, so producers will be gearing up again to plant their remaining corn acres and begin soybean planting in eastern and central Kansas (Fig. 2).



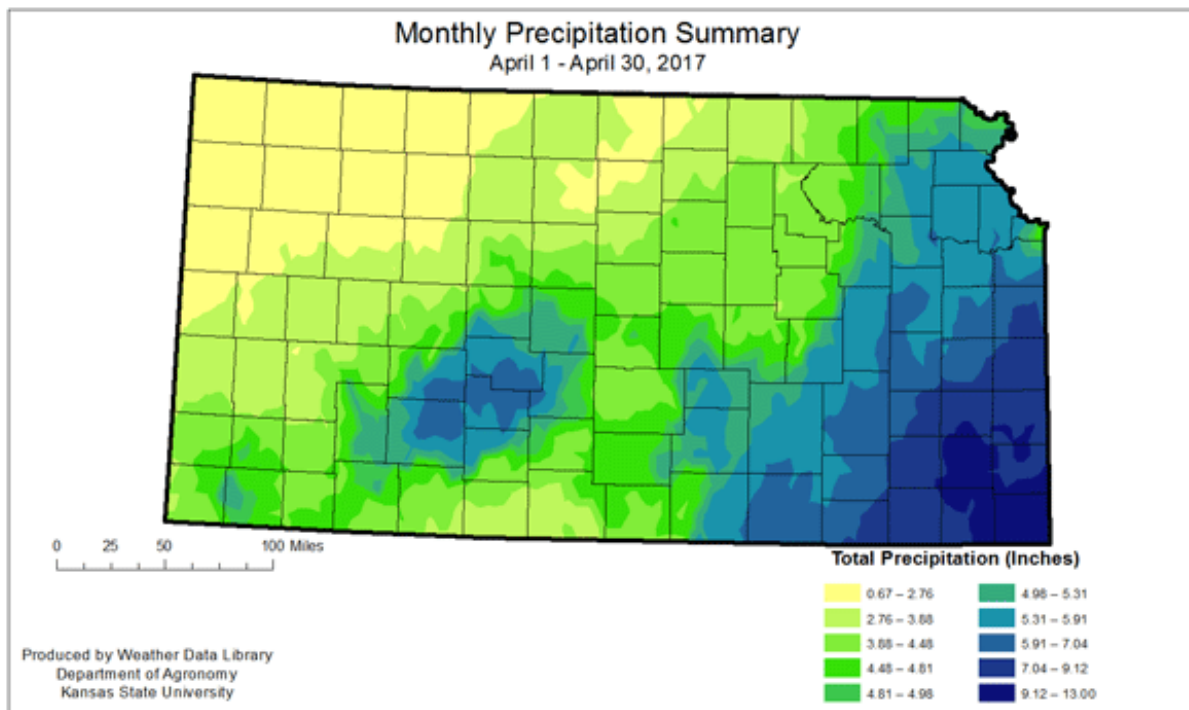
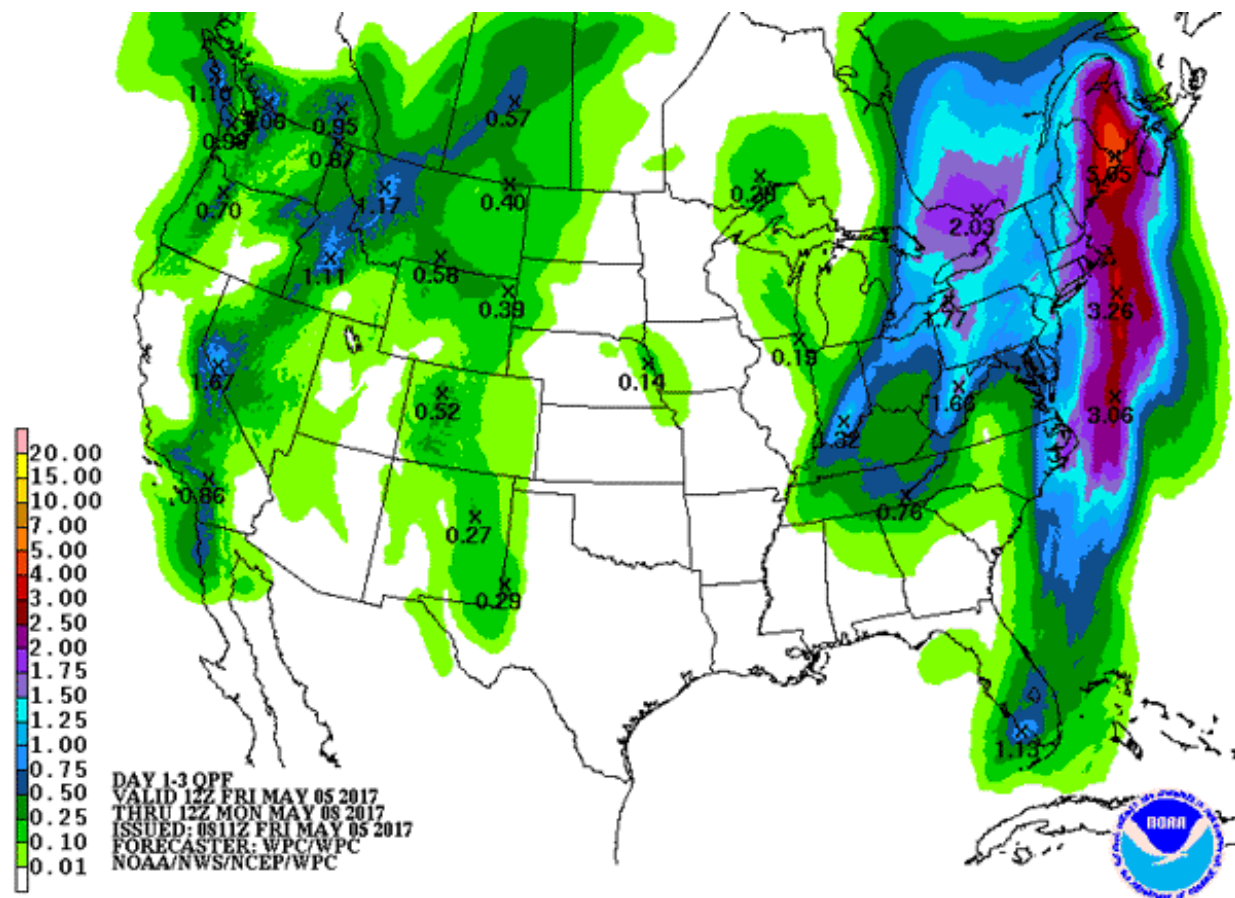
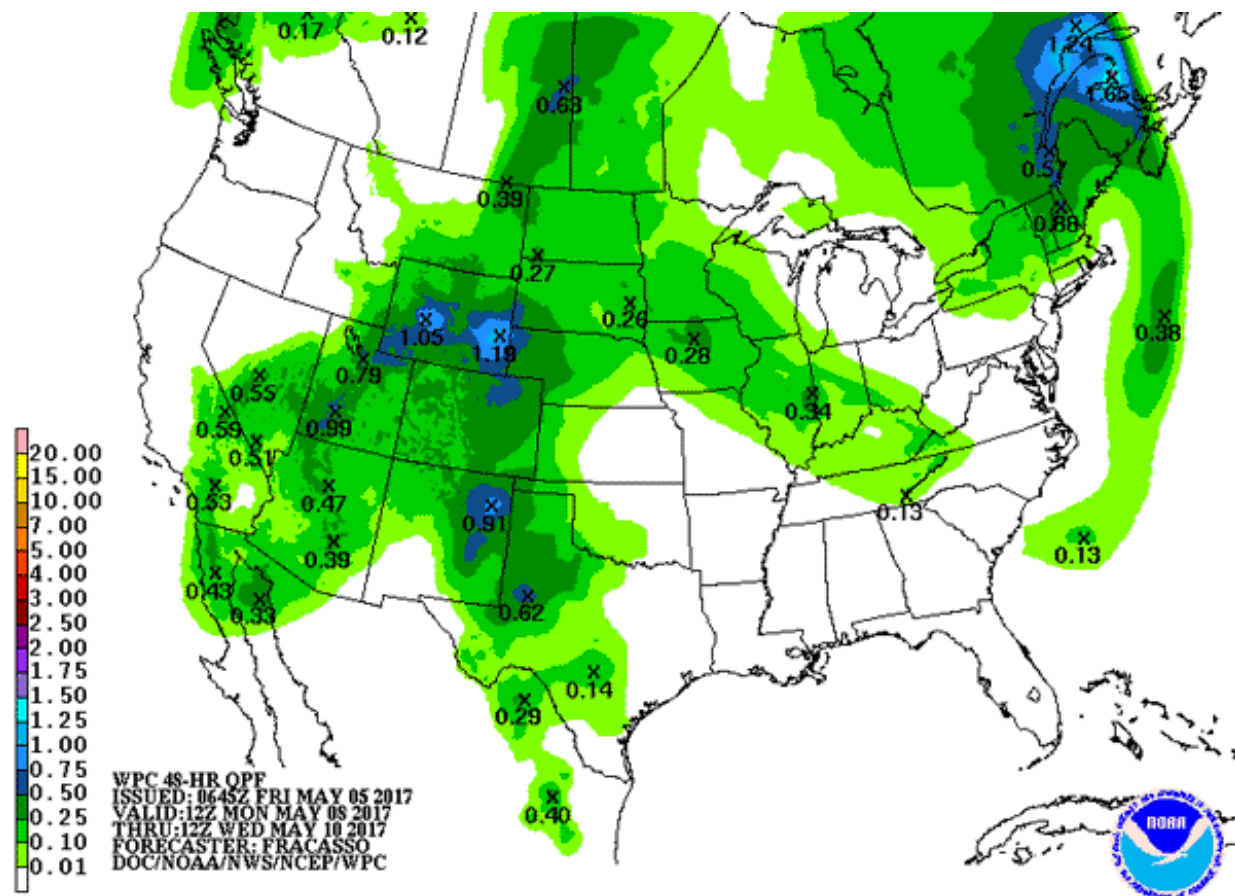


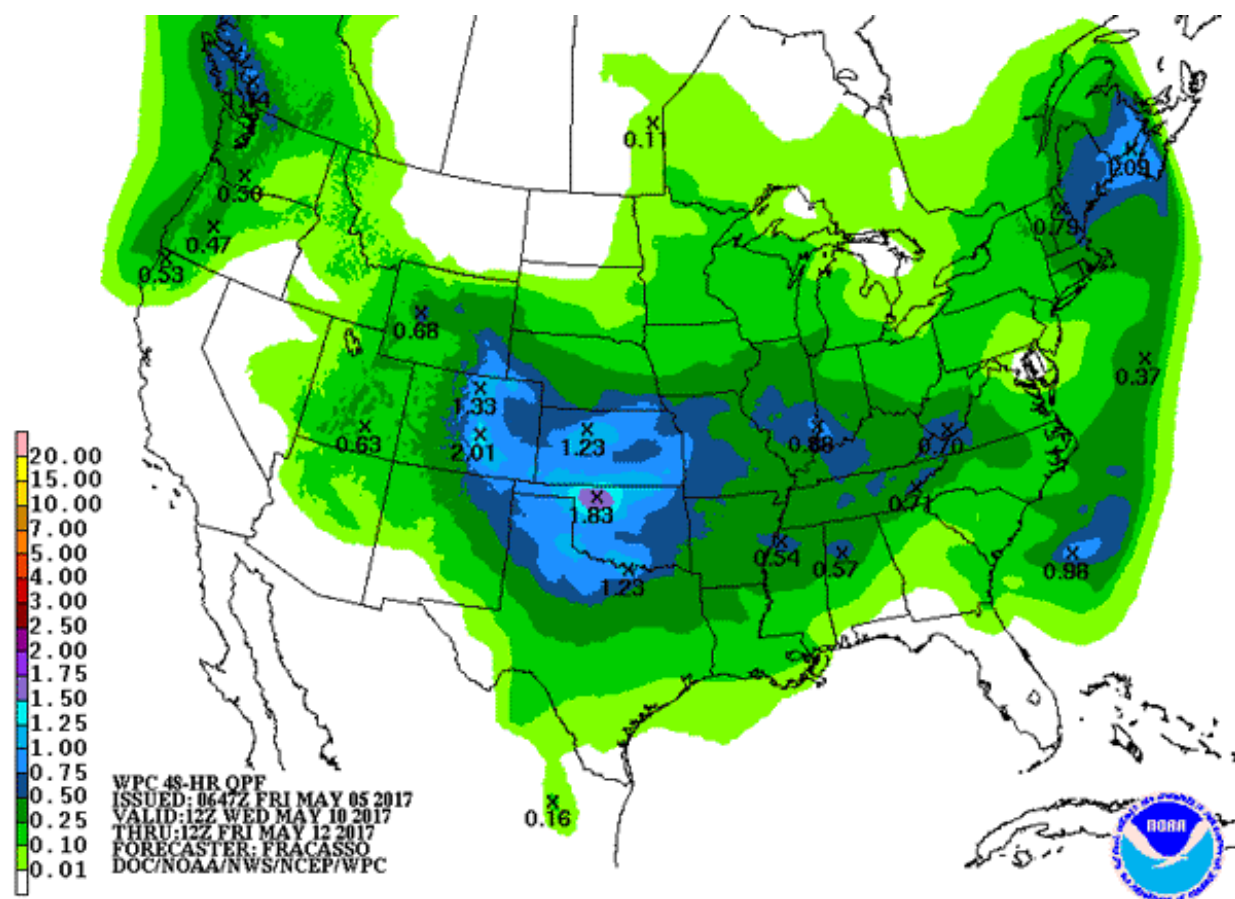
Figure 1. Weekly (upper panel) and monthly (lower panel) precipitation summary, April 29-May 5, 2017 and April 1-30, 2017 for Kansas.



May 5-8



May 8-10



May 10-12

Figure 2. Weekly precipitation forecast (7-day from May 5, 2017). Upper panel, May 5-8; Middle panel, May 8-10; Lower panel, May 10-12. Source: NOAA.

What should producers expect if they plant corn into soils that are too wet, and what can they do to minimize any problems?

It is best, of course, to allow time for the soil to dry adequately before tillage or planting operations if at all possible. Wet conditions will make the soil more susceptible to compaction. Tilling some soils when they are too wet can produce large, persistent clods, complicate planting, reduce herbicide effectiveness, and destroy the seedbed. Also, compaction can occur in the seed furrow itself, restricting proper root development (also diminishing nutrient accessibility) and early plant growth.

If soils remain or become unusually wet after the corn has emerged, corn may look sickly for a while. Saturated soils inhibit root growth, leaf area expansion, and photosynthesis because of the lack of oxygen and cooler soil temperatures. Yellow leaves indicate a slowing of photosynthesis and plant growth. Leaves and sheaths may turn purple from accumulation of sugars if photosynthesis continues but growth is slowed. For further details on these points check the companion article in this issue of the eUpdate: "Effect of standing water and saturated soils on corn growth and yield."



Figure 3. Uneven corn stand. Photo by Ignacio Ciampitti, K-State Research and Extension.

If wet weather conditions persist for more than a week, corn emergence will be delayed and seedlings will be more vulnerable to the presence of insects and diseases. Uneven corn stands likely will be greater when planting in cold and wet soils. This situation will directly affect plant-to-plant uniformity (Fig. 3), impacting potential yield.

Fortunately, the longer 8-14 day outlook is for a drier-than-normal pattern (Fig. 4), particularly in the eastern half of the state. This doesn't exclude some rain during the period, but heavy amounts are unlikely. Also, coupled with warmer temperatures and sunshine, drier-than-normal conditions would allow for quicker drying of the soils.

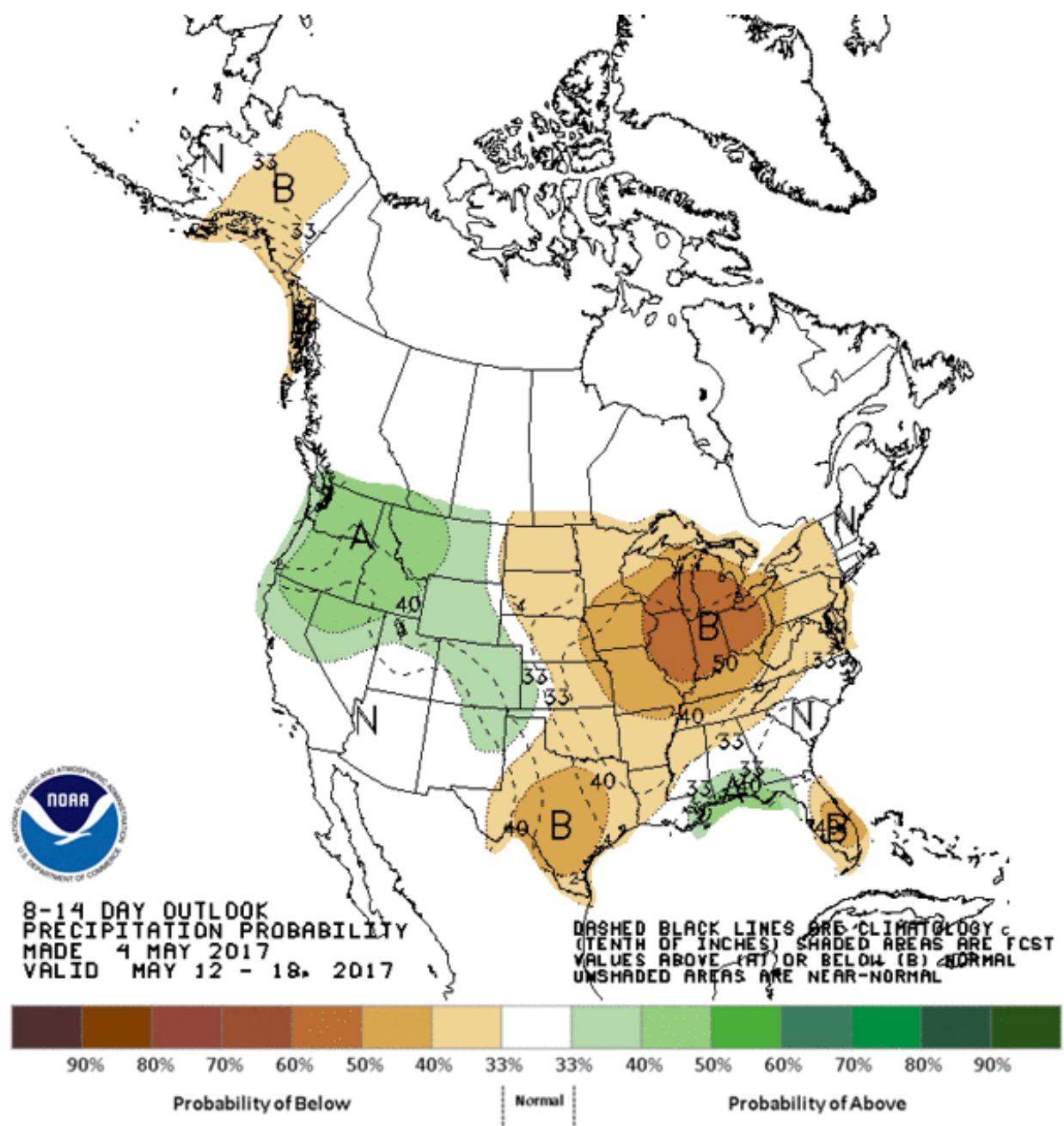


Figure 4. 8-14 Day Outlook (May 12- May 18, 2017) issued May 5, 2017. Source: NOAA.

Ignacio Ciampitti, Crop Production and Cropping Systems Specialist
ciampitti@ksu.edu

Mary Knapp, Weather Data Library
mknapp@ksu.edu

Doug Shoup, Southeast Area Crops and Soils Specialist
dshoup@ksu.edu

Doug Jardine, Extension Row Crops Plant Pathology
jardine@ksu.edu

Stu Duncan, Northeast Area Crops and Soils Specialist
sduncan@ksu.edu

4. Sidewall compaction from planting into wet soils

Conducting field work -- including planting, tillage, or traffic in general -- after wet weather can cause soil compaction, and in particular sidewall compaction in the seed furrow. The worst cases of sidewall compaction are seen after a field has been planted when the soil was too wet, followed by a period of dry weather. If the soil stays moist, the roots are usually able to grow through the walls of the seed furrow. But if the soil gets dry, the roots can have a harder time growing through that seed furrow wall, and instead grow along the furrow, resulting in what is referred to as sidewall compaction.



Figure 1. Sidewall and seed zone compaction in heavy clay soil. Photo by Stu Duncan, K-State Research and Extension.

With corn, the plants might look fine for a while, but the symptoms of this problem will probably show up after the plants get to be several inches tall. Symptoms will look like drought stress, nutrient deficiency, or both.

Since there aren't any good ways to fix sidewall compaction once it exists, the best practice would be to avoid creating the problem in the first place. This means waiting until soils are dry enough to plant. The way to test for this is to dig down to the desired planting depth, and try to make a ball with the soil. Next, see if the ball will crumble or crack apart, or if it deforms like molding putty. If it crumbles, it's ready to plant. If it deforms, it would be best to wait before resuming field operations. Even waiting as little as half a day could make a big difference.

DeAnn Presley, Soil Management Specialist
deann@ksu.edu

Stu Duncan, Northeast Area Crops and Soils Specialist
sduncan@ksu.edu

Ignacio Ciampitti, Row Crops and Cropping Systems Specialist
ciampitti@ksu.edu

5. 2017 Wheat Quality Tour report

The 2017 Wheat Quality Tour took place during May 1 – May 4. More than 70 people actively scouted hundreds of Kansas wheat fields in six routes (Fig. 1), leaving Manhattan and heading to Colby on day 1, from Colby to Wichita on day 2, and finally from Wichita to Manhattan on day 3. The overall 2017 production estimate for Kansas resulting from the tour was 282 million bushels of wheat.

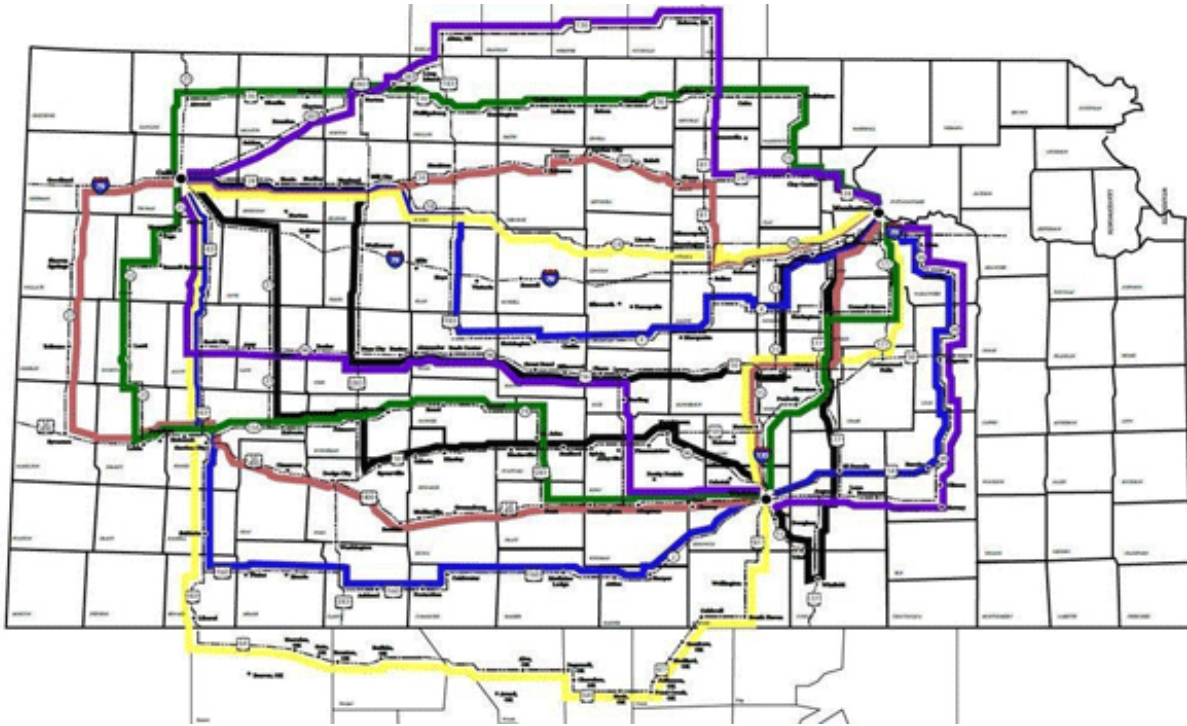


Figure 1. Representation of the six routes (purple, green, pink, yellow, blue, and black) explored during the wheat quality tour. Image courtesy: Wheat Quality Council.

Despite the high production estimate resulting from the tour, the Kansas wheat crop is currently facing many challenges, as described below, and will have to be exposed to near perfect weather conditions to be able to produce the 282 million bushels estimated.

Freeze damage

Several wheat fields sampled in the north central region of Kansas (Clay, Cloud, Republic, Saline, eastern Mitchell and Jewell counties, and surrounding region) were showing early signs of freeze damage. These included outside symptoms such as purpling discoloration (Fig. 2) and, when more closely inspected, whitish and mushy anthers (Fig. 3). The cold stress slows down crop growth and, consequently, sugars being transported within the plant accumulate in particular regions of the canopy, causing the purple discoloration. In other words, there is a source/sink imbalance inside the plant, where the source (leaves) has produced sugars while the sink (developing grains or growing points) temporarily slowed down due to the cold, thus promoting sugar accumulation and purpling. Mushy and whitish anthers are a consequence of direct cold damage to the male part of the wheat flower, which is particularly sensitive to cold during anthesis.



Figure 2. Photosynthetic sugars accumulated on wheat heads due to cold stress. The imbalance between a great amount of sugars produced by the source (leaves) versus a decreased sink strength due to the cold (temporary decrease in grain development) causes sugars to build up in particular regions of the plant. Photos from Clay Co., KS, by Romulo Lollato, K-State Research and Extension.

This freeze damage is most likely a result of the freeze on the morning of April 27, when temperatures in north central Kansas were held below freezing for as much as 7.3 hours and reached a low of 24 degrees in Republic Co. (for an in-depth assessment of the April 27th freeze, please check the article “Effect of freeze on April 27, 2017, on wheat in boot and early heading stages”, available [here](#)). As this was a recent event, the full extent of the freeze damage is still uncertain, but we advise producers in the north central region to carefully scout for freeze damage before investing in the crop with any management practice, such as application of foliar fungicides. If the crop has been damaged by freeze, yield losses might be severe enough that fungicide applications might not be justified.



Figure 3. Comparison between wheat anthers possibly affected by freezing temperatures (left panel, anthers characterized by a whitish or light green color and a mushy aspect, photo from Cloud Co.) and healthy anthers (right panel, anthers with a darker green color and more turgid aspect, photo from Mitchell Co.). Photos by Romulo Lollato, K-State Research and Extension.

Snow Cover

As we moved into western portions of Kansas, into Graham Co. and surrounding region, it was hard to estimate wheat yields due to a heavy layer of snow covering the crop. This snow had fallen during the period April 29 – May 1, and was still covering the crop in the evening of May 2 and morning of May 3. For more details on the snowfall event, please read the eUpdate article “Effects of snowfall April 29 and May 1, 2017 on Kansas Wheat” [here](#).

The snow was covering the majority of the fields, with a few isolated pockets of plants not covered by it (Fig. 4.). The thick layer of snow cover likely protected the wheat from the damaging effects of 40-60 mph winds observed during the period and from colder temperatures than the 30-32 F generally observed under the snow. Still, the wheat laying underneath the snow had anywhere from 20 to 50% broken stems (Fig. 4), depending on fields and portions within each field. Thus, yield losses from this event are still uncertain and represent the largest unknown within the production estimate

from the 2017 Wheat Quality Tour. The area affected by snow represents roughly 40% of the wheat area grown in Kansas and depending on how the wheat recovers from snow, the final actual production numbers might have a great range. The two major consequences of the snow to the wheat crop were:

- i. Mechanical damage resulting from the snow weight breaking stems
- ii. Possible cold damage from long exposure to temperatures at or below freezing



Figure 4. Wheat field lodging flat on the ground and covered in snow (upper left panel), broken and bent stems are a result of the heavy wet snow storm (lower left panel), and

developing wheat head indicating the wheat stage of development (flag leaf emergence/pre-boot). Photos taken in Sheridan Co., by Romulo Lollato, K-State Research and Extension.

Wheat streak mosaic

The majority of the fields visited west of Mitchell / Osborne counties had some level of wheat streak mosaic. In some fields, disease levels were minor and chances are that the crop will succeed in producing a decent yield despite the infection. As the tour moved into southwest Kansas, however, the extent of the damage by wheat streak mosaic virus was worsened, especially in Greeley, Hamilton, Wichita, Kearney, and Lane counties. Yield losses by wheat streak mosaic can be severe; which might result in greater area abandonment than the historical average.

One example of a field likely damaged by the snow and with a severe wheat streak mosaic infection is shown in Figure 5. For more details on wheat streak mosaic spread across Kansas, please see accompanying article in this issue of the Agronomy eUpdate.



Figure 5. Wheat field with frozen layer of ice / snow near the corner, and severe wheat streak mosaic infection (inset panel). Photos taken in Greeley Co. by Romulo Lollato, K-State Research and Extension.

Nitrogen deficiency

Another common theme observed in the 2017 Wheat Quality Tour was nitrogen deficiency. Many wheat fields had a good yield potential, as function of large number of heads per area and head size; however, many fields were showing signs of N deficiency which will result in decreased grain yields. The yield potential of these fields was being expressed in some cow pocks of high N fertility present in the fields (Fig. 6), but the average field conditions was much poorer. Nitrogen deficiency was more commonly seen in the central portion of the state.



Figure 6. Nitrogen deficiency, a common theme of the 2017 Kansas wheat crop. Photo taken in Kiowa Co., by Romulo Lollato, K-State Research and Extension.

A few possible explanations for such a common incidence of N deficient fields are:

- i. A depleted soil profile at wheat sowing, as a consequence of the high yields from the 2016 wheat or summer crops. Greater yields result in greater nutrient removal from the soil, depleting the reserves for the current wheat crop.
- ii. High growing season precipitation totals, which in parts of the state already surpasses 30 inches. The high precipitation totals could result in N leaching down the soil profile, ultimately out of the root zone.
- iii. Low N input by producers due to low wheat prices.

Stripe rust and leaf rust

While the 2017 tour encountered stripe and leaf rusts much less frequently than in previous years, it was present in many fields sampled in the central portion of the state. The greatest concern observed in the tour were cases in which the crop is already past the fungicide application window, and the disease is now at the flag leaf (Fig. 7). In these cases, producers don't have the option to control the disease anymore. This situation occurred more frequently in the southern tier of counties, where the crop is further along in development. Northern counties are mostly within the application window for foliar fungicides. For more details on stripe rust and leaf rust distribution in Kansas, please refer to the accompanying article in this issue of the Agronomy eUpdate.



Figure 7. Wheat in between $\frac{1}{4}$ and $\frac{1}{2}$ berry, past the fungicide application window and showing stripe rust on the flag leaf. Photo from Pratt Co., taken by Romulo Lollato, K-State Research and Extension.

Water logging

South central Kansas is also facing an additional problem, which is water logging. Many fields in Sumner and Sedgwick counties are now showing symptoms of water logging, which often consist of portions of the field where the entire wheat plant is dead due to anaerobic conditions. These portions of the field are often white and will not produce grain yield. The high incidence of water logged fields is the result of high total growing season precipitation coupled with poor drainage capacity of soils in the region.

The above factors are challenges that the 2017 Kansas wheat crop is currently facing. While all should contribute to restricted wheat yields to a certain extent, the largest uncertainty when estimating wheat production at the state level is whether the crop in western Kansas will be able to recover from the snowfall and still produce a decent yield.

Romulo Lollato, Wheat and Forages specialist
lolato@ksu.edu

Erick DeWolf, Extension Wheat Pathologist
dewolf1@ksu.edu

6. Preliminary assessment of wheat streak mosaic distribution in Kansas

Reports of wheat with severe infections of wheat streak mosaic, triticum mosaic, and High Plains mosaic continue to flow in this week. Based on these reports and our own scouting, we are beginning to get a better picture of the distribution and intensity of the disease problem. Our preliminary evaluation is that the western half of the state is experiencing high levels of the disease with many counties reporting above-normal levels of wheat streak mosaic (Figure 1).

A large part of the west central region of the state is experiencing extreme problems with the disease. Our survey efforts to date indicate that nearly all the wheat fields in this area are being affected by wheat streak mosaic to some degree. Many fields are severely diseased and will likely experience more than 70% yield loss or could be a complete loss.

These disease problems were set in motion last summer when summer weather conditions favored multiple flushes of volunteer wheat that harbors the virus and curl mites that spread the disease. Mild fall temperatures allowed additional time for the disease to spread to the newly emerging wheat crop. Unfortunately, there is nothing that can be done to treat the infected plants and stop the spread of the disease. We will continue to gather more information developing epidemic and follow up with additional information soon.

Distribution and Intensity of Wheat Streak Mosaic, Triticum Mosaic, and High Plains Mosaic in Kansas

May 5, 2017

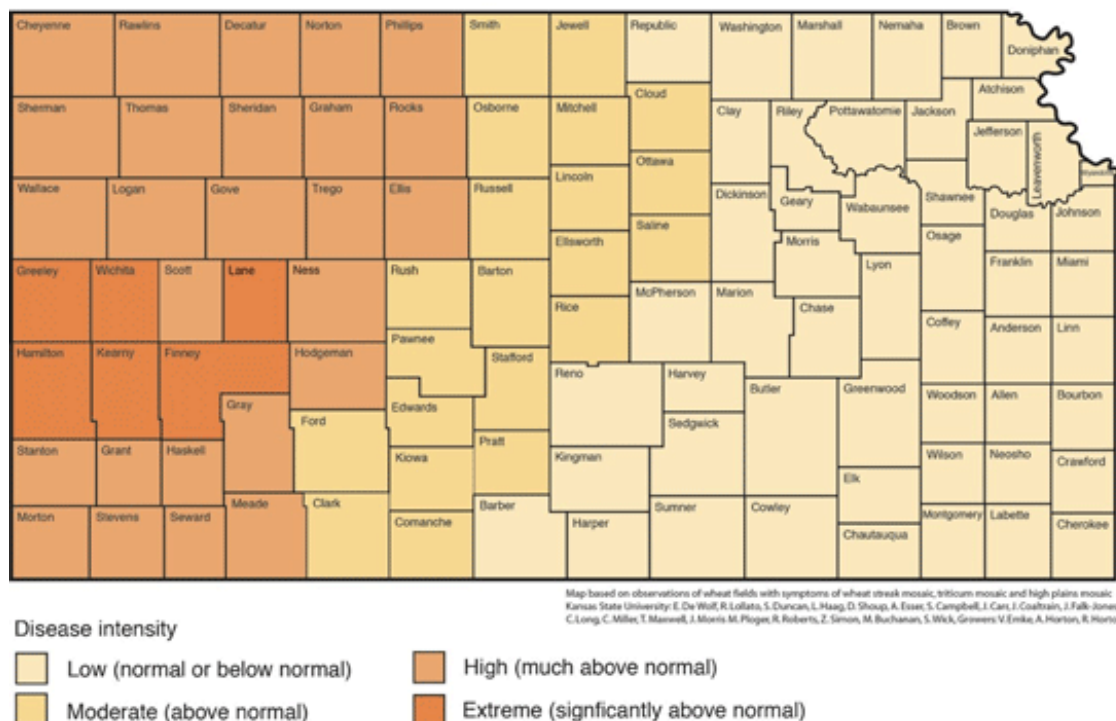


Figure 1. Preliminary estimates on the distribution and intensity of wheat streak mosaic in Kansas.

Erick DeWolf, Extension Wheat Plant Pathologist
dewolf1@ksu.edu

Romulo Lollato, Wheat and Forages Specialist
lolato@ksu.edu

7. Update on stripe rust and leaf rust in wheat

This week brought some mixed reports on the wheat disease situation in Kansas. We continue find stripe rust and leaf rust at low levels in many fields. The distribution of these diseases in the state changed slightly this week, with a few more counties in the central region of the state reporting low levels of both stripe rust and leaf rust in the middle canopy (Figures 1 and 2). Rust moved to the upper leaves in few counties in this region.

Stripe rust is developing more slowly than expected, but expanding distribution and a few reports of higher incidence still suggests we are at a moderate risk of problems with stripe rust.

The additional reports of leaf rust are also noteworthy. Leaf rust can also cause more than 20% yield loss when it becomes established on the upper leaves prior to flowering.

Growers with wheat that is between boot and flowering should be scouting their wheat for signs of stripe rust, leaf rust, or other diseases. Fields with good yield potential and seed production fields, where the value of the grain is higher, would be priorities for fungicide application. Growers with fields that were damaged by freezing temperatures and heavy snowfall should carefully evaluate yield potential before applying fungicides.

Distribution of Wheat Stripe Rust May 5, 2017

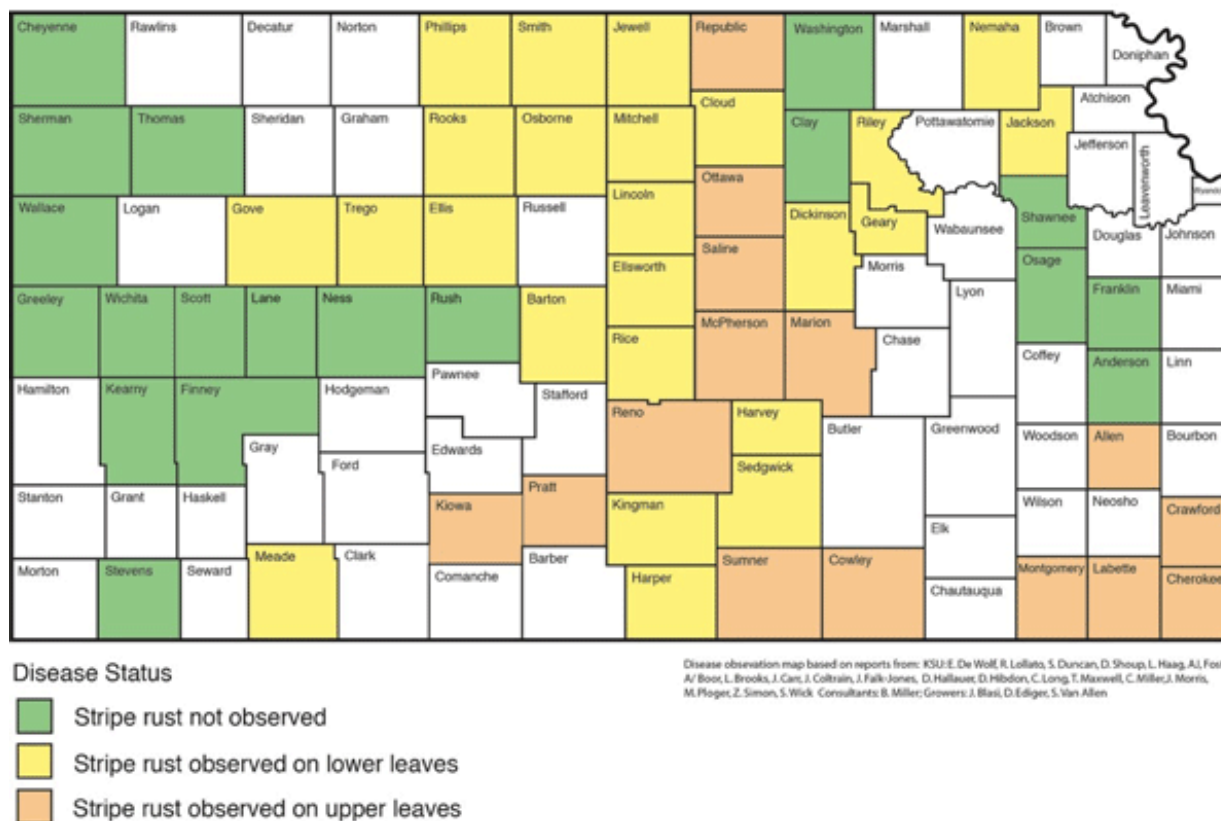


Figure 1. Current distribution of stripe rust in Kansas.

Distribution of Wheat Leaf Rust May 5, 2017

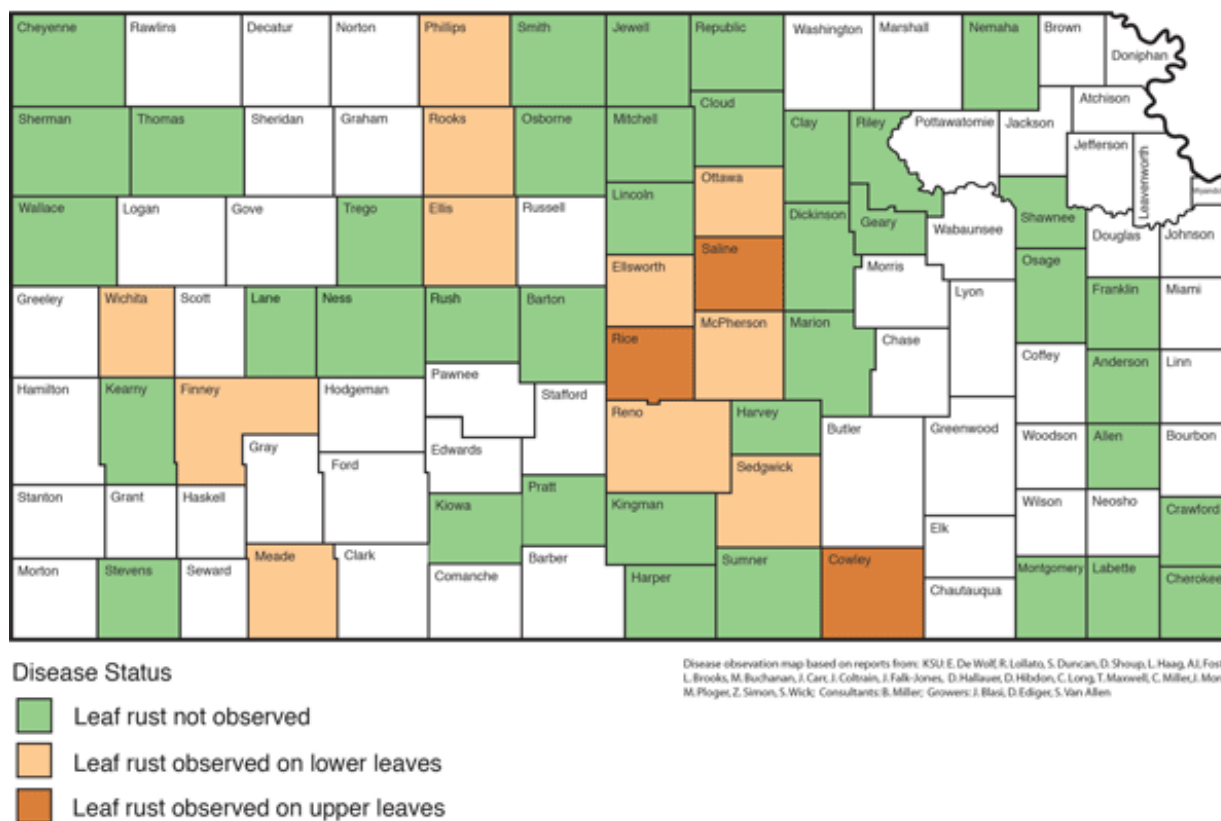


Figure 2. Current distribution of leaf rust in Kansas.

Erick DeWolf, Extension Wheat Plant Pathologist
dewolf1@ksu.edu

Romulo Lollato, Wheat and Forages Specialist
lolato@ksu.edu

8. 2017 In-Depth Wheat Diagnostic School in Hutchinson, May 10-11



K-State Research and Extension will hold its 2017 Wheat In-Depth Diagnostic School on May 10 and 11 at the South Central Kansas Experiment Field, 10620 S. Dean Road, Hutchinson. On May 10, the hours are 9 a.m. to 6 p.m. On May 11, the hours are 8 a.m. to 1 p.m.

Topics will include:

- Wheat Growth and Development
- Managing Wheat for Forage and Grain
- Wheat Fertility
- Disease Management
- Weed Identification
- Weed Management
- Entomology
- Wheat Breeding and new Technologies
- Precision Agriculture
- Summer Cover Crops After Wheat

Speakers (K-State Research and Extension unless otherwise noted):

- Romulo Lollato
- Stu Duncan
- David Marburger, Oklahoma State University
- Erick DeWolf
- Dorivar Ruiz Diaz
- Kevin Donnelly

- Dallas Peterson
- Allan Fritz
- Ray Asebedo
- DeAnn Presley
- Jeff Whitworth
- Holly Schwarting

This school is tailored to be a hands-on learning opportunity for agronomy professionals, farmers, and anyone interested in wheat production. It has approval for Certified Crop Advisor and Commercial Pesticide Applicator credits. The cost is \$140 for both days for those who RSVP by May 2. After that date and for walk-ins, the cost is \$180 for both days. The registration fee includes access to all speakers and an extensive take-home field book. Breakfast and lunch both days is also included in the fee.

To register for the school, register online at <http://www.global.ksu.edu/wheat-diagnostic>

For more information, contact registration@ksu.edu or call 785-532-5569.

Romulo Lollato, Wheat and Forages Specialist
lolato@ksu.edu

9. Four winter canola tours scheduled in May

K-State Research and Extension will be co-hosting several opportunities in May to learn more about winter canola varieties and crop production practices.

Having field tours at this time of year gives us a great opportunity to evaluate yield potential of the winter canola crop. As producers gear up for harvest, there are a number of questions we can address to help with those important decisions. We'll also talk about new varieties, variety development, and how well the crop has fared over the growing season.

Four tours have been scheduled.

- The first tour will be held May 12 in the Harper County area and is co-hosted by Progressive Ag Coop. The tour will begin at 10 a.m. at the southeast corner of Hwy 160 and NE 80th Ave. near Danville. There will be four additional stops highlighting different production practices and varieties. Lunch will be at 11:30 a.m. at the Blue Fair Barn in Harper. RSVP for lunch by May 10 by calling the Harper County Extension office at 620-842-5445.
- The second tour will be held May 23 starting at 2 p.m. at the South Central Kansas Experiment Field, Redd Foundation Field southwest of Partridge, Kan. To get to the field, drive west of Partridge 1.5 miles on Trail West Rd. Turn south on High Point Rd. and drive 0.5 miles to the field. Attendees will be able to see a National Winter Canola Variety Trial, Roundup Ready canola cultivars under development, fungicide/growth regulator trial, seeding rate trial, and the canola/wheat rotation study. Refreshments will be provided. The South Central Kansas Experiment Field day at the headquarters unit, 10702 S. Dean Rd., will follow at 5 p.m.
- The third field day will be held May 25 at the Southwest Research-Extension Center, 4500 E. Mary Street, Garden City, in conjunction with the Center's Spring Field Day. The field day starts at 4:30 p.m. and a meal will be provided. Attendees will hear about canola variety development, production practices, and the National Winter Canola Variety Trial.
- The fourth field day will be held May 26 starting at 10 a.m. near Montezuma. The first stop will be 1 mile north of town on the Ingalls blacktop (12th Road) on the west side of the road. Attendees will learn about canola growth and development, harvest options, and variety development. Lunch will be sponsored by Helena Chemical and Monsanto.

All field days are co-sponsored by K-State Research and Extension and the Great Plains Canola Association. Financial support for these field days was made available through the Great Plains Canola Association's Promote Canola Acres program and the U.S. Department of Agriculture-National Institute of Food and Agriculture Supplemental and Alternative Crops Competitive Grant Program.

Mike Stamm, Canola Breeder
mjstamm@ksu.edu

10. Cover Crop Field Day planned at K-State HB Ranch in Trego County, May 19

Kansas State University will host a Cover Crop Field Day on Friday, May 19 at 9:30 a.m. at the K-State HB Ranch in southeast Trego County. The ranch is at 39008 147 Highway in Brownell, Kansas.

K-State researchers will discuss ongoing research efforts at the HB Ranch evaluating cover crop management options for farmers growing dryland wheat.

Soil quality, nutrient cycling, weed and pest suppression and wind erosion reduction can be improved through the use of cover crops, but their use is not widely popular where water is limited because of the water they use. Harvesting cover crops for forage, however, can help increase profitability and offset revenue losses linked to any decreases in wheat yield.

Field day presentations include:

K-State cover crop research update;

- Tour of cover crop plots
- Cover crops and beneficial insects
- On-farm cover crop research update
- Cover crops and soil health
- Grazing cover crops

Lunch will be served. There is no fee to attend, but signup is requested by May 12 by calling 785-625-3425 or email milissa@ksu.edu.

11. Spring Crops Field Day in Parsons, May 23

The Southeast Research and Extension Center will host a Spring Crops Field Day on May 23 to update producers in the region on the latest information on varieties, production methods, and disease management.

The field day starts with registration and a complimentary breakfast from 7:30 to 8:30 a.m. at the research center, 25092 Ness Road, (immediately south of U.S. Highway 400) in Parsons.

The program includes:

Wheat Variety Plot Tour – Doug Shoup, K-State extension crops and soils specialist, Lonnie Mengarelli, K-State research assistant, and seed company representatives

Effectiveness of Precision Planting Row Units – Ajay Sharda, K-State extension precision agriculture/machine systems engineer

Reducing the Impact of Fusarium Head Blight in Wheat – Gretchen Sassenrath, K-State crop production agronomist

Corn and Soybean Disease Update – Doug Jardine, K-State extension plant pathologist

There is no cost to attend. In case of rain, the program will be conducted indoors. More information is available by calling 620-421-4826.

12. Southwest Research-Extension Center Spring Field Day, May 25

The Southwest Research-Extension Center will host its Spring Field Day on Thursday, May 25 from 4:30 to 7 p.m. at the center, located at 4500 E. Mary St. in Garden City.

The Spring Field Day is an annual event hosted at the research center for more than a decade. It provides an opportunity for K-State researchers to engage local producers, to provide updates and to receive feedback on the status of current research programs.

Producers attending the field day will learn about wheat and canola varieties and agronomy management practices to maximize productivity.

This field day provides a platform to keep producers up to date on new research and technology and a medium for dialogue between researchers and producers. Producers should consider this conference as an opportunity to refresh basic principles and to learn new principles they can apply to their own situation.

Supper will be provided courtesy of industry supporters. Continuing education credits have been applied for and should be available at this meeting.

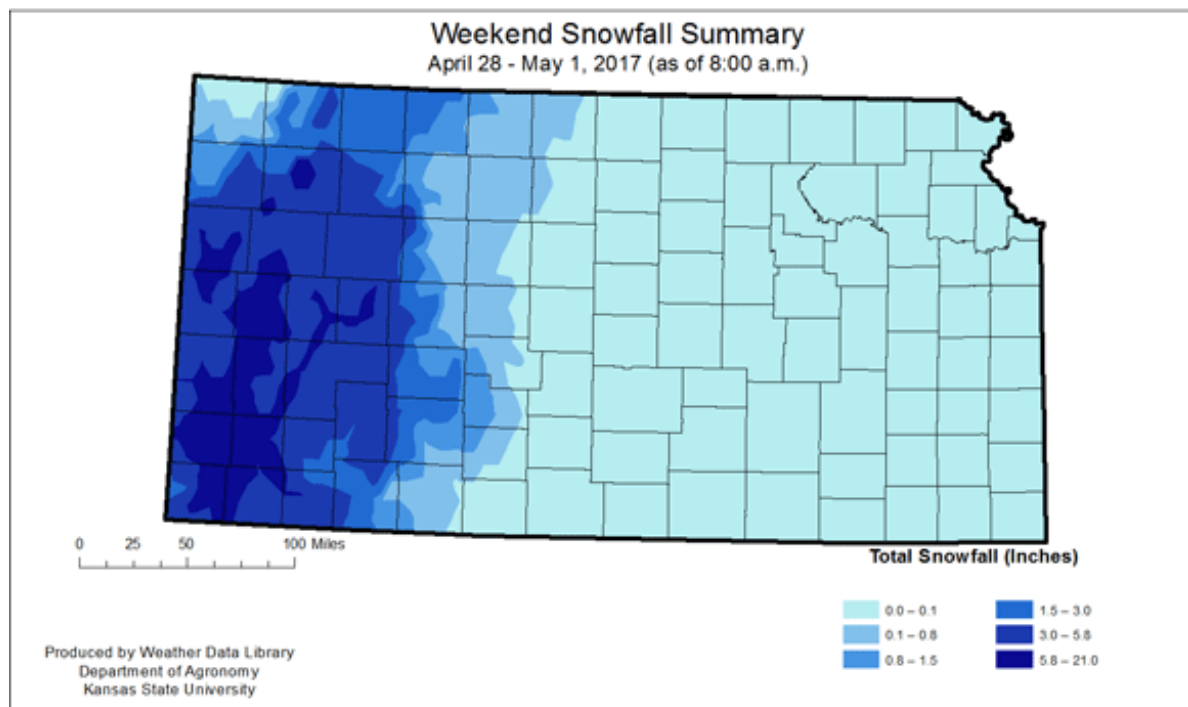
Contact Ashlee Wood at 620-276-8286 or email awood22@ksu.edu by 5 p.m. on May 17 to register. Prior registration is important to ensure supper will be available for all attendees.

For more information on the program contact A.J. Foster at 620-640-1259, or email anserdj@ksu.edu.

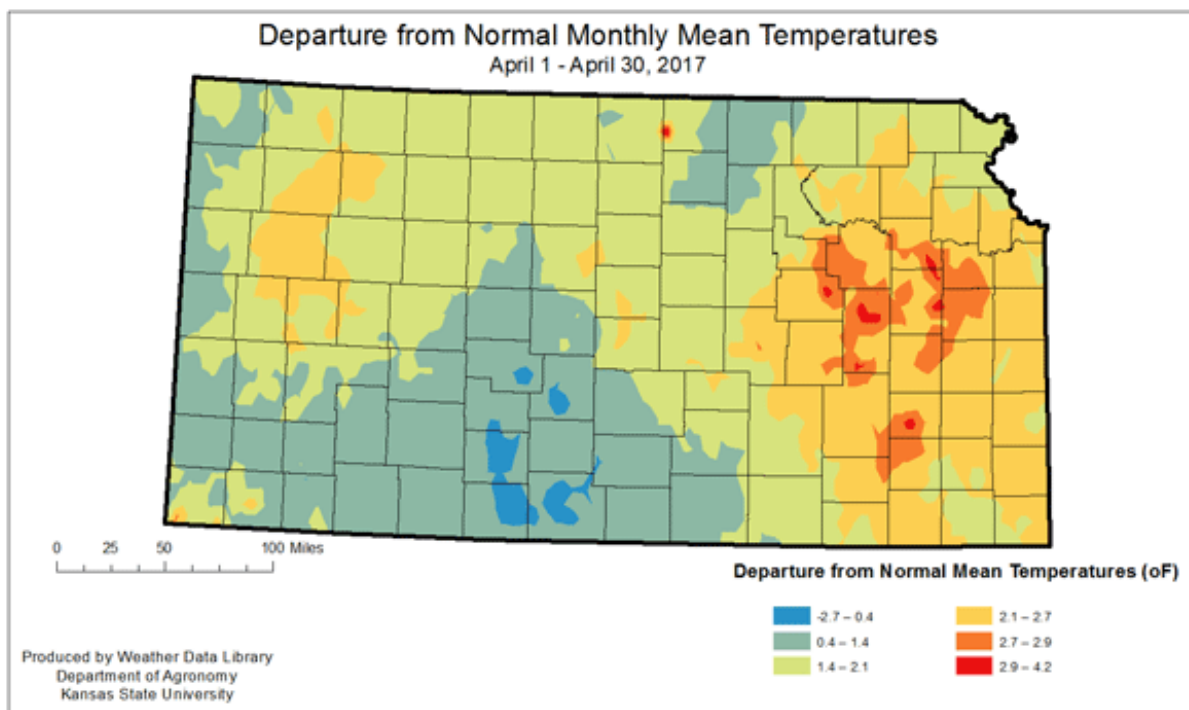
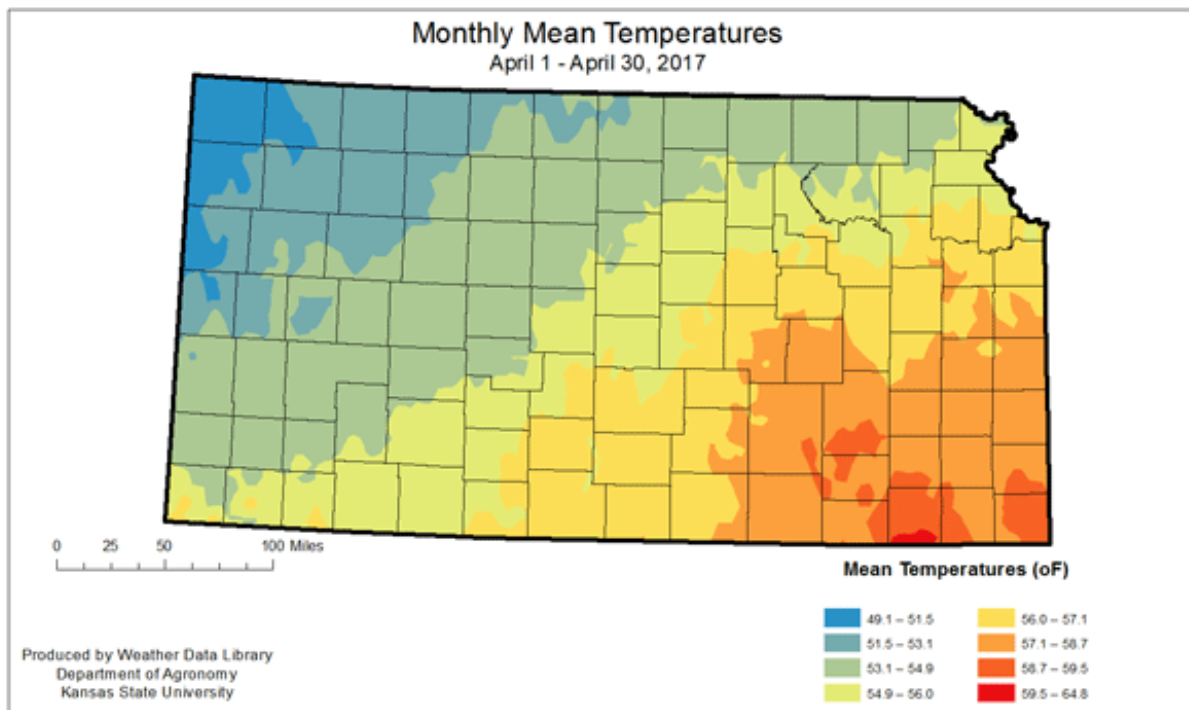
A.J. Foster, Southwest Area Crops and Soils Specialist
anserdj@ksu.edu

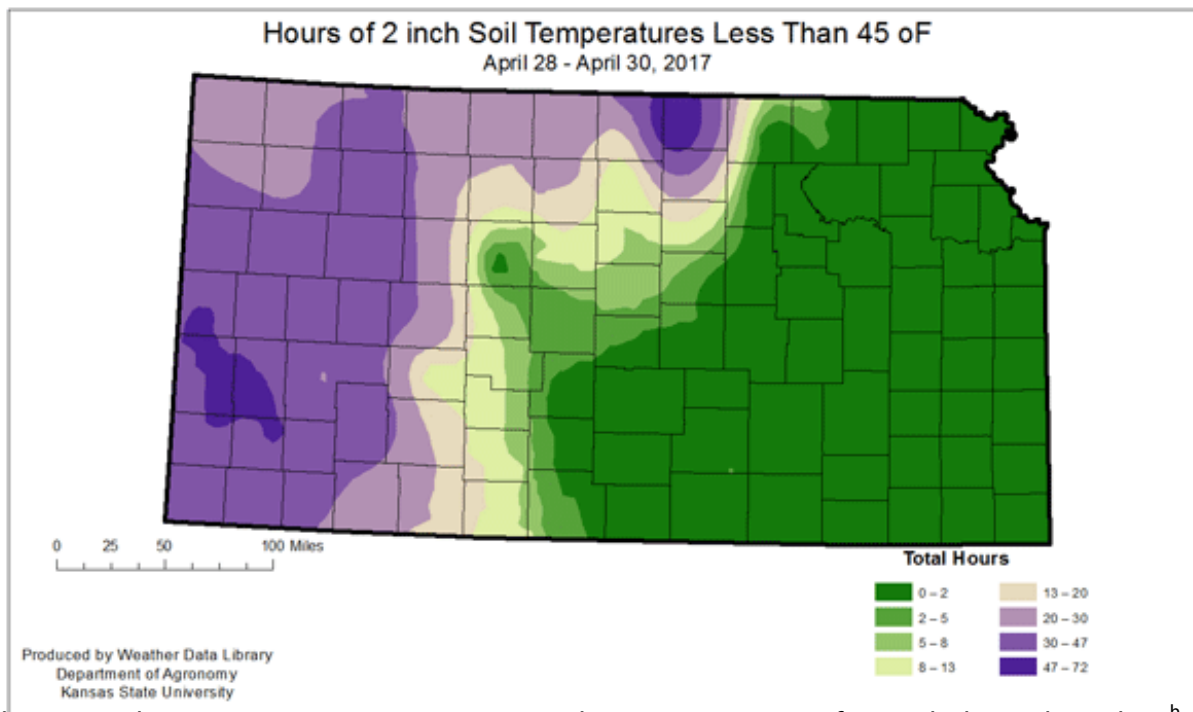
13. Kansas weather summary, April 2017: Epic blizzard

While much of April was warmer than normal in Kansas, the last week of the month brought a return to cold, wintery weather in the western third of the state, and cold rainy weather in the east. Thirteen stations recorded record amounts of snow for a three-day spring storm ending on the 1st of May. Tribune 1W, in Greeley County, reported 22 inches of snow in the event, with part of that total reported on the 1st of May. There were widespread reports of more than a foot of snow. This was complicated by strong winds, with averages over 30 mph for more than six hours, and peak winds in excess of 55 miles per hour. The storm also included cold temperatures with lows below the freezing mark each of the three days of the storm, with some locations reporting more than 48 hours of below-freezing temperatures. This has the potential for heavy losses in winter wheat that was in the heading/flowering stages. Damage from the event is still being collected, but included downed power lines/power poles, tree damage, livestock deaths and damage to winter wheat. Losses in the winter wheat may not be evident for another week to ten days.

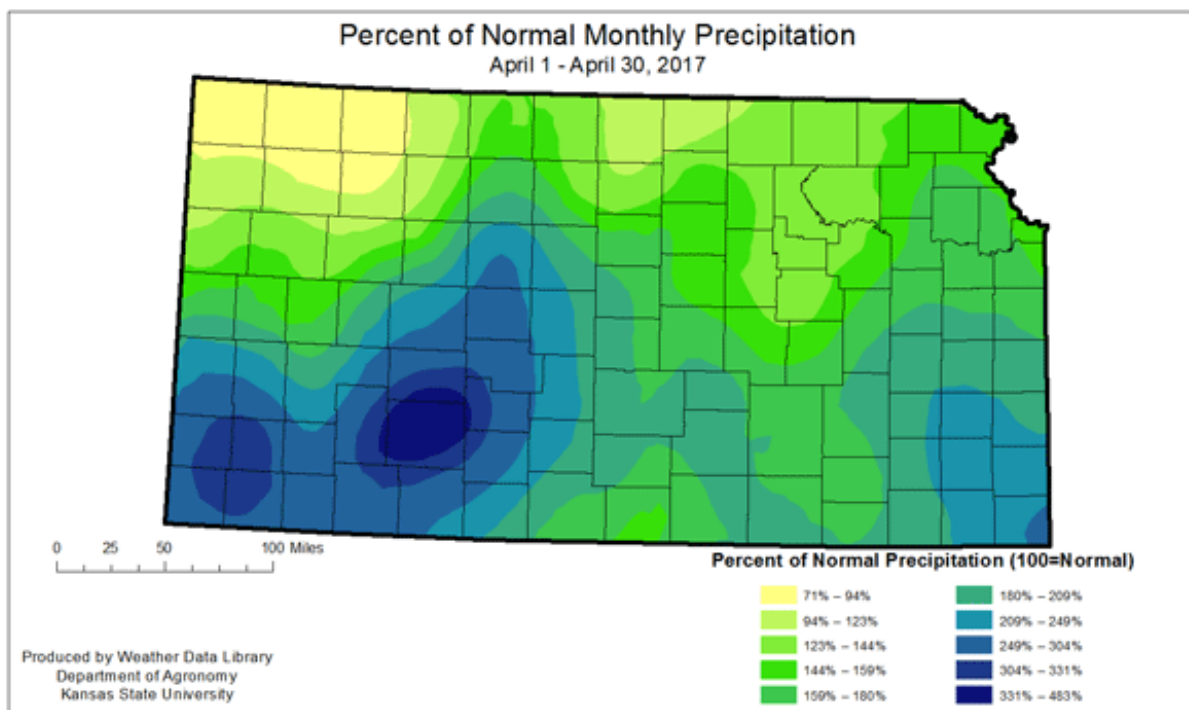
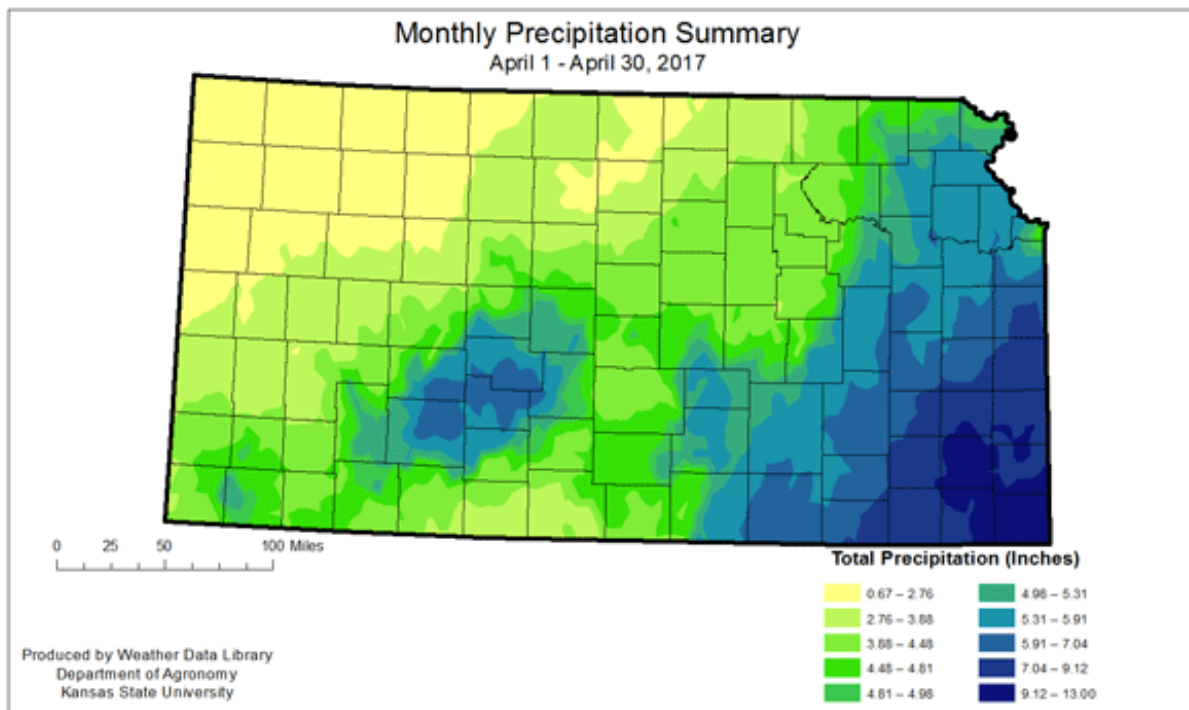


Despite the cold end, April was warmer than normal statewide. The greatest departure was in the East Central Division, with an average of 56.2 °F or 2.2 degrees warmer than normal. The South Central Division was closest to normal with an average of 55.9 degrees F or 0.7 degrees warmer than normal. The highest temperature reported during the month was 92 °F at the Garden City Experiment Station, Finney County, on the 20th. The coldest temperature reported was 20 °F at Council Grove Lake, Morris County on the 7th and again at Hays 1S, Ellis County, on the 30th. There were four record high maximum temperatures during the month and 28 record high minimum temperatures during the month. On the cold side, there were 29 new record cold maximum temperature in April and 5 new record low minimum temperatures. Freezing temperatures were reported in all nine climate divisions, with the coldest low temperatures in the North Central and Central Divisions, reaching the mid to low twenties on the 27th of April.





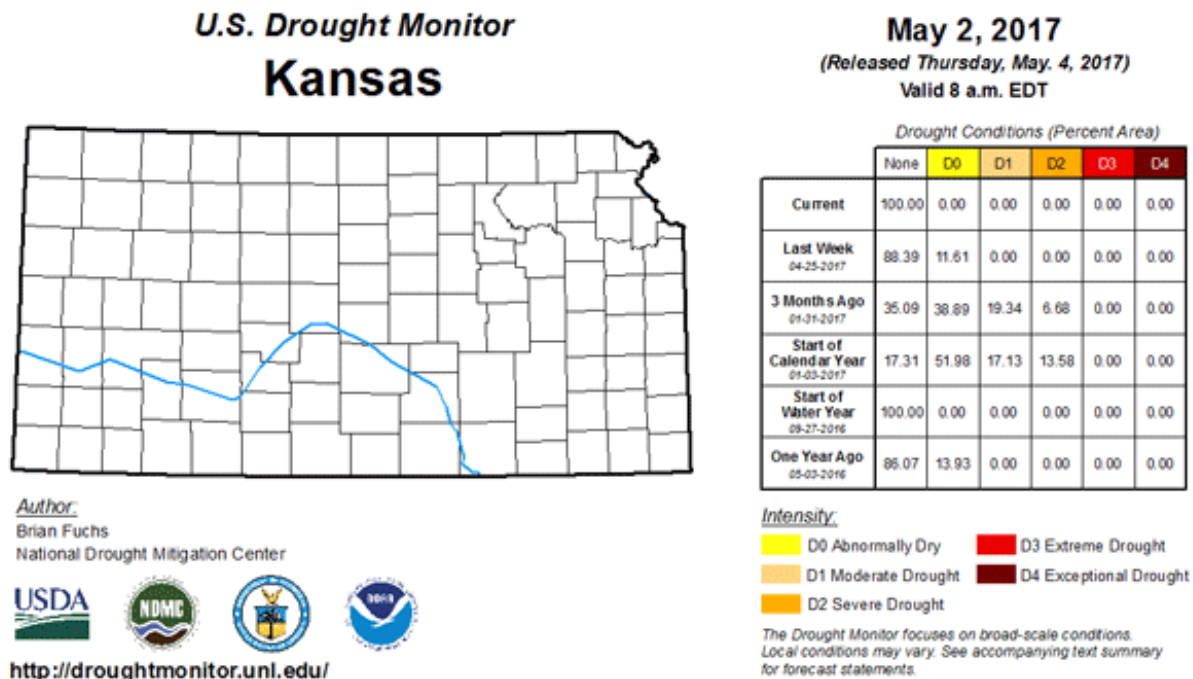
The statewide average precipitation was 4.86 inches, or 145 percent of normal. This ranks as the 6th wettest April since 1895. Only the Northwest Division was below normal for the month, as part of the storm total was recoded on the 1st of May. The Southwest Division had the greatest percent of normal, with an average of 4.47 inches or 292 percent of normal. The greatest 24-hour precipitation total for a National Weather Service (NWS) station was 34.18 inches at Pittsburg, Crawford County, on the 30th. The greatest 24-hour precipitation total for a Community Collaborative Rain Hail and Snow (CoCoRaHS) station was 5.10 inches at Fort Scott 9.3 NNE, Bourbon County, also on the 30th. The stations with the greatest monthly totals: 13.00 inches at Pittsburg, Crawford County (NWS); 14.09 inches at Farlington 0.8 NNE, Crawford County (CoCoRaHS). The greatest snowfall total for April at a National Weather Service station was 17 inches at Hugoton, Stevens County. The greatest snowfall total for the month at a CoCoRaHS station was 15 inches at Ulysses 3.8 ENE, Grant County.

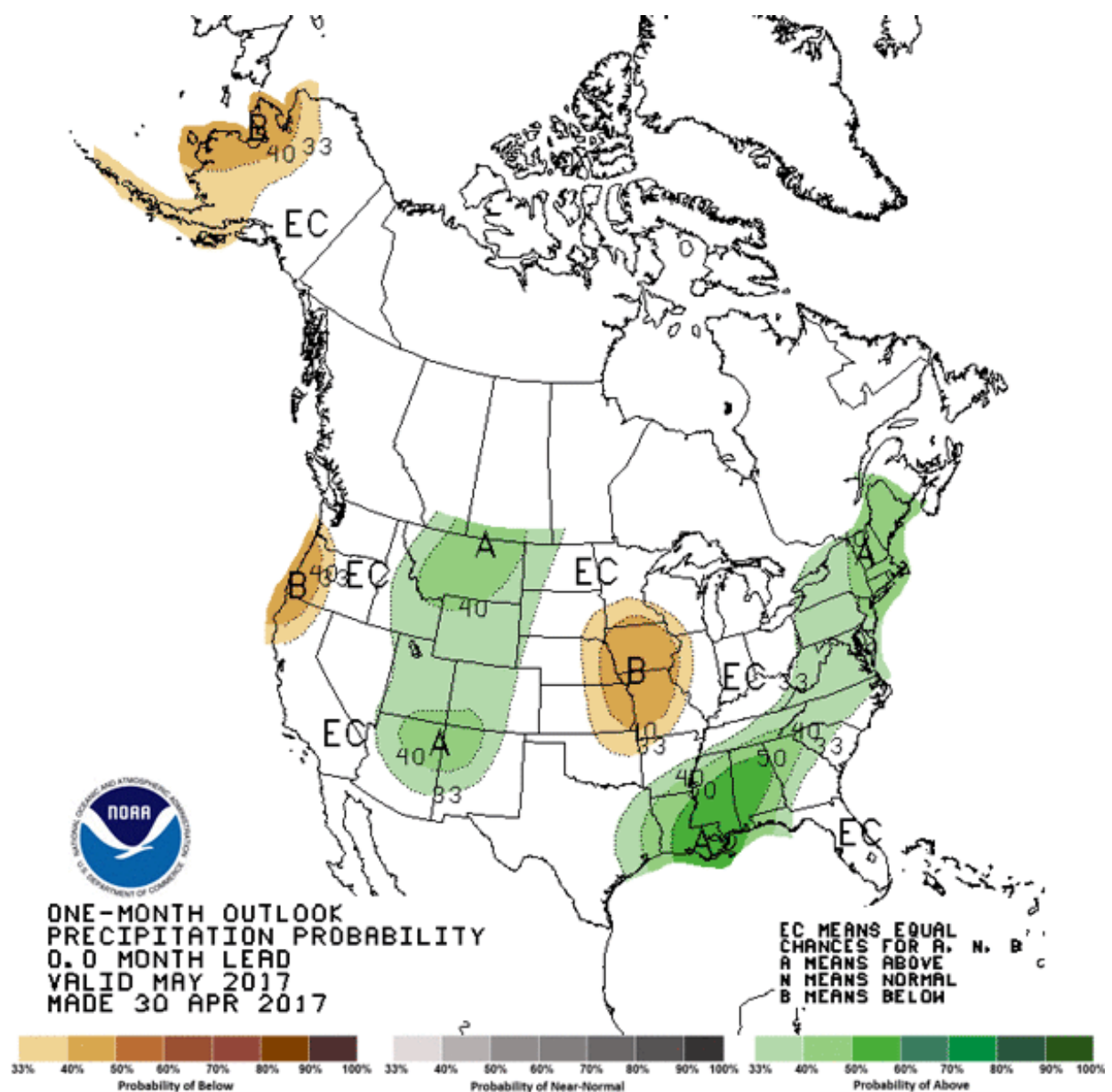


Aside from the blizzard, the month was less active than usual as far as severe weather events. There were 6 reports of tornadoes, 65 hail and 15 high wind events.

The higher-than-normal precipitation resulted in continued improvement in the drought conditions

as shown in the U.S. Drought Monitor. The state is now drought-free and even abnormally dry conditions have been eliminated. The May outlook calls for a slightly increased chance of drier-than-normal conditions in the eastern part of the state, but given the wet start to the month would not indicate an immediate swing into drought.





Apr 2017									
Kansas Climate Division Summary									
	Precipitation (inches)						Temperature (°F)		
	April 2017			2017 Jan. through April					Monthly Extremes
Division	Total	Dep.	% Normal	Total	Dep.	% Normal	Ave	Dep.	Max Min

North west	1.30	-0.77	62	3.57	-0.80	80	51.5	1.7	89	25
West Central	2.94	1.03	157	5.72	1.31	129	52.5	1.6	90	26
South west	4.74	3.10	292	8.98	4.96	223	55.3	1.7	92	26
North Central	3.88	1.36	153	7.49	1.50	123	53.9	1.1	88	25
Central	5.27	2.61	202	9.74	3.13	148	55.3	1.3	90	20
South Central	6.03	3.33	227	12.74	5.42	176	55.9	0.7	87	28
Northeast	4.70	1.45	147	8.91	1.45	121	54.7	1.2	83	27
East Central	5.01	1.45	138	9.40	0.92	110	56.3	2.2	82	20
Southeast	8.32	4.45	213	14.11	4.24	143	57.7	1.9	83	31
STATE	4.86	2.19	185	9.27	2.76	144	54.8	1.5	92	20
1. Departure from 1981-2010 normal value										
2. State Highest temperature: 92 oF at Garden City Experiment Station, Finney County, on the 20th.										
3. State Lowest temperature: 20 oF at Council Grove Lake, on the 7th; Hays, on the 30th.										
4. Greatest 24hr: 4.18 inches at Pittsburg, Crawford County, on the 30th (NWS); 5.10 inches at at Fort Scott 9.3 NNE, Bourbon County, on the 30th (CoCoRaHS).										
Source: KSU Weather Data Library										

Mary Knapp, Weather Data Library
mknapp@ksu.edu

14. Comparative Vegetation Condition Report: April 25 - May 1

The weekly Vegetation Condition Report maps below can be a valuable tool for making crop selection and marketing decisions.

The objective of these reports is to provide users with a means of assessing the relative condition of crops and grassland. The maps can be used to assess current plant growth rates, as well as comparisons to the previous year and relative to the 27-year average. The report is used by individual farmers and ranchers, the commodities market, and political leaders for assessing factors such as production potential and drought impact across their state.

The Vegetation Condition Report (VCR) maps were originally developed by Dr. Kevin Price, K-State professor emeritus of agronomy and geography, and his pioneering work in this area is gratefully acknowledged.

The maps have recently been revised, using newer technology and enhanced sources of data. Dr. Nan An, Imaging Scientist, collaborated with Dr. Antonio Ray Asebedo, assistant professor and lab director of the Precision Agriculture Lab in the Department of Agronomy at Kansas State University, on the new VCR development. Multiple improvements have been made, such as new image processing algorithms with new remotely sensed data from EROS Data Center.

These improvements increase sensitivity for capturing more variability in plant biomass and photosynthetic capacity. However, the same format as the previous versions of the VCR maps was retained, thus allowing the transition to be as seamless as possible for the end user. For this spring, it was decided not to incorporate the snow cover data, which had been used in past years. However, this feature will be added back at a later date. In addition, production of the Corn Belt maps has been stopped, as the continental U.S. maps will provide the same data for these areas. Dr. Asebedo and Dr. An will continue development and improvement of the VCRs and other advanced maps.

The maps in this issue of the newsletter show the current state of photosynthetic activity in Kansas, and the continental U.S., with comments from Mary Knapp, assistant state climatologist:

Kansas Vegetation Condition

Period 18: 04/25/2017 - 05/01/2017

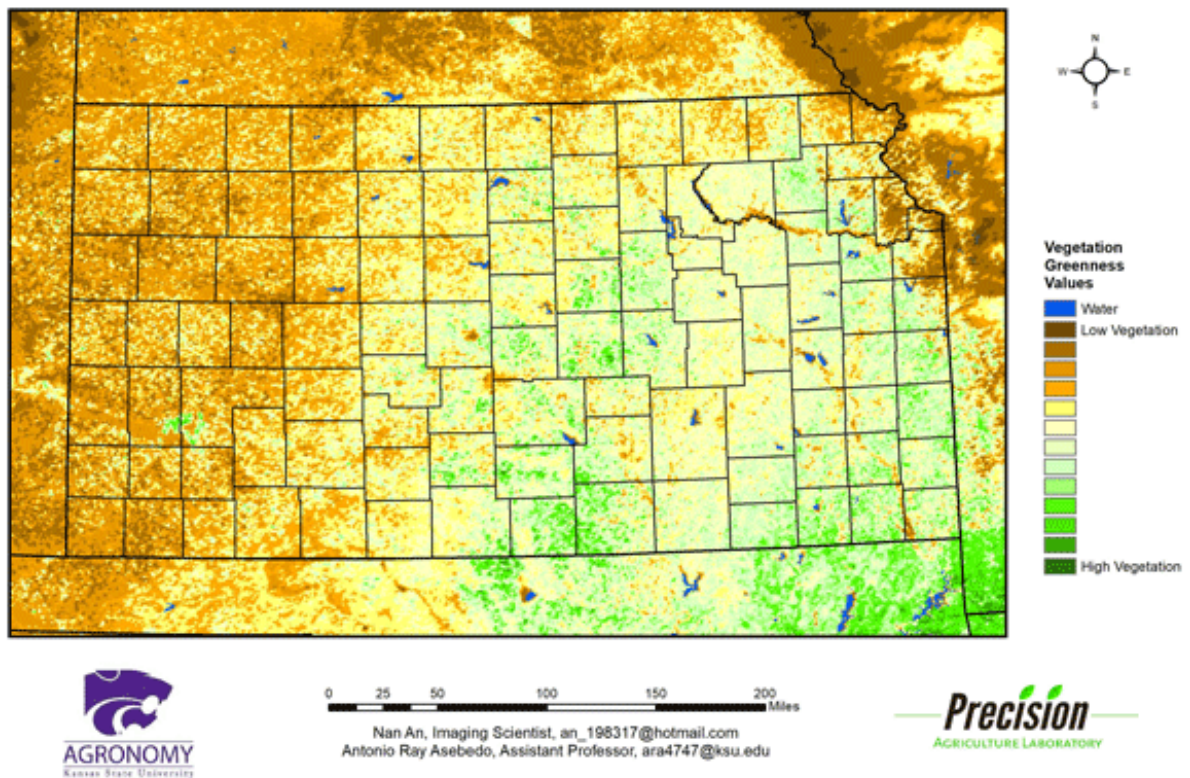


Figure 1. The Vegetation Condition Report for Kansas for April 25 – May 1, 2017 from K-State's Precision Agriculture Laboratory shows a continued increase in vegetative activity eastern Kansas. The recent cold weather has slowed vegetative activity in the west, while persistent clouds have masked activity in the extreme northeast.

Kansas State University Department of Agronomy

2004 Throckmorton Plant Sciences Center | Manhattan, KS 66506

www.agronomy.ksu.edu | www.facebook.com/KState.Agron | www.twitter.com/KStateAgron

Kansas Vegetation Condition Comparison
Late-Apr/Early-May 2017 compared to the Late-Apr/Early-May 2016

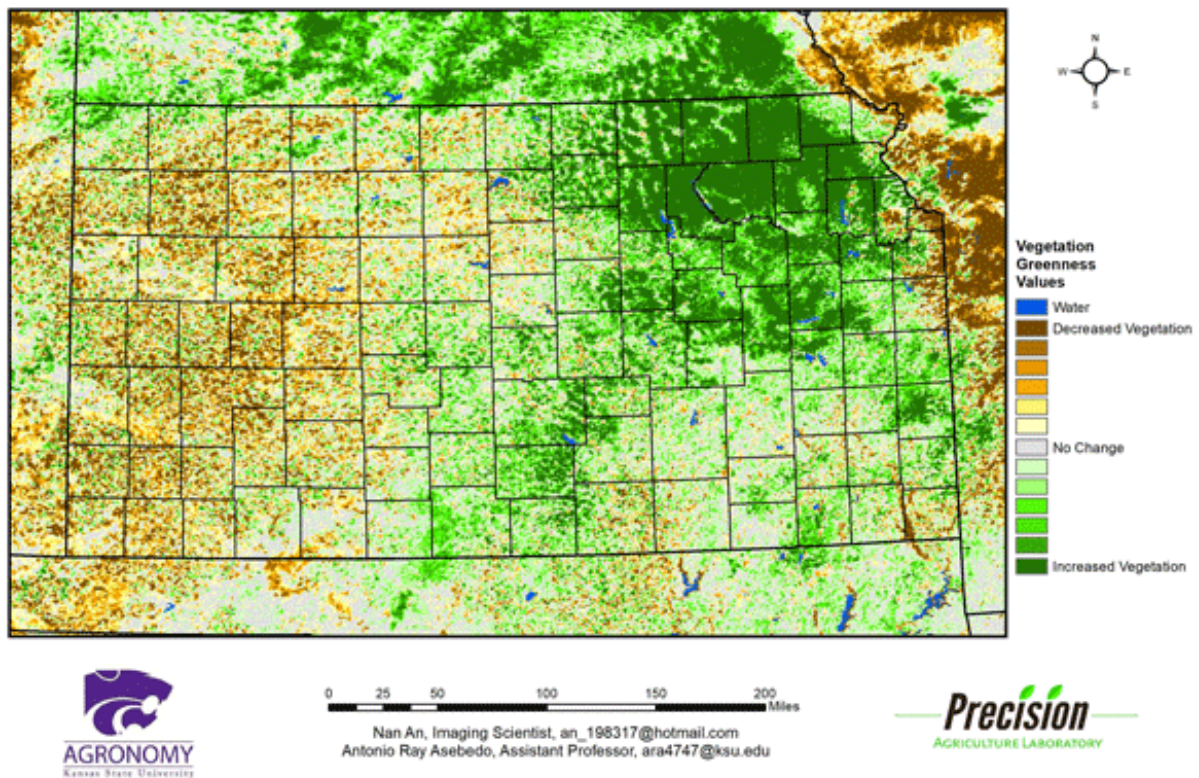


Figure 2. Compared to the previous year at this time for Kansas, the current Vegetation Condition Report for April 25 – May 1, 2017 from K-State’s Precision Agriculture Laboratory lower NDVI values are present in scattered areas of western and central Kansas. The winter wheat is less advanced this year than last, particularly in western Kansas, where dry fall conditions hampered establishment and recent cold weather has slowed development. The greatest increase in vegetative activity is in the eastern portions of the state, where moisture has been more plentiful this April and mild temperatures have been more consistent.

Kansas Vegetation Condition Comparison

Late-Apr/Early-May 2017 compared to the 28-Year Average for Late-Apr/Early-May

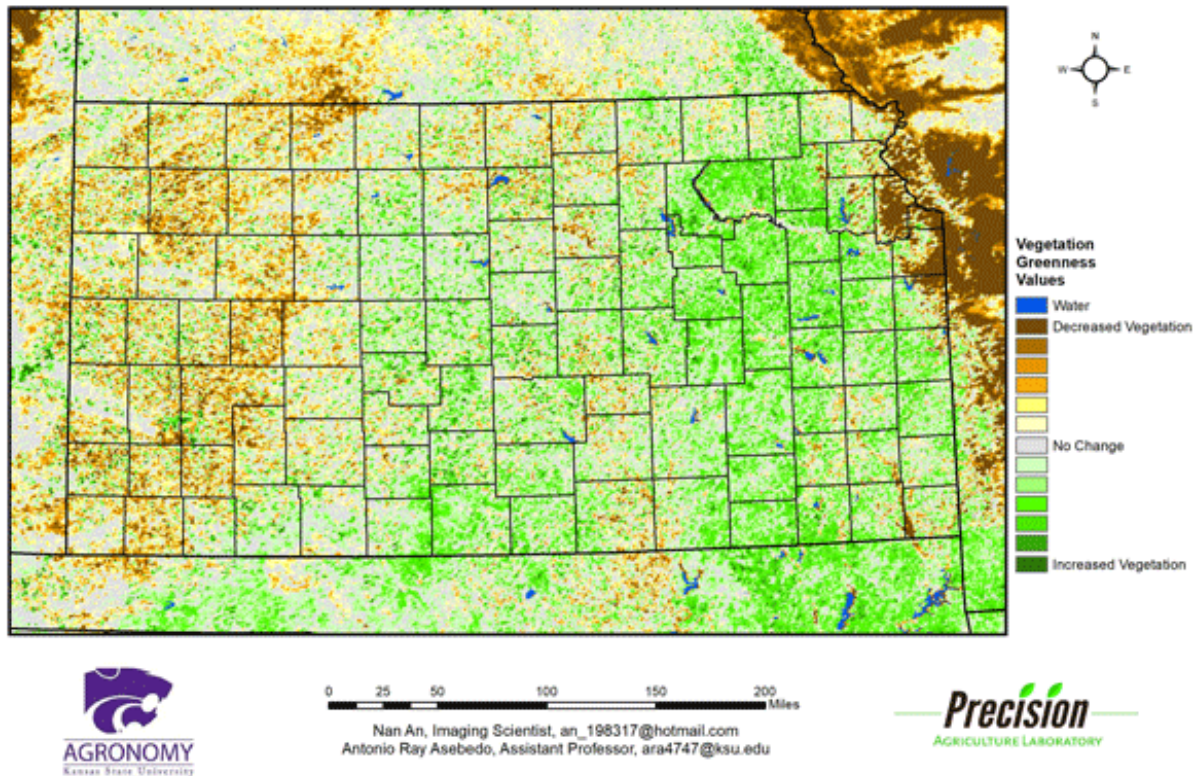


Figure 3. Compared to the 27-year average at this time for Kansas, this year's Vegetation Condition Report for April 25 – May 1, 2017, from K-State's Precision Agriculture Laboratory the eastern two-thirds of the state has near-normal vegetative activity. In the extreme northeastern corner, persistent cloud cover has masked activity. The western third of the state is showing below-average activity. The poor establishment of winter wheat last fall, coupled with the recent cold, snowy weather has hampered plant activity.

Kansas State University Department of Agronomy

2004 Throckmorton Plant Sciences Center | Manhattan, KS 66506

www.agronomy.ksu.edu | www.facebook.com/KState.Agron | www.twitter.com/KStateAgron

Continental U.S. Vegetation Condition

Period 18: 04/25/2017 - 05/01/2017

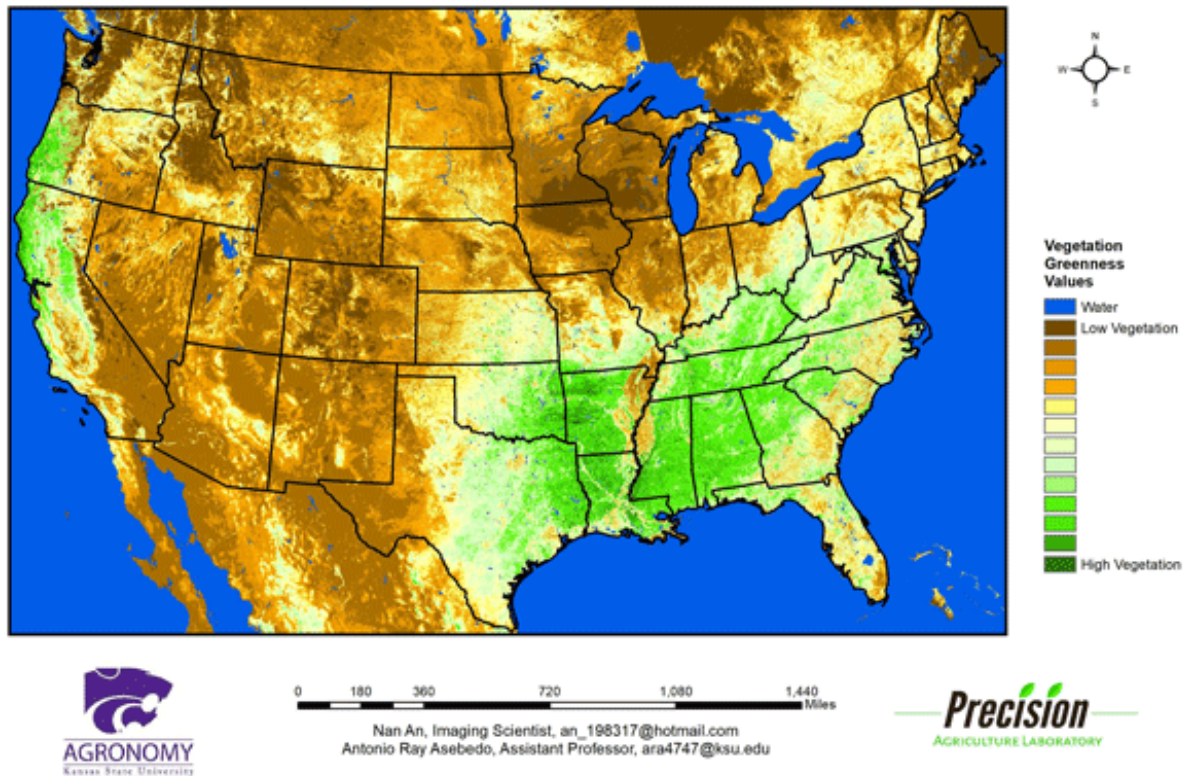


Figure 4. The Vegetation Condition Report for the U.S for April 25 – May 1, 2017 from K-State’s Precision Agriculture Laboratory shows an area of high NDVI values in the Southern Plains, particularly in east Texas and Louisiana. A second area of higher vegetative activity is also visible along the West Coast, where the wet conditions continue. Low NDVI values are visible along the central Mississippi River Valley. Intensifying drought conditions are slowing plant activity in the south from South Carolina through southern Georgia into Florida.

Kansas State University Department of Agronomy

2004 Throckmorton Plant Sciences Center | Manhattan, KS 66506

www.agronomy.ksu.edu | www.facebook.com/KState.Agron | www.twitter.com/KStateAgron

Continental U.S. Vegetation Condition Comparison
Late-Apr/Early-May 2017 Compared to Late-Apr/Early-May 2016

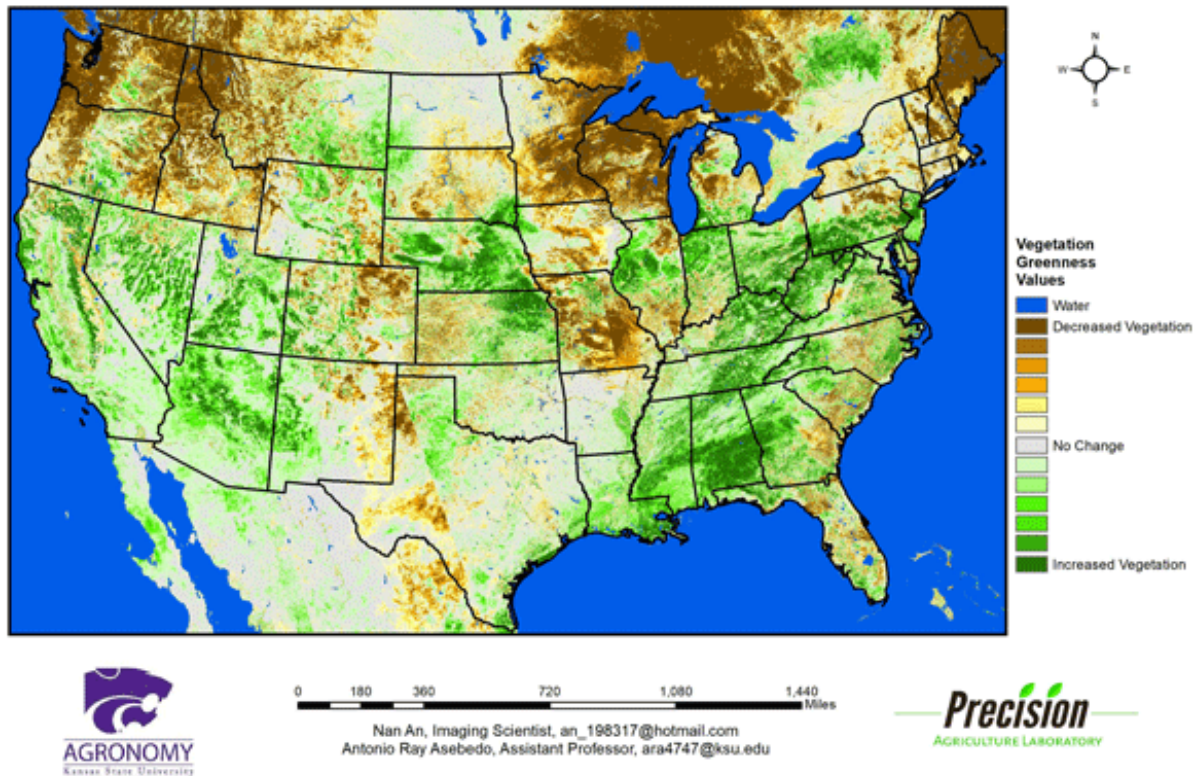


Figure 5. The U.S. comparison to last year at this time for April 25 – May 1, 2017 from K-State’s Precision Agriculture Laboratory again shows the impact that the split in the snow cover has caused this year. Much lower NDVI values prevail in the Pacific Northwest. The Northern Rockies are showing higher NDVI values as the snow pack is rapidly retreating. The South has much lower NDVI values due to persistent clouds in the area this year.

Continental U.S. Vegetation Condition Comparison
Late-Apr/Early-May 2017 Compared to 28-year Average for Late-Apr/Early-May

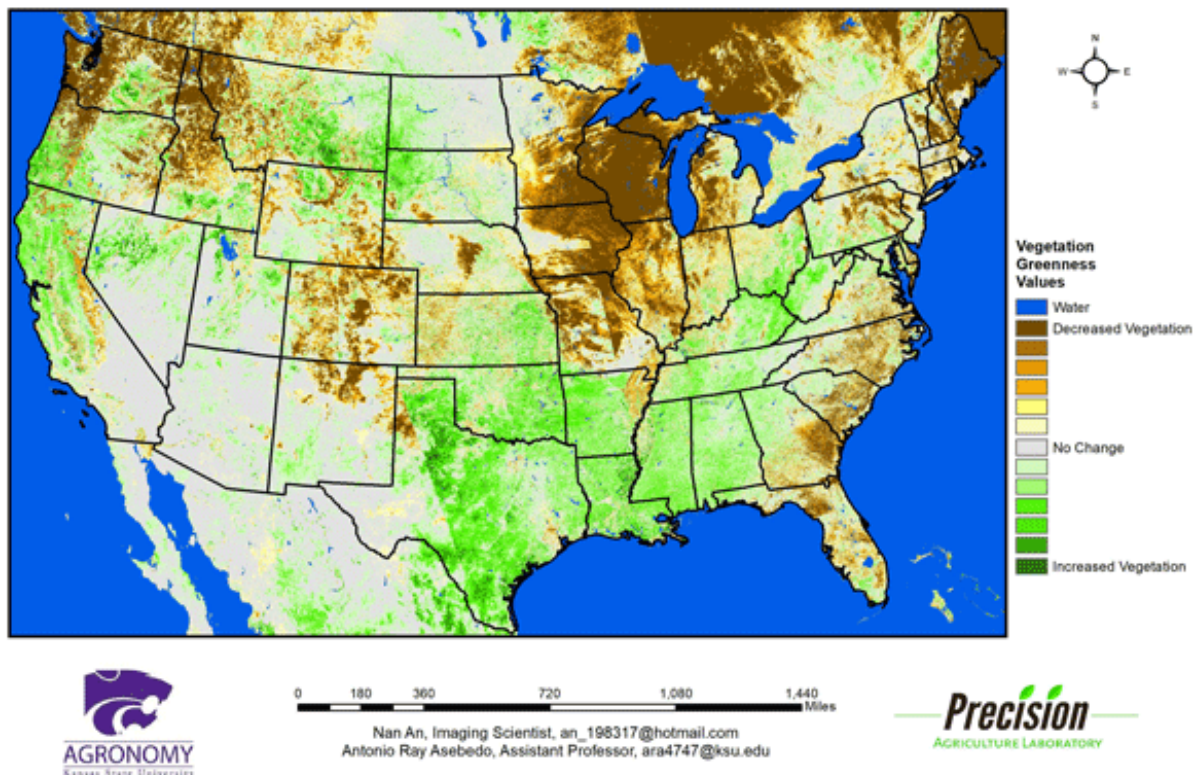


Figure 6. The U.S. comparison to the 27-year average for the period of April 25 – May 1, 2017 from K-State’s Precision Agriculture Laboratory shows an area of below-average photosynthetic activity in the Pacific Northwest, where continuing cloud cover has masked NDVI values. Below-average NDVI values are also present in the South from the Ohio River Valley, where continued cloud cover has also masked NDVI values. Higher-than-average vegetative activity is present in the Northern Plains and Northern Rockies as the snow pack continues to retreat rapidly.

Mary Knapp, Weather Data Library
mknapp@ksu.edu

Ray Asebedo, Precision Agriculture
ara4747@ksu.edu

Nan An, Imaging Scientist
an_198317@hotmail.com