Issue 621

K-STATE Research and Extension

Extension Agronomy

eUpdate

03/24/2017

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.

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1. Soil-applied residual herbicide options for soybeans

With the introduction and use of new herbicide-resistant technologies in soybeans, it will be important to utilize an integrated weed management system that includes soil-applied residual herbicides to optimize weed control and sustain the technology.

Broadly speaking, there are many good reasons to use a soil-applied residual herbicide for soybeans, including:

- Get early-season control of weeds and grasses to minimize early-season weed competition.

- Provide more flexibility with postemergence treatment timing.

- Provide additional herbicide sites of action to help manage and slow the development of herbicide resistant weeds.

- Help reduce the weed seed-bank over time.

There are a number of good soil-applied residual herbicide options for soybeans depending on the primary target weeds.

Pigweeds (including waterhemp and Palmer amaranth). Glyphosate-resistant waterhemp and Palmer amaranth are now fairly common in many fields throughout Kansas. Pigweed emergence will generally start in April but the greatest amount of emergence will occur in May and June. Preemergence or burndown-plus-residual herbicide applications will need to be targeted before pigweed has emerged or while it is still at small growth stages.

Figure 1. Palmer amaranth in soybeans. Photo courtesy of K-State Research and Extension.

For early-season pigweed control, the Valor-based herbicides (Valor SX, Valor XLT, Rowel, Encompass, Outflank, Panther, Fierce, Fierce XLT, Gangster, Surveil, Trivence, Afforia, Envive, and Enlite) and Authority-based herbicides (Authority First, Sonic, Authority Assist, Authority MTZ, Authority Maxx, Authority Elite, Blanket, Broadaxe XC, Spartan, and Spartan Elite) can all provide very good to excellent control to supplement a postemergence program. If glyphosate-resistant pigweed is

suspected, higher use rates may be required to give adequate residual control.

Prefix, Zidua, Zidua Pro, and Anthem, are other excellent "foundation" herbicides for residual pigweed control in soybeans. Metribuzin, Warrant, Dual, Boundary, Outlook, and Prowl products can also provide some early-season pigweed control, but may not provide as much residual control as those previously mentioned products. Split applications of overlapping residual herbicides -- early preplant and at-planting or early postemergence -- may be the best approach to manage glyphosate-resistant pigweed in no-till systems.

Marestail. Marestail is probably the most widespread glyphosate-resistant weed in Kansas. Marestail control in soybeans should begin in early spring by controlling fall-germinated seedlings and rosettes before they start to bolt. 2,4-D and dicamba can be used in early spring, but the proper preplant intervals need to be followed. The preplant intervals for 2,4-D LV4 are 1 week for up to 1 pt/acre and 30 days for 1 to 2 pt/acre. The preplant interval for Clarity is 14 days following an application rate up to 8 oz/acre and accumulation of 1 inch of rainfall. Dicamba has generally provided better marestail control than 2,4-D. Xtendimax, FeXapan, and Engenia can be utilized ahead of Xtend soybeans without a preplant waiting interval.

Figure 2. Marestail. Photo by Dallas Peterson, K-State Research and Extension.

The Kixor-containing products Sharpen, OpTill, Zidua Pro, and Verdict can be used any time before

soybean emergence (cracking), but are most effective if applied before plants get too big. To optimize marestail control with Kixor products, use an adequate spray volume to insure good spray coverage and apply in combination with a methylated seed oil.

Liberty herbicide may be the best option as a rescue treatment to burn down bolted marestail prior to planting. There is no waiting interval required between a Liberty application and planting soybeans, but it will not provide any residual marestail control. Other preplant herbicides that can help with burndown and provide residual marestail control include FirstRate-based herbicides, such as Authority First, Sonic, Gangster, or Surveil in combination with glyphosate.

Velvetleaf. Glyphosate is not always entirely effective on velvetleaf. To assist in velvetleaf control, the Valor-based and FirstRate-based herbicides (Valor SX, Valor XLT, Rowel, Encompass, Outflank, Panther, Fierce, Fierce XLT, Gangster, Surveil, Authority First, and Sonic, Trivence, Afforia, Envive, and Enlite) are some of the most effective preplant and preemergence herbicides you can use.

Cocklebur. The most effective preplant and preemergence herbicides to aid in cocklebur control are those that contain First Rate, Classic, or Scepter. Such products would include Authority First, Sonic, Authority XL, Authority Maxx, Gangster, Surveil, Envive, Fierce XLT, and Valor XLT. Pursuit or Pursuit-containing products such as Zidua Pro, OpTill, and Authority Assist can also be used as a preplant treatment in Roundup Ready soybeans to provide residual cocklebur control. Extreme which contains glyphosate and Pursuit can be used either preplant or postemerge for some additional residual control in Roundup Ready soybean.

Morningglory. Glyphosate sometimes has trouble controlling morningglory. To help get better control, you can use either Authority-based or Valor-based herbicides preplant or preemergence. OpTill and Zidua Pro can also provide good early-season morningglory control.

Kochia. Kochia is a major weed problem in western areas and historically has been difficult to control with glyphosate, especially as it gets bigger. In addition, much of the kochia in western Kansas is now glyphosate-resistant. A majority of kochia will probably have emerged prior to soybean planting, so controlling that kochia before planting is critical.

Research by K-State the last couple of years indicates that Authority-based products have provided the best residual kochia control in soybeans. Metribuzin can also provide good kochia control, but soil pH and texture label guidelines need to be followed. The Kixor-containing products, such as Sharpen, OpTill, Zidua Pro, and Verdict, may help with kochia burndown and early-season kochia control, but may not provide very much residual control.

Xtendimax, FeXapan, and Engenia can be utilized ahead of Xtend soybeans for burndown and early-season residual control of kochia. ALS-inhibiting herbicides may or may not provide kochia control because of the occurrence of ALS-resistant kochia.

Crabgrass and other small-seeded grasses. Glyphosate usually gives good control of most grasses, but producers may want to apply a foundation herbicide to control grasses early, followed by a postemergence grass control herbicide. Fierce, Fierce XLT, Prefix, Zidua, Zidua Pro, Anthem, Dual II Magnum, Outlook, Warrant, and Prowl H2O can all provide early season grass and pigweed control ahead of postemergence treatments. Of these, Fierce, Fierce XLT, Prefix, and Zidua, Zidua Pro generally provide the best pigweed control, and Prowl H20 the least.

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2. Status of new ALS-resistant "Inzen" sorghum technology

A few roadblocks remain to the commercial introduction of the new ALS-resistant "Inzen" sorghum technology, although a major hurdle has been overcome with the announced 2016 registration approval of "Zest WDG herbicide." Zest WDG is the dry formulation of the active ingredient nicosulfuron for use on Inzen sorghum hybrids. Inzen sorghum hybrids are being developed by DuPont Pioneer and Advanta. However, no Inzen are currently commercially available to growers yet.

In addition, the Canadian Food Inspection Agency, which regulates the release of Plants with Novel Traits (PNT), has not yet approved this technology. Inzen sorghum and products containing Inzen sorghum fall into this PNT category and must receive approval before Inzen sorghum or products from Inzen sorghum can be exported into Canada. The bottom line is that the timeframe for a full launch of this technology has been delayed by the need for Canadian approval and hybrid development.

The latest word from United Sorghum Checkoff program is that a full launch of Inzen hybrid technology could be 2019 at the earliest, and possibly 2020. No seed company farmer demonstrations will be planted in 2017, but university field trials demonstrating the Inzen grain sorghum technology will continue in 2017.

K-State continues to be active and very successful breeding Inzen sorghum lines with excellent tolerance to nicosulfuron and very good yield potential. Interested sorghum companies can get more information on the availability of these ALS-resistant inbreds by contacting K-State sorghum breeder, Dr. Tesfaye Tesso at ttesso@ksu.edu

Yield potential of test cross hybrids resistant to ALS inhibitor herbicides as compared to commercial checks, 2015. Tesfaye Tesso and his group, Agronomy Department, K-State.

Entry	bu/acre	Yield as % of the top check
PR14/15-119 × PR14/15-199	132	101
PR14/15-143 × PR14/15-241	122	93
PR14/15-103 × PR14/15-175	134	103
PR14/15-149 × PR14/15-190	128	98
PR14/15-105 × PR14/15-181	134	103
PR14/15-119 × PR14/15-199	131	100
PR14/15-121 × PR14/15-190	122	93
PR14/15-121 × PR14/15-197	126	97
PR14/15-157 × PR14/15-217	119	91
Pioneer 84G62	130	-
Dekalb 54 00	129	-

Zest WDG herbicide applied postemergence can control volunteer sorghum and small annual grasses such as volunteer wheat, witchgrass, barnyardgrass, foxtails, sandbur, and crabgrass. Unlike glyphosate, Zest WDG must be applied to very small grasses to achieve adequate control. Generally Zest WDG may have limited activity on grassy sandbur, stinkgrass, and crabgrass unless these grasses are very, very small at the time of application. A complete list of grasses controlled and their maximum size for adequate control is provided in the Zest WDG label.

Inzen sorghum technology is the result of a multi-year partnership between Kansas State University and DuPont Crop Protection with support from the Kansas Grain Sorghum Commission, the United Sorghum Checkoff Program, and National Sorghum Producers.

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3. Corn planting and soil temperatures: Late-March and projected conditions

Corn planting time is here, or nearly here. Soil planting conditions are critical for successful emergence and early-season uniformity of the crop. In making this decision, producers should not only consider the optimal soil temperature for adequate emergence but also soil moisture conditions at planting.

Soil temperature conditions for the past week (March 15-21) experienced minimal changes in the SE and NE regions of the state, ranging from 49-51 F for the SE to 43-46 F for the NE and NC regions (Fig. 1). Average soil temperatures varied from 43 F (minimum) to close to 59 F (maximum) for this period. The warmest soil temperatures were in the SW and southern section of the SC region. As reflected in the Figure 2, a large soil temperature increase occurred in the western part of the state – with temperatures increasing approximately from 4 to 8 F compared to the previous week. Soil temperature increases were reported in all districts, but lower increases were reported in the NC, NE and SE regions.

As a reminder, selection of the optimal planting date is one of the most critical factors in the farming decision-making process. In making this decision, producers should consider soil temperatures rather than just the calendar dates. Changes in soil temperature will be also affected by changes in soil moisture.

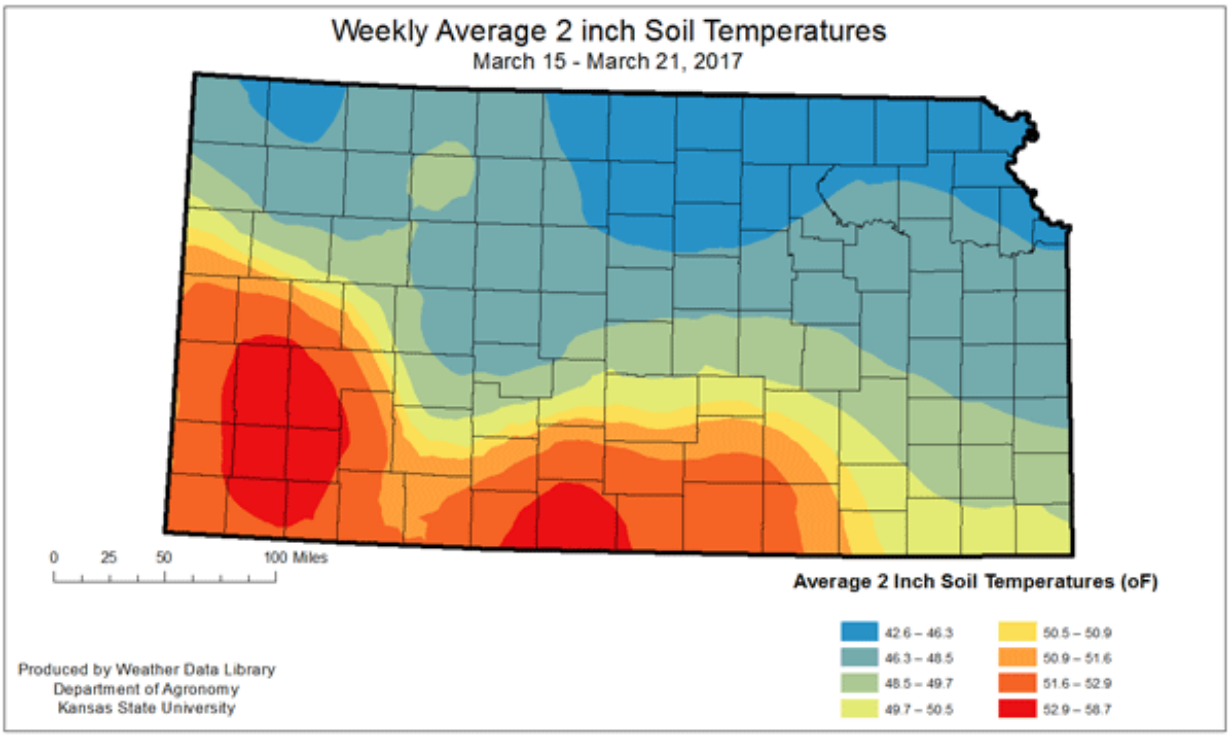


Figure 1. Average soil temperatures at 2-inches for the week of March 15-21, 2017.

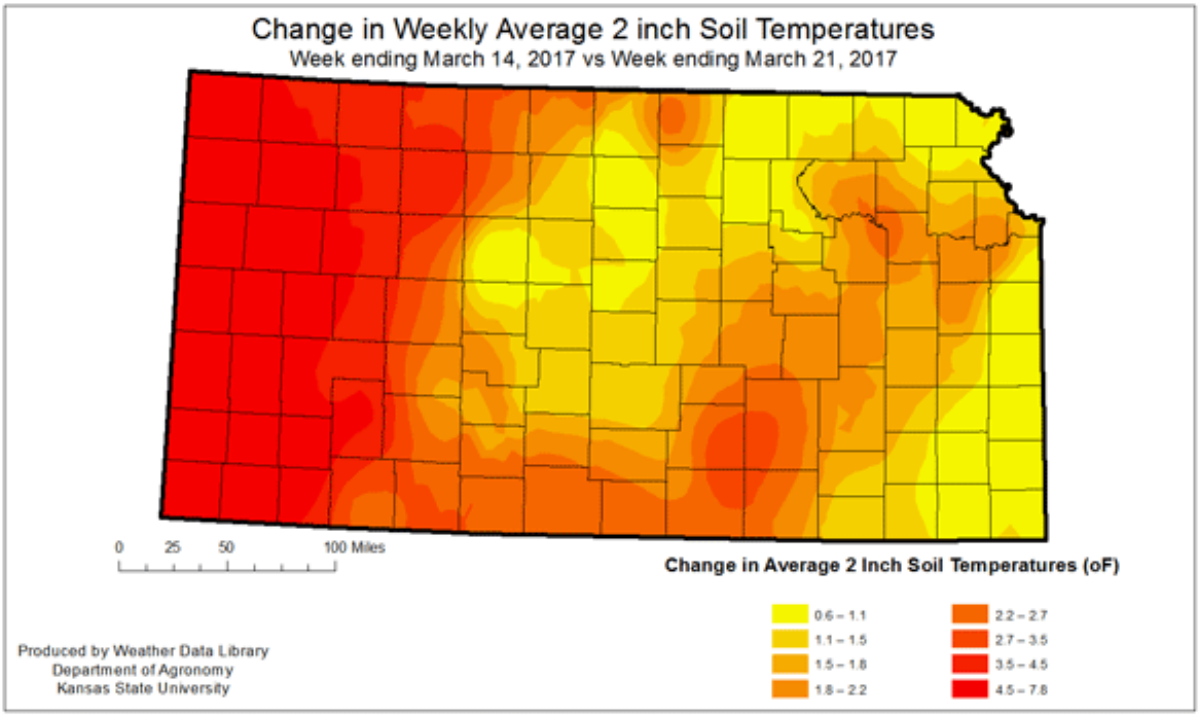


Figure 2. Changes in weekly average soil temperatures at 2-inches week ending March 14 vs. week ending March 21.

The precipitation outlook for the coming 7 days (March 24-31) is projecting between 1 to close to 4 inches depending on the area of the state (Fig. 3). Larger precipitation amounts are forecast for the eastern and SC parts of our state – between 2.5 to 4 inches; while less than 1.5 inches is projected for the western, NC, and NW parts of the state.

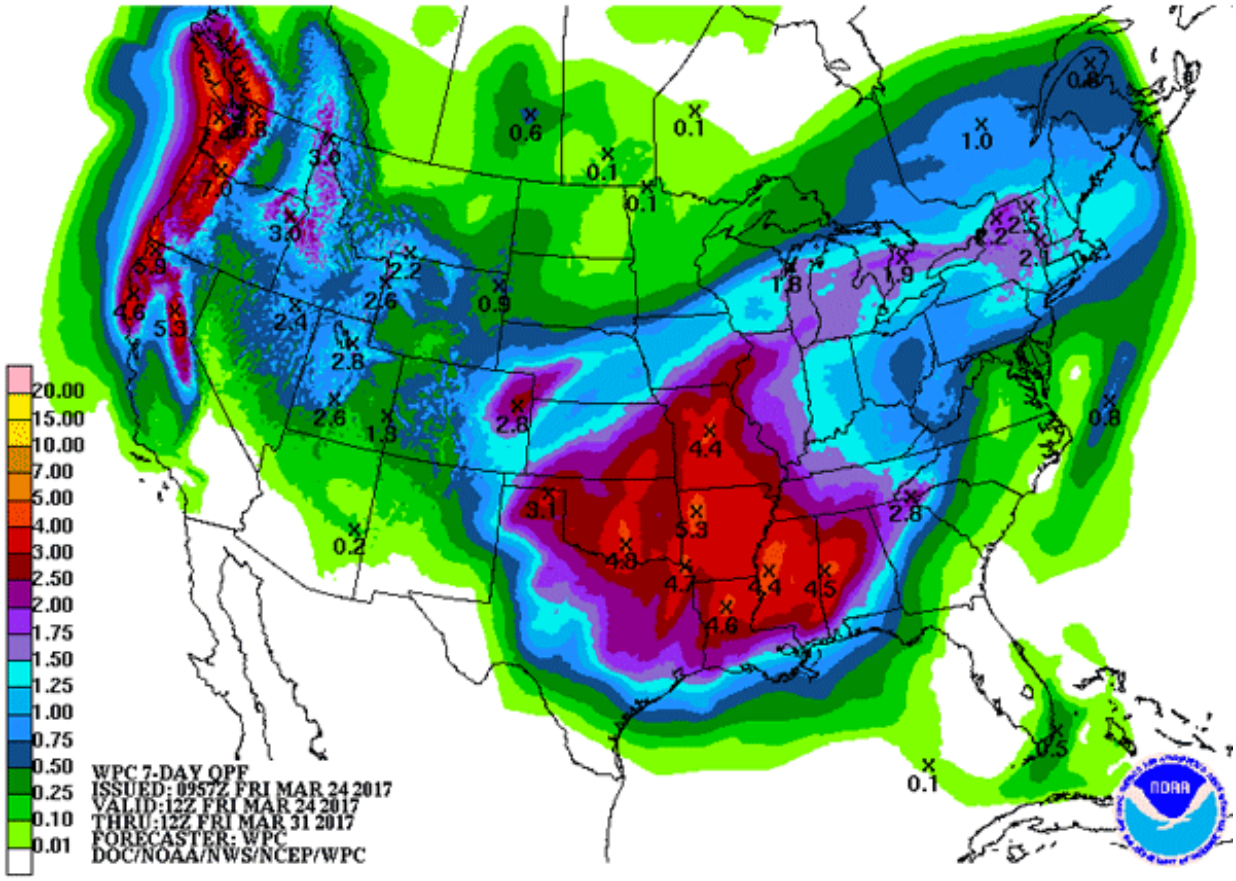
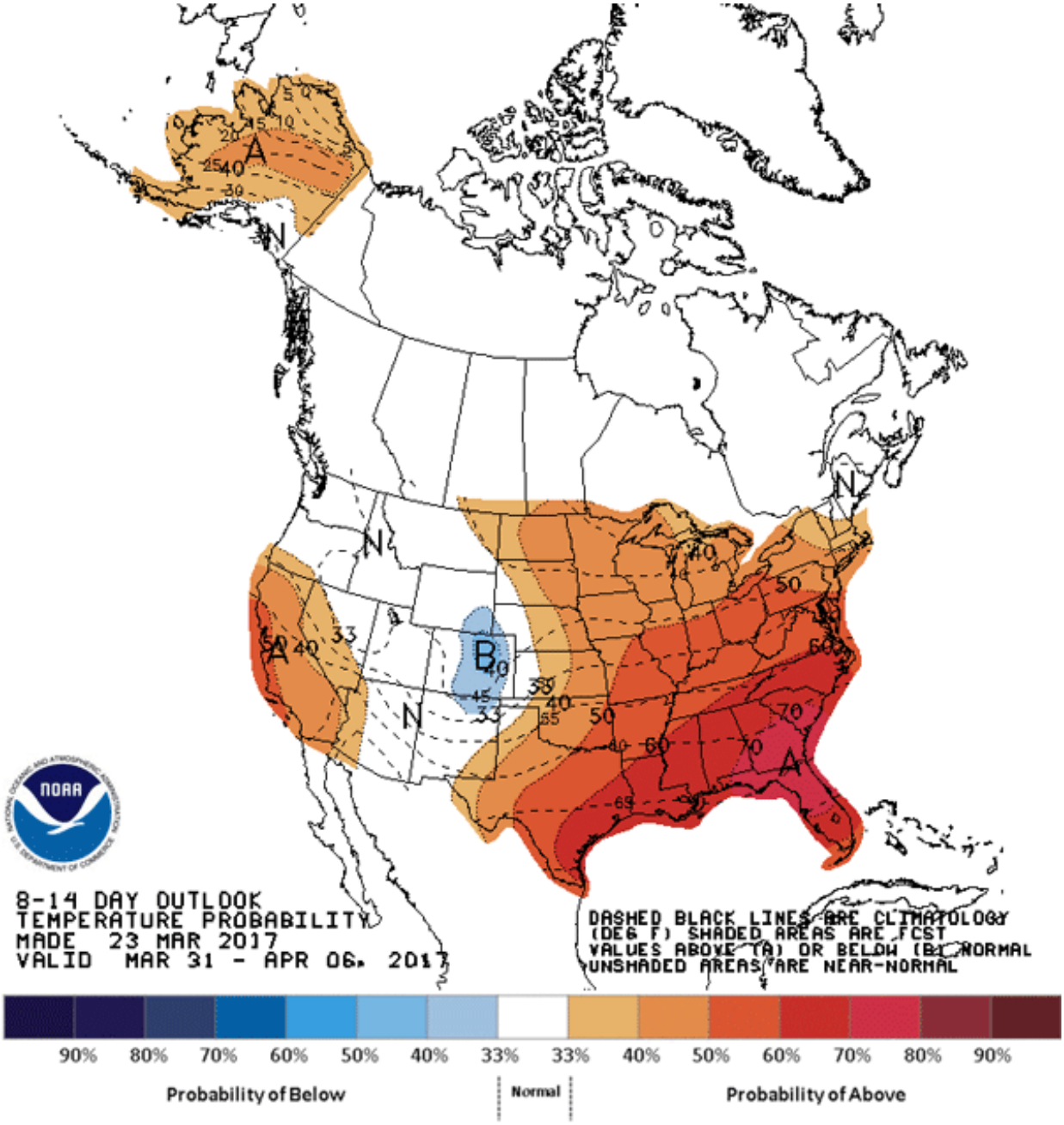


Figure 3. 7-Day Outlook Precipitation Probability from March 24-31, NOAA.

Many factors, including amount of residue coverage, soil moisture, and topographic position will impact the actual change in soil temperature in any given field. Wet soils in a no-till situation will be slower to warm. Dry soils will vary more rapidly, matching air temperatures.

Projections for coming weeks are for precipitation and temperature to be above normal for almost the entire state (Fig. 4), which will slow down soil warming conditions. Also, soil moisture content will impact the workability of those fields for planting.



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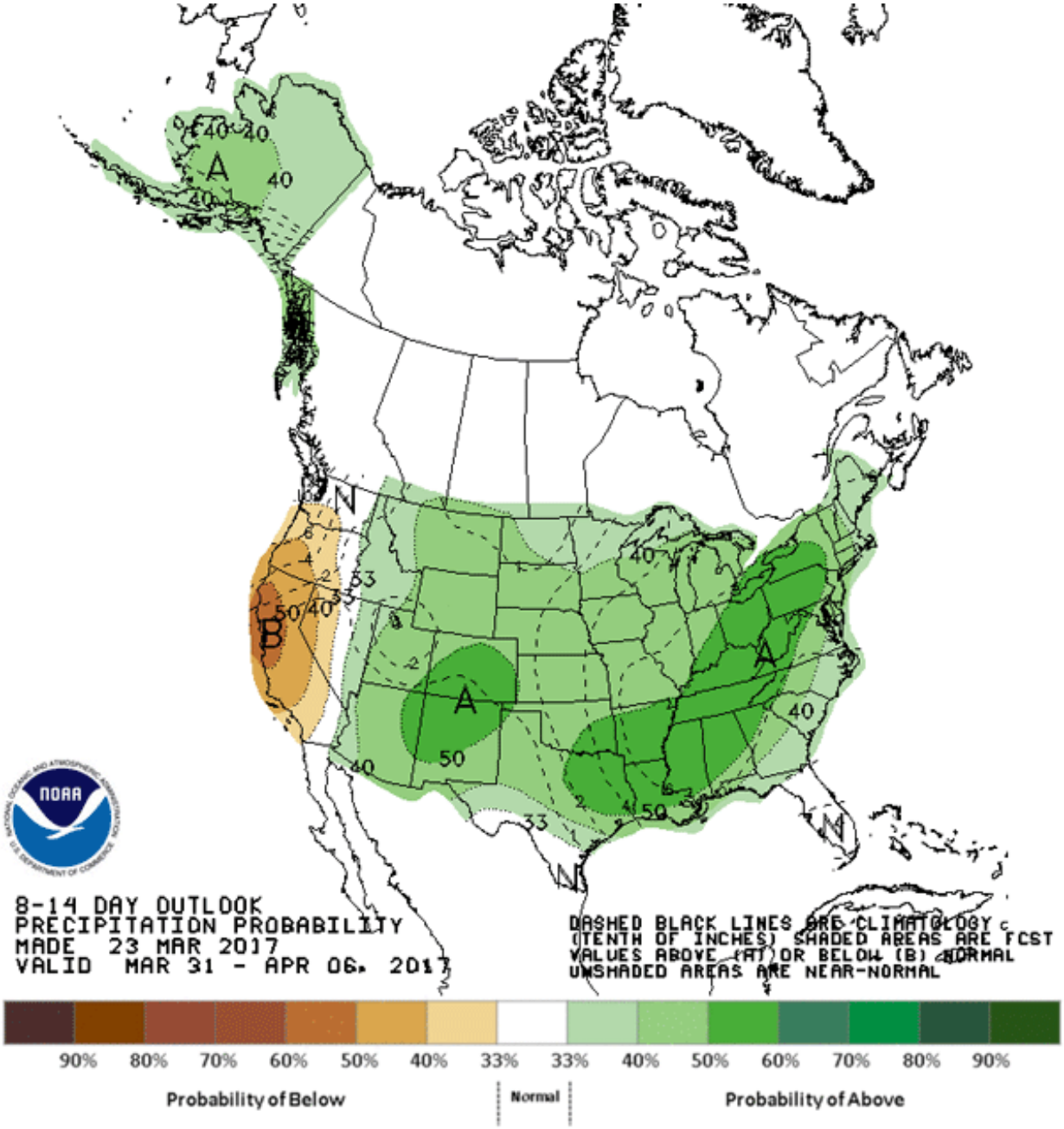

Figure 4. 8-14 Day Outlook temperature (upper panel) and precipitation (lower panel) probability from March 31-April 6, NOAA.

As a reminder optimal soil conditions produce a large impact on corn uniformity and early growth. Lack of uniformity in emergence can greatly impact corn potential yields.

Temperatures at or above 55 F will help establish the young corn plants and improve the probability of presenting a uniform canopy. Proper soil moisture conditions will be needed to avoid potential problems related to wet soils, such as having plants with shallow root systems, which can increase susceptibility to standability problems during the growing season.

Think about all these factors when deciding on the optimal planting time. Wet conditions seem likely to affect early planting for corn in many areas of the state. If possible, wait and plant under more uniform soil temperature and moisture conditions to guarantee a more uniform early-season stand of plants. More information about planting status of summer row crops will be provided in upcoming issues of the Agronomy eUpdate. Stay tuned!

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4. Early-season outlook for wheat diseases

Stripe rust and leaf rust: The rust diseases are some of the most important diseases in the state and annually cause more yield loss than most other diseases of wheat. The rust diseases often become established in Texas and Oklahoma before spreading north to Kansas. We can use outbreaks in these southern areas as early indicators of problems that may arise in Kansas. This year, the early reports from Texas indicate that stripe rust levels are low in most areas and Oklahoma has yet to report stripe rust in 2017. This suggests that the risk of stripe rust in Kansas is much lower than in 2015 or 2016.

Leaf rust, however, has been more of a problem in Texas, with reports of severe leaf rust in mid-canopy prior to heading. Oklahoma reported some active leaf rust earlier this season but the dry conditions in March appeared to hold the disease in check. There are no reports of leaf rust to date in Kansas for the 2017 season. We have a lot of acres planted to varieties that are susceptible to leaf rust (T158, TAM111, TAM112, WB4458). We will need to watch for signs of leaf rust as we approach flag leaf emergence in Kansas during April.

Wheat streak mosaic: This viral disease has emerged as a serious problem in parts of western Kansas again in 2017. Wheat steak mosaic causes a yellow discoloration of leaves and severe stunting in infected plants (Figure 1). The KSU diagnostic lab was receiving samples of wheat with wheat streak mosaic already in the fall, which is an early indication that this may be an above-average year for this disease. We continue to receive samples with symptoms of wheat streak mosaic this spring and reports of above-normal levels of the disease in some areas of west central Kansas.

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Figure 1. Wheat with symptoms of wheat streak mosaic. Photo by Erick DeWolf, K-State Research and Extension.

Root rots: Several samples of wheat from western Kansas have also been infected with common root rot. This fungal disease causes dark-colored lesions on the sub-crown internode and other roots (Figure 2). The damaged roots often break off when plants are removed from the soil. Common root rot is present at low levels almost every year in Kansas and survives between seasons on crop residues and organic matter in the soil. In most years, the plants have enough healthy roots to compensate for those damage caused by the disease. When soil conditions are dry, however, the damage caused by common root rot can cause more problems. Under dry soil conditions, the plants are not growing as vigorously and often have poorly developed root systems. Any damage to the root system by common root rot aggravates the drought stress and is likely contributing to the decline of some wheat fields this season.

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Figure 2. Wheat with symptoms of common root rot.

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5. Comparative Vegetation Condition Report: March 14 - 20

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:

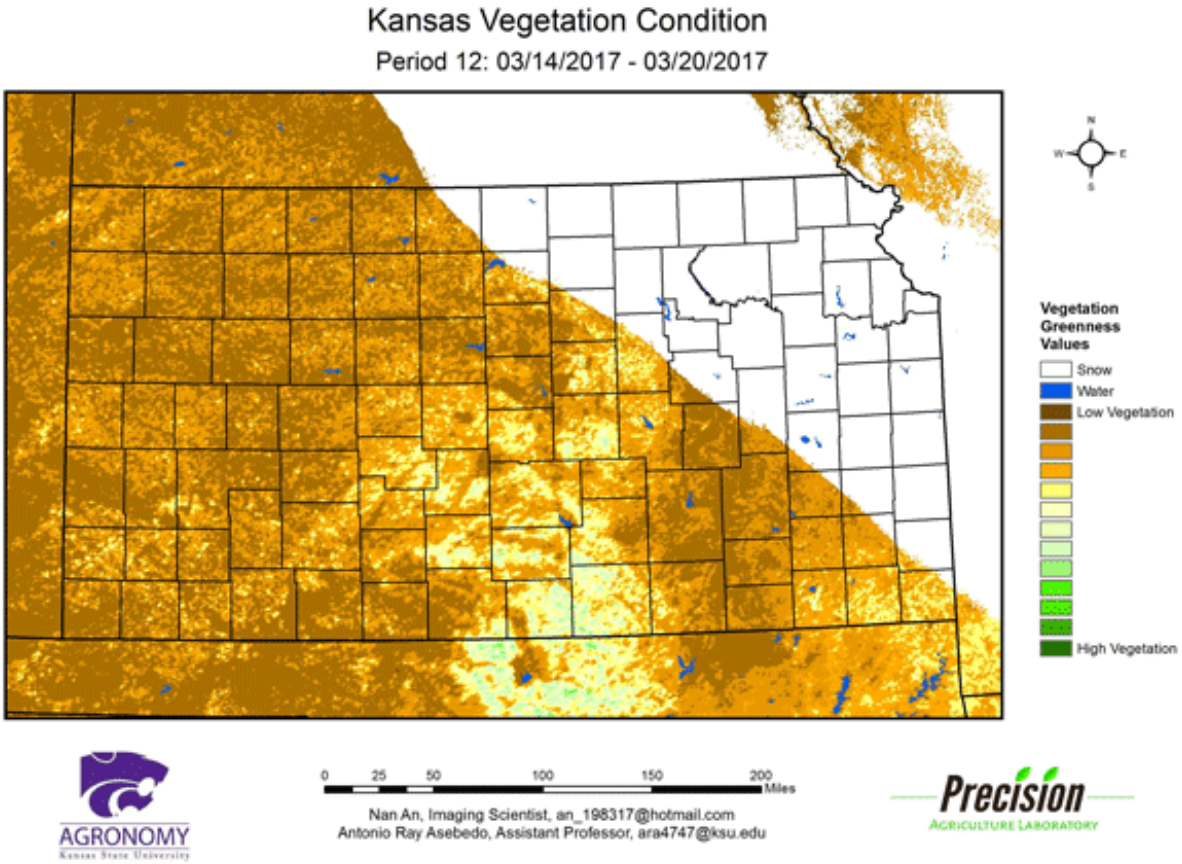

Figure 1. The Vegetation Condition Report for Kansas for March 14 – March 20, 2017 from K-State's Precision Agriculture Laboratory shows the light snow that fell during the period. Amounts were generally less than an inch and melted quickly. The little vegetative production is mainly in south central Kansas, although it continues to expand northward. This is not unexpected even with the warmer-than-normal temperatures.

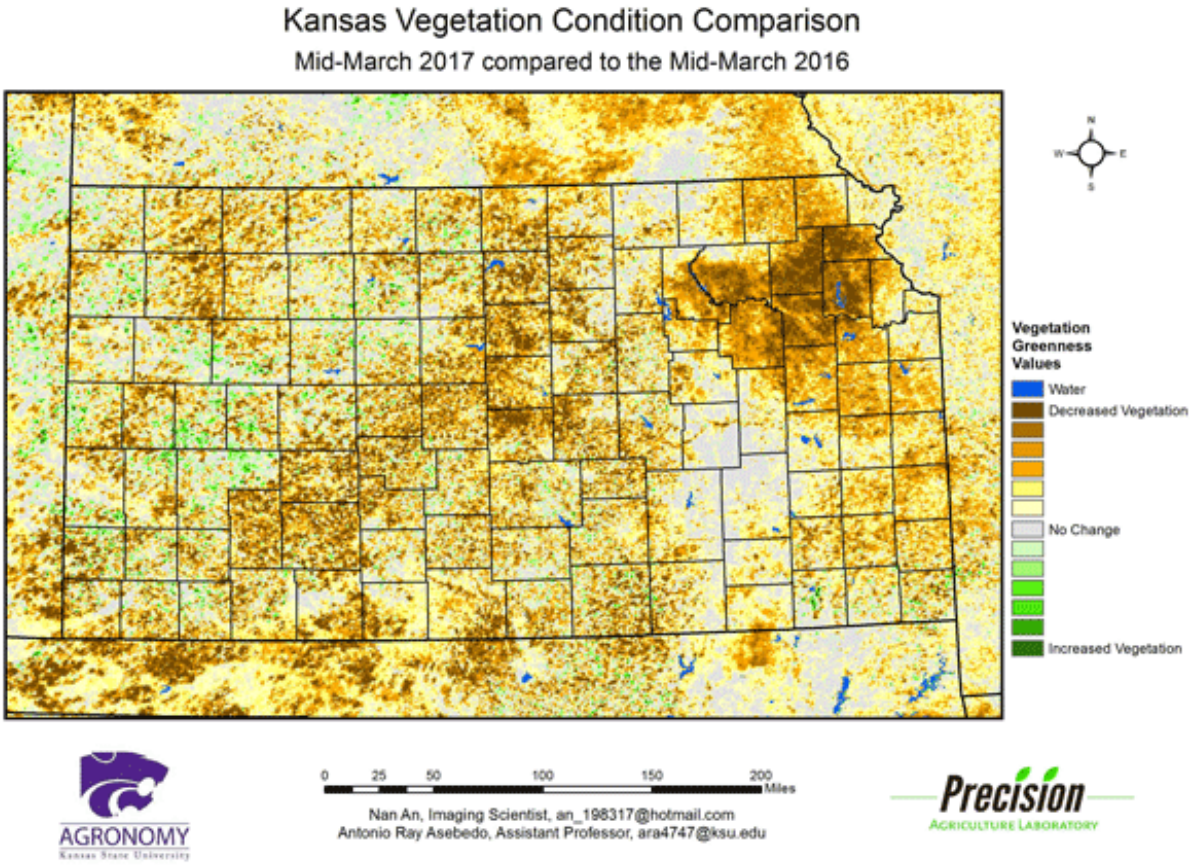

Figure 2. Compared to the previous year at this time for Kansas, the current Vegetation Condition Report for March 14 – March 20, 2017 from K-State's Precision Agriculture Laboratory shows much lower NDVI values across much of Kansas. The winter wheat is less advanced this year than last, particularly in western Kansas, where dry fall conditions hampered establishment. In northeast Kansas, persistent cloud cover also accounted for reduced NDVI values.

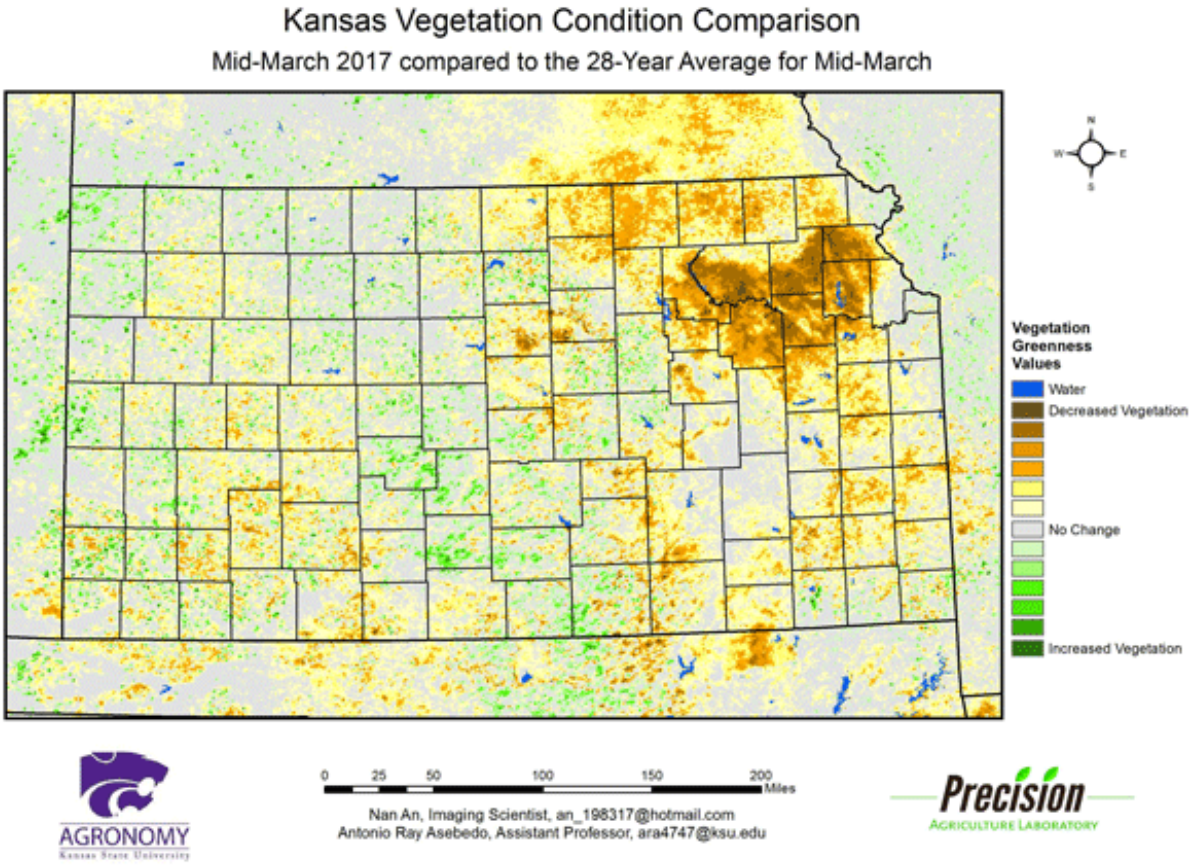

Figure 3. Compared to the 27-year average at this time for Kansas, this year's Vegetation Condition Report for March 14 – March 20, 2017 from K-State's Precision Agriculture Laboratory much of the state has expanding areas of below-average photosynthetic activity. The highest NDVI values are in the central and south central parts of the state, where precipitation has been more favorable. The low NDVI values in northeast Kansas are largely due to persistent cloud cover.

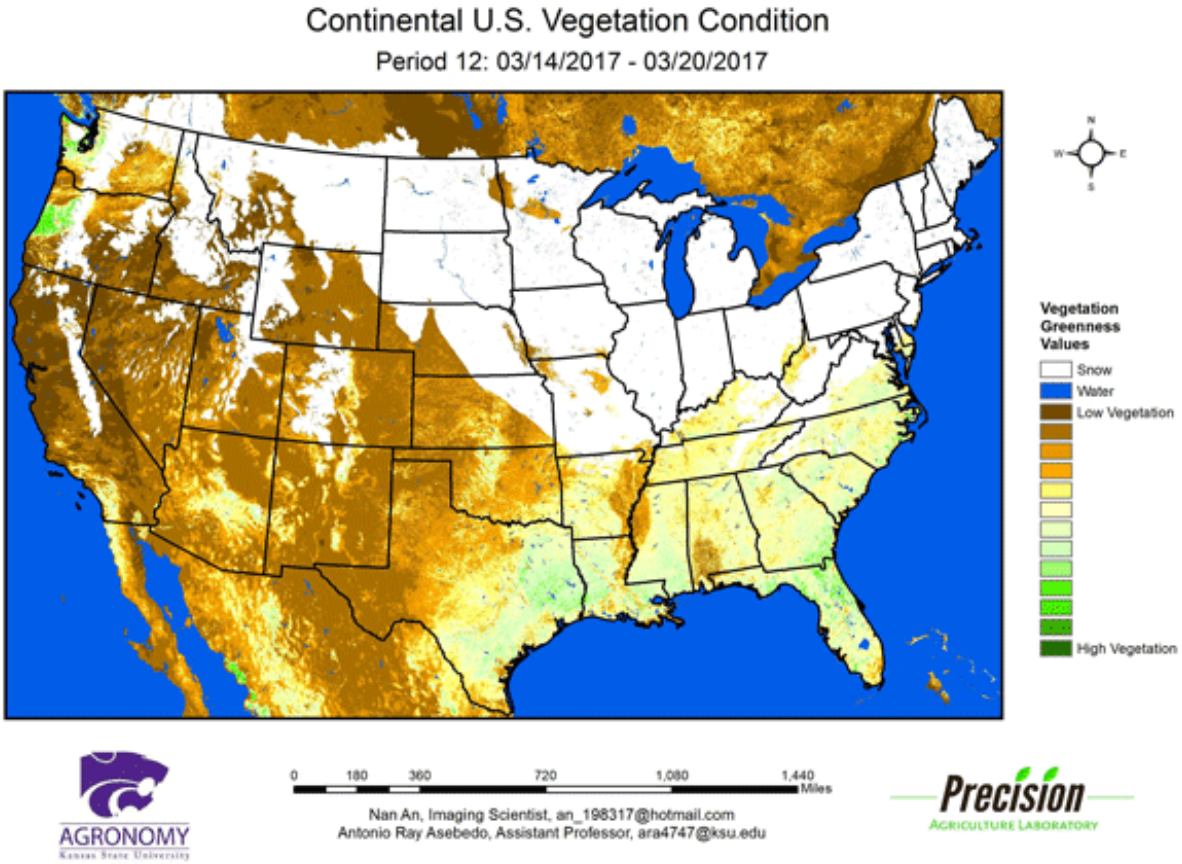

Figure 4. The Vegetation Condition Report for the U.S for March 14 – March 20, 2017 from K-State's Precision Agriculture Laboratory shows the highest NDVI values are confined to the South, particularly in east Texas and Louisiana. Snow coverage was mostly in the Upper Midwest and New England. Parts of Upstate New York had relief from the snow deficit that has been present for most of the winter.

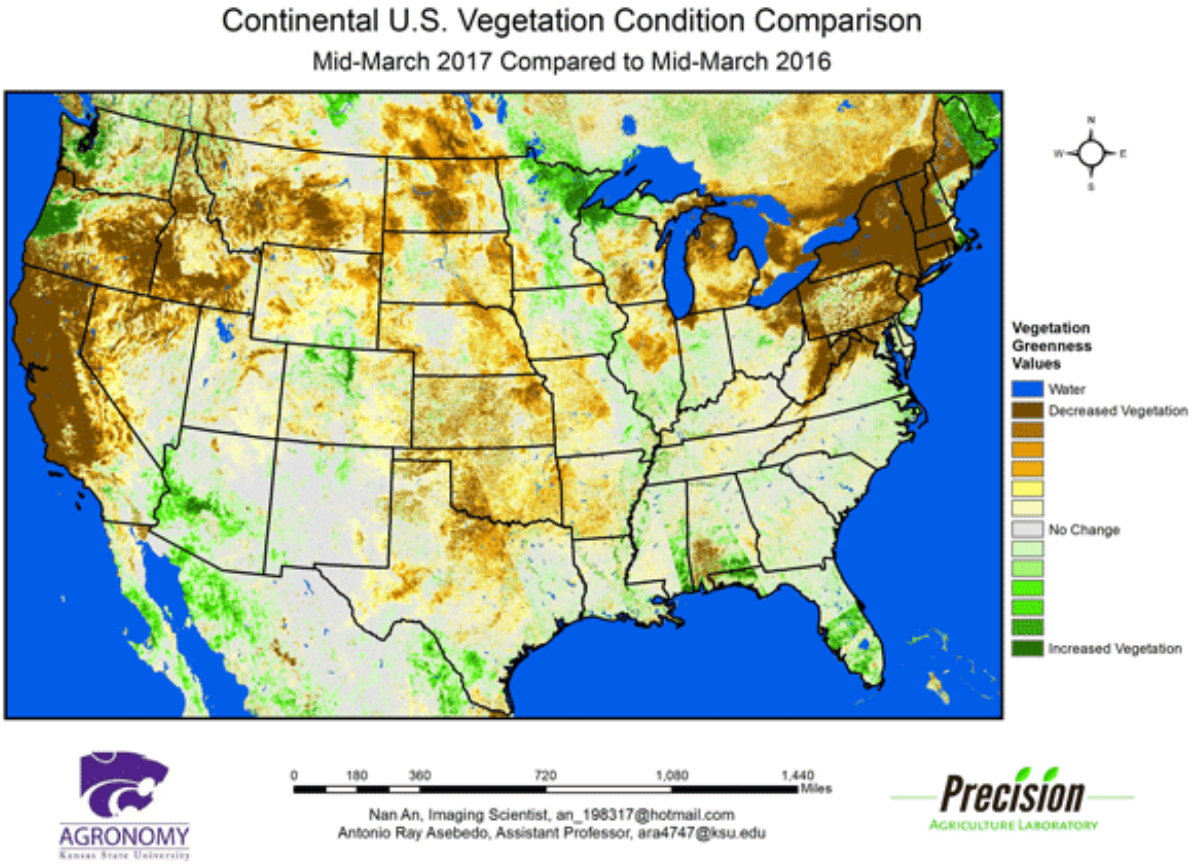

Figure 5. The U.S. comparison to last year at this time for March 14 – March 17, 2017 from K-State's Precision Agriculture Laboratory shows the impact that the split in snow cover has caused. Much lower NDVI values prevail from the Pacific Northwest through the northern Plains and into New England, where snow coverage continues to be much higher this year. In contrast, the Central Plains has had less moisture. Winter wheat conditions are much poorer than last year at this time.

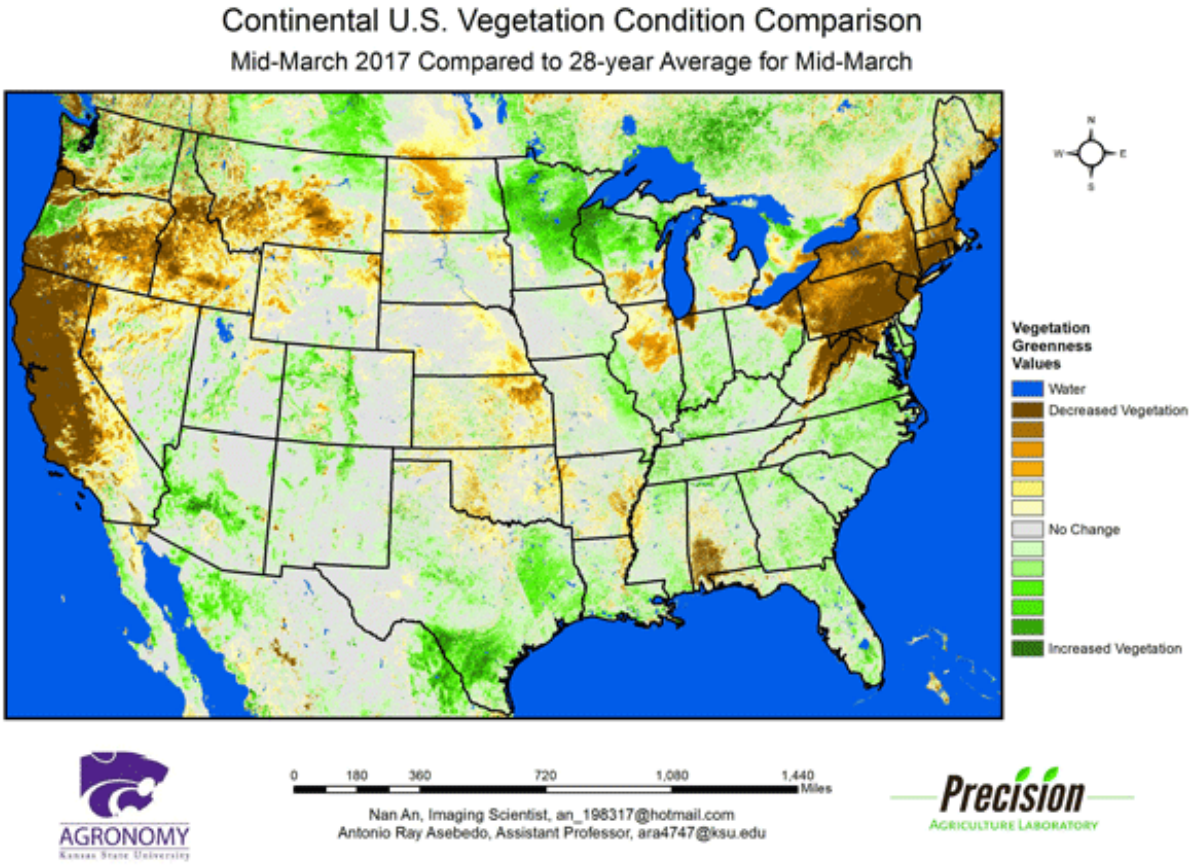

Figure 6. The U.S. comparison to the 27-year average for the period of March 14 – March 20, 2017 from K-State's Precision Agriculture Laboratory shows an area of below-average photosynthetic activity in the Intermountain West, where snow cover is greatest. Above-average NDVI values are visible in the Midwest from Iowa through Pennsylvania and northward. This is particularly true in central Minnesota and Wisconsin. Warmer-than-normal temperatures and little snow cover has favored early vegetative growth with continued risk of freeze damage.

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