Issue 630

K-STATE Research and Extension

Extension Agronomy

eUpdate

04/28/2017

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

eUpdate Table of Contents | 04/28/2017 | Issue 630

1. Considerations for ground vs. aerial applications of fungicide to wheat

With the widespread rains, many producers will not be able to make timely applications of fungicide to wheat using a ground rig. However this may not be the case in all areas. As producers evaluate their application options between ground vs. aerial application of fungicides they should keep several points in mind.

The IF and WHEN decisions of fungicide application are much more important considerations than the application method. Both application methods, when performed correctly under good conditions, provide effective application of fungicides. Always use the surfactants and solution rates as described on the product label for the chosen application method.

A common question from those considering ground rig application is the potential yield loss from wheel tracks. The table below shows the percent of field area that will be trafficked for various boom and tire widths.

	Tire Track Width (inches)		
	12	18	24
Boom Width (feet)	Tracked portion of field, percent		
60	3.3	5.0	6.7
90	2.2	3.3	4.4
100	2.0	3.0	4.0
120	1.7	2.5	3.3

It's important to realize however that percent of area trafficked is not necessarily equal to yield loss. There is still significant yield component flexibility in wheat plants. Due to the increased resource availability, the plants next to the wheel track will somewhat compensate for the lost plants in the trafficked area. Wheat plants next to the wheel track will most likely have increased kernel weight and potentially increased kernels/head. Additionally, some of the plants that are trafficked may still go on and contribute to grain yield.

When evaluating the economics of the decision, too often a producer may assign no cost to the operation of his own sprayer. A decision should revolve around the economics of aerial application vs. the true cost of the producer's ground rig.

A likely range of machinery related cost (labor not included) for self-propelled sprayers is from $2.50 to $3.50/acre or $135 - $180/engine hour. This wide range results largely from the wide range in the number of acres covered per engine hour (field capacity). Variability in fuel cost is a relatively minor factor. Field capacity is affected by field size and shape, if the sprayer is tendered at the field vs. returning to an operations base, the time required to tender, and if the sprayer is transported or driven between fields.

Obviously, a true and honest evaluation of costs should include a labor charge for the operator and any labor associated with the tendering and transporting of the sprayer, especially if there are other timely task the operator could be performing (i.e. planting of row-crops).

Lucas Haag, Northwest Area Crops and Soils Specialist
lhaag@ksu.edu

2. Is there any value to starter fertilizer on soybeans?

Soybean is a crop that can remove significant amounts of nutrients per bushel of grain harvested.

Because of this, soybeans can respond to starter fertilizer applications on low-testing soils,

particularly phosphorus.

Typically, corn shows a greater response to starter fertilizer than soybean. Part of the reason for that is that soils are generally warmer when soybeans are planted than when corn is planted. The typical response in early growth observed in corn is usually not observed in soybeans. However, yield response to direct soybean fertilization with phosphorus and other nutrients can be expected in low-testing soils.

K-State guidelines for soybeans include taking a soil test for phosphorus (P), potassium (K), sulfur (S), zinc (Zn), and boron (B). If fertilizer is recommended by soil test results, then fertilizer should either be applied directly to the soybeans or indirectly by increasing fertilizer rates to another crop in the rotation by the amount needed for the soybeans.

The most consistent response to starter fertilizer with soybeans would be on soils very deficient in one of the nutrients listed above, or in very high-yield-potential situations where soils have low or medium fertility levels. Furthermore, starter fertilizer in soybeans can be a good way to complement nutrients that may have been removed by high-yielding crops in the rotation, such as corn and help maintain optimum soil test levels.

Banding fertilizer to the side and below the seed at planting is an efficient application method for soybeans. This method is especially useful in reduced-till or no-till soybeans because P and K have only limited mobility into the soil from surface broadcast applications.

However, with narrow row soybeans, it may not be possible to install fertilizer units for banding. In that situation, producers can surface-apply the fertilizer. Fertilizer should not be placed in-furrow in direct seed contact with soybeans because the soybean seed is very sensitive to salt injury.

Soybean seldom responds to nitrogen (N) in the starter fertilizer. However, some research under irrigated, high-yield environments suggests a potential benefit of small amounts of N in starter fertilizer.

Figure 1. Visual differences with starter P fertilizer on low testing soils. Picture by Nathan Mueller, former K-State Agronomy graduate student and current University of Nebraska Cropping Systems / Ag Technology Educator.

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

3. Corn planting in Kansas: Soil moisture and precipitation outlook for late April

During the last week corn planting made some progress in Kansas. The eastern part of the state is now 40% planted (50% for the SE area) based on April 23, USDA-NASS information. The central districts will likely show substantial progress in the next report from the planting operations that took place this week. Corn planting progress is also starting to move in the same direction in western Kansas, with about 10% planted overall.

The short-term forecast for the next days is calling for more rain and low temperature conditions for our state. If this occurs, it will slow down the corn planting progress indefinitely. A summary of the past month's precipitation gives us a good idea of soil moisture conditions at planting (Fig. 1). The largest departure from normal precipitation is in the southwest and eastern parts of the state.

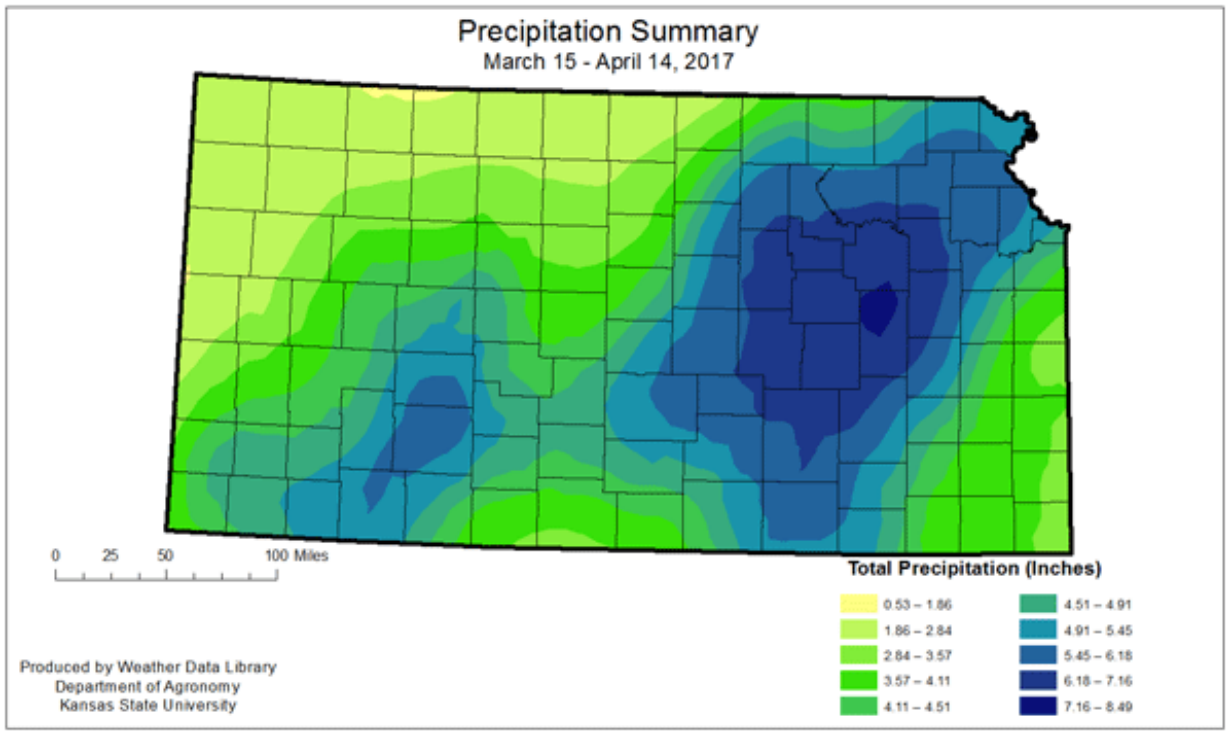

Figure 1. Precipitation summary for the period from March 15-to-April 14, 2017.

For the next 7 days, April 28 to May 5, the outlook for precipitation (Fig. 2) shows a probability of receiving from 1.0 (in the northwestern region) to more than 3 inches of rain (in the eastern part of the state), adding to the precipitation already received this past month. This will definitely slow down the soil drying process and impede any field work until conditions are more suitable for planting.

The outlook for the medium term (8-14 day, April 27 to May 5-11) is calling for a below-normal probability for precipitation in the eastern part of the state, normal probability for center corridor, and above-normal probability for the southwest corner (Fig. 3). A similar pattern is projected for the

northern states of the Great Plains, but below-normal precipitation is projected for the rest of the Corn Belt.

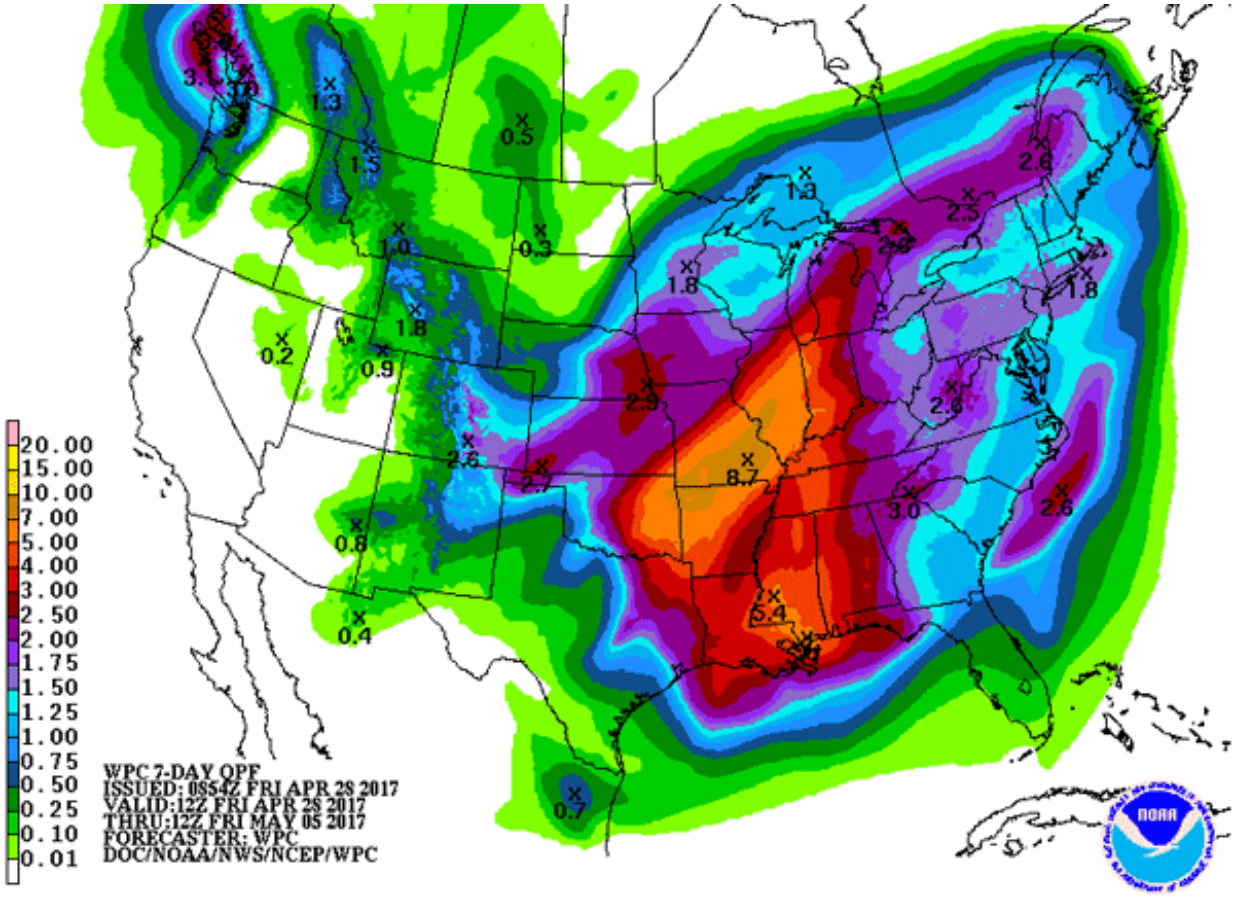

Figure 2. 7-Day Outlook Precipitation Probability from April 28 – May 5, NOAA.

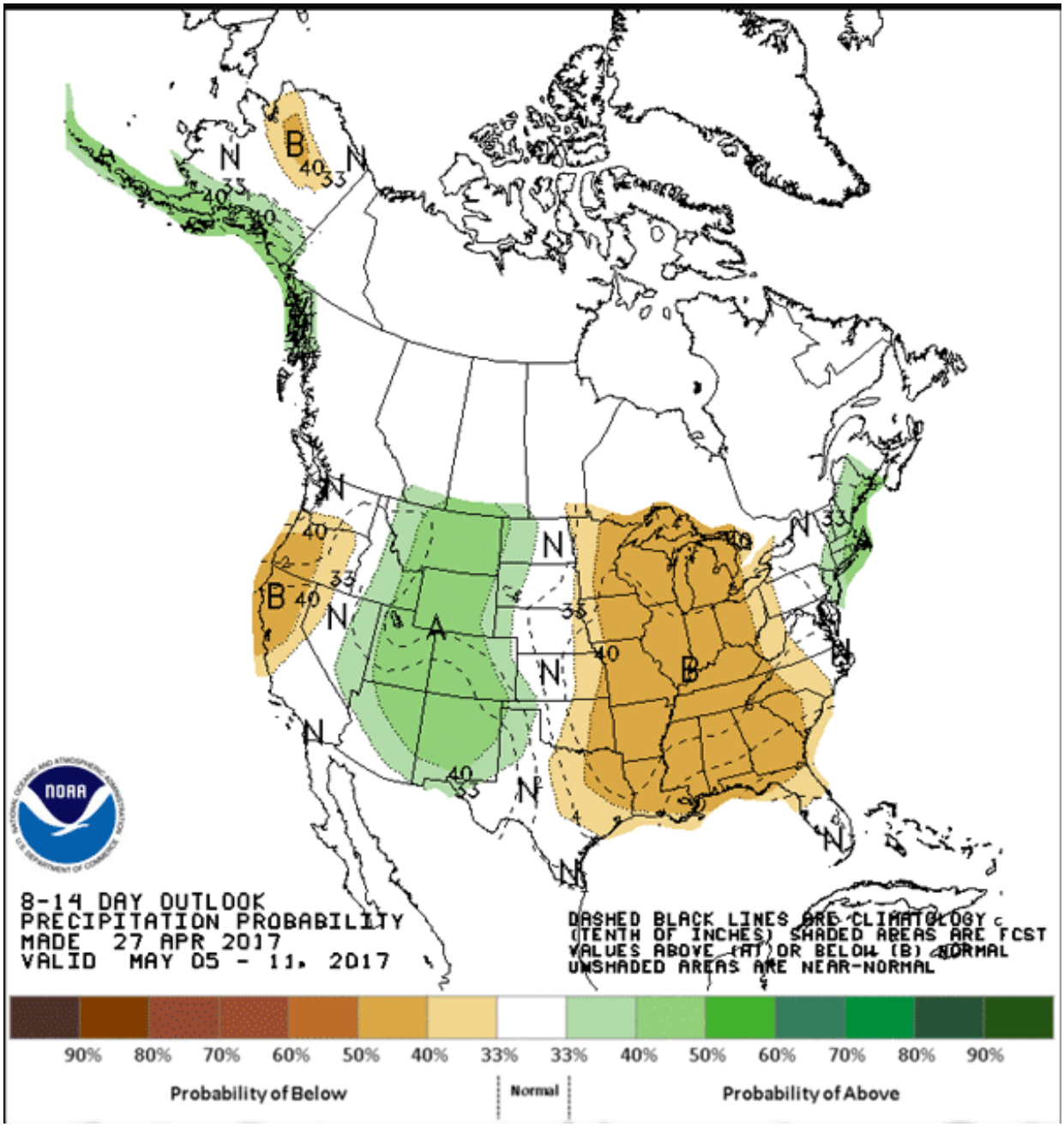

Figure 3. 8-14 Day Outlook Precipitation Probability from NOAA.

Optimal soil conditions have a large impact on corn uniformity and early-season growth. Lack of uniformity in emergence can greatly impact corn potential yields.

An open window for resuming corn planting may occur by late next week and the following week. It is always important to look for the best planting conditions. 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!

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

Mary Knapp, Weather Data Library
mknapp@ksu.edu

4. New K-State publication on the yield benefits of drought-tolerant corn hybrids

A new publication, titled "Drought-Tolerant Corn Hybrids: Yield Benefits," is now available through K-State Research and Extension. The authors include K-State agronomists Ignacio Ciampitti, Kraig Roozeboom, Stu Duncan, Eric Adee, Alan Schlegel, Doug Shoup, and Gary Cramer.

The publication, MF3338, can be found at: http://www.bookstore.ksre.ksu.edu/pubs/MF3338.pdf

Drought-Tolerant Corn Hybrids: Yield Benefits

The use of drought-tolerant corn hybrids has been increasing. These hybrids have been selected for traits that should allow them to maximize plant productivity per unit of available water.

Currently, two different kinds of drought-tolerant hybrids are commercially available. The first are non-transgenic, conventionally bred, drought-tolerant corn hybrids from Pioneer (Optimum AQUAMAX) and Syngenta (Artesian). The second are transgenic drought-tolerant corn hybrids that combine both traditional breeding aimed at improving traits associated with drought tolerance and a transgenic trait, developed by Monsanto (Genuity DroughtGard). These hybrids are generally targeted for water-limited environments in the central Great Plains. This publication presents information from six research studies (2012 and 2013 seasons) conducted by K-State Research and Extension to evaluate drought-tolerant hybrids in a wide range of production environments.

Results

All sites (located in western, central, and eastern Kansas) compared either one or both types of drought-tolerant hybrids from diverse companies with a standard, non-drought-tolerant counterpart of similar maturity. The tests also evaluated the yield response of the hybrids to varying plant population and irrigation levels. Yield response to changes in plant population was not affected by hybrid selection; thus the current information indicates no need to change plant population when using drought-tolerant hybrids.

Overall, the analysis found a yield benefit for drought-tolerant versus non-drought-tolerant corn hybrids spanning a wide range of diverse environments and stress conditions across Kansas during the 2012-2013 growing seasons (Figure 1). In absolute terms, the yield advantage of using drought-tolerant hybrids was around 6 bushels per acre compared to the non-drought-tolerant material (in nearly 350 corn hybrid comparisons; Figure 1). In low-yielding environments (less than 120 bushels per acre), drought-tolerant out-yielded non-drought-tolerant corn hybrids more often than they did in the higher-yielding environments (between 180 and 260 bushels per acre).

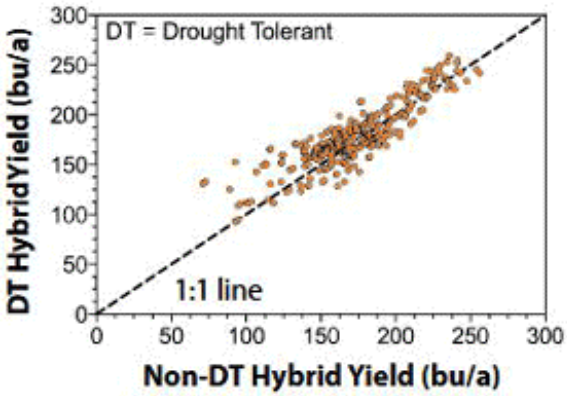

Figure 1. *Yield for the drought-tolerant (DT) hybrids compared to non-drought-tolerant (non-DT) corn hybrids at the same environment and plant density across six studies for 2012 and 2013 growing seasons. Dashed line represents 1:1 ratio. Adapted from Adee et al., 2016.*

Drought-Tolerant versus Non-Drought-Tolerant Corn Hybrids: Yield Environment Analysis

The analysis of information across diverse yield environments allows a more clear understanding where there may be a yield advantage from planting drought-tolerant hybrids. A linear response and plateau function was used to describe the yield advantage for drought-tolerant hybrids across a range of yields for the non-drought-tolerant hybrids (Figure 2). The yield advantage for drought-tolerant hybrids gradually increased as the yield of the regular hybrids decreased from 172 bushels per acre (represented by the vertical dashed line in Figure 2.)

It is important to note that these are generalized relationships, and there are varied responses at each yield level. How individual hybrids respond to a specific environment is influenced by a number of factors, including the type, timing, and duration of the stress.

From the data collected it can be concluded many management factors affect yield results, which makes it difficult to separate out the effect of hybrid alone.

Potential research-based interpretations of the drought-tolerant yield advantage are:

- Slower vegetative growth, saving water for reproductive stages (water conservation),
- Greater root biomass with superior water uptake,
- Differential regulation in the stomata opening, controlling water and carbon dioxide exchange processes, and
- Other potential physiological modifications.

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

5. 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 2After 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
lollato@ksu.edu

6. 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

7. Cover Crop Field Day planned at K-State HB Ranch in Trego County

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.

8. 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

9. Comparative Vegetation Condition Report: April 18 - 24

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:

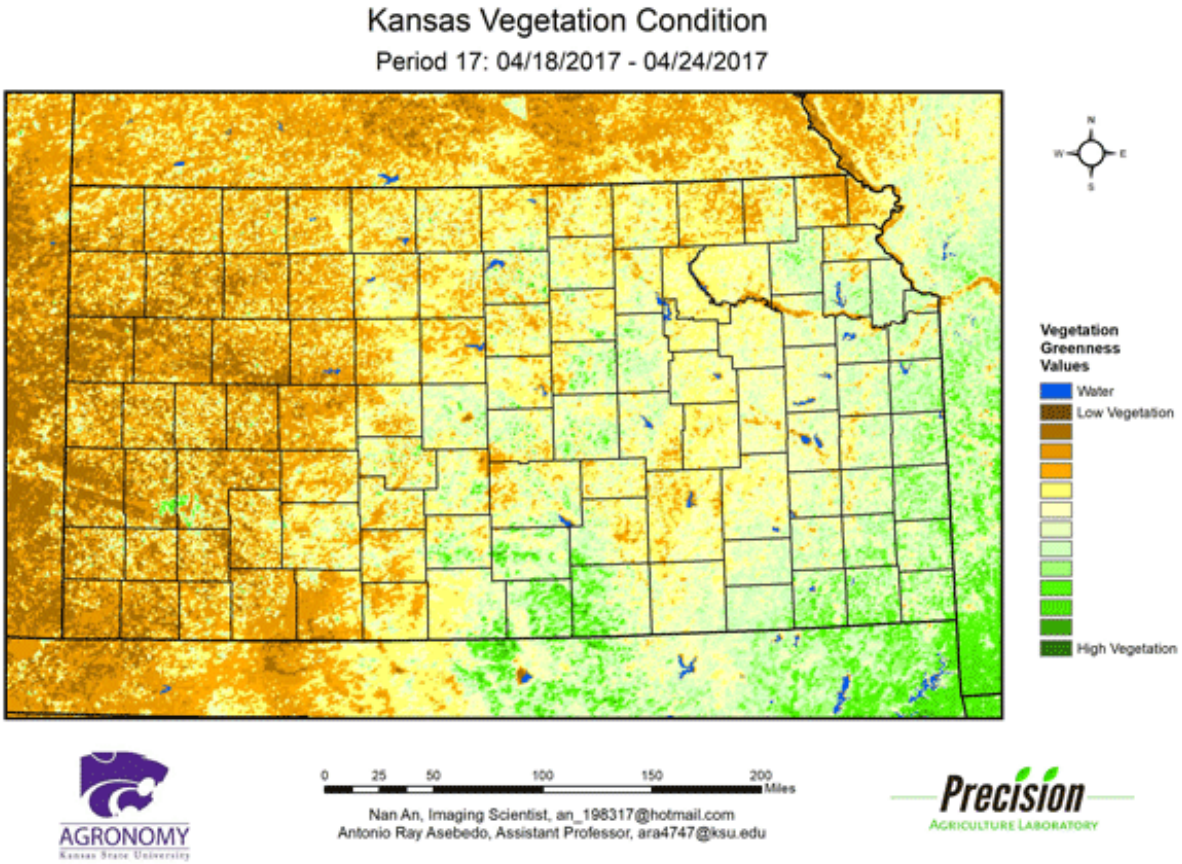

Figure 1. The Vegetation Condition Report for Kansas for April 18- April 24, 2017 from K-State's Precision Agriculture Laboratory shows a continued increase in vegetative activity along the Arkansas River in southwest Kansas into south central Kansas. Southeast and east central Kansas are showing the greatest activity. These are also the areas of the state that have consistently been warmer than normal.

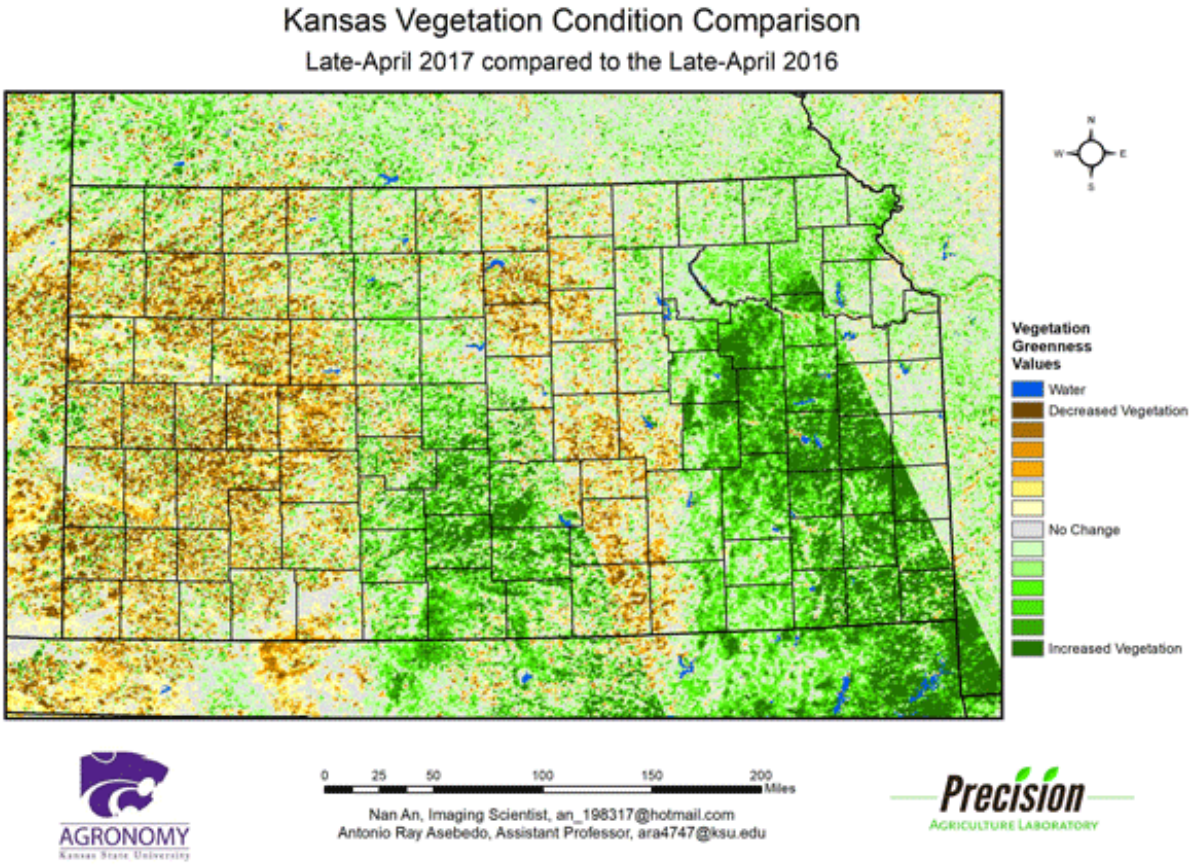

Figure 2. Compared to the previous year at this time for Kansas, the current Vegetation Condition Report for April 18 – April 24, 2017 from K-State's Precision Agriculture Laboratory lower NDVI values are evident in scattered areas of western and central Kansas. The winter wheat is less advanced this year than last, particularly in western Kansas, where dry fall conditions hampered establishment. The greatest increase in vegetative activity is in the eastern portions of the state, where moisture has been more plentiful this April.

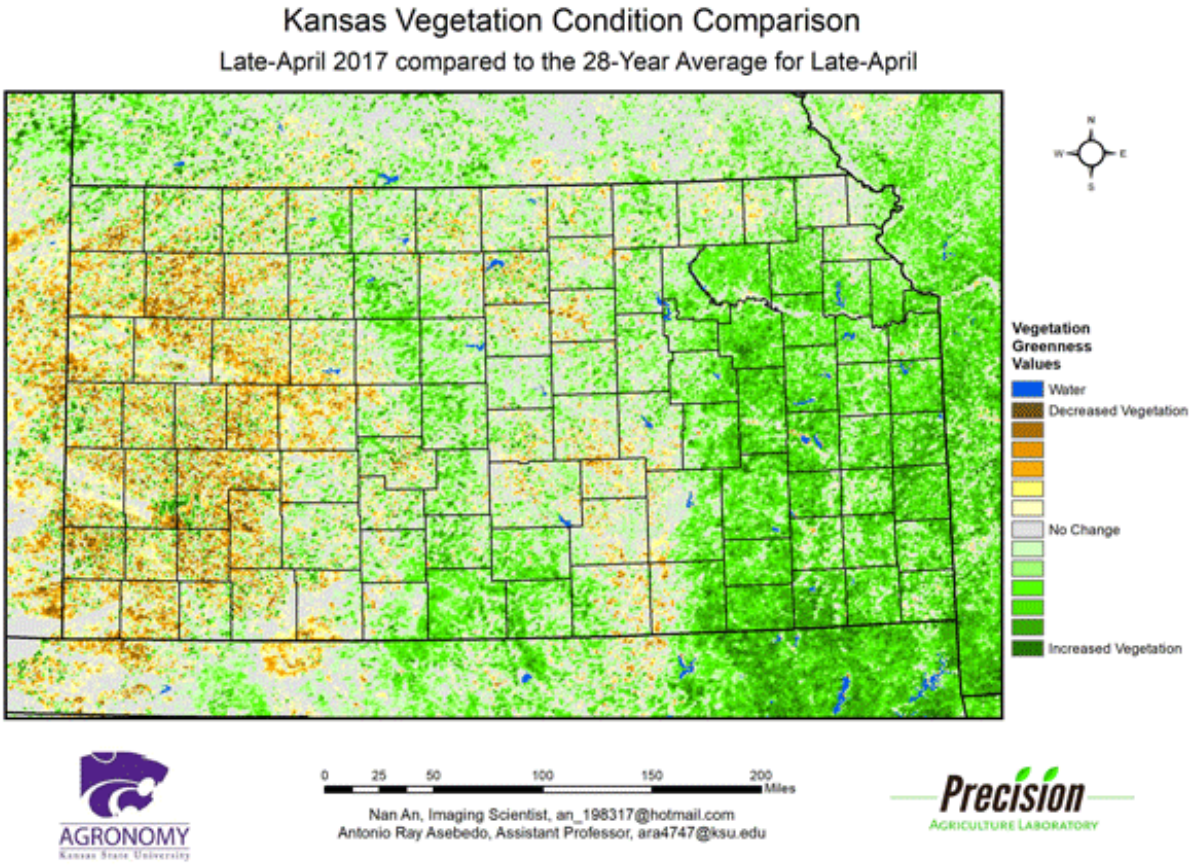

Figure 3. Compared to the 27-year average at this time for Kansas, this year's Vegetation Condition Report for April 18 – April 24, 2017, from K-State's Precision Agriculture Laboratory much of the state has above-average photosynthetic activity. The highest NDVI values are in the Flint Hills and areas to the east, where precipitation has been more favorable. The lingering impact from the dry conditions last fall is most visible in western Kansas where wheat emergence was uneven.

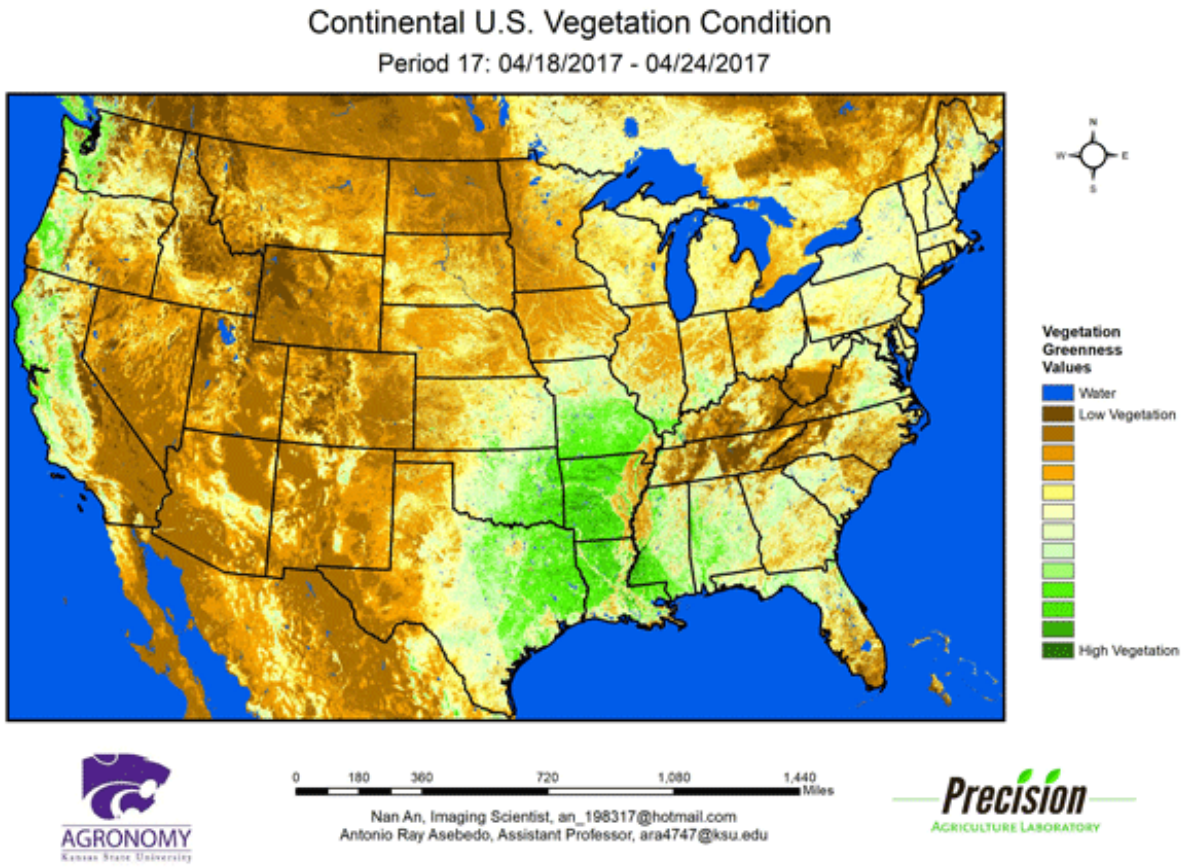

Figure 4. The Vegetation Condition Report for the U.S for April 18 – April 24, 2017 from K-State's Precision Agriculture Laboratory shows the highest NDVI values are confined to the Southern Plains, particularly in east Texas and Louisiana. A second area of high vegetative activity is also visible along the West Coast, where the wet conditions continue. Low NDVI values are visible along the central Mississippi River Valley. As of April 1st, the snow depiction has been dropped, since the snow season is largely over.

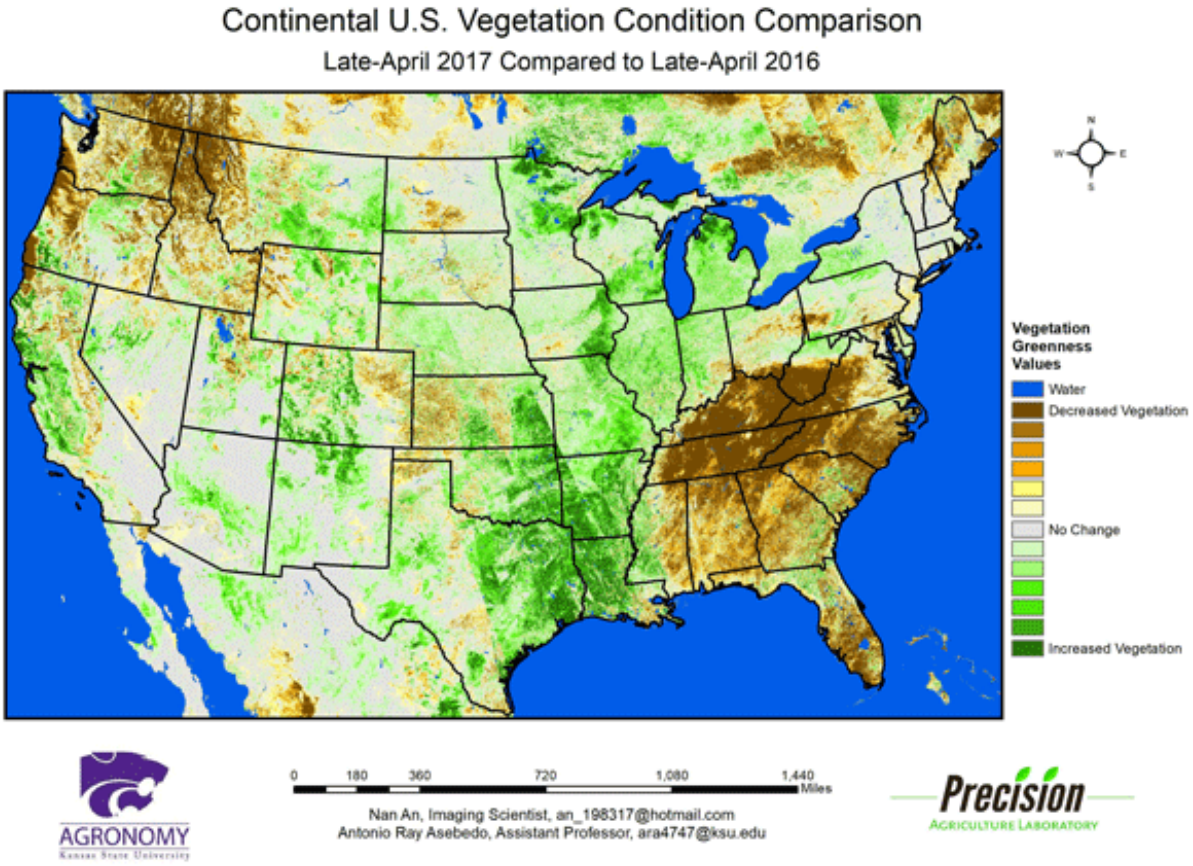

Figure 5. The U.S. comparison to last year at this time for April 18 – April 24, 2017 from K-State's Precision Agriculture Laboratory again shows the impact that split in the snow cover has caused this year. Much lower NDVI values prevail in the Pacific Northwest. The Northern Rockies are showing higher 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.

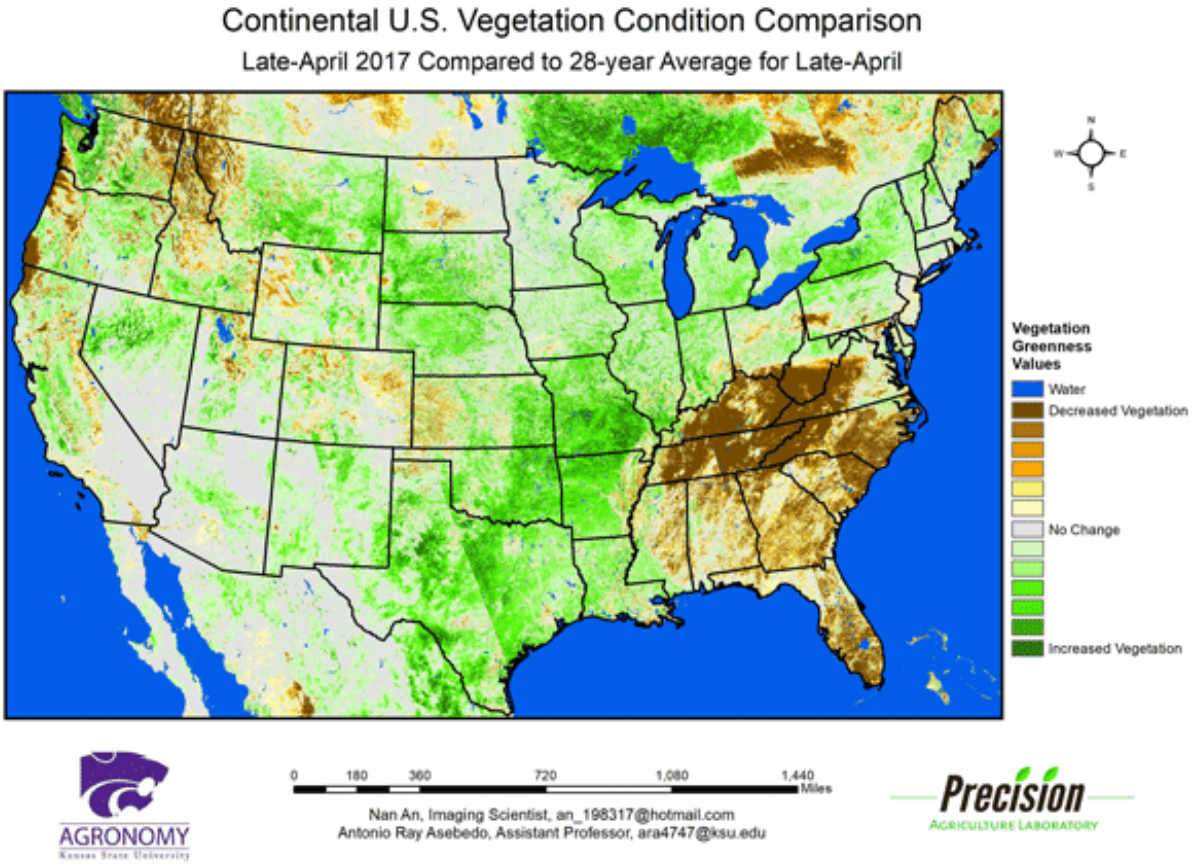

Figure 6. The U.S. comparison to the 27-year average for the period of April 18 – April 24, 2017 from K-State's Precision Agriculture Laboratory shows an area of below-average photosynthetic activity in the Pacific Northwest, where continuing storm systems have masked vegetative activity. Below-average NDVI values are also present in the South and the Ohio River Valley, where continued cloud cover has also masked vegetative activity. 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