



K-STATE
Research and Extension

Extension Agronomy

eUpdate

03/25/2016

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, Jim Shroyer, Crop Production Specialist 785-532-0397 jshroyer@ksu.edu, or Curtis Thompson, Extension Agronomy State Leader and Weed Management Specialist 785-532-3444 cthompso@ksu.edu.

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1. Make sure all interested parties are getting our eUpdate!

We would like to remind our readers about all the great delivery options for receiving the Agronomy eUpdate, and to encourage all recipients to share this valuable publication with as many interested people as possible.

If you are on our email list, you receive the weekly eUpdate in its entirety along with any special editions that we send out in between regular issues. If you follow @KStateAgron on Twitter, you will receive a tweet with a link to the weekly eUpdate plus additional tweets during the week about individual eUpdate articles and special editions. Some of you may receive the eUpdate by both email and Twitter.

Every now and then we hear from a producer, consultant, or extension agent who just starting getting the Agronomy eUpdate by email or via Twitter and wished they had known about it sooner. You can help! We encourage all eUpdate recipients to promote the eUpdate to interested parties and to forward or retweet it to your email lists and followers.

We believe, and we've heard from many others who agree, this weekly electronic newsletter is the best of its kind in the world! And it's free. We'd like everyone to take advantage of our fantastic product, and give us your feedback if you'd like.

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Thanks to all our readers!

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2. Drought-tolerant corn hybrids: Yield benefits

In recent years, drought conditions have raised questions about the utilization of corn as the main crop for maximizing yield production per unit of available water in dryland environments.

Non-transgenic, conventionally bred, “drought-tolerant” (DT) corn hybrids from Pioneer and Syngenta were released to the market with the expectation of increasing corn production in water-limited regions. In recent years, Monsanto also released its new biotech transgenic DT hybrid.

Overall, the information from seed companies indicates that DT hybrids could provide from 2 to more than 15 percent yield increase over “competitor hybrids” in non-limiting and water-limiting environments, respectively.

K-State research conducted over the 2012-2015 growing seasons across the state has recently been summarized. The objective of this article is to present an overview of the DT vs. non-DT responses to management practices such as plant population and irrigation.

The information below is intended to provide some guidance to farmers, consultants, and agronomists in making the right decision for selecting corn hybrids. In addition, we hope to develop a better understanding of the kinds of environments in which DT hybrids could be most likely to result in a yield benefit. These hybrids are generally targeted for water-limited environments in the Western Great Plains.

Results

Our research compared DT hybrids from diverse companies with a standard non-DT counterpart of similar maturity. The tests also evaluated the yield response to varying plant population and irrigation levels.

At the plant scale, our analysis did not reveal any change in the plant response to plant population between DT and non-DT hybrids. This indicates no need to change plant population when using DT hybrids. This conclusion was briefly introduced in an article on corn seeding rates in the eUpdate dated March 14, 2014 ([Agronomy eUpdate 445](#)).

We also analyzed yields at the plot level for DT vs. comparable non-DT hybrids with similar maturity. The information presented in the figure below (Fig. 1) depicts the association of the yields for the DT vs. non-DT corn hybrids: Yellow points = research plots (2012-2013); blue points = on-farm plots; green points = 2014; red points = 2015 growing season plots.

Overall, the analysis found a yield benefit of 3 percent for DT vs. non-DT hybrids under diverse environments and stress conditions across Kansas during the 2012-2015 seasons. In absolute terms, the yield advantage of using DT hybrids was around 5 bushels per acre compared to the non-DT material. Similar yield trends were observed in research plots and on-farm demonstration plots. A great proportion of DT and non-DT yields were similar -- within a 5% confidence interval as highlighted in Figure 1 -- except in low-yielding and high-yielding environments. In low yielding-environments, DT out-yielded non-DT corn hybrids more often compared to the situation in higher-yield environments.

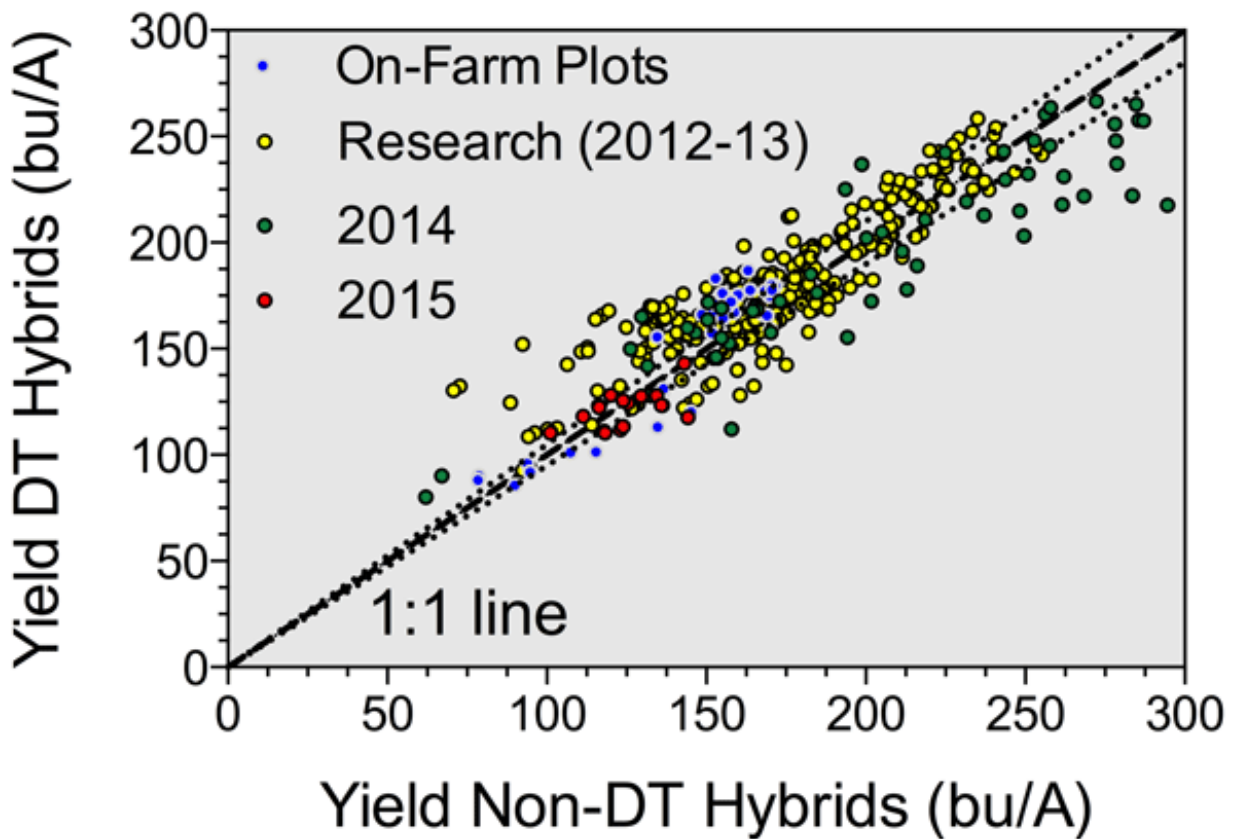


Figure 1. Yield for the DT versus non-DT corn hybrids across site-years for the 2012, 2013, 2014, and 2015 growing seasons.

DT vs. non-DT corn hybrids: Yield Environment Analysis

The analysis of information across diverse yield environments allows us to more clearly understand where there would be a yield advantage from planting DT hybrids. It is clear from Figure 2 that the yield advantage of DT corn hybrids increases as the yield potential of the crop decreases. This graph shows that there is basically no yield difference between DT and non-DT hybrids when yields are around 170 bushels per acre or greater. The yield advantage for DT hybrids gradually increases as the yield of the regular hybrids decreases from 170 bushels per acre.

It is important to note however, that these are generalized relationships, and that there are varied responses at each yield level. Some individual points show no difference between DT vs. non-DT hybrids at yields around 100 bushels per acre. Other points show a 30-bushel-per-acre yield advantage for non-DT hybrids at 160 to 170 bushels per acre, and still others show a 60-bushel-per-acre yield advantage for DT hybrids when non-DT hybrid yields were near 70 bushels per acre. On the opposite side of the yield environments, under high yield environments (>220 bushel-per-acre), individual points show a 30 to 60-bushel-per acre yield advantage for non-DT hybrids when DT hybrid yields were above 220 bushels per acre. How individual hybrids respond to a specific environment is influenced by a number of factors, including the timing and duration of the stress.

One more technical clarification is important to note. The linear response and plateau (LRP) function

model fitted in Figure 2 (adjusted to the 2012-2013 data), presented an R^2 of 0.26 units, which can be interpreted to indicate that this model is accounting for only slightly more than one-fourth of the total variation presented in the data. Even when including observations from studies conducted in the last two years (2014-2015), the trend observed in the DT yield advantage versus the non-DT yield values (Fig. 2) is not being modified. From all these years of data collection and analysis we can conclude that there are many management factors involved in the yield results, which makes it difficult to separate out the effect of hybrid alone.

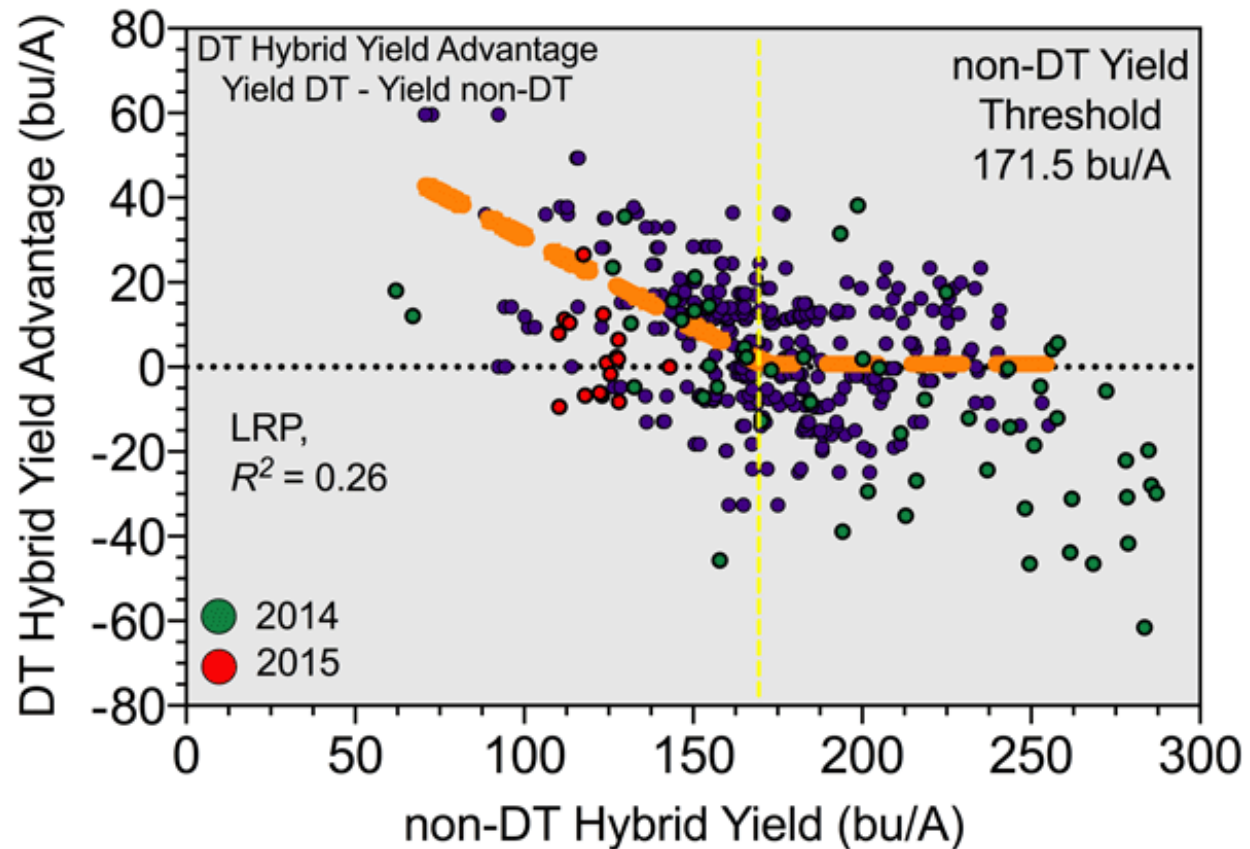


Figure 2. Yield advantage for DT compared to non-DT corn hybrids in the same environment and at the same population, ranging from low-yielding environments to high-yielding environments across site-years for the 2012, 2013, 2014, and 2015 growing seasons.

Still, we need to be cautious using and interpreting this information. More experiments and research data need to be collected, and a deeper understanding is needed to more properly analyze the main causes of the yield differences of DT vs. non-DT corn genotypes. Potential interpretations offered for the yield advantage for the DT corn hybrids in certain environments are:

- Slower vegetative growth, saving water for reproductive stages (stress avoidance)
- Greater root biomass with superior water uptake
- Differential regulation in the stomata opening, controlling water and CO_2 exchange processes
- Other potential physiological modifications

Summary

General observations:

1) Performance of individual hybrids within DT and non-DT types may vary. Some non-DT hybrids can perform nearly as well as the DT hybrids even in stressful conditions, and DT hybrids have the potential to yield with non-DT hybrids when water isn't limiting.

2) The advantage of the DT hybrids became more evident when the water stress increased to the point of leaves rolling most days.

3) From the information at hand, it is reasonable to expect a DT hybrid to serve as a type of insurance policy to sustain yield potential under water-limited environments. It also appears that there is no yield penalty associated with DT hybrids if water-limiting conditions do not occur.

Lastly, it is critical to understand that these corn genetic materials will not produce yield if the environment is subjected to terminal drought. We cannot expect them to thrive when moisture is severely limited, especially in dryland systems. As properly and explicitly stated by all seed companies, these DT materials have demonstrated the ability maintain yields to a certain degree in water-limited situations, and those yield differences will likely be in the order of 5 to 15 bushels per acre (depending on the environments and crop practices), when compared with a similar maturity non-DT corn hybrid.

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3. Planting conditions as of late March

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 calendar schedule. After a very warm start to the month, there has been a declining trend in air temperature across Kansas in the last two weeks of March.

For the week of March 19-24, average weekly soil temperatures at 4 inches varied greatly among crop reporting districts in Kansas, overall ranging from 45 to 55 F (Fig. 1). For example, in the NE region, soil temperatures ranged from 50 to 55F; while in the SW region, those temperatures varied from 47 to 50 F. Soil temperatures at 4 inches were below 50 F in most of Kansas. Minimum soil temperatures were below 40 F for the NW region (Fig. 2).

The range between minimum and maximum soil temperatures during the past week varied from 10 (Central) to 30 F (Northeast). These differences were primarily related to the large variations in air temperatures experienced last week (Fig. 3). Projections for the coming weeks are for increasing air temperatures, which can increase soil temperatures. The actual change in soil temperatures in any given field will be affected by amount of cover, amount of soil moisture, and landscape position. Wet soils in a no-till situation will be slower to warm. Dry soils will vary more rapidly, and match air temperatures more closely.

Each summer row crop has an optimal soil temperature for emergence. A minimum for corn is 50 F for germination and early growth. However, uniformity and synchrony in emergence is primarily achieved when soil temperatures are above 55 F. Uneven soil temperatures around the seed zone can produce non-uniform crop germination and emergence. Lack of uniformity in emergence can greatly impact corn potential yields.

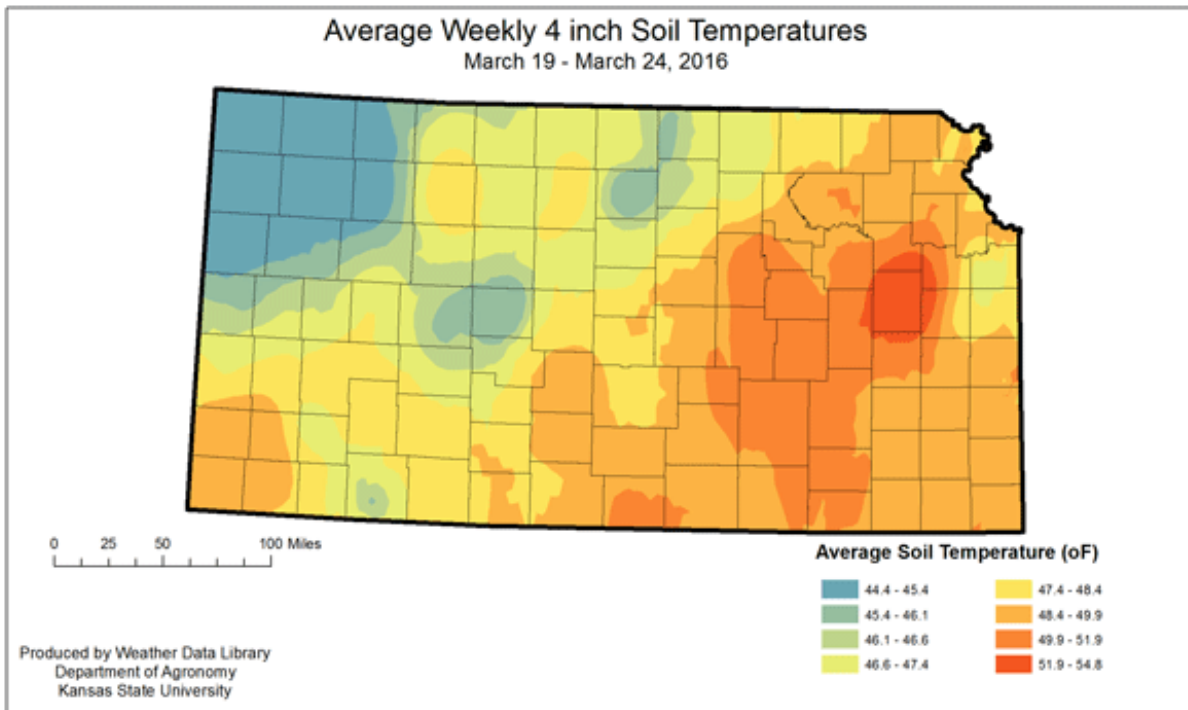


Figure 1. Average soil temperatures at 4-inches for the week of March 19-24, 2016.

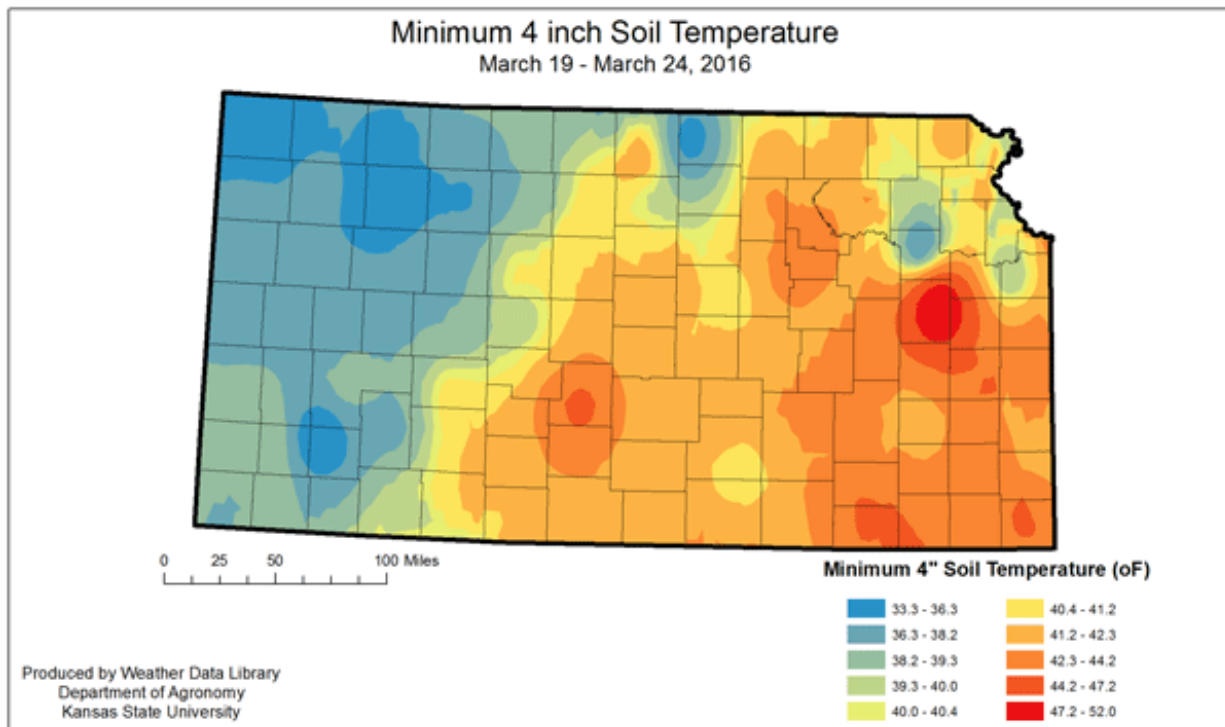


Figure 2. Average minimum soil temperatures at 4-inches for the week of March 19-24, 2016.

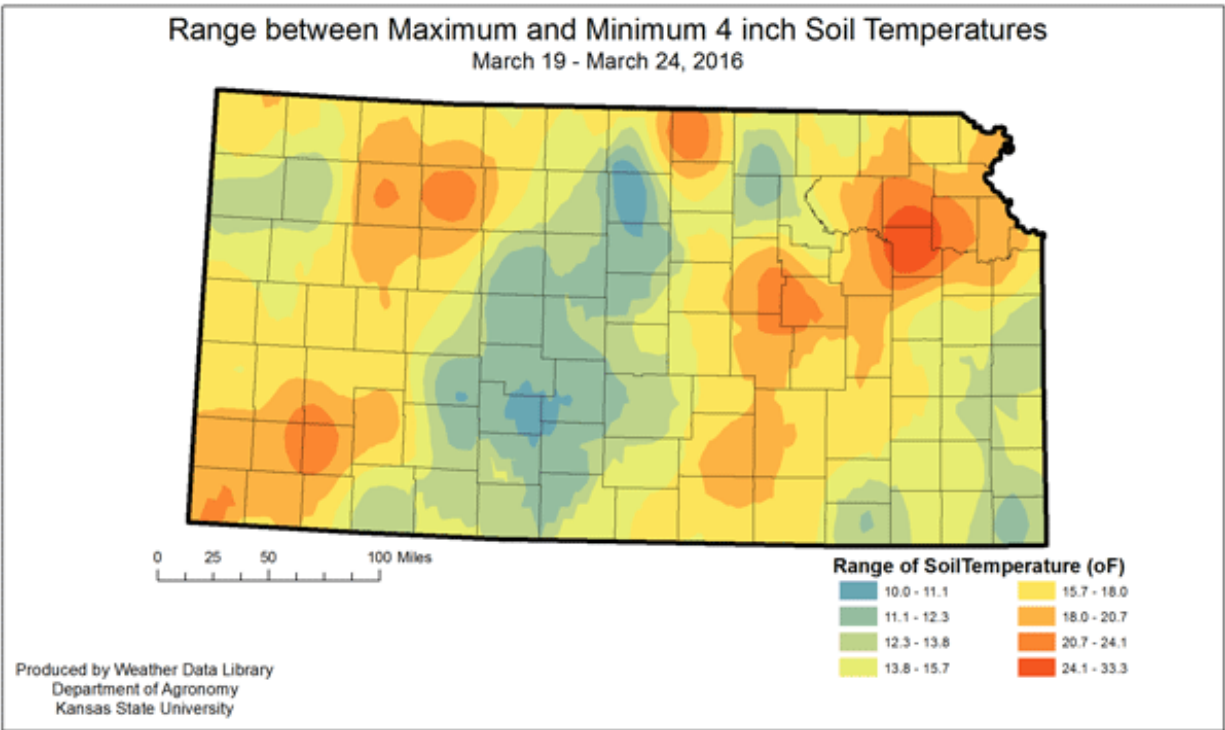


Figure 3. Average difference between maximum and minimum soil temperatures at 4 inches for the week of March 19-24, 2016.

Overall average day for last spring freeze (32 F) is quite variable around the state (Fig. 4). The largest variability is from SE to NW Kansas; with the earliest last spring freeze date for the SE region (April 5-15) and latest for the NW area (May 3-8). Corn planting dates before April 15 in the SE region would increase the likelihood of the crop suffering from a late spring freeze. Similar conditions can be projected for NW Kansas if corn is planted before May 8.

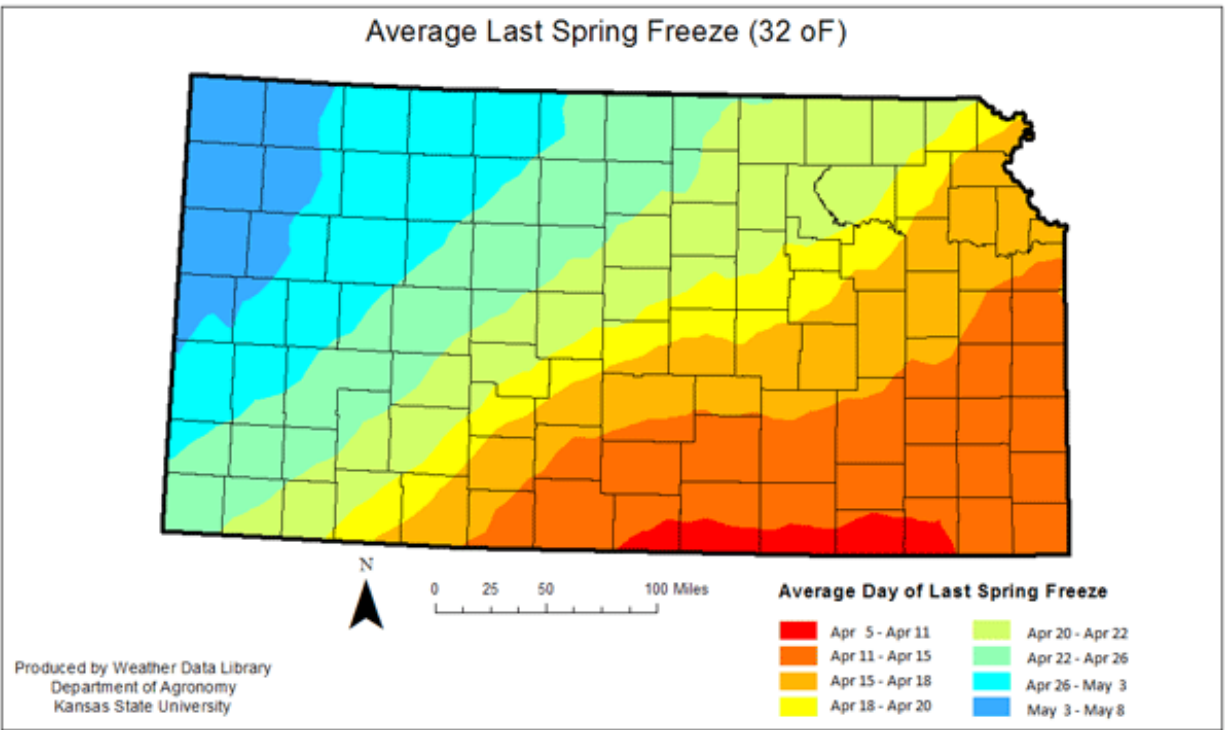


Figure 4. Average last spring freeze (32 F) for Kansas.

Low temperatures at planting can greatly impact the final number of plants through non-uniform emergence and early growth, consequently reducing yields. This is particularly true for corn, since it is the earliest summer row crop planted. When soil temperatures remain at or below 50 degrees F after planting, the damage to germinating seed can be particularly severe.

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

Think about all these factors when deciding on the optimal planting time for corn and your other summer row crops. 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. Managing freeze-damaged alfalfa

The hard freezes last week could affect some alfalfa stands. If so, producers will have to decide how to manage their stands in the coming weeks.



Figure 1. Freeze-damaged alfalfa in Hodgeman County, taken April 17, 2013. Photo by Jim Shroyer, professor emeritus, K-State Research and Extension.



Figure 2. Closeup of freeze-damaged alfalfa. The apical meristems have been killed on most stems. These plants are not tall enough to cut or shred. Regrowth from the crown should begin as soon as it warms up. Photo by Jim Shroyer, professor emeritus, K-State Research and Extension.

Here are some key points:

* In established stands, the growing point is at the top of each stem, and is protected within a cluster of leaves. The leaves may have freeze damage, but the growing point might not be affected. If it is cold enough for a long period of time, such as occurred in most western Kansas last week, the growing point may also be killed by freezing temperatures. In the photo, many of the terminal buds are frozen and they have a bleached appearance.

No action will be needed on the alfalfa stands if new growth begins emerging from the tips of the stems, or if the plant begins branching out below the tips. In both cases, the new growth means the growing points were unaffected and the plants are recovering.

If new shoots are emerging from the crown buds, however, there will be very little regrowth from the damaged stems. In much of western Kansas there isn't enough topgrowth to cut or graze, but that is an option, if there is enough growth for it to be worthwhile before the new growth gets tall enough to be damaged by the mowing. Do not cut or damage new regrowth from the crown buds. That could severely damage the stand.

If there is no regrowth occurring at all after 7-10 days of warm weather and the plants are severely

wilted without recovery, mow or shred the plants to encourage new regrowth from the crown buds.

* If you plan to shred or cut the damaged stands, be sure to leave at least 2-3 inches of stubble. This will help encourage regrowth.

* Freeze-damaged alfalfa that is only 6-8 inches tall or less will be slower to regrow after mowing or shredding than taller alfalfa. That's because alfalfa plants are depleting carbohydrate reserves from the roots during the first 6-8 inches of growth, and will not have as much carbohydrate reserves for regrowth as taller alfalfa. With slower regrowth, producers will have to watch especially closely for insect infestations and treat if necessary. Alfalfa taller than 8 inches will have manufactured a new supply of carbohydrate reserves for the root and crown, and will be able to regrow more quickly after mowing or shredding.

* If damaged stands are cut, producers should watch the regrowth carefully for further infestations of alfalfa weevil and possibly pea aphids, and treat immediately. Weevil larvae that survive in the leaf litter on the soil surface will start feeding on the new growth once the weather warms up. Alfalfa weevil has already been reported in Kansas this spring and the hard freezes probably didn't kill the weevil larvae in all areas, so producers should not rely on that to have happened.

Some producers were able to get an insecticide application on fields between cold spells and wind gusts. They have reported some dead larvae. However, up until last night (the night of March 24/25), the cold temps in south central and north central Kansas had not been cold enough to harm the alfalfa weevil larvae. Whether it did last night or not won't be known for a few more days. Thus, fields should continue to be monitored every three days (at least weekly) for a couple more weeks.

If the foliage is actually killed back to ground level, the weevils will continue to feed on the regrowth and thus hold that regrowth back significantly. The majority of the weevils are still very small, thus the majority of their feeding is yet to happen. The larvae will be in the foliage and if that foliage has been wilted due to the cold then it may form a protective canopy and the larvae will be well protected from a chemical application.

Insecticides and a hard freeze will both kill all the lady beetles, parasitic wasps, and any other beneficial insects that help keep the aphids under control, so aphids may rebound fairly quickly. Thus, scouting should continue for weevils and aphids even if an effective insecticide application has already been made. If an insecticide has already been applied, pay attention to the label for the pre-harvest interval (PHI) and number of applications allowed per cutting for the product used.

* If an insecticide had already been applied to the alfalfa for weevil control, producers will have to be aware of any residual insecticide in the alfalfa that may affect how it can be utilized.

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5. Could bird cherry-oat aphids be a problem on wheat this spring?

Bird cherry-oat aphids (Fig. 1) have been reported in large numbers this month in several Oklahoma fields by Tom Royer, Extension Entomologist with Oklahoma State University. The very strong south winds observed last few days increase the risk that aphids might migrate into Kansas in large numbers. Thus far, bird cherry oat aphids have been reported in small numbers in the central corridor of the state, but this is a situation producers should be aware of especially following the freeze events observed last few days (see Agronomy eUpdate special issue 556 of March 21st, 2016, "[Potential for injury to wheat in Kansas from below-freezing temperatures](#)" for more information).

The only years that we have seen bird cherry-oat aphid feeding on wheat that caused concern just due to the numbers of aphids were years in which freeze damage played a part in stressing the wheat, killing some tillers, and thus concentrating the aphid populations on the reduced number of wheat plants and tillers that survived the spring freeze. Otherwise, lady beetles/lacewings/parasitic wasps are usually effective at regulating aphid populations.

Bird cherry-oat aphids are usually the first aphids to infest wheat in the spring and the last to still infest wheat in the fall. Wheat growing under good conditions can withstand more aphid feeding than wheat under stressful growing conditions. If there are 20-50 aphids/tiller and very few beneficials (lady beetles/lacewings/parasitic wasps) then an insecticide application may be justified, especially between boot and heading. Otherwise, the beneficials usually keep aphids under control. An insecticide application will decimate beneficials.

Another factor to consider is that an abrupt shift to cold temperatures after a warm spell in spring is usually beneficial to aphids as compared to their biological control agents. It is especially important to scout for aphids under these circumstances because aphids can sustain economic injury to wheat when in abundant numbers. The economic damage caused by aphids can be furthered if the primary tillers of the wheat crop have been damaged by the freeze event, a situation in which a higher percentage of wheat's yield will depend on the secondary tillers. Secondary tillers, if exposed to large numbers of aphids from the start, can be severely damaged and grain yield impaired by harvest time.

Decisions to apply pesticides to control aphids should be taken based on the number of aphids present. Producers should count the number of aphids on 25 - 50 randomly selected tillers across a zig-zag transect of the field. Previous research has shown as much as 9% yield loss when 20-40 bird cherry-oat aphids per tiller were present before boot stage.



Figure 1. Bird cherry-oat aphid adult female and nymph. Photos courtesy of K-State Department of Entomology.

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6. Agricultural Mobile Apps: A review and update of machinery apps

This article provides a review and update of some of the current “machinery apps” for agriculture. These apps can assist farmers in the decision making process of machinery selection, agricultural equipment preparation, inventory, information on specific equipment, and more.

While these apps can often help you make decisions, always make sure to check with your crop consultants, Extension agents, and Extension specialists.

Stay tuned for more in this series of annual reviews and updates on Ag-Apps from our KSUCROPS Crop Production team (led by Dr. Ciampitti) and the K-State Department of Agronomy. More updated lists of Ag-Apps will be included in the next several editions of the Agronomy eUpdates.

NOTE: These apps are all available as of the time this article is published. Alterations or changes in availability could occur, affecting the ability to access these apps.

For this series of articles, we have grouped Ag-Apps into the following 10 classifications:

- **ID Apps:** For identification purposes (weeds, insects, diseases, and nutrients)
- **CALC Apps:** For calculating purposes (nutrient removal calculations, tank mixes, volume to spray, etc.)
- **SCOUT Apps:** For scouting purposes or for geo-positioning (soil sampling, recording notes, soil types, etc.).
- **ECON Apps:** For checking grain prices, market evolutions, fertilizer price trends, news and finances.
- **FIELD GUIDE Apps:** For diagnosing crop production issues in the field, primarily related to field guides (crop management: insect, disease, weed, and more).
- **LIVESTOCK Apps:** Apps related to the animal side, nutrition, health, and information on markets.
- **IRRIGATION Apps:** Apps related to field crop irrigation and water application.
- **MACHINERY Apps:** Apps for associated with agricultural equipment preparation, inventory, providing information of the machine.
- **GENERAL AG Apps:** GAG (general Ag-Apps) for general use, weather-related, for meetings, for reading magazines, among several other Apps’ properties.
- **NON-AG Apps:** For general use from e-readers to calculators, email, calendar, picture editing, and more.

7. Machinery Apps


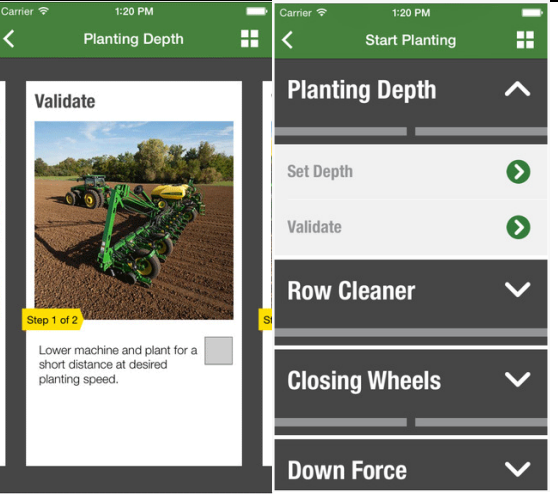

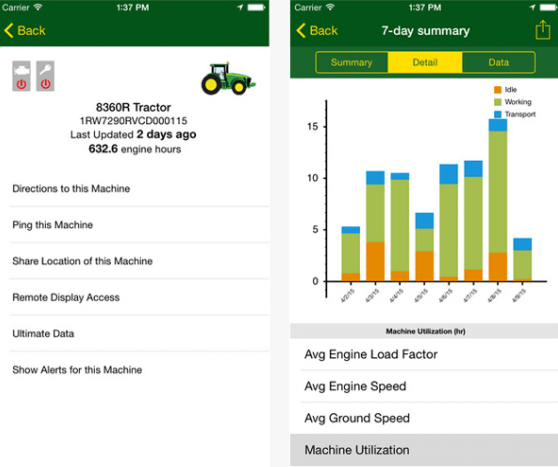

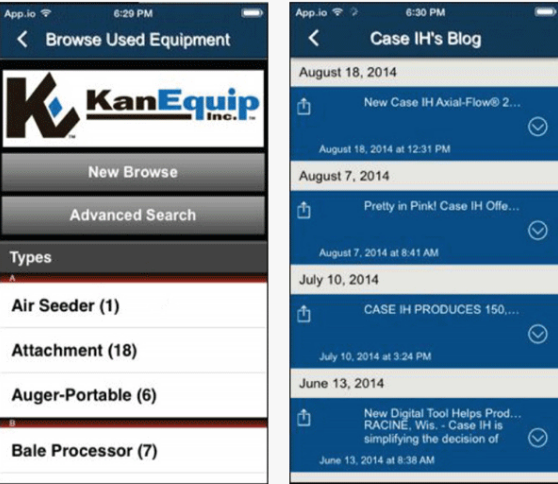
Apps for agricultural equipment selection and operation.

Machinery Apps

Name of App and Source	Picture	Brief description and cost																
<p>AgCommand</p>  <p>AGCO Corporation</p>		<p>This app allows you to monitor your fleet from anywhere, at any time.</p> <p>FREE</p>																
<p>Heavy Equipment Inventory App</p>  <p>Snappii</p>	<p>Save and store collected inventories as PDF files on your device</p>  <p>Email PDF files, upload them to cloud drives and print out</p>  <p><i>We can customize this app</i></p> <p><i>We can customize this app</i></p>	<p>This app allows you to manage equipment inventory, sync data across multiple devices, store collected data on your own device and capture photos.</p> <p>FREE</p>																
<p>GoHarvest</p>  <p>John Deere</p>	 <p>Outside Configuration</p> <p>Feed Accelerator Speed: Low</p> <table border="1" data-bbox="885 1346 1170 1633"> <thead> <tr> <th>CONFIGURATION</th> <th>VALUE</th> </tr> </thead> <tbody> <tr> <td>Chaffer Clearance (mm)</td> <td>15 - 20 (Deep Tooth) 17 - 22 (General Purpose)</td> </tr> <tr> <td>Dual Zone Chaffer Clearance (mm)</td> <td>5 Level 10 Sidehill</td> </tr> <tr> <td>Fan Speed (rpm)</td> <td>900 - 1300</td> </tr> <tr> <td>Sieve Clearance (mm)</td> <td>10-14 (Deep Tooth) 11-15 (General Purpose)</td> </tr> <tr> <td>Threshing Clearance</td> <td>20 - 35</td> </tr> <tr> <td>Threshing Speed (rpm)</td> <td>250 - 450</td> </tr> <tr> <td>Top Cover Transport Vanes (If Equipped)</td> <td>Standard</td> </tr> </tbody> </table> <p>Inside Configuration</p>	CONFIGURATION	VALUE	Chaffer Clearance (mm)	15 - 20 (Deep Tooth) 17 - 22 (General Purpose)	Dual Zone Chaffer Clearance (mm)	5 Level 10 Sidehill	Fan Speed (rpm)	900 - 1300	Sieve Clearance (mm)	10-14 (Deep Tooth) 11-15 (General Purpose)	Threshing Clearance	20 - 35	Threshing Speed (rpm)	250 - 450	Top Cover Transport Vanes (If Equipped)	Standard	<p>GoHarvest suggests initial settings for the combine model selection and crop type. A seed loss calculator function is available to calculate seed losses.</p> <p>FREE</p>
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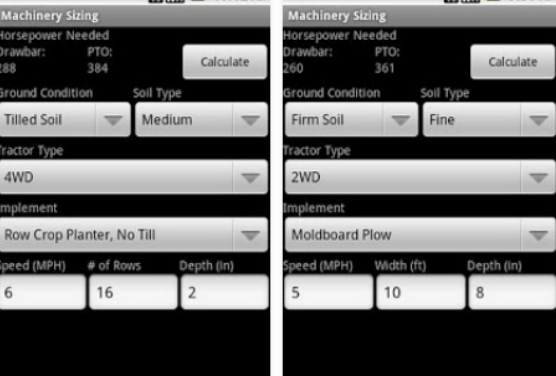



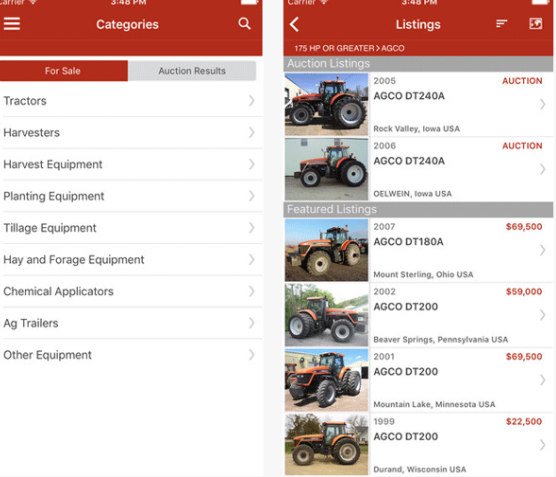
MOBILE AGRICULTURAL APPS – REVIEW from KSUCROPS ©Kansas State University

Machinery Apps

Name of App and Source	Picture	Brief description and	cost
<p>GoPlant</p>  <p>John Deere</p>		<p>The GoPlant app gives you the ability to optimize your machine as you enter the planting season. GoPlant suggests initial settings to help get you started right.</p>	<p>FREE</p>
<p>JDLink</p>  <p>John Deere</p>		<p>This app is John Deere's telematics system designed for customers who desire to take their operation to the next level of productivity.</p>	<p>FREE</p>
<p>KanEquip</p>  <p>KanEquip (Angela Janzen)</p>		<p>This app allows you to find any location via GPS, check parts and inventory lists, add pictures of your crops or equipment, and get information about the equipment.</p>	<p>FREE</p>


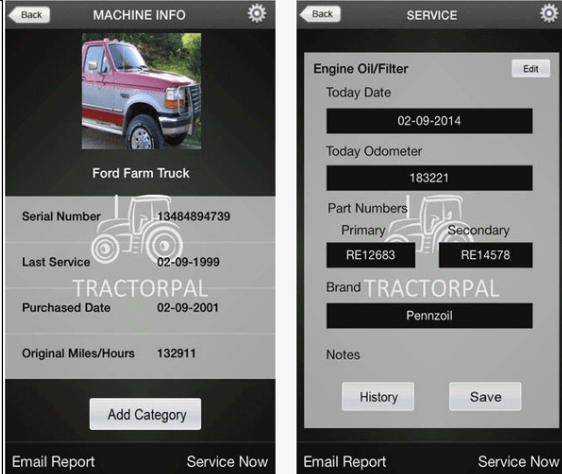

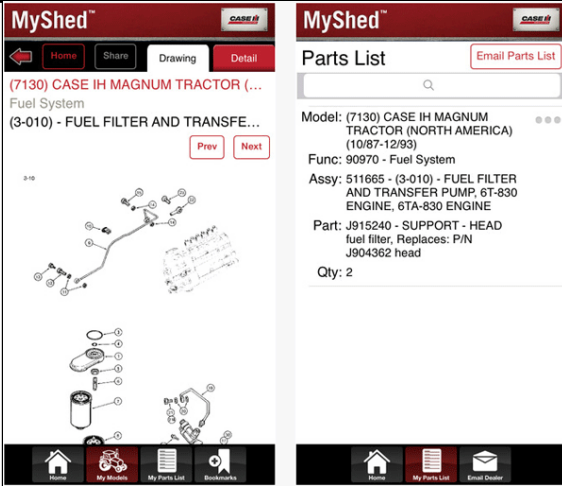

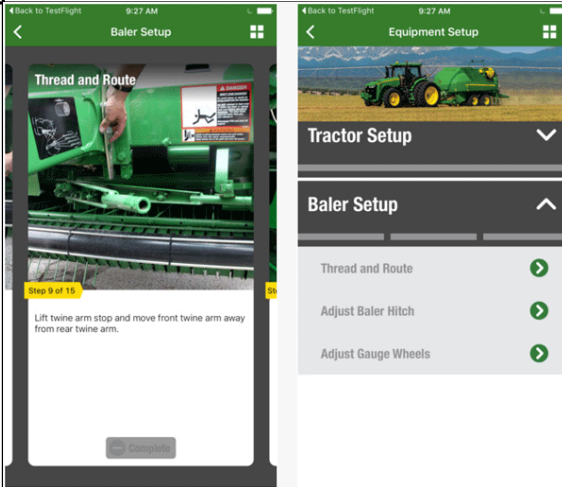
MOBILE AGRICULTURAL APPS – REVIEW from KSUCROPS ©Kansas State University

Machinery Apps

Name of App and Source	Picture	Brief description and	cost
<p>Machinery Sizing</p>  <p>K-State Research and Extension</p>		<p>Quickly estimate tractor horsepower needed to pull various implements. Select ground and soil conditions, tractor type, pulling speed, working depth, and size of the implement.</p> <p>FREE</p>	
<p>New Holland Agriculture MyShed</p>  <p>New Holland Agriculture</p>		<p>This app provides engineering parts manuals, assembly diagrams, and part number lists for all machines. It also allows you to send a parts list and image to your dealer.</p> <p>FREE</p>	
<p>TractorHouse</p>  <p>Sandhills Publishing</p>		<p>This app features thousands of listings from hundreds of dealers throughout North America. It lets you drill down instantly to the equipment category, make, and model.</p> <p>FREE</p>	

MOBILE AGRICULTURAL APPS – REVIEW from KSUCROPS ©Kansas State University

Machinery Apps

Name of App and Source	Picture	Brief description and cost
TractorPal  Keith King		This app will simplify your machinery care in three ways. It will track your inventory, track your service, repair records, and have email reminders of maintenance needs. FREE
CaseIH MyShed  Case IH		This app provides parts manuals, assembly diagrams, and part number lists for different equipment. It also allows you to send a parts list and image to your dealer. FREE
GoBale  John Deere		This app gives John Deere baler equipment operators the ability to optimize their machine through proper equipment and monitor setup, as well as maintenance and in-field procedures. FREE

MOBILE AGRICULTURAL APPS – REVIEW from KSUCROPS ©Kansas State University

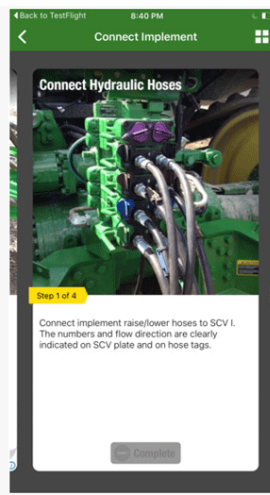
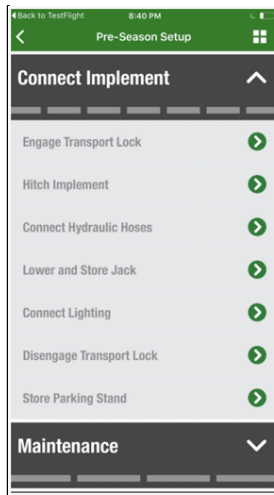
Machinery Apps

Name of App and Source	Picture	Brief description and cost
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GoTill



John Deere



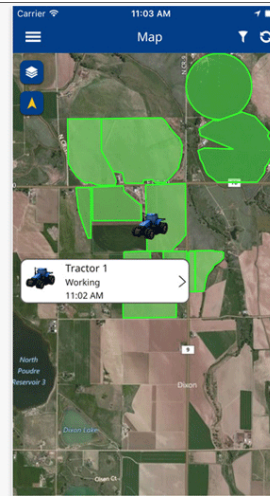
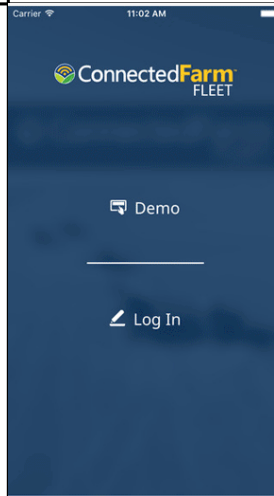
This guide is intended to provide a quick-reference overview of key adjustments, maintenance, and operation. Users can record operation and save them.

FREE

Connected Farm Fleet



Trimble Navigation Limited



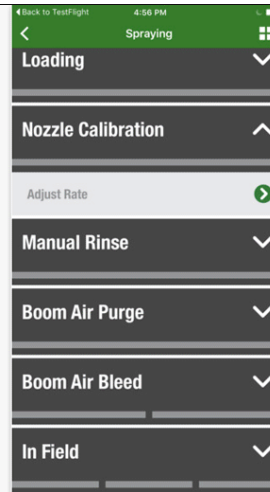
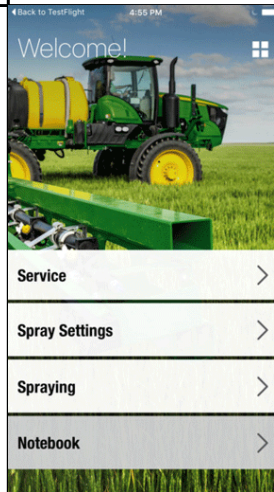
This app is a powerful management tool for viewing live equipment GPS locations and current status.

FREE

GoSpray



John Deere



This app gives John Deere application equipment operators and technicians the ability to optimize their machine through proper set-up and maintenance procedures.

FREE

Each of the next two issues of the eUpdate will feature another classification of Ag-Apps from our

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KSUCROPS Crop Production team and the K-State Department of Agronomy!

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

Jeffrey Albers, Agronomy undergraduate student in crop production, KSUCROPS Team
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Aaron Brinkman, Agronomy undergraduate student in crop production, KSUCROPS Team
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7. Ultra-high density grazing is topic of March 29 webinar



Ultra-high stock density grazing is the management tool of grazing livestock in much higher-than-normal concentrations to achieve landscape-focused objectives. The long-term goal is to enhance soils, forages and livestock production.

Such grazing is usually expressed in pounds of live-weight per acre at a given moment in time. Depending on the environment and forages, ultra-high stock densities are usually in excess of 100,000 pounds of animal live-weight per acre with some graziers exceeding 1 million pounds per acre thus requiring multiple moves to fresh pasture daily.

Great Plains Grazing team member and Samuel Roberts Noble Foundation consultant, Hugh Aljoe, will present "Ultra-High Stock Density Grazing: Five Precautions Before Implementation," a free webinar at 1:30 p.m. (CDT) on Tuesday, March 29. The webinar is open to anyone interested in gaining a better understanding of a practice known as "mob grazing." It is hosted by Great Plains Grazing, a U.S. Department of Agriculture-Agriculture and Food Research Initiative-Coordinated Agricultural Project (USDA-AFRI-CAP) grant.

Webinar participants can expect to learn:

- Infrastructure needs
- Setting production goals and measuring them
- Differences between stocking density and grazing intensity

Aljoe serves as a pasture and range consultant in the foundation's agricultural division consultation program. He serves as the consultation program manager, coordinating the efforts of the division's agricultural consultants across its 47-county service area, in both Oklahoma and Texas.

Before joining the Noble Foundation in 1995, Aljoe was the ranch manager of Belvedere Land & Cattle Corp. for 10 years. He supervised the growth of the ranch from a small 450-acre, 150-head purebred ranch into an extensive 3,900-acre, 1,500-head purebred and commercial cow-calf operation. Forage resources were predominantly introduced bermudagrass pastures (overseeded to ryegrass) that were operated in modified short-duration grazing systems.

This webinar is part of a monthly series hosted by Great Plains Grazing. The webinar series aims to provide research-based information, and is targeted for producers and extension agents. Previous webinars are archived and available for viewing on the [Great Plains Grazing website](#).

Due to Zoom's space limitations, this webinar is only available to the first 100 participants.

Register at [Great Plains Grazing March Webinar Registration](#).

Lana Barkman, Great Plains Grazing Project Manager
laneann@ksu.edu

8. K-State Sorghum School set for March 31 in Phillipsburg

K-State will hold a Sorghum School on March 31 in Phillipsburg, at the Phillips County Fair Building, 1481 U.S. Hwy 183. The school begins with registration at 9:30 a.m. and adjourns at 2:30 p.m.

The topics and speakers for the school are:

10:00 – 10:40: Sorghum market outlook and profitability prospects – Dan O'Brien

10:40 – 11:30: Sorghum insects / Sugarcane aphid – J.P. Michaud, Entomologist, KSU Ag Research Center-Hays

11:30 – Noon: MyFields/Insects – Brian McCornack and W. Johnson, Dept. of Entomology

Lunch

12:40 – 1:10: Sorghum production practices – Lucas Haag, Northwest Area Crops and Soils Specialist

1:10 – 1:40: Sorghum fertilization practices – Dorivar Ruiz Diaz, Nutrient Management Specialist

1:40 – 2:30: Weed management: New and key strategies – Curtis Thompson, Weed Management Specialist

Lunch will be provided, courtesy of the sponsors. There is no cost to attend, but participants are asked to pre-register by March 28. CEUs and Commercial Pesticide Credits will be offered. Lunch will be provided by the sponsorship of the Kansas Grain Sorghum Commission.

Online registration is available at: <http://bit.ly/KSSORGHUMSchools>

You can also register by emailing or calling the Phillips-Rook District Research and Extension, Phillipsburg office at 785-543-6845. For more information, contact:

Contact Information:

Cody Miller, Ag Extension District Agent, Phillips-Rooks District codym@ksu.edu

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

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

Jill Barnhardt, Kansas Grain Sorghum Commission jill@ksgrainsorghum.org

9. Vegetative activity in southwest Kansas reduced by recent hard freezes

There has been a considerable decrease in vegetative activity in southwest Kansas compared to last week. Figure 1 below is a comparison of NDVI (Normalized Difference Vegetation Index) readings between the week of March 15-21 and March 8-14. NDVI is an index of plant “greenness” or photosynthetic activity, and is one of the most commonly used vegetation indices. The reduced level of NDVI readings in southwest Kansas from the week of March 8-14 to the week of March 15-21 is striking, and illustrates the significant effect of the hard freeze on wheat, alfalfa, and other vegetation actively growing at the time of the freeze.

This area of reduced NDVI activity corresponds remarkably well to the area where some of the coldest temperature persisted for the longest time (Figure 2). In southeast Kansas, where temperatures remained milder, there was actually an increase in photosynthetic activity from the week of March 8-14 to the week of March 15-21.

Because NDVI is directly related to leaf greenness, the decrease in NDVI readings as compared to last week is a direct consequence of leaf burn, leaf senescence, and overall decrease in crop vigor experienced by wheat, alfalfa, and other crops as result of the extremely low temperatures. A general leaf burn and decreased crop vigor as result of below-freezing temperatures was expected for most of the state, and should not necessarily result in decreased grain yields, provided the growing point was not affected. The decrease in NDVI readings as compared to last week cannot be correlated with death of the growing point at this time. Producers should be able to assess the actual effects of the freeze to the growing point over the next few days.

Reports from agronomists and producers from across the state correlate well with Fig. 1. Thus far, leaf damage has been reported throughout the state but very few growing points have been affected. Damage to the growing point has generally been restricted to extremely early tillers in few fields, such as that shown in Figure 3 by Doug Shoup, K-State Southeast Area Agronomist. The affected growing point in Figure 3 was from an isolated area of more advanced plants within a field in Butler County, in south central Kansas, where the flag leaf was emerging out of the whorl. The unaffected growing point in Figure 3 was sampled from the same field, but from a plant that was still in the second node stage of development at time of the freeze.

For more information on symptoms of freeze damage in wheat, please refer to eUpdate issue 555 of March 21st, 2016, “[Diagnosing late winter/early spring freeze injury on wheat](#)”. For more information on symptoms of freeze injury in alfalfa, please see accompanying article in the current eUpdate issue “Managing freeze-damaged alfalfa.”

Kansas Vegetation Condition Comparison

Mid-March 2016 compared to the Early-March 2016

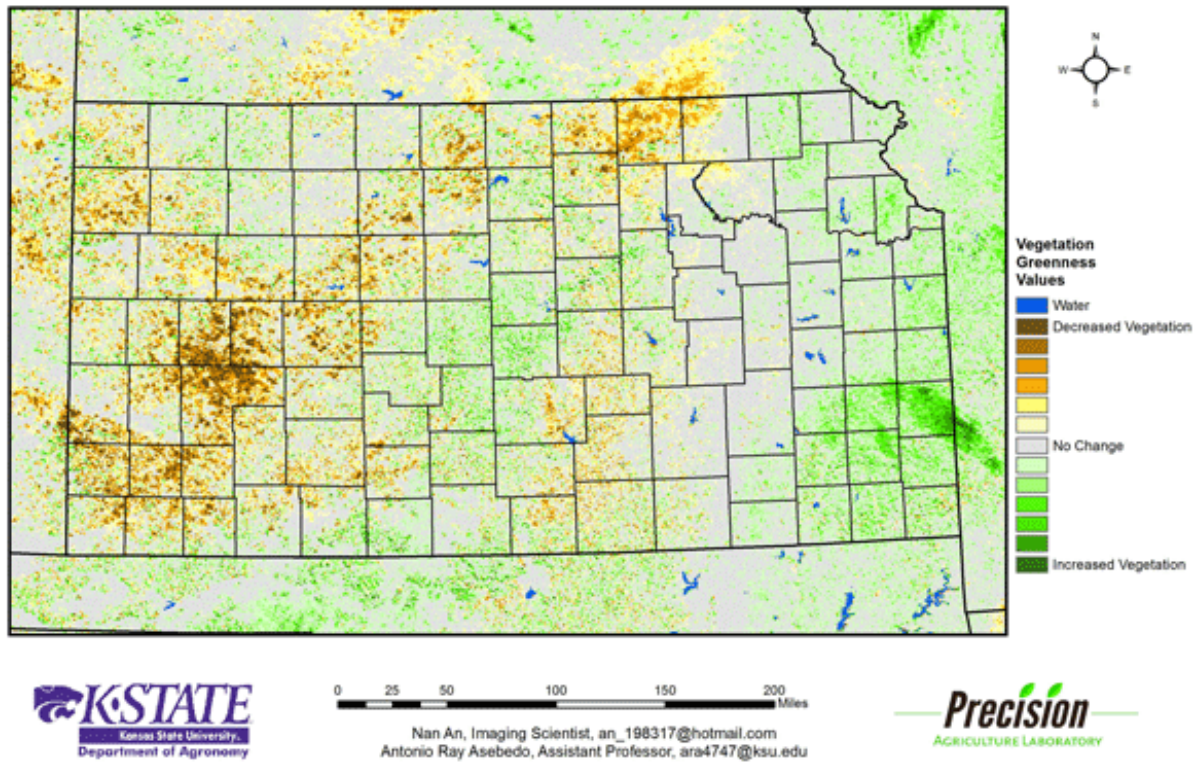


Figure 1. Vegetative activity from the week of March 15-21 compared to the previous week. Source: K-State Precision Agriculture Laboratory.

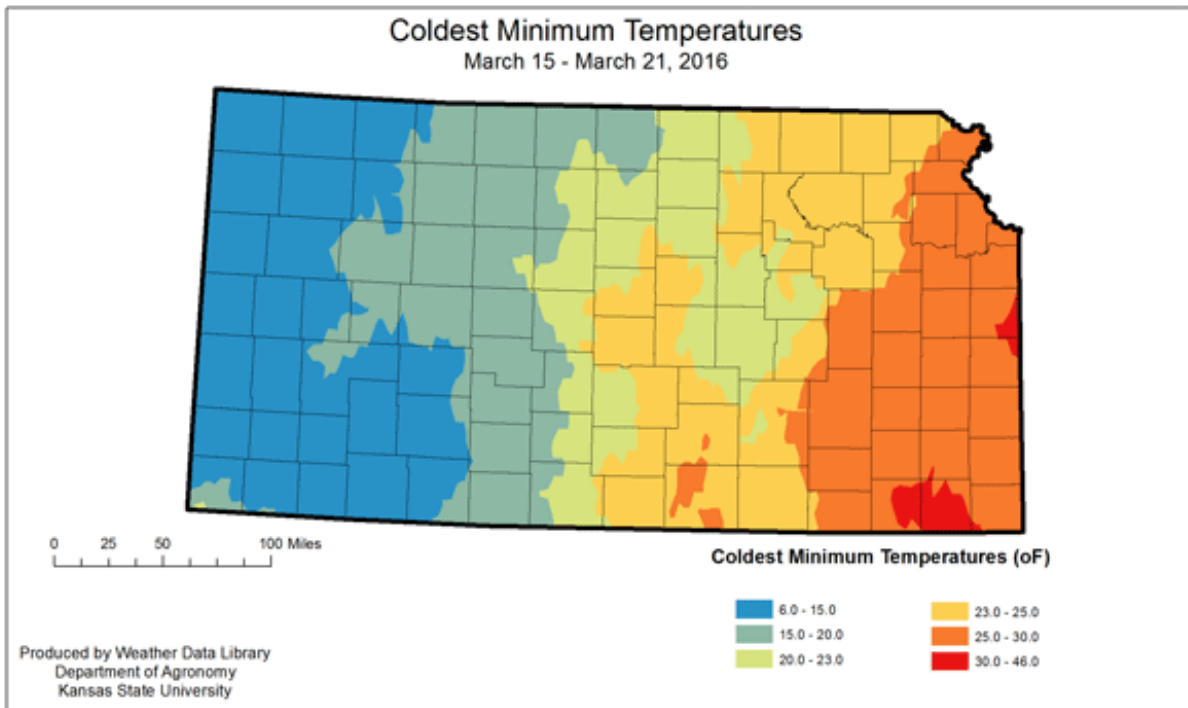


Figure 2. Coldest minimum temperatures from March 15-21, 2016. Source: K-State Weather Data Library.



Figure 3. Wheat growing point damaged by freeze from an area of the field in an advanced stage of development (Feekes 8, flag leaf emergence, upper plant) versus an undamaged growing point from a plant in a different area of the same field. The lower plant in this photo was still at Feekes 7 (second node) at time of freeze event and had no apparent damage at the time of the photo. Photo by Doug Shoup, K-State Research and Extension.

Mary Knapp, Weather Data Library
mknapp@ksu.edu

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

10. Comparative Vegetation Condition Report: March 15 - 21

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. 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 12: 03/15/2016 - 03/21/2016

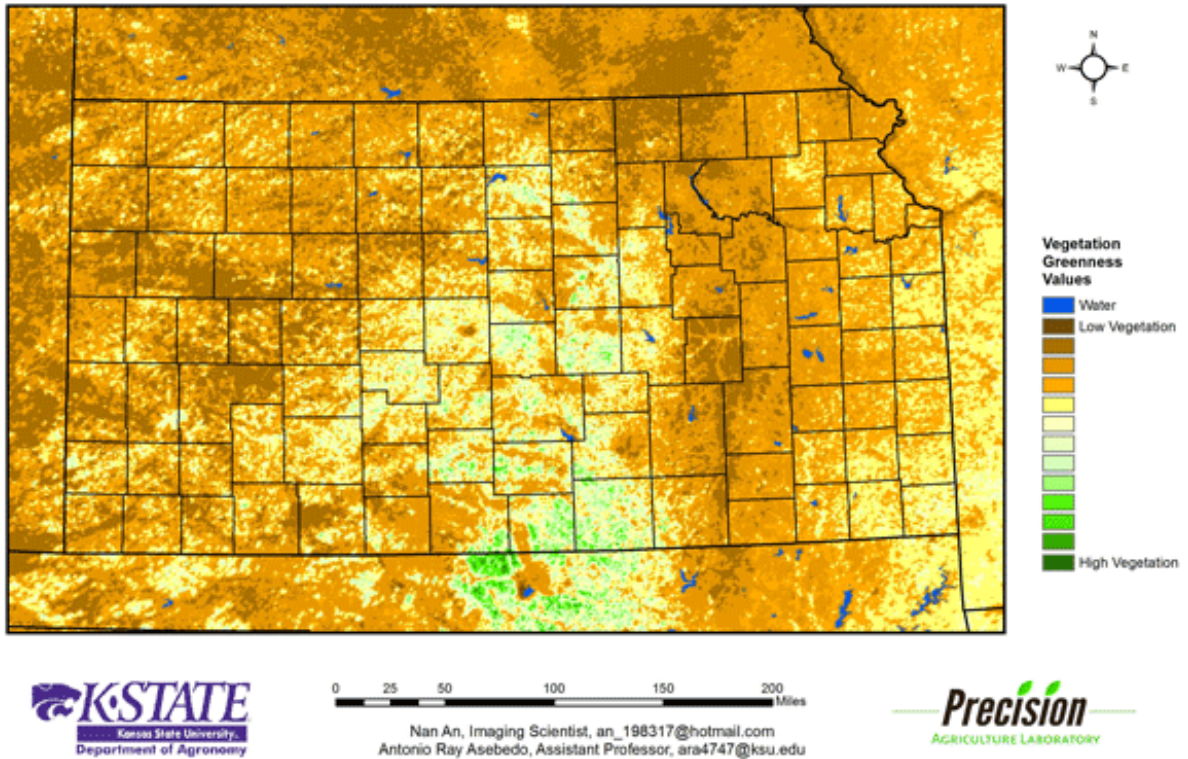


Figure 1. The Vegetation Condition Report for Kansas for March 15 – 21 from K-State’s Precision Agriculture Laboratory shows little expansion of the area of highest plant production. The highest NDVI values are still in Sumner and Harper counties. Some higher activity is also visible in the Arkansas River Valley in Southwest Kansas.

Kansas Vegetation Condition Comparison Mid-March 2016 compared to the Mid-March 2015

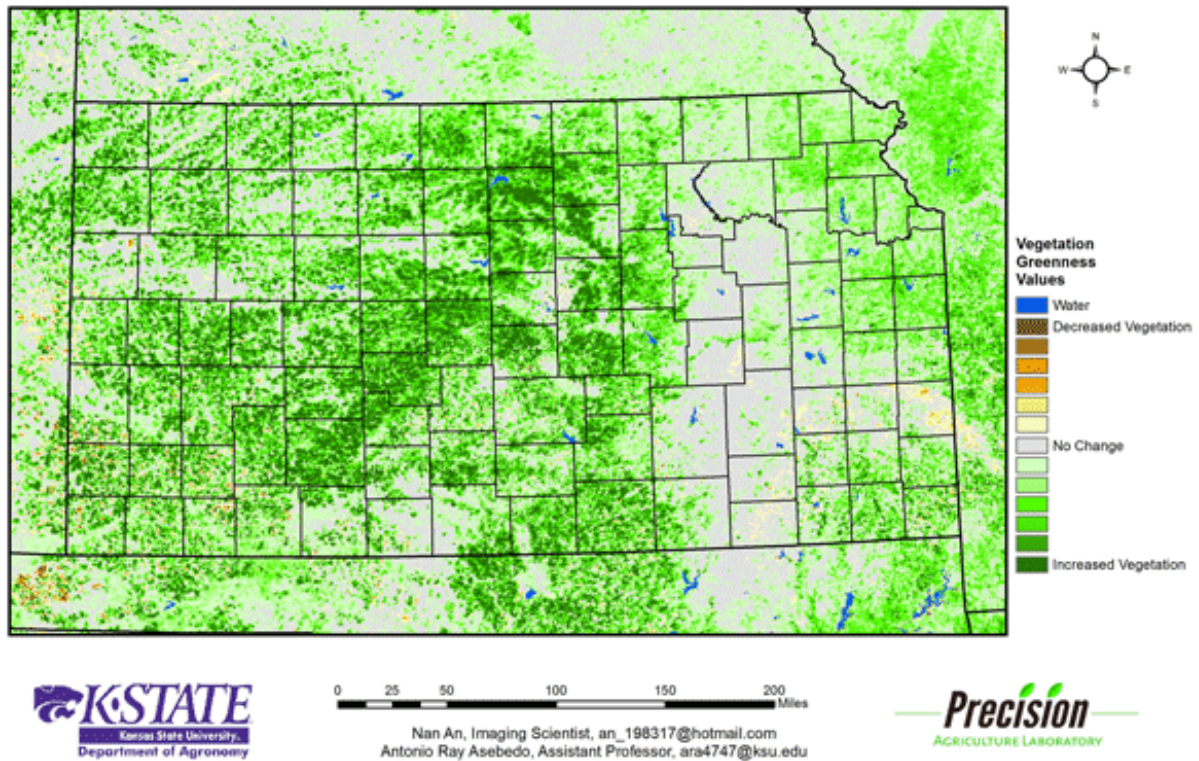


Figure 2. Compared to the previous year at this time for Kansas, the current Vegetation Condition Report for March 15- 21 from K-State's Precision Agriculture Laboratory shows much higher photosynthetic activity continues in the western two thirds of the state. There is also a pocket of higher NDVI values in southeast Kansas where warm temperatures and recent rains have favored plant development.

Kansas Vegetation Condition Comparison
Mid-March 2016 compared to the 27-Year Average for Mid-March

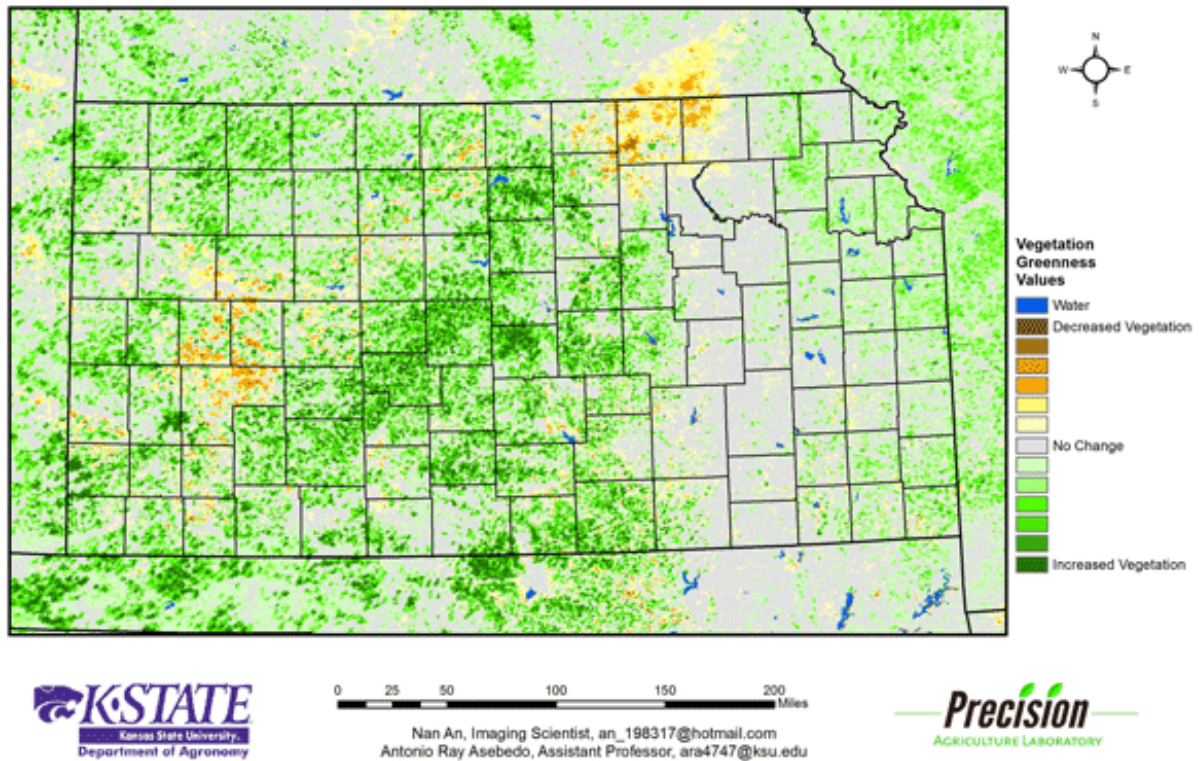
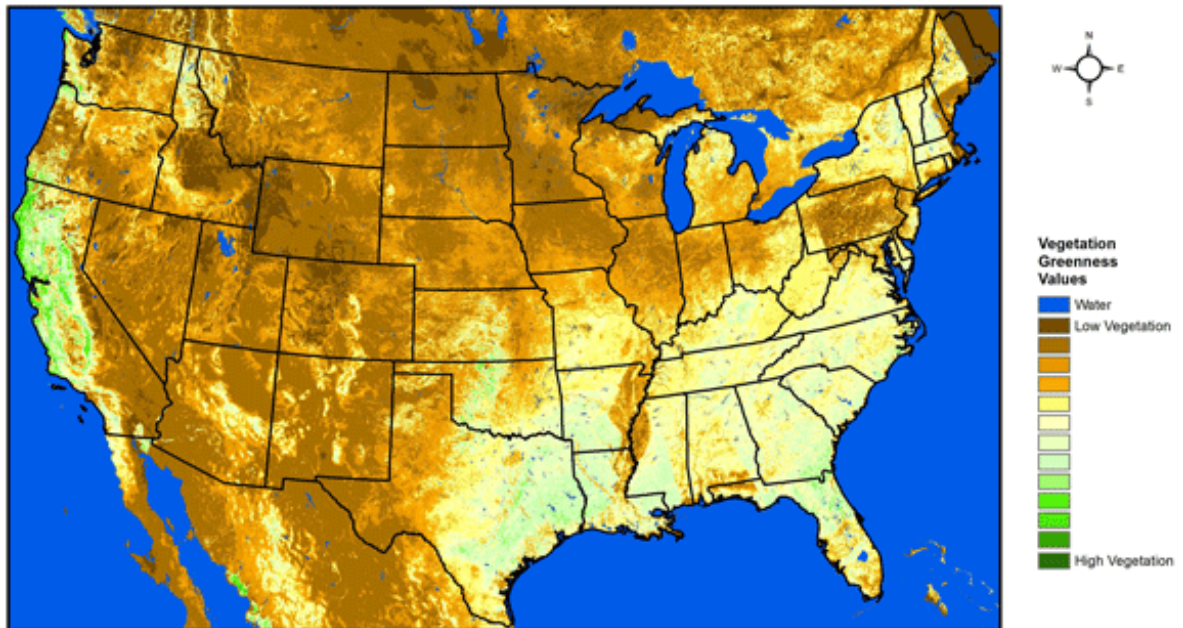


Figure 3. Compared to the 27-year average at this time for Kansas, this year's Vegetation Condition Report for March 15 – 21 from K-State's Precision Agriculture Laboratory shows that the area of above-average photosynthetic activity continues to increase. The largest areas with the greatest increase are in central and south central Kansas. Temperatures continue above normal across the state, with the warmest departures in the southwest. There is a small area in Finney and Scout counties of below-average vegetative activity. We will be watching for the impact of the recent freezing temperatures across these areas.

Continental U.S. Vegetation Condition

Period 12: 03/15/2016 - 03/21/2016



Nan An, Imaging Scientist, an_198317@hotmail.com
Antonio Ray Asebedo, Assistant Professor, ara4747@ksu.edu



Figure 4. The Vegetation Condition Report for the U.S for March 15 – 21 from K-State’s Precision Agriculture Laboratory shows higher NDVI values across central California, where recent rains have been plentiful. For the rest of the continental U.S. it shows that the highest photosynthetic activity is in east Texas through central Oklahoma. Heavy rains last week have reduced vegetative activity in the lower Mississippi River Valley. Impacts from the flooding rains along the Gulf Coast are also visible in Louisiana, Mississippi, and Alabama.

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Continental U.S. Vegetation Condition Comparison
Mid-March 2016 Compared to Mid-March 2015

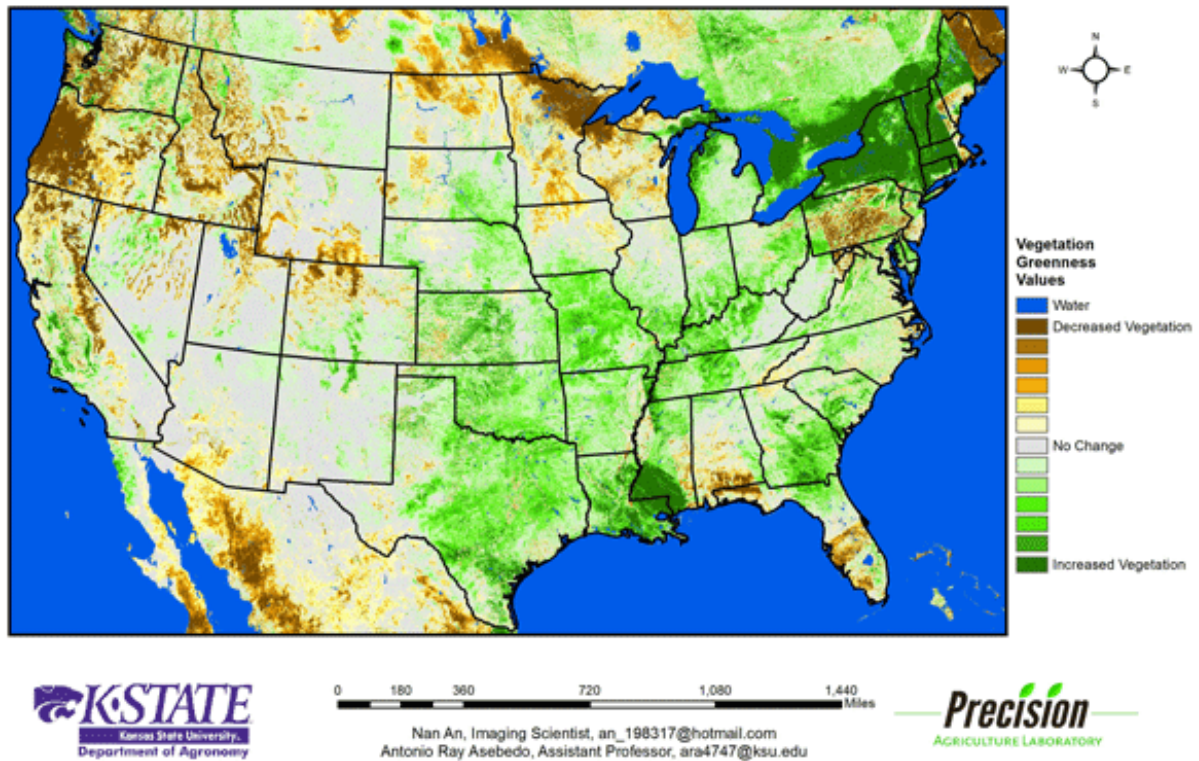


Figure 5. The U.S. comparison to last year at this time for the period March 15 – 21 from K-State’s Precision Agriculture Laboratory shows that lower NDVI values are most evident along the Pacific Northwest while much higher NDVI values are visible from the Great Lakes to New England, and in the Central and Southern Plains. Along the northern tier, the snow continues to be the major influence. The Northeast continues to see a low snow season, while the Pacific Northwest has a higher snow pack than last year. In the Plains, warmer temperatures than last year have fueled early progress in the vegetation, despite recent cold weather.

Continental U.S. Vegetation Condition Comparison
Mid-March 2016 Compared to 27-year Average for Mid-March

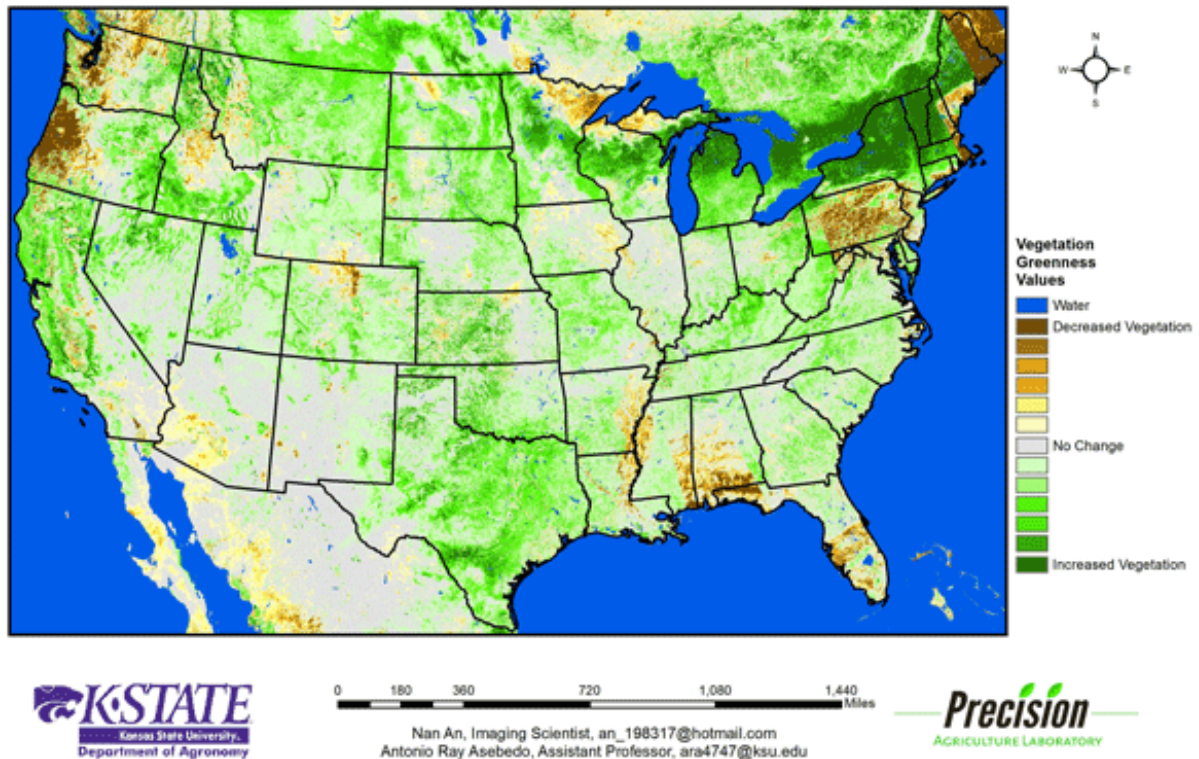


Figure 6. The U.S. comparison to the 27-year average for the period March 15 – 21 from K-State’s Precision Agriculture Laboratory shows continued above-average photosynthetic activity across the Plains. The increased vegetative activity in eastern Montana and North Dakota is of particular concern. Snow pack in these areas is below average and abnormally dry conditions continue to expand in the region. Warmer-than-average winter temperatures across the Northern Plains is also spurring plant development. The below-average vegetative activity in the Southeast is largely due to last week’s heavy rainfall, while the below-average NDVI values in the Pacific Northwest are indicative of the current snowpack conditions.

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