extension AGRONOMY e-Updates

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1. Fierce: New registration for use in soybeans

Fierce herbicide has now received registration for use in soybeans. Fierce, a premix of pyroxasulfone and Valor herbicides, is a new herbicide from Valent. Pyroxasulfone is a new chemical that was first registered for use in corn last year under the trade name of Zidua. It has a similar mode of action to the acetamide herbicides Dual, Outlook, and Harness, but is more active at lower rates, provides longer residual control, and has better activity on some broadleaf weeds than the acetamides.

The combination of pyroxasulfone and Valor in Fierce can provide broad-spectrum control of grass and broadleaf weeds, including the small-seeded annual grasses, waterhemp, Palmer amaranth, and velvetleaf. Fierce control of kochia will be fair to good, and likely less than the control provided by Authority-based products.

Fierce can be applied in the fall, or in the spring as a preplant or preemergence treatment at rates of 3 to 3.75 oz/acre. Fall treatments should not be made until after October 15. Fall treatments will help provide residual control of labeled weeds in the spring and the early part of the growing season, but probably will not provide adequate control through the growing season for later-emerging summer annual weeds such as waterhemp and Palmer amaranth. To optimize control of waterhemp and Palmer amaranth, applications closer to planting will probably provide the best residual control.

Fierce may need to be tank-mixed with other burndown herbicides such as glyphosate, 2,4-D, or Liberty if weeds are emerged at application time. That’s because pyroxasulfone does not provide control of emerged weeds and Valor only provides burndown of selected species. Preemergence applications of Fierce should be made within 3 days after planting and prior to soybean emergence or cracking, and soybeans treated with Fierce should not be irrigated at cracking or severe soybean injury could occur. Do not graze Fierce-treated soybean fields or feed treated forage or hay to livestock.

Fierce has provided good preemergence weed control in research at K-State, including glyphosate-resistant waterhemp. It could be a very useful tool to provide residual weed control and help manage glyphosate-resistant weeds.

Registration of other pyroxasulfone products in soybeans is still pending.

-- Dallas Peterson, Weed Management Specialist
dpeterso@ksu.edu

-- Curtis Thompson, Weed Management Specialist
cthompso@ksu.edu

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

2. Preemergence herbicide programs for corn

There are several preplant and preemergence residual herbicides available for corn. It's important to know the strengths and weaknesses of each product in terms of the spectrum of weeds controlled. A table summarizing weed species response to various corn herbicides can be found on pages 22-24 of the 2013 Chemical Weed Control for Field Crops, Pastures, Rangeland, and Noncropland (SRP 1081). See:
http://www.ksre.ksu.edu/bookstore/pubs/SRP1081.pdf

For burndown applications in a no-till system on emerged grass and broadleaf weeds, an application of glyphosate and a product containing dicamba or 2,4-D may be critical. The choice between 2,4-D and dicamba will depend on weed species present. Dicamba products will be more effective on kochia and marestail. 2,4-D is more effective on winter annual mustards. The use of preemergence herbicides often provides control of weeds for several weeks. This can greatly improve the effectiveness of a postemerge herbicide application, and give the producer more leeway on post application timing.

Soil-applied residual herbicides for corn can be grouped into several basic categories.

* Acetamides and acetamide/atrazine premixes. The main acetamide products used in corn include acetochlor, S-metolachlor, dimethamid-P, pyroxasulfone, and flufenacet, and many premix products containing one of these five active ingredients. In general, these products are very effective in controlling grasses (except Johnsongrass and shattercane) and small-seeded broadleaf weeds such as pigweeds. They are much less effective in controlling small-seeded kochia or large-seeded broadleaf weeds such as cocklebur, devilsclaw, morningglory, sunflower, and velvetleaf. There have been no cases of weed populations in Kansas developing resistance to the acetamides to date.

The acetamide products are most effective when applied with atrazine. Several atrazine/acetamide premixes are available and should be used instead of acetamides alone unless atrazine is not allowed. In past years, often because of cost, reduced rates of these products were applied to help manage heavy summer annual grass pressure, then followed up with a good postemergence herbicide program. With the increased occurrence of glyphosate- and other herbicide-resistant weeds, the use of reduced/setup rates greatly increases the risk of unacceptable control.

In fields with normal weed and grass infestations (no herbicide resistance problems), a reduced-rate of an acetamide/atrazine premix product applied preemerge, followed by a postemerge-applied herbicide can still do a good job. The purpose of the low-rate preemerge treatment is to kill the easy weeds (common annual grasses and pigweeds), get corn off to a head start, keep the weed infestation at a manageable density, and buy time for the post application.

* HPPD-inhibitors. Examples of HPPD-inhibitors are isoxaflutole (e.g. Balance Flexx, Corvus, and Prequel) and mesotrione (e.g. Callisto, Lexar EZ, Lumax EZ). These products either contain atrazine or should be applied with atrazine, and are excellent on kochia, pigweeds, velvetleaf, and many other broadleaf weeds. Lexar EZ, Lumax EZ, and Corvus+atrazine will provide the best control of grass weeds. Corvus will also control shattercane. Balance Flexx has activity on shattercane but is less consistent than Corvus. Prequel has a low rate of Balance mixed with Resolve and will not provide the same level of residual weed control as Lexar EZ, Lumax EZ, Balance Flexx, or Corvus used at full rates. Keep in mind, products containing Balance should not be applied to coarse-textured soils when the water table is less than 25 feet below the soil surface. Balance Flexx does not provide adequate control of sunflower. Corvus will be much better than Balance Flexx, provided the sunflower is not ALS resistant. Herbicides containing clopyralid such as Hornet, TripleFlex, or Surestart will provide very good control of sunflower. Zemax is a new herbicide containing S-metolachor and mesotrione, and is similar to Lumax EZ or Lexar EZ less the atrazine. Control of broadleaf weeds with Zemax will be less than Lumax EZ or Lexar EZ unless atrazine is added to the mix. Callisto, a component in Lexar EZ or Lumax EZ, has the same mode of action as Balance Flexx or Corvus but has less activity on grass weeds, thus if applied preemergence it should be applied with an acetamide and atrazine.

* Triazine. Atrazine is a common component of many preplant and preemergence herbicide premixes for corn. Where weed pressure is light, a March application of atrazine with crop-oil concentrate and 2,4-D or dicamba can control winter annual weeds such as mustards and marestail and provide control of most germinating weeds up to planting. If kochia is the key target, 0.5 to 1.0 lb/acre atrazine with a pint of dicamba applied in mid-March can provide excellent control of germinating kochia. It is essential to add glyphosate to the mix if winter annual grasses are present. In a premix with other herbicides, atrazine adds burndown control of newly emerged grasses and broadleaf weeds present near planting time, as well as some residual control of small-seeded broadleaf weeds such as pigweeds and kochia (except for triazine-resistant populations).

* PPO-inhibitors. Examples of PPO-inhibitors include flumioxazin (e.g. Valor, Fierce), and saflufenacil (Sharpen, Verdict). Valor or Fierce must be applied 7 to 30 days before corn planting in a no-till system. These herbicides provide excellent control of pigweeds; however, they are marginal on kochia. Fierce will provide improved control of velvetleaf compared to that from Valor. The addition of atrazine will enhance kochia, pigweed, velvetleaf, and morningglory control, provided the populations are not triazine-resistant. Sharpen and Verdict have excellent activity on pigweeds, kochia, and large seeded broadleaf weeds, however, length of residual is relatively short compared to other preemergence products when all are compared at full rates.

* ALS-inhibitors. Examples of ALS-inhibitors for use as a soil-applied herbicide for corn include flumetsulam (Python) and Hornet, which is a premix of flumetsulam and clopyralid. Both herbicides have broadleaf activity only. These products are strong on large-seeded broadleaf weeds such as cocklebur, sunflower, and velvetleaf, or the small-seeded common lambsquarters. Adding Hornet to a full rate of an acetamide/atrazine mix as a preemerge treatment will control the annual grasses and add considerably to large-seeded broadleaf weed control. Sunflower appears to be most sensitive to Hornet, followed closely by cocklebur and velvetleaf. Morningglory is less sensitive. Depending on weed species present, control may be improved enough that a postemerge treatment is not needed.

An additional ALS-inhibiting herbicide from DuPont is called Resolve. Also a component in Prequel, which was previously mentioned, Resolve will provide short residual control of grass and broadleaf weeds and should be used as a setup herbicide with a good postemergence weed control program. If ALS-resistant broadleaf weeds are present, these ALS-containing herbicides often will be less effective.

New products for 2013

There are four new herbicides containing Pyroxasulfone labeled for corn in 2013.

* Zidua, from BASF, contains the new active ingredient pyroxasulfone, which is in the acetamide family. Pyroxasulfone provides excellent residual control of annual grasses, with minor activity on shattercane, excellent activity on pigweeds, and good activity on velvetleaf and kochia. Pyroxasulfone has better activity on kochia than other acetamides. When combined with atrazine, this product will be very competitive with other acetamide/atrazine premixes.

* Fierce is a premix of the new active ingredient pyroxasulfone and Valor. This Valent product, because of the Valor component, must be applied to corn at a single use rate of 3 oz/acre at least 7 days before planting. The Valor component in Fierce will provide improved activity on some broadleaf weeds over Zidua alone.

* Anthem, from FMC, is a premix of pyroxasulfone and Cadet. This product will give similar residual weed control as Zidua. However, Anthem will provide some activity on limited broadleaf weed species when applied postemergence.

*Anthem ATZ is a premix of Anthem plus atrazine. The addition of atrazine will enhance broadleaf weed control, especially for kochia, and the large-seeded broadleaf weeds like velvetleaf and morningglory.

The rate structure of Zidua, Anthem, and Anthem ATZ is dependent upon soil texture. Coarse, medium, and fine textured soils allow different rates of these herbicides. Also, these herbicides can be applied on corn up to V4 stage of growth. Product availability of these new herbicides may be limited in 2013.

-- Curtis Thompson, Weed Management Specialist
cthompso@ksu.edu

-- Dallas Peterson, Weed Management Specialist
dpeterso@ksu.edu

3. Management of drought-tolerant corn hybrids

Recent drought conditions in Kansas and the Great Plains have raised questions about specific management techniques for drought-tolerant corn hybrids. Conventionally bred drought-tolerant hybrids from Syngenta and Pioneer have been on the market for several years, and Monsanto is in the process of an initial release of the first biotech drought-tolerant hybrids for the 2013 growing season.

In general, data available from the individual companies indicates that drought-tolerant hybrids will provide anywhere from a 5-15 percent yield increase over “competitor hybrids” in water-limiting

situations. Although independently generated data to corroborate these claims is limited, our research in 2012 showed that drought-tolerant hybrids can sustain higher yields and plant populations in limited irrigation environments.
These hybrids are generally targeted for water-limited environments in the Western Great Plains.

Initial research in central and eastern Kansas has shown that drought-tolerant hybrids can perform well in limited irrigation settings east of the High Plains.

2012 Study Details – Topeka and Scandia

Research conducted at Scandia and Topeka in 2012 compared two Pioneer AQUAmax hybrids with two standard Pioneer hybrids of similar maturity. Each hybrid was planted at four populations (25, 30, 35, and 40,000 plants/acre) at Topeka and three populations (30, 35, and 40,000 plants/acre) at Scandia.

These hybrid and population treatments were subjected to three irrigation levels: 100 percent of evapotranspiration (ET), 75 percent ET, and 50 percent ET. At Topeka, irrigation water applied after tasseling was 6.75 inches for the low irrigation level, 9.34 inches for the medium, and 12.00 inches for the high irrigation levels. Rainfall totaled 7.75 inches from planting to maturity. At Scandia, the total water applied was 5 inches at the low irrigation level, 7.5 inches at the medium, and 10 inches at the high irrigation level. Rainfall at Scandia totaled 11.53 inches from planting to maturity.

2012 research results and considerations for the 2013 growing season

At Topeka, both types of hybrids were nearly identical in their yield response to increasing populations when water was not a limiting factor (Figure 1). At Scandia, there was very little yield response to population in the regular hybrids and a decreasing yield trend in the drought-tolerant hybrids as population increased at full irrigation (Figure 2).

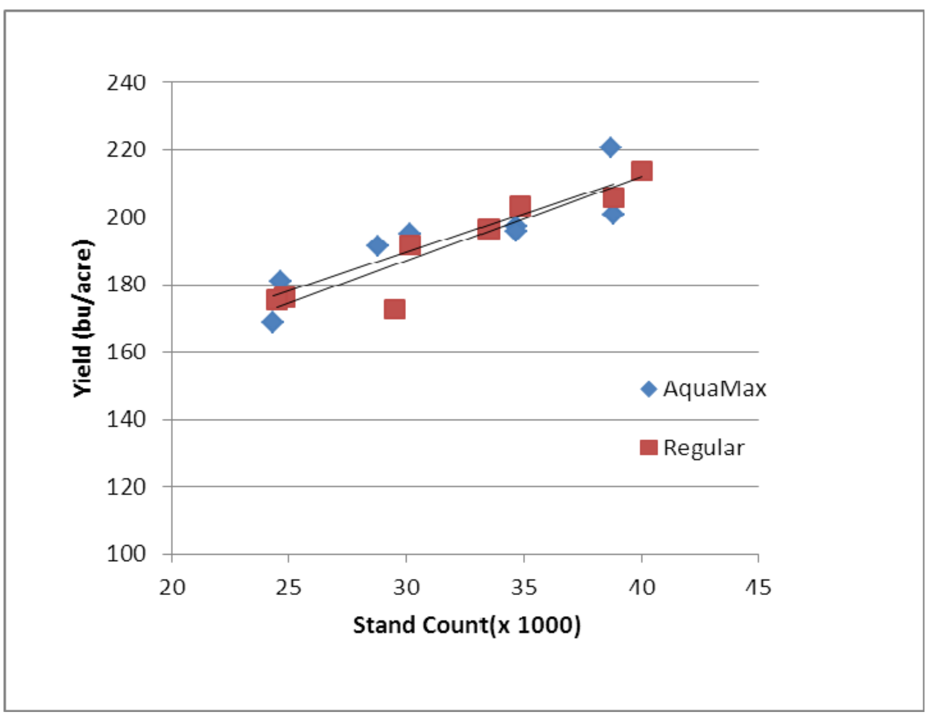


Figure 1. Yield response to plant population of drought tolerant and standard hybrids at full (100% ET) irrigation at Topeka.

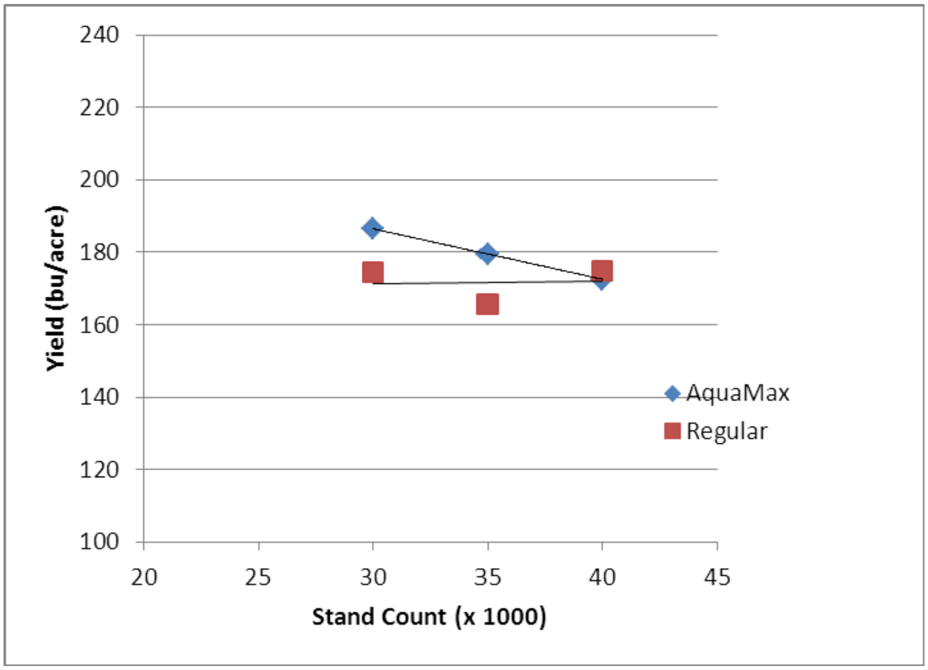


Figure 2. Yield response to plant population of drought-tolerant and standard hybrids at full (100% ET) irrigation at Scandia.

However, averaged across populations and irrigation levels, the drought-tolerant hybrids out-yielded the regular hybrids at both sites (Tables 1 and 2).

Table 1. Effect of drought tolerance and maturity on brown leaves at dent and yield, averaged across all populations and irrigation levels: 2012, Kansas River Valley Experiment Field, Topeka Unit.

Hybrid Type	Maturity (days)	Brown Leaf* (%)	Yield* (bu/a)
AQUAmax	111	4.4 b*	162a
Regular	111	3.4 b	167a
AQUAmax	114	6.4 b	166a
Regular	115	15.3 a	150b

*means followed by different letters are different at P=0.05.

Table 2. Effect of drought tolerance and maturity on corn yield, averaged across all populations and irrigation levels: 2012, Irrigation Experiment Field, Scandia.

Hybrid Type	Maturity (days)	Yield* (bu/a)
AQUAmax	111	166a
Regular	111	163a
AQUAmax	114	169a
Regular	115	141b

*means followed by different letters are different at P=0.10.

As water became more limiting, the drought-tolerant hybrids sustained yields at higher populations at both sites. When water availability was reduced further at Topeka and Scandia, the yields of the drought-tolerant hybrids were as much as 20 percent greater than regular hybrids (Figures 3 and 4). Furthermore, the drought-tolerant hybrids demonstrated the ability to sustain populations as much as 10,000 plants/acre higher than the standard hybrids at both study sites.

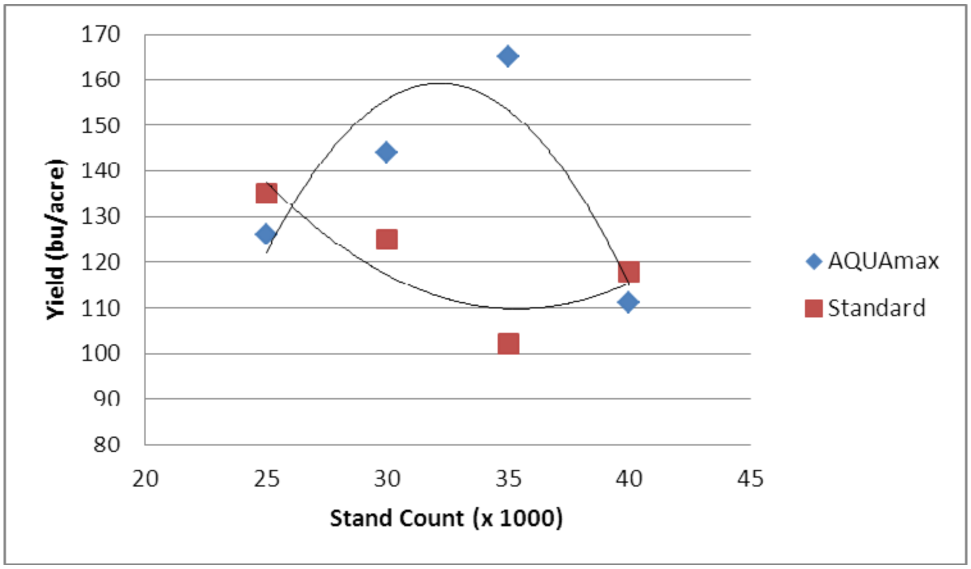


Figure 3. Yield response to plant population of drought tolerant and standard hybrids at low (50% ET) irrigation at Topeka.

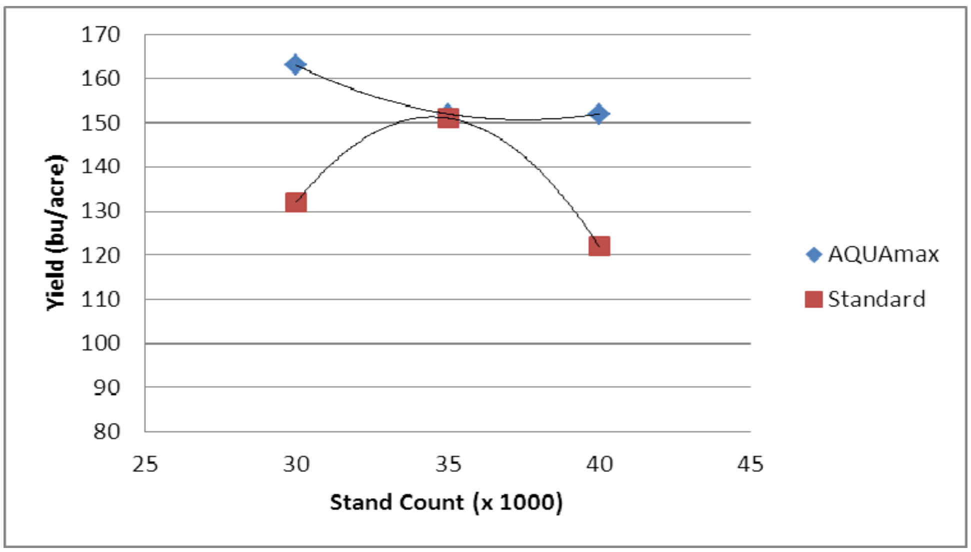


Figure 4. Yield response to plant population of drought tolerant and standard hybrids at low (50% ET) irrigation at Scandia.

Summary

The information shown above is a general overview of results from a single year of data collection. Caution should be used in drawing conclusions from a study conducted at two locations for one year, but some observations can be made that could assist producers in making decisions.

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

2) Populations can be higher than the 30,000 or so typically planted in the area, especially if water isn't too limiting. Drought-tolerant hybrids can tolerate higher populations when moisture conditions become stressful.

3) The advantage of the drought-tolerant hybrids became more evident when the water stress increased to the point of leaves rolling most days.

4) From the information at hand, it is reasonable to expect a drought-tolerant hybrid to serve as a type of insurance policy to maintain yields in the event that dry conditions develop during the growing season. It also appears that there is no yield penalty associated with drought-tolerant hybrids if water-limiting conditions do not occur.

However, it is important to understand that these hybrids are not the final answer to the severe drought conditions experienced in the last few years. Drought-tolerant hybrids have demonstrated the ability maintain yields to a certain degree in water-limited situations, but we cannot expect them to thrive when moisture is severely limited, especially in dryland systems.

-- Randall Nelson, Agronomist-In-Charge, North Central Experiment Fields
jrnelson@ksu.edu

-- Eric Adee, Agronomist-In-Charge, Kansas River Valley and East Central Experiment Fields
eadee@ksu.edu

4. Starter fertilizer rates and placement for corn

Many producers in Kansas could benefit by using starter fertilizer when planting corn. Starter fertilizer is simply the placement of some fertilizer, usually nitrogen (N) and phosphorus (P), near the seed -- which "jump starts" growth in the spring. It is not unusual for a producer to see an early season growth response to starter fertilizer application. But whether that increase in early growth translates to an economic yield response is not a sure thing in Kansas. How the crop responds to starter fertilizer depends on soil fertility levels, tillage system, soil temperature, and N placement method. Phosphorus source is not an important factor.

Soil fertility levels

The lower the fertility level, the greater the chance of an economic response to starter fertilizers. A routine soil test will reveal available P and potassium (K) levels. If soils test low or very low in P, below 20 ppm, there is a very good chance that producers will obtain an economic yield response to applying a starter fertilizer containing P, even in some low-yield environments. If the soil test shows a medium level of P, 20-30 ppm, it’s still possible to obtain a yield response to P fertilizer. But the yield response will not occur as frequently, and may not be large enough to cover the full cost of the practice. If the soil test is high, above 30 ppm, economic responses to starter P fertilizers are rare. The chances of an economic return at high P soil test levels are greatest when planting corn early in cold, wet soils. In general, the same principles apply with K. If soil tests are low, below 130 ppm, the chances of a response to K in starter are good. The lower the soil test level, the greater the odds of a response.

All of the recommended P and/or K does not need to be applied as starter. If the soil test recommendation calls for high rates of P and K in order to build up or maintain soil test levels, producers will often get better results by splitting the application between a starter and a preplant broadcast application. As a general rule, starter fertilizer should be limited to the first 20-30 pounds of P or K per acre, with the balance being broadcast for best responses.

Phosphorus source

Does the type of phosphorus used as a starter make any difference? In particular, what about the ratio of orthophosphate to polyphosphate in the fertilizer product? This has been a concern for many producers.

Liquid 10-34-0 is composed of a mixture of ammonium polyphosphates and ammonium orthophosphates. The dissolved ammonium orthophosphate molecules are identical to those found in dry MAP (e.g. 11-52-0) and/or DAP (e.g. 18-46-0). Ammonium polyphosphates are simply chains of orthophosphate molecules, formed by removing a molecule of water, and are quickly converted by soil enzymes back to individual orthophosphates identical to those provided by MAP and/or DAP.

Polyphosphates were not developed by the fluid fertilizer industry because of agronomic performance issues. Instead, polyphosphates were developed to improve the storage characteristics of fluid phosphate products (and other fertilizers made from them) and to increase the analysis of liquid phosphate fertilizers. Ammonium polyphosphate is equal in agronomic performance to ammonium orthophosphates when applied at the same P_2O_5 rates in a similar manner. And liquid phosphate products are equal in agronomic performance to dry phosphate products if applied at equal P_2O_5 rates in a similar manner.

The University of Nebraska evaluated the effect of phosphorus application from orthophosphate or polyphosphate applied at identical P_2O_5 rates on corn yield (Table 1). There was no yield difference between phosphorus sources. The simple reason for this is that when polyphosphate is added to soil, a process called hydrolysis breaks down the polyphosphate chains into orthophosphates. The concern of many people is the length of time it takes for this process to occur. Previous studies indicate that **although it may take a few days to complete the hydrolysis process, the majority is completed in 48 hours.** As a result, phosphorus in soil solution will typically be similar from either source shortly after application.

Table 1. Corn Yield Response in Nebraska to Different Sources of P Fertilizer

	Phosphorus Source	
P_2O_5 Rate (lb/ac)	Polyphosphate	Orthophosphate
	----------------------Corn bu/ac----------------------	
15	124	124
30	134	134
45	142	142

Tillage system

No-till corn will almost always respond to a starter fertilizer that includes N – along with other needed nutrients – regardless of soil fertility levels or yield environment. This is especially so when preplant N is applied as deep-banded anhydrous ammonia or UAN, or where most of the N is sidedressed in-season. That's because no-till soils are almost always colder and wetter at corn planting time than soils that have been tilled, and N mineralization from organic matter tends to be slower at the start of the season in no-till environments.

In general, no-till corn is less likely to respond to an N starter if more than 50 pounds of N was broadcast prior to or shortly after planting.

In reduced-till systems, the situation becomes less clear. The planting/germination zone in strip-till or ridge-till corn is typically not as cold and wet as no-till, despite the high levels of crop residue between rows. Still, N and P starter fertilizer is often beneficial for corn planted in reduced-till conditions, especially where soil test levels are very low, or low, and where the yield environment is high. As with no-till, reduced-till corn is also less likely to respond to an N starter if more than 50 pounds of N was broadcast prior to or shortly after planting.

Conventional- or clean-tilled corn is unlikely to give an economic response to an N and P starter unless the P soil test is low.

Starter fertilizer placement

Producers should be very cautious about applying starter fertilizer that includes N and/or K, or some micronutrients such as boron, in direct seed contact. It is best to have some soil separation between the starter fertilizer and the seed. The safest placement methods for starter fertilizer are either:

-- A subsurface-band application 2 to 3 inches to the side and 2 to 3 inches below the seed, or
-- A surface-band application 2 to 3 inches to the side of the seed row at planting time, especially in conventional tillage or where farmers are using row cleaners or trash movers in no-till.

If producers apply starter fertilizer with the corn seed, they run an increased risk of seed injury when applying more than 6 to 8 pounds per acre of N and K combined in direct seed contact on a 30-inch row spacing. Nitrogen and K fertilizer can result in salt injury at high application rates if seed is in contact with the fertilizer. Furthermore, if the N source is urea or UAN, in-furrow application is not recommended regardless of fertilizer rate. Urea converts to ammonia, which is very toxic to seedlings and can significantly reduce final stands.

Work several years ago at the North Central Kansas Irrigation Experiment Field near Scandia illustrates some of these points (Table 2). In this research, former Agronomist-In-Charge Barney Gordon compared in-furrow, 2x2, and surface band placement of different starter fertilizer rates in a multi-year study on irrigated corn. Excellent responses from up to 30 pounds of N combined with 15 pounds of P were obtained with the both the 2x2 and surface-band placement. In-furrow placement however, was not nearly as effective. This was due to stand reduction from salt injury to the germinating seedlings, likely due to the high application rate of N plus K in furrow, indicating the importance of monitoring the N+K rates for in furrow application. Where no starter, or the 2x2 and surface band placement, was used, final stands were approximately 30-31,000 plants per acre. However, with the 5-15-5 in furrow treatment, the final stand was approximately 25,000. The final stand was just over 20,000 with the in-furrow 60-15-5 treatment.

Table 2. Effect of Starter Fertilizer Placement on Corn Yield at North Central Irrigation Experiment Field

	Yield (bu/acre)		
Fertilizer Applied (lbs)	In-Furrow Placement	2x2 Band Placement	Surface Band Placement
Check: 159 bu	--	--	--
5-15-5	172	194	190
15-15-5	177	197	198
30-15-5	174	216	212
45-15-5	171	215	213
60-15-15	163	214	213
Average	171	207	205

-- Dave Mengel, Soil Fertility Specialist
dmengel@ksu.edu

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

5. Canola College Scheduled for March 28 in Enid, Oklahoma

Canola production will be taken to the next level at this year's Canola College, scheduled for March 28 at the Garfield County Fairgrounds Pavilion in Enid, Oklahoma. Registration begins at 8:30 a.m., and the conference will last until 3:30 p.m.

Those who attend will have the opportunity to interact with more the 200 new and veteran canola producers and industry representatives from Kansas and Oklahoma.

This is the premier canola production education event in the Kansas-Oklahoma region. At this year's conference, there will be four concurrent breakout sessions throughout the day, featuring everything from canola basics to talks from experienced producers. Speakers will also discuss insect control, weed control, harvest management, and the benefits of a canola-wheat rotation.

Lunch will be served. There is no charge to attend Canola College. Attendees are asked to register, however, for the meal count. To register, go to: www.canola.okstate.edu/

Canola College is a joint effort of Kansas State University, Oklahoma State University, the Great Plains Canola Association, and partners from the canola industry. For more information, contact Mike Stamm at 785-532-3871 or mjstamm@ksu.edu.

-- Mike Stamm, Canola Breeder
mjstamm@ksu.edu

6. Comparative Vegetation Condition Report: February 19 – March 4

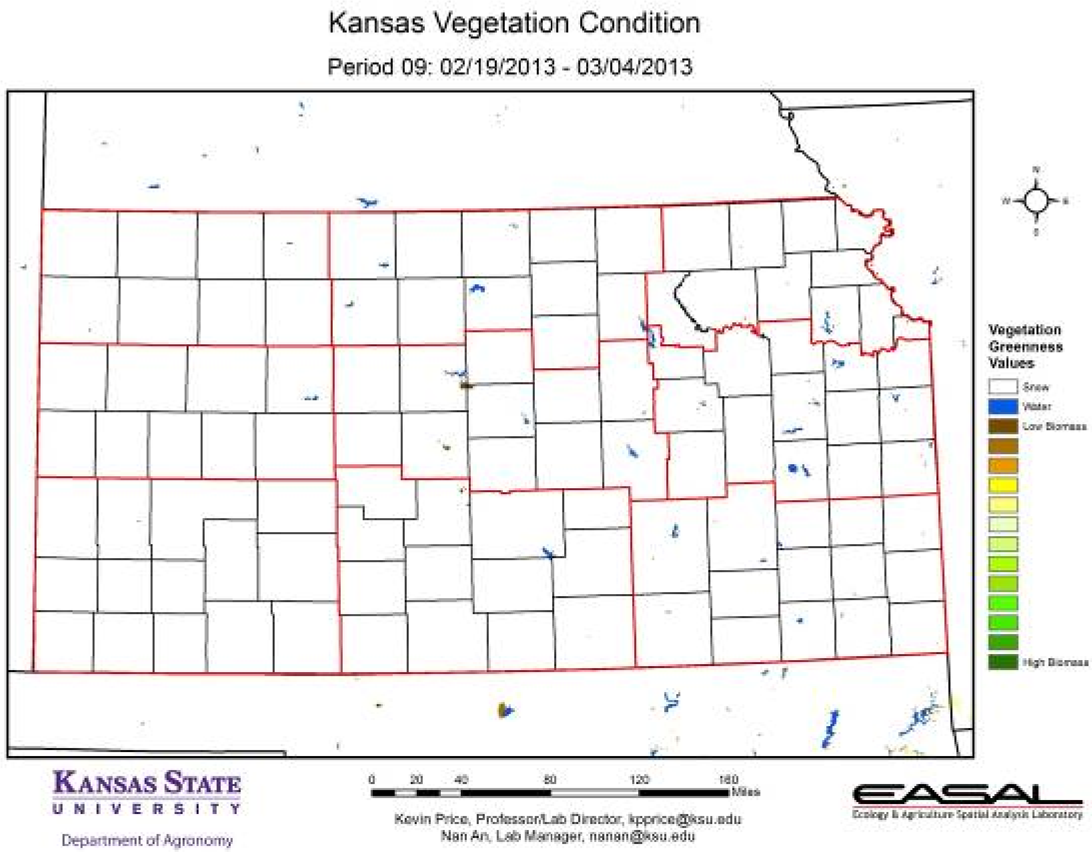
K-State's Ecology and Agriculture Spatial Analysis Laboratory (EASAL) produces weekly Vegetation Condition Report maps. These maps can be a valuable tool for making crop selection and marketing decisions.

Two short videos of Dr. Kevin Price explaining the development of these maps can be viewed on YouTube at:
http://www.youtube.com/watch?v=CRP3Y5NIggw
http://www.youtube.com/watch?v=tUdOK94efxc

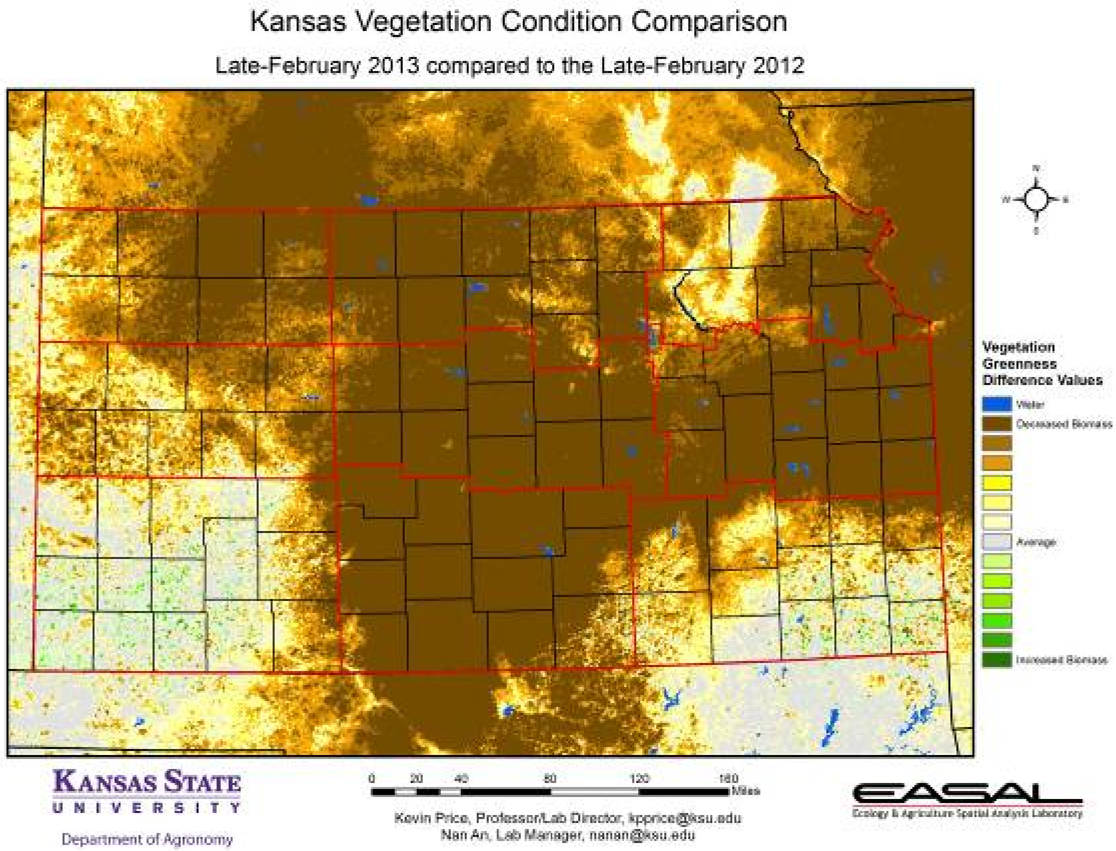
The objective of these reports is to provide users with a means of assessing the relative condition of crops and grassland. The maps can be used to assess current plant growth rates, as well as comparisons to the previous year and relative to the 24-year average. The report is used by individual farmers and ranchers, the commodities market, and political leaders for assessing factors such as production potential and drought impact across their state.

NOTE TO READERS: The maps below represent a subset of the maps available from the EASAL group. If you'd like digital copies of the entire map series please contact Kevin Price at kpprice@ksu.edu and we can place you on our email list to receive the entire dataset each week as they are produced. The maps are normally first available on Wednesday of each week, unless there is a delay in the posting of the data by EROS Data Center where we obtain the raw data used to make the maps. These maps are provided for free as a service of the Department of Agronomy and K-State Research and Extension.

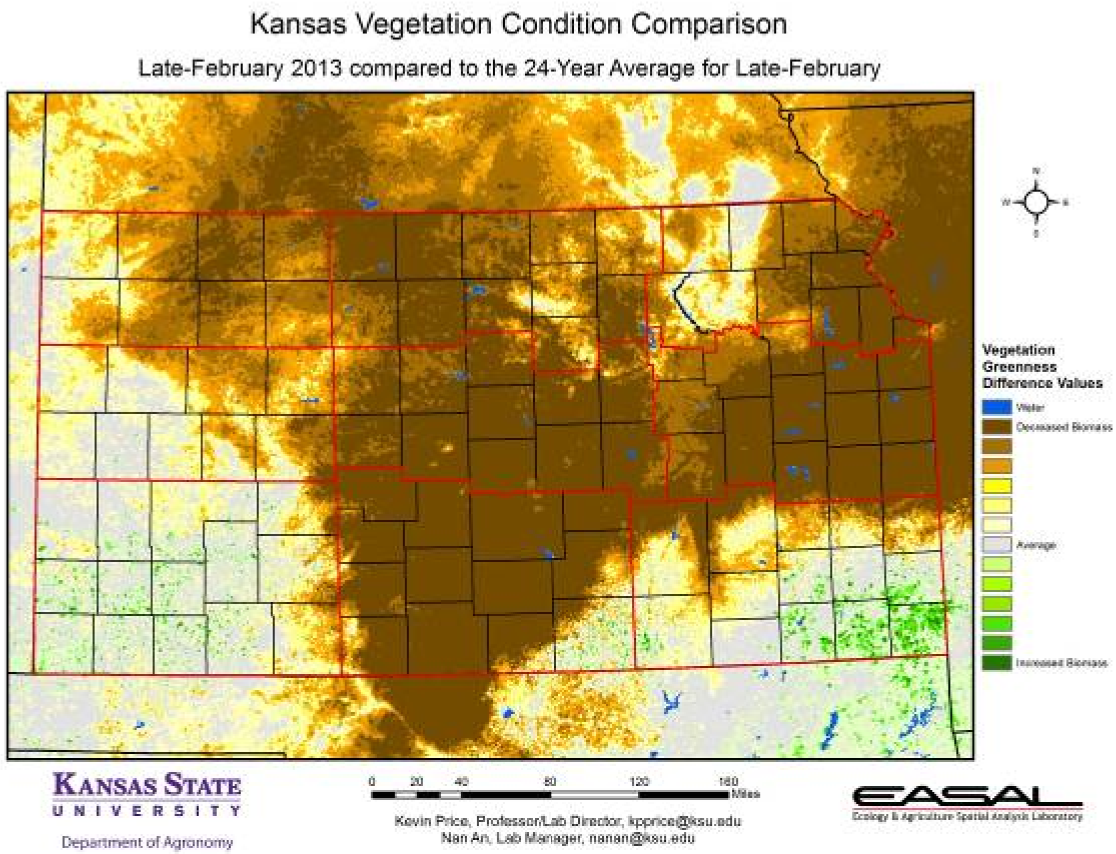
The maps in this issue of the newsletter show the current state of photosynthetic activity in Kansas, the Corn Belt, and the continental U.S, with comments from Mary Knapp, state climatologist:



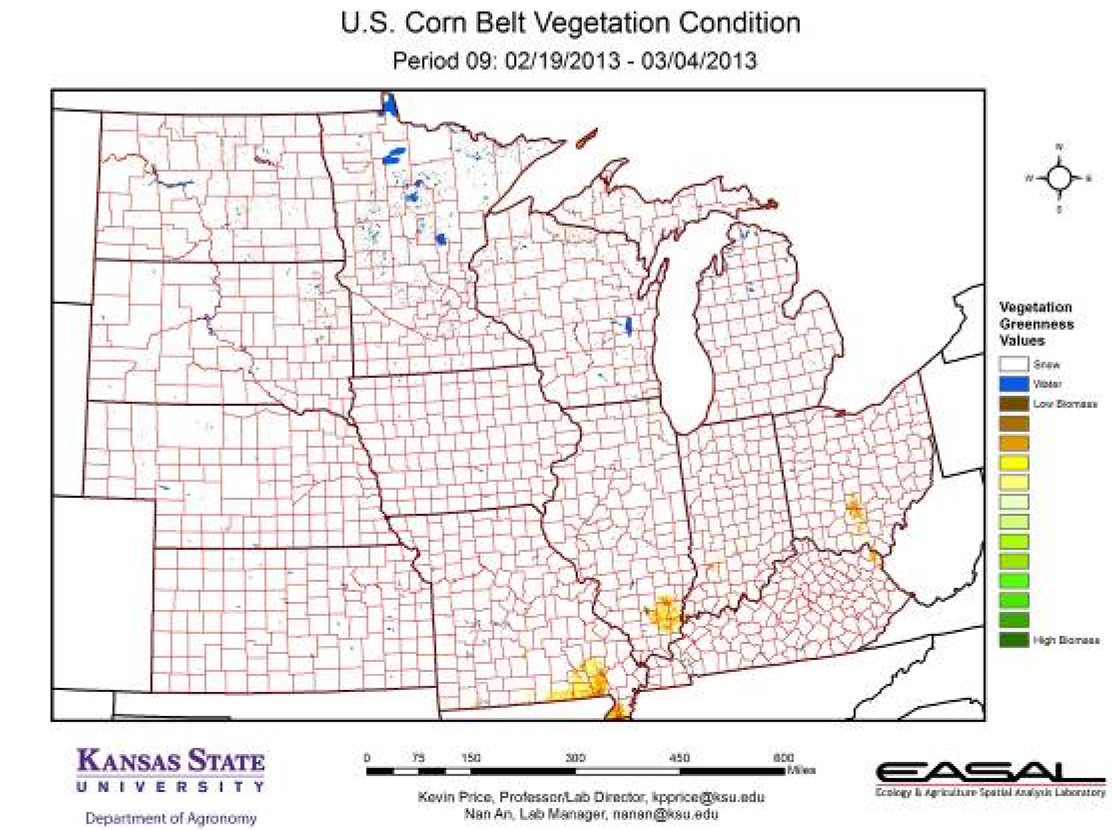
Map 1. The Vegetation Condition Report for Kansas for February 19 – March 4 from K-State's Ecology and Agriculture Spatial Analysis Laboratory shows that snow coverage was statewide. With the last storm, the heaviest snowfall was in southeast Kansas. In central Kansas and southeast Kansas, areas with the heaviest totals had snow water equivalents that were as much as 4 inches.



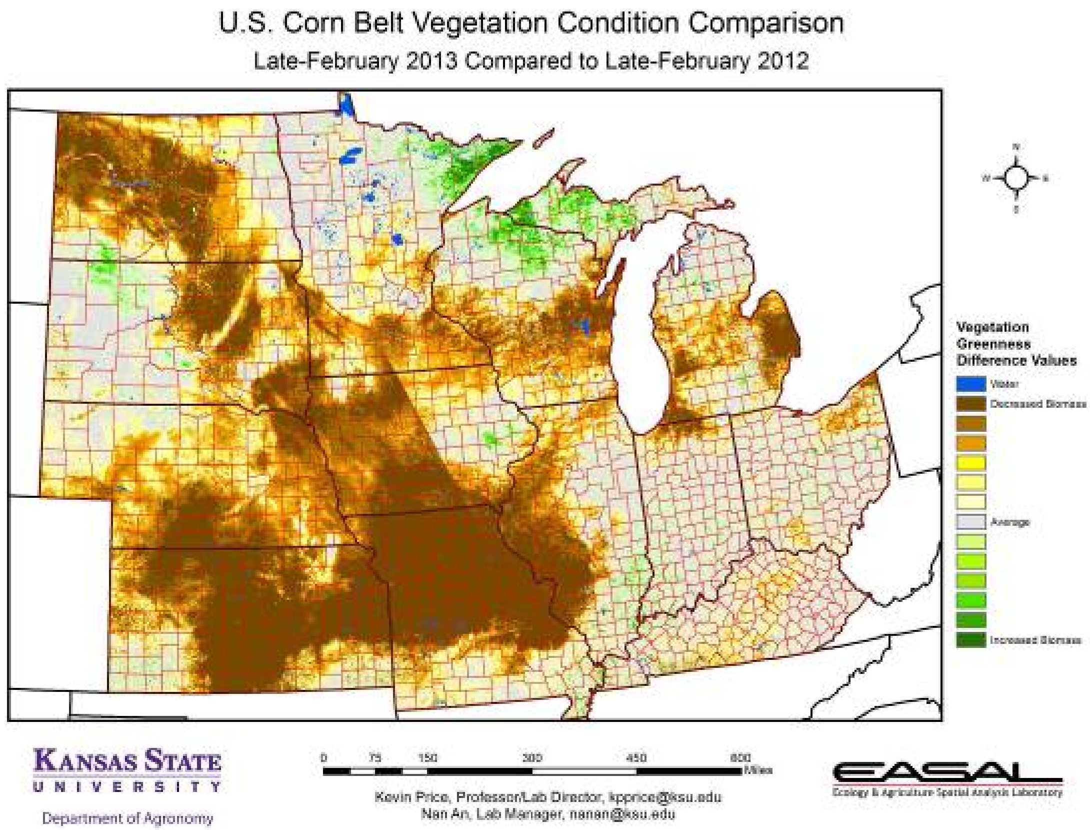
Map 2. Compared to the previous year at this time for Kansas, the current Vegetation Condition Report for September February 19 – March 4 from K-State's Ecology and Agriculture Spatial Analysis Laboratory shows that much of the state has much lower NDVI values. This year, temperatures are running 6 to 12 degrees cooler than average in all except the Southwestern Division, whereas last year temperatures averaged 6 to 8 degrees warmer than average.



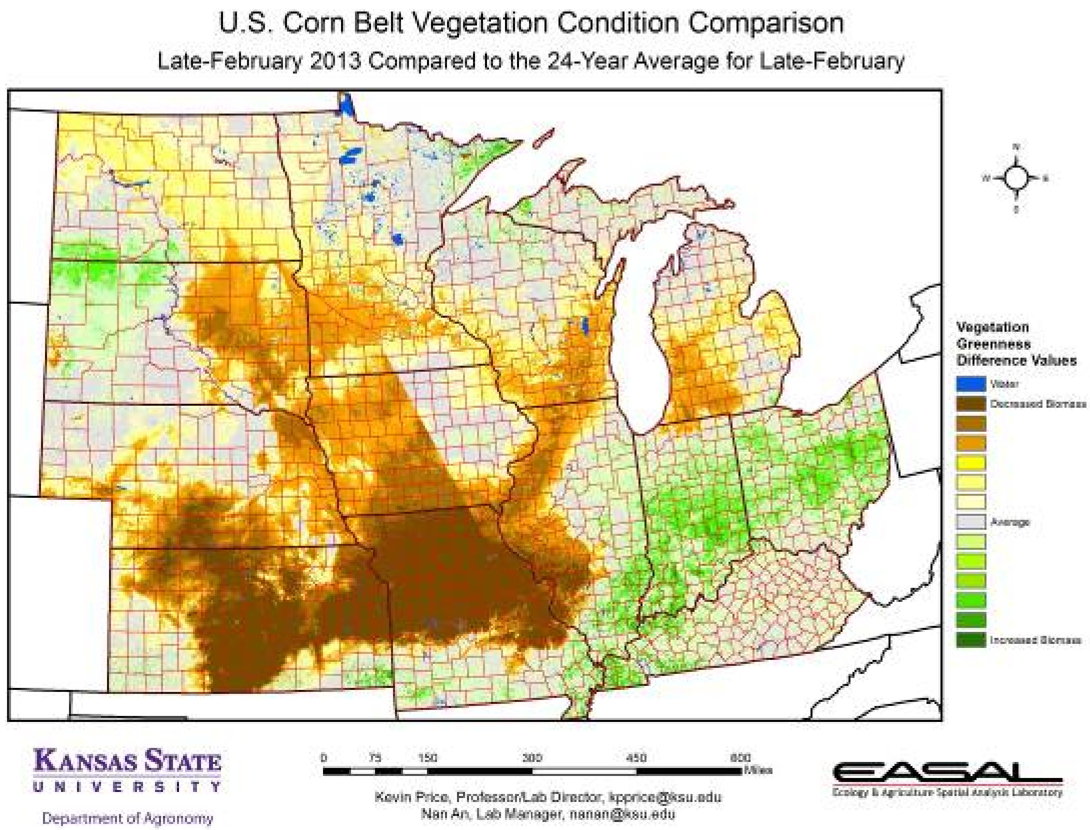
Map 3. Compared to the 24-year average at this time for Kansas, this year's Vegetation Condition Report for February 19 – March 4 from K-State's Ecology and Agriculture Spatial Analysis Laboratory shows much below-average photosynthetic activity in most of the state. Cooler soils and cooler-than-average air temperatures have slowed plant development in much of the state.



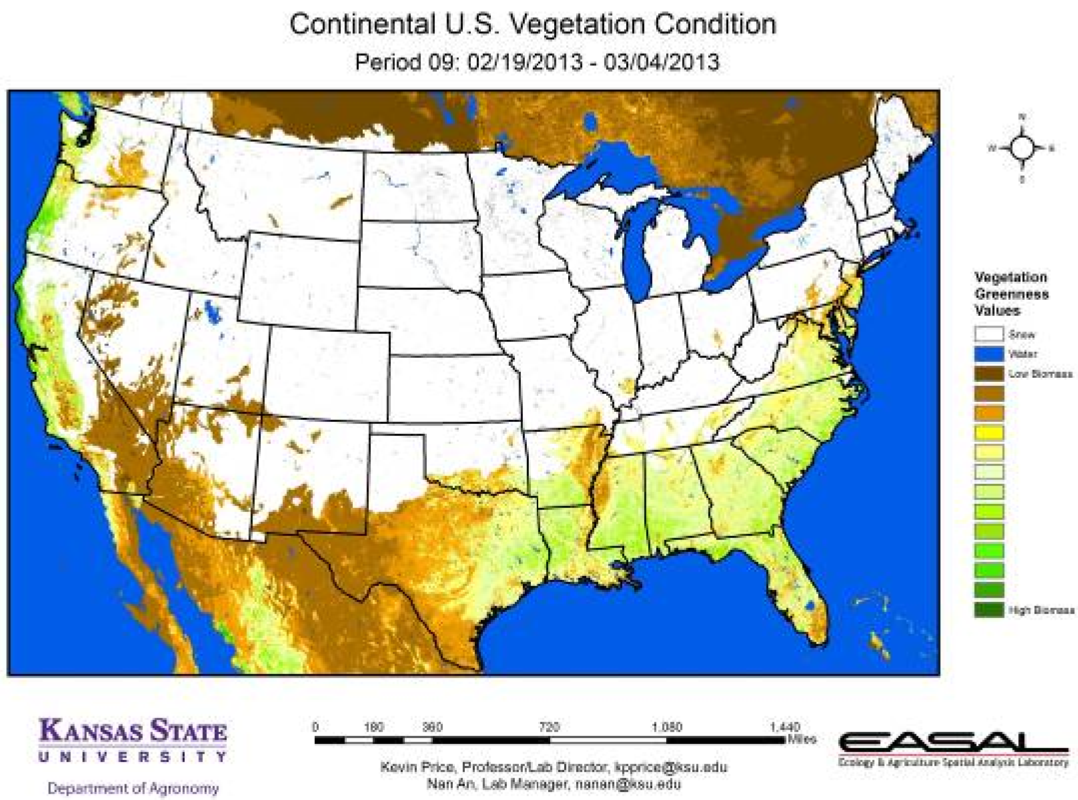
Map 4. The Vegetation Condition Report for the Corn Belt for February 19 – March 4 from K-State's Ecology and Agriculture Spatial Analysis Laboratory shows that most of the region had snowfall during the period. By March 4th, snow depths of 2 to 4 inches were still present as far south as central Missouri. Across the northern reaches of the Corn Belt snow depth was in the range of 30 to 40 inches.



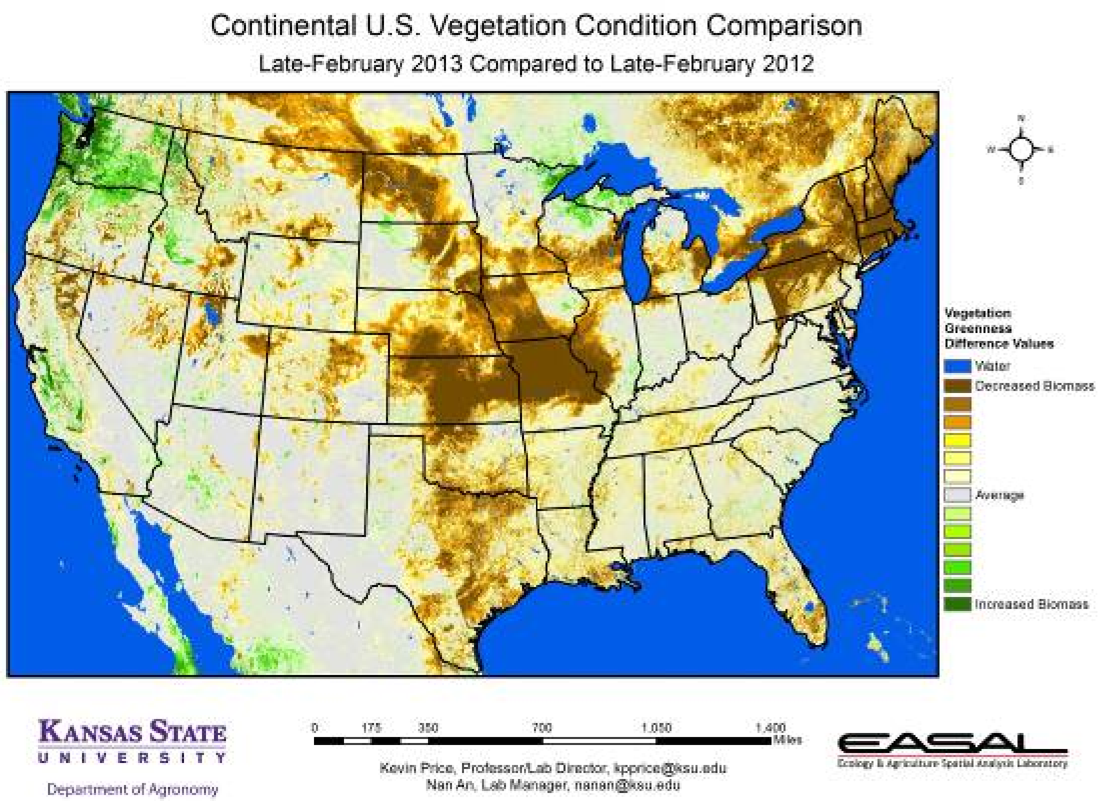
Map 5. The comparison to last year in the Corn Belt for the period February 19 – March 4 from K-State's Ecology and Agriculture Spatial Analysis Laboratory shows that NDVI values are lower across much of the western part of the region. In the eastern half of the region, temperatures and moisture are similar to last year, while in the western half of the region, temperatures are much cooler than last year and snow cover has been more prevalent.



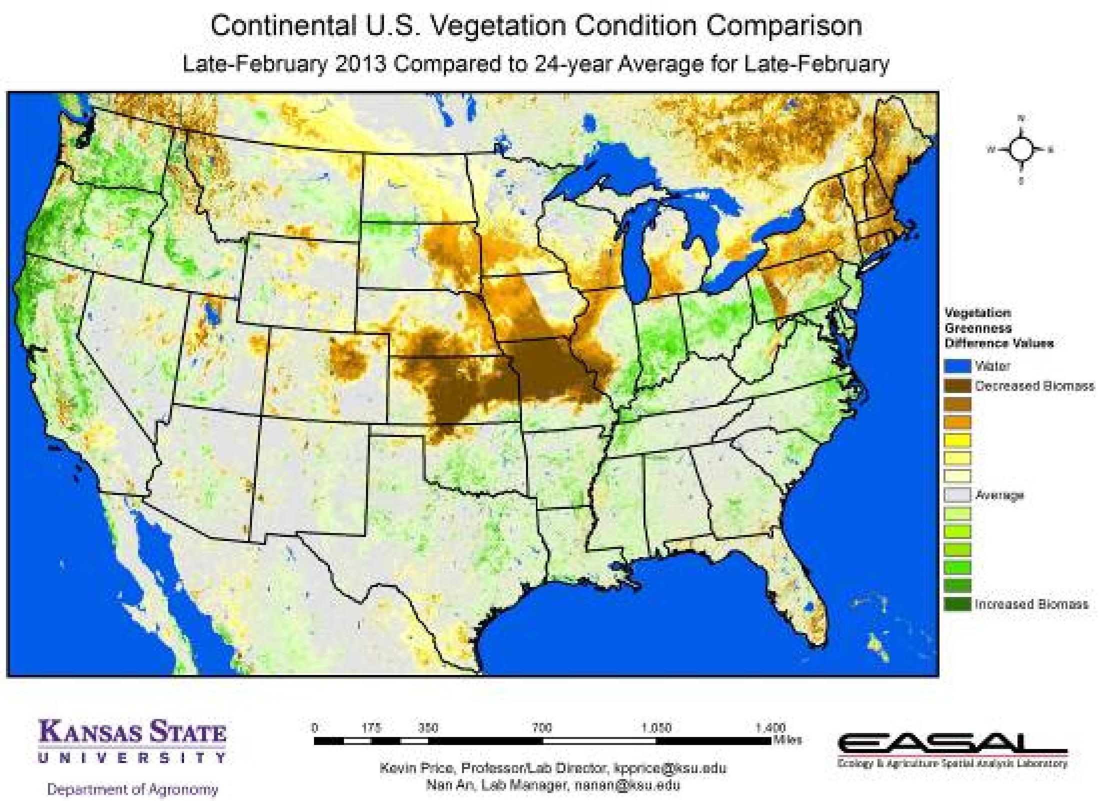
Map 6. Compared to the 24-year average at this time for the Corn Belt, this year's Vegetation Condition Report for February 19 – March 4 from K-State's Ecology and Agriculture Spatial Analysis Laboratory shows that photosynthetic activity is below average in the center of the region. The gap in northeastern Iowa is due to a splice line issue rather than a sharp improvement in photosynthetic activity.



Map 7. The Vegetation Condition Report for the U.S. for February 19 – March 4 from K-State's Ecology and Agriculture Spatial Analysis Laboratory shows that snow cover penetrated as far south as the Texas Panhandle. Amarillo had 17 inches of snow on the ground on the 26th of February, and didn't report zero snow cover until the 3rd of March.



Map 8. The U.S. comparison to last year at this time for the period February 19 – March 4 from K-State's Ecology and Agriculture Spatial Analysis Laboratory shows that lower photosynthetic activity is most notable in the Plains and in upper New England. Last year, temperatures were much warmer than average in these regions, with vegetation breaking dormancy earlier than usual.



Map 9. The U.S. comparison to the 24-year average for the period February 19 – March 4 from K-State's Ecology and Agriculture Spatial Analysis Laboratory shows that the Pacific Northwest and the Ohio River Valley are slightly above average in biomass productivity, while much of Kansas and Missouri have lower photosynthetic activity. Cooler temperatures in the Kansas and Missouri have slowed plant development in these areas.

-- Mary Knapp, State Climatologist
mknapp@ksu.edu

-- Kevin Price, Agronomy and Geography, Remote Sensing, Natural Resources, GIS
kpprice@ksu.edu

-- Nan An, Graduate Research Assistant, Ecology & Agriculture Spatial Analysis Laboratory (EASAL)
nanan@ksu.edu

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.