k-state extension AGRONOMY e-Updates

Number 288
March 18, 2011

1. Kochia control in wheat

As of mid-March, kochia was emerging in wheat and wheat stubble in western Kansas. Much of the wheat stands in that area are thin and the early growth is below average. As a result, it is possible for kochia to grow taller and to be even more competitive than usual this year, reduce yield, and pose a serious problem by harvest time if left uncontrolled.

Challenges to getting good control of kochia

It is not always easy to control kochia in a standing wheat crop, however. There are four big challenges to kochia control in wheat:

* There are many populations of kochia with resistance to either ALS-inhibitor herbicides, atrazine, or glyphosate. There may even be some populations resistant to dicamba.
* A majority of kochia emerges early in the spring, but some emergence can extend over a period of weeks or months. A herbicide applied early in the spring will need to have residual activity to be effective on later-emerging kochia. Several ALS-inhibitor herbicides have good residual activity, but are ineffective on ALS-resistant kochia.
* Dicamba, a non-ALS herbicide and one of the more effective products on most populations of kochia, must be applied before the jointing stage of wheat, meaning that later-emerging plants may not be controlled.
* Most other non-ALS herbicides that can be applied at a later growth stage of wheat are primarily contact herbicides that require thorough coverage to be effective, and this can be difficult to achieve when the wheat canopy gets larger and covers up some of the kochia present. Two exceptions are Huskie and Starane. Those two products can be applied at later

growth stages of wheat, are translocated (Starane more so than Huskie), and are effective on kochia.

Control in the standing wheat crop

At one time, the most effective way to control kochia in the wheat crop was an application of a sulfonylurea herbicide with residual activity. This is still a good approach where the kochia populations present are susceptible to ALS-inhibitor herbicides. The advantage of using this type of herbicide is that several sulfonylureas have both foliar and residual weed control, and thus can provide good control of susceptible populations through wheat harvest. Also, the sulfonylurea herbicides provide a broad spectrum of broadleaf weeds. Tank-mixing a growth regulator herbicide with a sulfonylurea herbicide is generally recommended to add additional control and to help reduce the risk of developing ALS-resistant weeds.

If populations of kochia resistant to ALS-inhibitor herbicides are present in wheat, getting good control becomes a little more difficult.

One option is to apply dicamba, or a premix that includes dicamba, such as Rave (Amber + dicamba) or Pulsar (Starane + dicamba). These products have to be applied before the jointing stage of wheat, and thus may miss later-germinating kochia. Dicamba alone has some residual soil activity, but not as much as most sulfonylurea herbicides. Rave will have residual activity from the Amber, but since Amber is a sulfonylurea herbicide, it would not provide any residual control of kochia populations that are resistant to ALS-inhibitor herbicides. Both ingredients in Pulsar have limited residual activity.

Another option producers have is Starane, which is effective on kochia. Like dicamba, Starane is a growth regulator herbicide, but it can be applied up to the early boot stage of wheat. Starane also has limited residual activity, so good coverage is still important for control. Starane is weak on mustard control.

Huskie is also effective on kochia. It is a broad-spectrum herbicide effective on most broadleaf weeds in wheat, and can be applied up to the boot stage of wheat. Huskie also has limited residual activity, so producers will need to make sure kochia plants are thoroughly covered with Huskie to get the best control. Ideally, the Huskie should be timed for application after the majority of kochia has emerged, but before the wheat canopy has become thick.

Buctril and Aim can control kochia and can be applied at later stages of wheat development, but both are contact herbicides with little or no residual activity. Consequently, both products have the same challenges as Starane and Huskie in terms of getting good coverage. Getting thorough coverage is even more critical with Buctril and Aim, since they are true contact herbicides and not translocated in plants.

Control in wheat stubble after harvest

If kochia has not been completely controlled in the wheat crop, then it may be present at the time wheat is harvested. In most cases, the kochia plants will have grown taller than the wheat canopy and will get “topped” by the combine as the wheat is harvested.

If kochia has been topped, producers should wait until some regrowth has occurred before applying herbicides in the wheat stubble to control it. A combination of glyphosate plus either dicamba or Starane may be the most effective treatments to control kochia in wheat stubble. Even if kochia populations are resistant to glyphosate, the tank-mix combinations with dicamba or Starane will probably provide good control. Some 2,4-D can be added to the mixture to help with control of other broadleaf weeds, although 2,4-D generally will not help much in controlling kochia.

To improve the chances of getting good control after wheat harvest, apply the postharvest treatments in the morning hours or after the field has received some moisture, not when the kochia plants are under maximum stress. Use the highest labeled rate of glyphosate, and make sure to add ammonium sulfate and any necessary surfactants.

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

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

2. 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 very unusual for a farmer not 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, and N placement method. Phosphorus source is not an important factor.

Soil fertility levels

The lower the fertility level, the greater the chance of economic responses 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 get 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 get 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. The chances of an economic return at higher soil test levels are greatest when planting corn early in cold, wet soils. If the soil test is high, above 30 ppm, economic responses to starter P fertilizers are rare. 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, and 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 soil test levels, producers will often get better results by splitting the application between a starter and a preplant broadcast application. If the soil test P levels are medium to high, applying all the recommended P as a starter will be adequate.

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 dissolved in water. The dissolved ammonium orthophosphates are identical to dry MAP (e.g. 11-52-0) and/or DAP (e.g. 18-46-0). The dissolved ammonium polyphosphates are quickly converted by soil enzymes to 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 on corn yields of phosphorus application from orthophosphate or polyphosphate applied at identical P_2O_5 rates (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 polyphosphates into orthophosphates. The concern for 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 be typically similar from either source 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 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 in the row middles. 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.

Nitrogen 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 starter fertilizer and seed. The safest placement methods for starter fertilizer are either:

-- A deep-band application 2 to 3 inches to the side and 2 to 3 inches below the seed, or
-- A surface-band application 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. 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 (see chart below). In-furrow placement 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

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

-- Kent Martin, Southwest Area Crops and Soils Specialist
kentlm@ksu.edu

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

3. Corn seeding rate recommendations

The optimal corn population for any situation will depend on the anticipated environment and how the hybrid responds to that environment. Producers can look back to their corn crop from the previous growing season, or wait until the current growing season is nearly complete, and evaluate whether the population they used was adequate.

Individual hybrids can respond differently, but the following guidelines may help in deciding if current seeding rates need to be adjusted. If more than about 5% of the plants are barren or if most ears have fewer than 350 kernels per ear, the population may be too high. If there are consistently more than 500 kernels per ear or if most plants have a second ear contributing significantly to grain yield, the population may be too low. Of course the growing conditions will influence ear number and ear size as well, so it is important to factor in the growing conditions for that season when interpreting these plant responses.

Don’t be too concerned if a half-inch or so of the ear tip has no kernels. If kernels have formed to the tip of the ear, there may have been room in that field for more plants contributing to grain yield. Again, "tipping back" will vary with individual hybrids and with growing conditions. Potential ear size is set before silking and the actual final number of kernels is not determined until after pollination and early grain fill.

Always keep the long-term weather conditions in mind. In 2010, May and June were extremely wet in some areas, causing soils to be saturated for extended periods of time and high nitrogen losses. Late July and August were dry in much of the state. Most of the early-planted corn was done silking and much of grain fill was complete by then, but later planted corn may have suffered. With a relatively dry winter, soil moisture reserves may be less than optimal, making aggressive seeding rates more risky in low-rainfall areas.

Optimal seeding rates may need to be adjusted for irrigated corn if fertilizer or irrigation rates are sharply increased or decreased. For example, research at the Irrigation Experiment Field near Scandia has shown that if fertilizer rates are increased, seeding rates also have to be increased to realize the maximum yield benefit. Consult seed company recommendations to determine if seeding rates for specific hybrids should be at the lower or upper end of the recommended ranges for a given environment.

The recommended planting rates in the following table attempt to factor in these types of questions for the typical corn growing environments found in Kansas. Adjust within the

recommended ranges depending on the specific conditions you expect to face and depending the hybrid you plan to use.

The following recommend planting rates are from the K-State Corn Production Handbook.

Suggested Dryland Corn Final Populations and Seeding Rates			
Area	Environment	Final Plant Population (plants per acre)	Seeding Rate*
Northeast	100-150 bu/a potential	22,000-25,000	26,000-29,500
	150+ potential	24,000-28,000	28,000-33,000
Southeast	Short-season, upland, shallow soils	20,000-22,000	23,500-26,000
	Full-season bottomground	24,000-26,000	28,000-30,500
Northcentral	All dryland environments	20,000-22,500	23,500-26,500
Southcentral	All dryland environments	18,000-22,000	21,000-26,000
Northwest	All dryland environments	16,000-20,000	19,000-23,500
Southwest	All dryland environments	14,000-20,000	16,500-23,500

Suggested Irrigated Corn Final Populations and Seeding Rates			
Environment	Hybrid Maturity	Final Plant Population (plants per acre)	Seeding Rate*
Full irrigation	Full-season	28,000-34,000	33,000-40,000
	Shorter-season	30,000-36,000	35,000-42,500
Limited irrigation	All	24,000-28,000	28,000-33,000

* Assumes high germination and that 85 percent of seeds produce plants. Seeding rates can be reduced if field germination is expected to be more than 85%.

For more information, see the K-State Corn Production Handbook, C-560:
http://www.ksre.ksu.edu/library/crpsl2/c560.pdf

-- Kraig Roozeboom, Cropping Systems and Row Crop Production Specialist
kraig@ksu.edu

4. Importance of corn stand and emergence uniformity

With corn planters beginning to roll soon, it is a good time to think about the importance of uniformity of stands and emergence. These are two different things. Stand uniformity has to do with how consistent plant spacing is within the row. Uniformity of emergence deals with timing. Do most plants come up at the same time, or are some delayed by several days?

Stand uniformity: Although uniform stands are desirable, how important is it that the distance between plants be the same from one plant to the next? Past research has indicated the potential for a 1 to 3.4 bushel/acre decrease in yield for every 1-inch deviation in plant spacing. Stu Duncan, Northeast Area Crops and Soils Specialist, has been looking at corn plant populations and stand uniformity the past few years. His results indicate little yield reduction from non-uniform stands as long as the final population is within 15% of the target population.

This agrees with work done by other researchers who have concluded that reduced population and non-uniform emergence have more potential to negatively influence yields than does non-uniform plant spacing. In fact, one study indicated that "doubles" (two plants where one was intended) can increase yield in favorable environments because the effective plant population was increased. Individual corn plants have enough flexibility in yield components (primarily ear size) to make use of the small changes in available resources resulting from non-uniform plant spacing.

Try to obtain plant spacings that are as consistent as possible, but don't become overly anxious about it as long as the typical spacing between plants is within two to three inches of the desired plant spacing and the final population is not substantially lower than what was desired.

Uniform emergence: Emergence can be delayed by non-uniform moisture in the seed zone, crusting, non-uniform planting depth, or non-uniform crop residue. Uniform emergence can be important for maximizing yield. Research has shown that if one out of six plants is delayed by two leaf stages, yields can be reduced by 4%. If one out of six plants is delayed by four leaf stages, yields can be reduced by up to 8%. Other research has indicated that if plants emerged within a period of two weeks, yield reductions were minimal (<3%). A 3% yield reduction may not be enough to justify replanting but it is enough to justify efforts to minimize variability in emergence when it could affect gross receipts by as much as $36/acre at 200 bushel/acre yields and $6/bushel corn.

Planter speed can affect both stand and emergence uniformity. Research conducted in northeast Kansas supports the conclusion that final plant population, which was reduced with higher planting speeds, had a greater impact on yield than did accompanying reductions in uniformity of plant spacing. Be sure to follow manufacturer guidelines for recommended planter speeds.

High-residue, no-till situations can be more challenging for getting uniform emergence. Uniform distribution of crop residues during harvest is essential for uniform emergence of the next crop. The use of vertical tillage, as well as chopping corn heads, are gaining popularity as ways to manage corn residue. Comparing vertical tillage to no-till, there were no differences in stand count or yield at any of four research locations in 2010 (DeAnn Presley, unpublished data). This experiment is being continued at five sites in 2011, to evaluate this new type of shallow, residue management tool.

Adjust planter units to optimize seed placement and depth. Seed firmers may help place seeds more uniformly. Emergence might be delayed slightly with deeper planting, but it will likely emerge more uniformly than if it were planted too shallowly.

-- Kraig Roozeboom, Cropping Systems and Crop Production Specialist
kraig@ksu.edu

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

-- DeAnn Presley, Soil Management Specialist
deann@ksu.edu

5. Kansas Flint Hills Smoke Management Plan: The role of emergency personnel

The following is a slightly edited transcript of the seventh in a series of K-State's Agriculture Today radio broadcasts on the Kansas Flint Hills Smoke Management Plan. This is an interview with Jason Hartman, Kansas Forest Service, conducted by Eric Atkinson of the K-State Radio Network. Podcasts of all Agriculture Today interviews can be found at: http://www.ksre.k-state.edu/DesktopDefault.aspx?tabid=197

For complete information on the Kansas Flint Hills Smoke Management Plan, see the new website: www.ksfire.org/

Q: It has long been advised, and even mandated in some locations, that local authorities be notified of any grassland burning activity, both before and after the burn, is that right?

A: Several counties require, as a matter of county ordinance, that the dispatch center or fire chief be called to notify them of a prescribed burn. In those counties where it's not required, it's encouraged.

Q: That's beyond the smoke issue. It has to do with safety and notifying the public that a prescribed burn is underway, as opposed to a wildfire, correct?

A: Yes, especially in this era of cell phones. Smoke from a prairie burn can be visible from a great distance. So when a call from a cell phone comes in, if the dispatcher knows that a prescribed burn was planned in that area or at that address, they can avoid an unnecessary dispatch of emergency services to what is already a controlled situation.

Q: Now to the smoke management plan itself. What role do the local emergency authorities, such as sheriff's office or fire departments, have in this plan?

A: They will be among those who get the greatest number of questions from the public about what is going on, what is involved, what the idea is, what's voluntary, what's a regulation, and what's a restriction. So the local authorities need to be educated as much or more than any other entity about the smoke management plan.

Q: The agriculture side of this plan is voluntary, correct?

A: Yes, it is voluntary. The only way a voluntary effort can work is for as many people as possible to know about it and support it. If our local fire and emergency services personnel understand that and know how the plan works, they can help the local citizens support it and keep it voluntary.

Q: Authorities will be even more involved in the non-agricultural burning restrictions, correct?

A: For the month of April, the plan requests local authorities to enforce restrictions on any open burning other than for grassland management. So burning of any brush piles and things like that would be restricted, and the burden of enforcing the restrictions falls on the local jurisdictions.

Q: Where will those restrictions be implemented?

A: The 13 Flint Hills counties, plus three urban counties: Johnson, Sedgwick, and Wyandotte.

Q: Local authorities are also collecting information on acreage that is being burned with prescribed burning. What is that aspect of the plan?

A: When you notify the local authorities that you're going to be doing a prescribed burn, one of the things they'll ask in most counties is how many acres will be burned. We initially went to nine counties (although this program is open and available to any county that wishes to participate) and asked the local authorities to enter the number of acres that was burned in their county at the end of the month in an online form. When we first started working on the smoke management plan, a question was raised asking how many grassland acres are burned with a prescribed burn every year. And no one really knew. This is an effort to get a better handle on that.

Q: So it is simply a matter of documentation?

A: Yes, this will allow us to ground truth other sources of information, such as satellite imagery. Also, with this monthly data, we can keep track of how many acres are burned in each county that participates each month. If we know how many acres were burned in March, for example, in a given county then we'd know how many more acres might be left to be burned in April. The more information we have, the better prepared we are in our planning.

Q: Theoretically, looking into the future, could this kind of information could be plugged into that decision-making tool that's being developed for smoke mitigation?

A: Yes. Those kind of decision-making tools will work better if they know how many acres are left to potentially be burned, and how much smoke could still be emitted into the air. There's no personal data being collected and reported. This is simply a county-wide effort.

Q: Part of the intent of the smoke management plan is to spread the burning out over a longer time period and reduce the intensity of the smoke from prescribed burns in the Flint Hills. How would that benefit local fire departments responding to wildfires?

A: Through education, information on the website www.ksfire.org, and other sources of information, we hope that people will find that there are possibly several different times that they could burn and still meet their objectives – brush control, prairie management, or livestock gain. Hopefully as people learn that, we can avoid having too much burning going on at any one time in any one area. In addition to causing air quality concerns at times, overly concentrated burning also stretches emergency response capabilities as thin as they can be stretched. If we can avoid those kind of situations, it makes everyone a little safer.

-- Steve Watson, Agronomy e-Update Editor
swatson@ksu.edu

6. Foliar nitrogen fertilizer products for wheat

Various foliar nitrogen (N) fertilizer products are being promoted as an option for spring fertilization of wheat. These products range in analysis and can include straight nitrogen products or mixtures of N plus other macro and micro nutrients. The straight nitrogen products will typically have an analysis similar to traditional liquid N fertilizers, such as 28 to 30 percent N.

One of the main differences between traditional UAN and the foliar products is that a certain percentage of the N in the foliar fertilizers is in some type of slow-release form. As a result, these specialty products are generally safer for application directly to the foliage in later stages of growth and result in less leaf burn than traditional UAN products. This has some appeal, especially where producers have been unable to get into the fields early and topdress applications have been delayed.

K-State has tested many different types of foliar N fertilizer products over the years. Foliar N fertilizer products are just as effective as traditional N fertilizers on a pound-for-pound basis, but they *are not more effective* than traditional N fertilizers. They can be applied in a broadcast spray application at later growth stages of wheat growth than traditional N fertilizer products without damaging the wheat. For that reason, they may have some value in situations where late applications of N are either necessary because earlier applications could not be made, or where a late application is desired in order to increase protein levels.

However, at the normal topdress time (prior to jointing), producers should simply compare a foliar product to a traditional N fertilizer product based on the cost of a pound of N per acre to determine which product gives the best value. Invariably, the foliar products will be several times higher in terms of cost-per-pound-of-N than the traditional N fertilizers. In unusual situations (well after jointing or when trying to increase protein levels), the foliar N products would have some premium value since traditional N products could not safely be used in a broadcast spray application.

To reduce the potential for leaf burn, there are alternative ways to apply traditional liquid N sources other than the standard spray nozzle. Streamer bars, a 10- to 15-inch long plastic bar which can be used with traditional spray booms in place of the nozzle, provide a solid stream of liquid fertilizer spaced every 5-6 inches. These streams of liquid greatly reduce foliar burn as compared to complete foliage coverage with standard flat fan spray nozzle. Broadcast granular urea also produces limited leaf burn as compared to sprayed UAN. In a study we conducted in 2008, applying 60 pounds of N as UAN sprayed on at Feekes 7 or 9 yielded 47 bushels per acre; broadcast urea at the same time yielded 51 bushels per acre, and UAN applied with streamer bars yielded 56 bushels per acre.

What kind of yield response can producers expect with later N applications, assuming the crop needs significantly more N? In 2009 a study was conducted to look at the effects of delayed N application using granular urea. The check plots, which received no N in fall or spring, yielded 46 bu/acre. In all the other plots 30 pounds of N was applied prior to planting. In these plots, applying an additional 60 pounds N at Feekes 4 (late tiller) produced 83 bu/acre; at Feekes 6 (jointing) 82 bu/acre; at Feekes 7 (second joint) 79 bu/acre, and at Feekes 9 (early boot) 65 bu/acre.

The bottom line is, there is still plenty of time to get N applied to wheat using traditional N products, especially if you put some N on last fall, before considering any alternatives for late applications. As it gets later and the temperatures warm up, spraying liquid UAN solutions on wheat can result in leaf burn. Alternative application methods such as broadcasting granular urea or applying UAN with streamer bars are safer options. Foliar N products could also be used for later applications, but the limited amounts of N which can be applied based on the labels of many of these foliar products limits their use in situations where large amounts of N are needed.

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

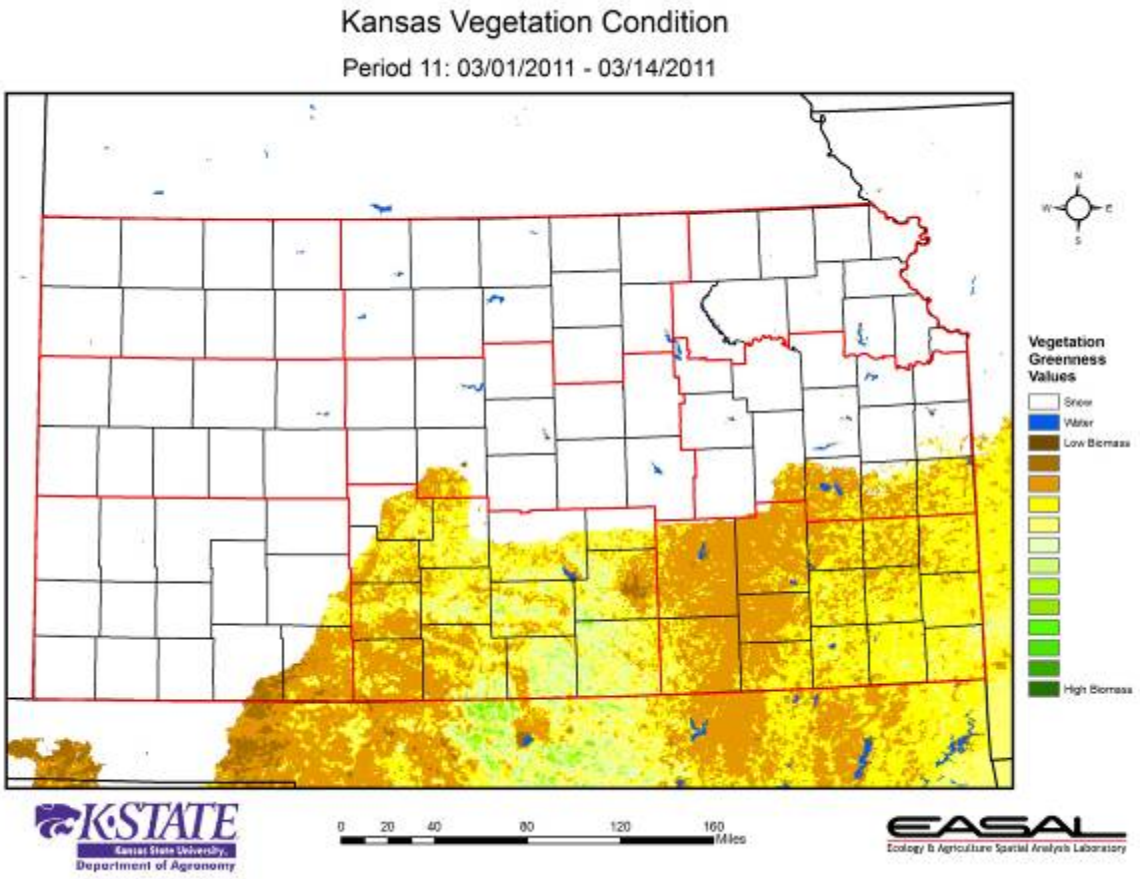
7. Comparative Vegetation Condition Report: March 1 – March 14

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.

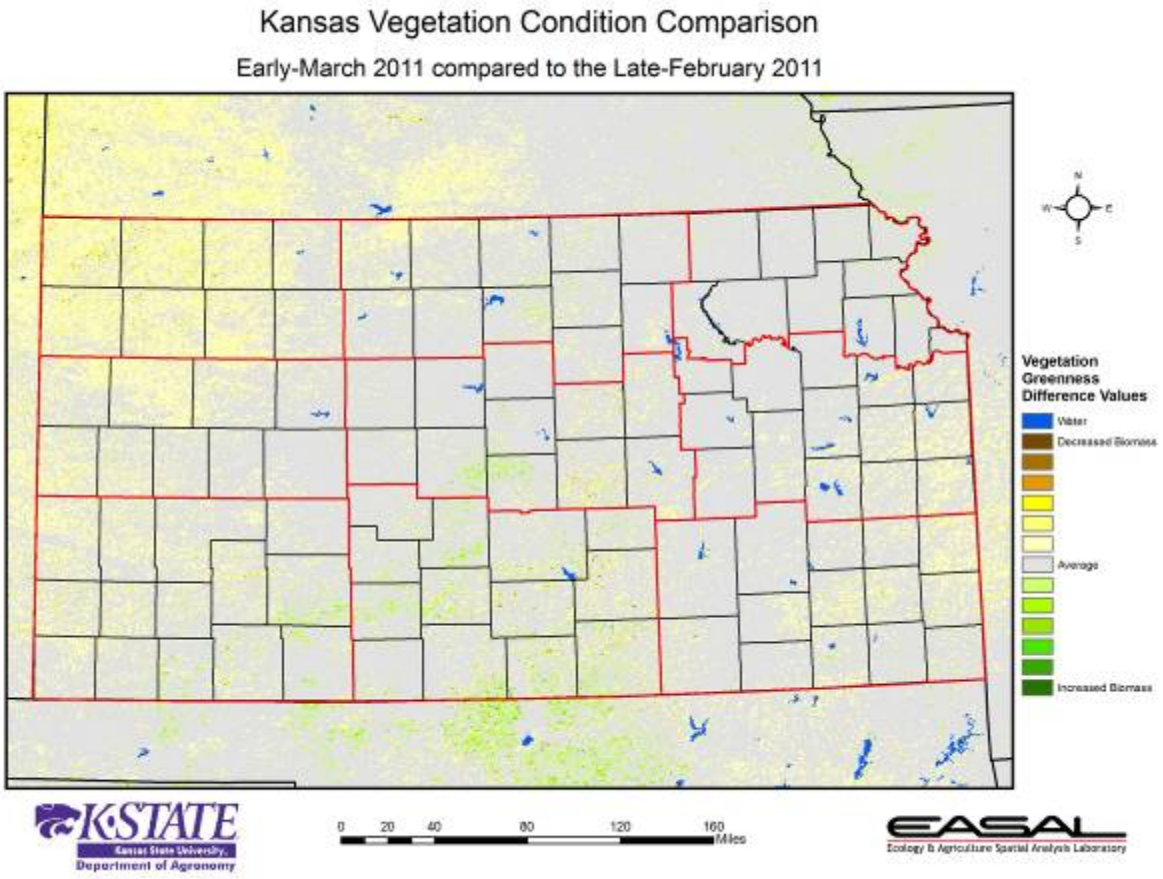
Two short videos of Dr. Kevin Price explaining the development of these maps can be viewed on YouTube at:
http://www.youtube.com/watch?v=CRP3Y5NIggw
http://www.youtube.com/watch?v=tUdOK94efxc

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 21-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.

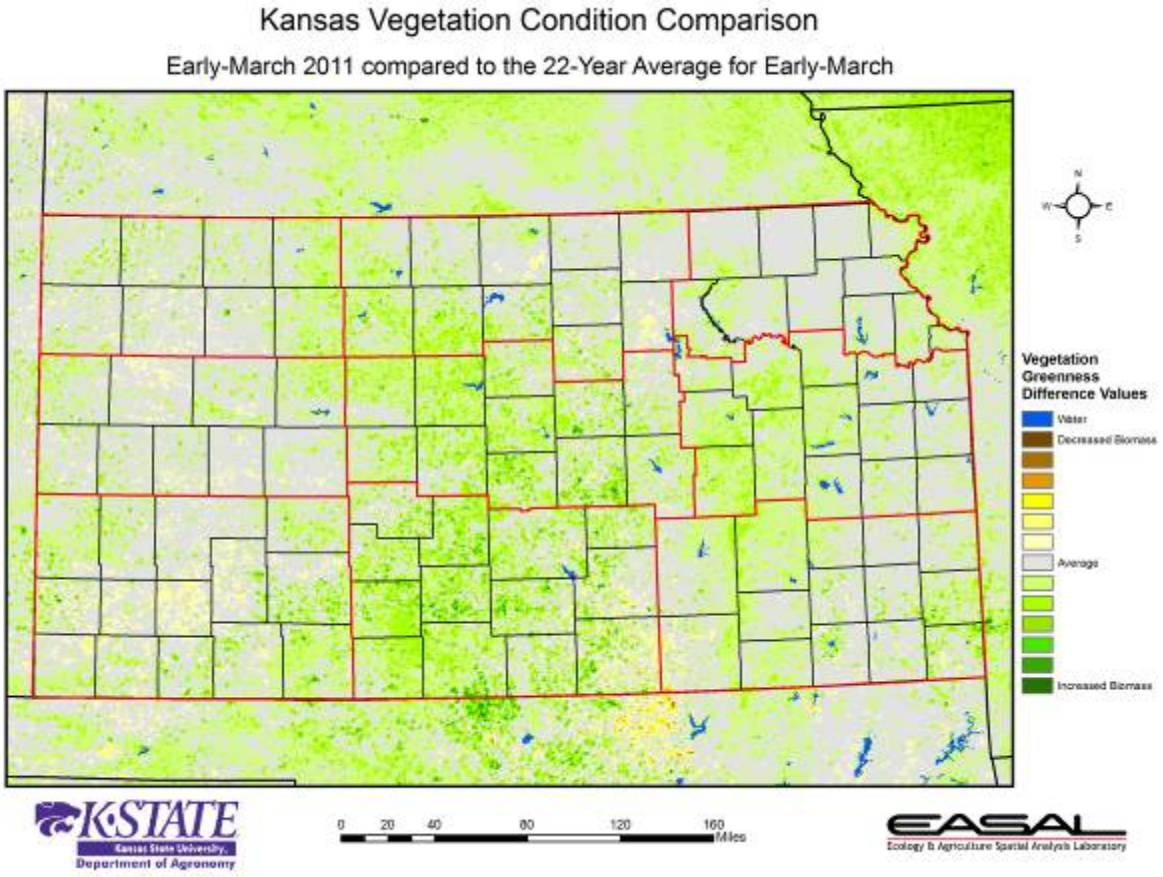
The maps below show the current vegetation conditions in Kansas, the Corn Belt, and the continental U.S, with comments from Mary Knapp, state climatologist:



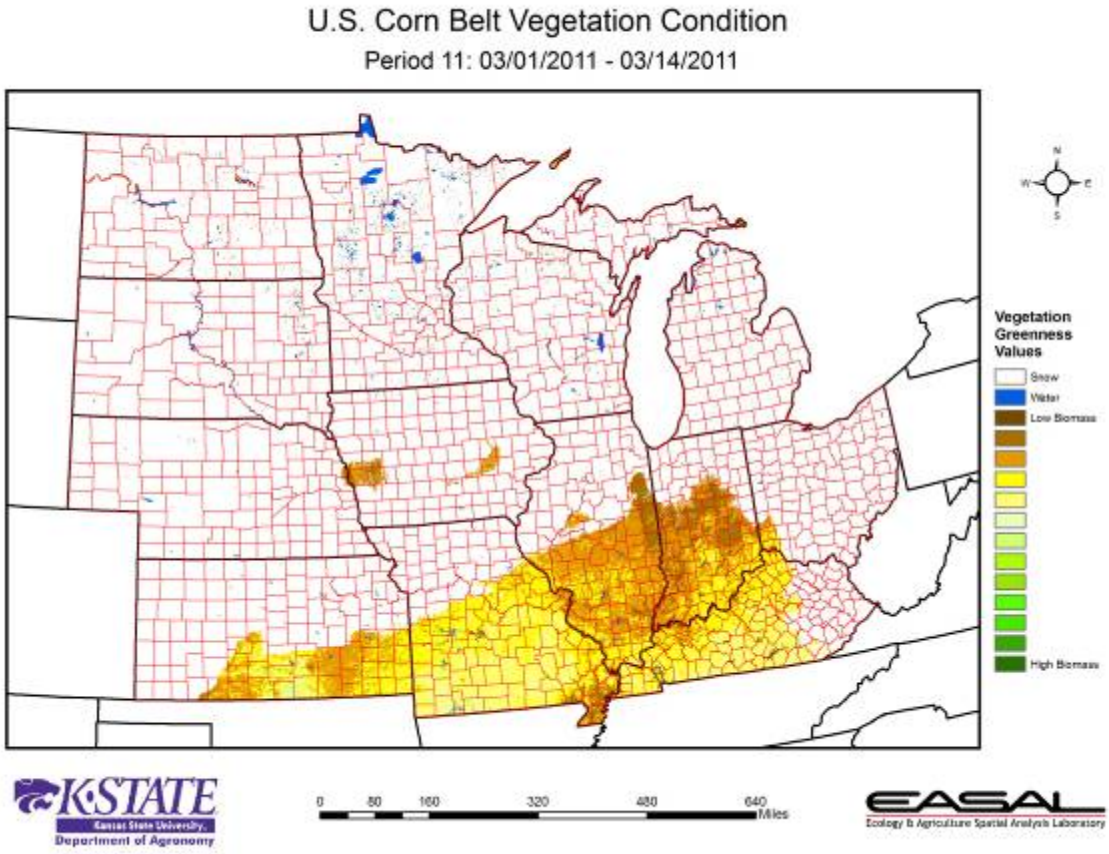
Map 1. The Vegetation Condition Report for Kansas for March 1 – 14 from K-State's Ecology and Agriculture Spatial Analysis Laboratory shows the result of the March 9 and the March 14 storms. Moisture amounts, despite the snowfall, averaged just over half of the normal for the period.



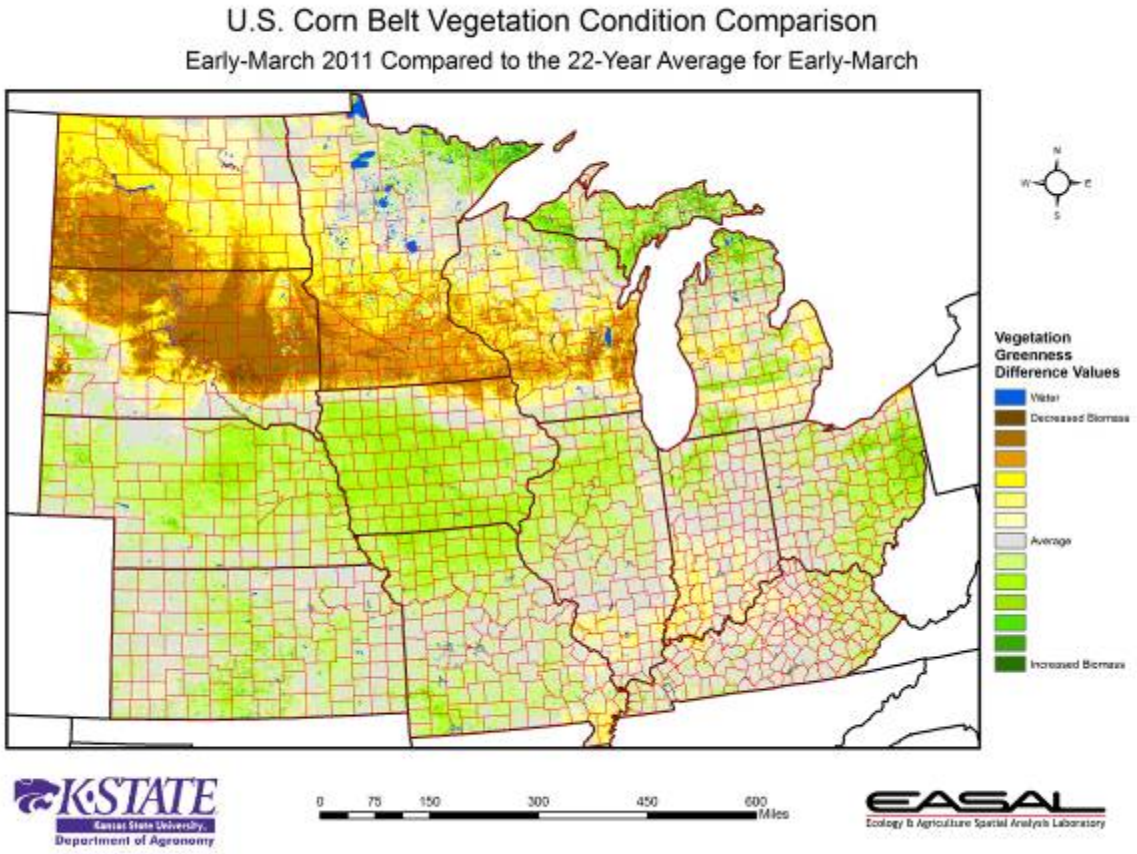
Map 2. Compared to the previous period at this time for Kansas, this year's Vegetation Condition Report for March 1 – 14 from K-State's Ecology and Agriculture Spatial Analysis Laboratory shows a decrease in photosynthetically active biomass, particularly in the western areas of the state.



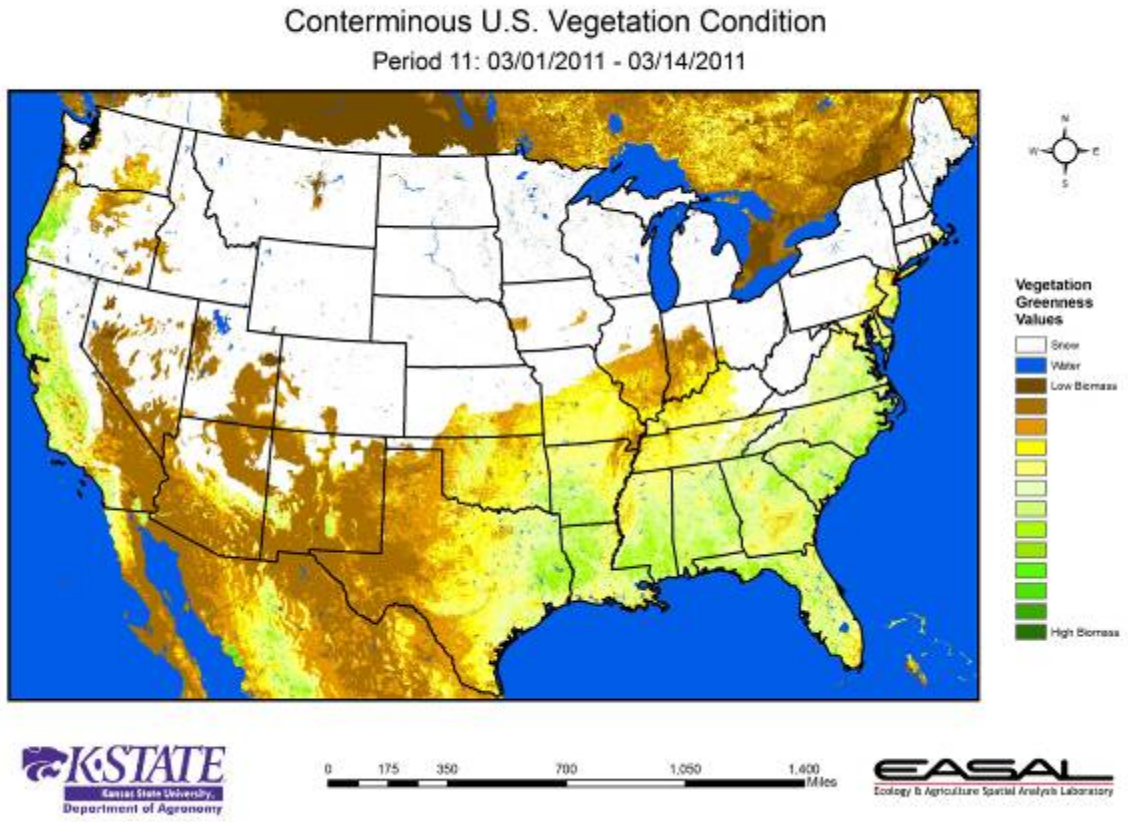
Map 3. Compared to the 22-year average at this time for Kansas, this year's Vegetation Condition Report for March 1 – 14 from K-State's Ecology and Agriculture Spatial Analysis Laboratory shows greater-than-normal photosynthetic activity in the central portion of the state, while below-normal photosynthetically active biomass is evident in the southwest division, as well as in south central Kansas. In the Flint Hills region, greater-than-average activity can be seen as a response to the warmer-than-normal temperatures prevalent in March.



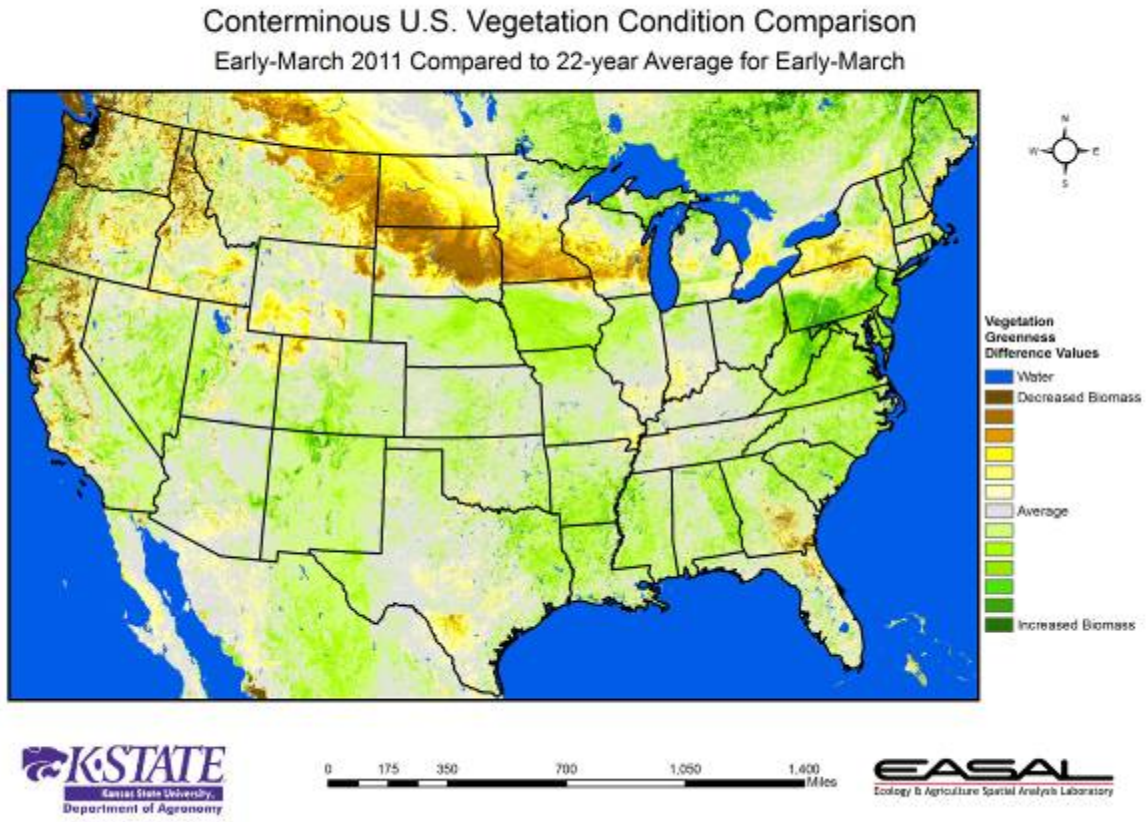
Map 4. The Vegetation Condition Report for the Corn Belt for March 1 – 14 from K-State's Ecology and Agriculture Spatial Analysis Laboratory shows that the snowpack is retreating, but most of the area is still showing little signs of spring green-up.



Map 5. Compared to the 22-year average at this time for the Corn Belt, this year's Vegetation Condition Report for March 1 – 14 from K-State's Ecology and Agriculture Spatial Analysis Laboratory shows that the below-normal activity has retreated northward. Some areas of below-normal activity can still be seen along the Ohio River in Illinois, Indiana, and Missouri where flooding continues to be a problem.



Map 6. The Vegetation Condition Report for the U.S. for March 1 – 14 from K-State's Ecology and Agriculture Spatial Analysis Laboratory shows the northward progressing of increasing photosynthetically active biomass. Areas of below-normal productivity in Georgia and Florida correspond to moderate to severe drought. Louisiana and Alabama, also still in moderate drought, show the benefits of recent rains.



Map 7. The U.S. comparison to the 22-year average for the period March 1 – 14 from K-State's Ecology and Agriculture Spatial Analysis Laboratory shows even more clearly the impact of recent rains on areas of Louisiana and Alabama. Below-normal photosynthetically active biomass, due to drought, can be seen in Georgia and North Florida, as well as parts of Texas. The areas of decreased photosynthetically active biomass in the northern states show the impact of the lingering snowpack.

-- 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, or Jim Shroyer, Research and Extension Crop Production Specialist and State Extension Agronomy Leader 785-532-0397 jshroyer@ksu.edu