

# **Extension Agronomy**

# eUpdate

# 02/27/2015

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. Preemergence herbicide programs for corn

There are several preplant and preemergence residual herbicides available for corn. These herbicide programs are key to managing glyphosate-resistant and other difficult-to-control weeds. 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 23-25 of *2015 Chemical Weed Control for Field Crops, Pastures, Rangeland, and Noncropland* (SRP 1117). See: http://www.ksre.ksu.edu/bookstore/pubs/SRP1117.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, applied just before or following planting, 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, metolachor, dimethamid-P, pyroxasulfone, and flufenacet, and many premix products containing one of these active ingredients. In general, these products are very effective in controlling annual grasses (except shattercane and Johnsongrass) 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. An exception are those products containing pyroxasulfone – Zidua, Anthem, and Anthem ATZ. These products have activity on kochia and the large-seeded 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. These premixes generally fit into two groups: products with a reduced atrazine rate and products with a full atrazine rate. Soil type, soil pH, and organic matter will determine whether the reduced- or full-rate atrazine product is used. 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 products with reduced/setup rates of atrazine greatly increases the risk of unacceptable weed control.

#### **HPPD-inhibitors**

Examples of HPPD-inhibitors are isoxaflutole (e.g. Balance Flexx, Corvus, and Prequel) and mesotrione (e.g. Callisto, Callisto Xtra, Lexar EZ, Lumax EZ, and Zemax). 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 on sunflower, provided the sunflower is not ALS-resistant. Herbicides containing clopyralid such as Hornet, TripleFlex II, or Surestart II will provide very good control of sunflower.

Zemax (Callisto + S-metolachlor) and Callisto Xtra (Callisto + atrazine) are new herbicides similar to Lumax EZ or Lexar EZ but Zemax and Callisto Xtra contain only two active ingredients. Control of broadleaf weeds with Zemax or Callisto Xtra will be less than Lumax EZ or Lexar EZ unless atrazine is added to Zemax or an acetamide to Callisto Xtra. Callisto, a component in Lexar EZ or Lumax EZ, has the same mode of action as Balance Flexx or Corvus – but Callisto has less activity on grass weeds. Thus, if Callisto is applied preemergence it should be applied with an acetamide herbicide and atrazine. A new herbicide from Syngenta called Acuron (expecting a March Federal label approval) contains Lumax EZ + bicyclopyrone. Bicyclopyrone is an HPPD-inhibitor herbicide that enhances large-seeded broadleaf weed control and also has grass activity. Acuron will have enhanced control of giant ragweed, common ragweed, common cocklebur, and velvetleaf, along with improved morningglory control over Lumax EZ.

#### 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 early to 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). Unless your situation prohibits atrazine use, always apply atrazine with HPPD-inhibitor and acetamide herbicides.

#### **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, the length of residual activity can be 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, 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

Kansas State University Department of Agronomy 2004 Throckmorton Plant Sciences Center | Manhattan, KS 66506 www.agronomy.ksu.edu | www.facebook.com/KState.Agron | www.twitter.com/KStateAgron 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. These three-way premixes, acetochlor+chlopyralid+flumetsulam, include SureStart II and TripleFlex II. Sunflower appears to be most sensitive to Hornet, followed closely by cocklebur and velvetleaf. Morningglory is less sensitive.

An additional ALS-inhibiting herbicide from DuPont is called Resolve (rimsulfuron). Rimsulfuron is also a component in Prequel, Instigate, Basis, and Basis Blend, which was previously mentioned. Additional products containing rimsulfuron include Harrow and Crusher. 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.

Curtis Thompson, Extension Agronomy State Leader and Weed Management Specialist <u>cthompso@ksu.edu</u>

# 2. Soybean fertilizer requirements in Kansas

Compared to corn, wheat, and sorghum, soybeans remove significant amounts of nutrients per bushel of grain harvested. Nutrient uptake in soybeans early in the season is relatively small. However as they grow and develop, the daily rate of nutrient uptake increases. Soybeans need an adequate nutrient supply at each developmental stage for optimum growth.

High-yielding soybeans remove substantial nutrients from the soil. This should be taken into account in an overall nutrient management plan. A 40-bushel-per-acre soybean crop removes approximately 30 pounds of  $P_2O_5$  and 50 pounds of  $K_2O$  with the grain; in addition, approximately 10 pounds of  $P_2O_5$  and 40 pounds of  $K_2O$  can be removed with the stover.

#### Nitrogen

Nitrogen is supplied to soybeans mainly by nitrogen fixation, and fertilizer nitrogen application is not recommended if the plants are well nodulated. Soybeans are heavy users of nitrogen, removing a total of 130 pounds per acre, and about 44 pounds with the stover for a 40-bushel-per-acre soybean crop. Soybeans use all the nitrogen they can fix plus nitrogen from the pool of available nitrogen in the soil. Nitrogen fertilizer application to soybean seldom results in any yield benefit, and efforts should focus on proper inoculation.

#### Phosphorus

Phosphorus applications should be based on a soil test. Responses to direct phosphorus fertilization is generally consistent in soils testing very low or low in soil test phosphorus. Response to starter phosphorus fertilizer application in soybeans can occur, but it depends on several factors. The most important factor is the soil test level. Generally, warmer soils at soybean planting, compared to corn, also may contribute to typically lower response to starter fertilizers in soybeans. However, starter fertilizer in soybeans can be a good way to complement nutrients that may have been removed by high-yielding crops in the rotation like corn. Banding fertilizer at planting is an efficient application method for soybeans. Soybean seeds are easily injured by fertilizer, therefore, no direct seed contact with fertilizer is advised.

#### Potassium

Soybean seeds are relatively high in potassium and removal of potassium by soybeans is greater than for other crops on a per-bushel basis when only the grain is removed. As with phosphorus, a soil test is the best index of potassium needs. Soils testing very low or low should be fertilized with potassium, either as a banded starter at planting or broadcast and incorporated. Potassium should not be placed in contact with the soybean seed because of possible salt injury. Yield increases from potassium can be comparable to those with phosphorus under very low and low soil test levels.

#### Sulfur

Sulfur is mobile in the soil (leaching is common), but fairly immobile in the plant. High soil test variability along with significant uptake by crops generates the need for proper sulfur management, especially in sandier soils and fields with several different soil types. Deficiency symptoms in soybeans are pale-green to yellow leaf color without prominent veins or necrosis in the youngest

trifoliate leaves. Recent Kansas studies suggest a low probability of soybean response to sulfur application. However, sulfur removal with soybean can be significant, and more sensitive crops in the rotation such as wheat may require sulfur fertilization.

#### Iron

Iron deficiency symptoms appear in irregularly shaped spots randomly distributed across a field, primarily in fields with a previous history of iron deficiency. Different annual weather patterns can make iron chlorosis more or less prevalent. Iron chlorosis also differs under different soil conditions. In general, high soil pH and high carbonates (free lime) can increase the incidence of iron deficiency. Iron chlorosis can be a big limitation in some regions of western Kansas. Iron fertilizer using chelated sources, and in direct contact with the seed (in-furrow) has shown significant yield responses in soils with history of iron chlorosis. If iron chlorosis has been a common problem in the past, producers should select a soybean variety tolerant to iron chlorosis. It may be beneficial to use a chelated iron in-furrow application. Foliar iron treatments seldom result in yield increase.

#### Others

Zinc, manganese, and boron are other nutrients that can be limiting in soybean. The need for zinc should be determined by soil tests. Zinc fertilizer can be either banded at or broadcast preplant with little difference in response when applied at an adequate rate. Both organic and inorganic zinc sources (chelates and nonchelates) can be used, but chelates are considered more effective than the inorganic sources.

Manure applications also are effective at eliminating micronutrient deficiency problems, including iron. Monitoring nutrient levels with tissue analysis along with soil tests conducted during the crop season should be used to diagnose potential nutrient deficiencies. Stresses such as drought, heat, and pest pressure can all influence tissue test results. Some micronutrients also can cause phytotoxicity if prevalent in large quantities. Nutrient removal by soybean is very high in high-yielding environments so fertilizer application rates will be high or soil test levels will drop. Regular soil testing (every 2 to 3 years) is essential for optimum nutrient management. Use a build and maintain phosphorus and potassium management system or be willing to fertilizer each crop each year, including soybeans. Soybeans take advantage of residual phosphorus and potassium, but keep in mind the total nutrient needs in the rotation.

See K-State Research and Extension publication *Soil Test Interpretations and Fertilizer Recommendations*, MF2586 for more complete soybean fertilizer recommendations: <u>http://www.ksre.ksu.edu/bookstore/pubs/MF2586.pdf</u>

Dorivar Ruiz Diaz, Nutrient Management Specialist

ruizdiaz@ksu.edu

Kansas State University Department of Agronomy 2004 Throckmorton Plant Sciences Center | Manhattan, KS 66506 www.agronomy.ksu.edu | www.facebook.com/KState.Agron | www.twitter.com/KStateAgron

# 3. On-farm Research Collaborative Project: Non-biased, Research-based, and Grower-driven

K-State Extension state specialists, area agronomists, and county/district agents are again seeking to collaborate with producers in establishing on-farm and large-scale research plots in 2015. Last year, we had on-farm projects in diverse areas around Kansas, setting up tests involving corn, soybean, and grain sorghum. In 2015, we will be collaborating with the Kansas Ag Research and Technology Association (KARTA) on these tests, along with K-State's Lucas Haag, Ajay Sharda, Terry Griffin, and Extension agents and area agronomists.

The goal of our on-farm research collaborative project is to establish a network of on-farm research collaborators with the main purpose of providing research results on production practices at the regional or local scale, under a wide set of growing conditions and soil types.

Among other benefits, this will help agronomy researchers at K-State check the validity of previous scientific findings conducted in small plots and in more controlled environments.

The on-farm information will be produced and used by farmers. Farmer participation is the key component of this project and farmers will be the main beneficiary.

#### Why should I get involved in this project?

1. The project has a main goal to improve yields and/or minimizing input costs, increasing overall efficiency at the local level.

2. The project will help producers learn the best ways to design an on-farm test so they can obtain reliable information on a specific question related to their own farms.

3. The outcomes from this project will aid other growers in Kansas.

#### Who are the key players?

1. <u>Kansans farmers</u>: Farmers are the main players, the ones who will implement the trials and collect the data.

2. <u>Extension Agricultural Agents</u>: The agents are the "gatekeepers" of this project. They work very closely with farmers and can assist, if needed, with information and/or help on implementing the trials.

3. <u>K-State Extension State Specialists and Area Agronomists</u>: K-State faculty will assist Extension agents and Kansas farmers in developing the protocols, implementing trials, and analyzing the research information generated at the on-farm scale.

# Research data (small-plots) vs. On-farm data (large-plots): What is the main different between these concepts?

Information produced at research stations has the following features:

- 1. Small plot size = small variability ("controlled conditions")
- 2. Intensive sampling = usually related to a graduate student project, with many samples taken throughout the growing season
- 3. More complex and more treatments can be evaluated
- 4. Small sample size = measurements may be less representative of "real" farm conditions

On-farm data have the following features:

- 1. Large plot size = higher variability due to uncontrollable variation within each plot
- 2. Less intensive sampling
- 3. Less complex and fewer treatments can be evaluated
- 4. Large sample size = measurements may more closely represent "real" farm conditions

#### Are the on-farm protocols the same for all environments and farmers or should they be farmeror site-specific?

Farmers have their own interest and specific questions that need to be properly addressed. Protocols will be designed to fit each farmer's situation. Some of the diverse topics that we have discussed include: corn/ soybean/ sorghum seeding rates; corn/ sorghum hybrids; sorghum/ soybean row spacing; corn/ soybean/ sorghum planting dates; full or limited irrigation; and other topics.

#### **Protocols:**

<u>Crops</u>: Corn / Soybean / Sorghum / Winter Canola

Topics:

- Seeding Rates
- Planting Dates
- Row Spacing
- Hybrid/ Variety Selection

#### How many factors need to be evaluated?

The idea is to perform "simple" on-farm experiments evaluating one or two factors at the time.

#### How many levels for each factor?

This will depend on the availability of space in the field, but to properly understand the optimum crop management level, 4 to 5 levels are usually needed. For example, if corn seeding rate is evaluated, five seeding rates will allow the grower to properly identify the optimum seeding rate for each specific farm environment. The diagram below presents an example of 5 test levels for a seeding rate study.



**Replications?** 

To obtain statistically sound and solid recommendations, a minimum of 3 replications are recommended.

#### Are crop production practices environment-specific?

The example in the graphic below shows how the optimum plant density to maximize corn grain yield will vary according to different environments. For the low yielding environment (<100 bu/acre), the economically optimum plant density was about 15,000 to 20,000 plants per acre; while for the high-yielding site, economically optimum maximum plant density is about 25,000 plants per acre. Therefore, different yield potentials in different environments have different "optimum" crop production practices to maximize net returns.



Goal for the next 5 years

This project has as a goal to establish a network of on-farm research trials with the purpose of finetuning crop production recommendations to local environments. The end result will hopefully be to generate practical information that will either improve yields or minimize input costs.

Our goal will only be possible if farmers collaborate with us and vice versa, in a reciprocal approach.

Farmers interested in participating in this project can get more information by directly contacting Ignacio Ciampitti at 785-410-9354 or Ciampitti@ksu.edu or by contacting their county Extension Agricultural Agents or Area Extension Agronomists.



-- Ignacio Ciampitti, Crop Production and Cropping Systems Specialist, K-State On-Farm Research Project Coordinator and KARTA collaborator

ciampitti@ksu.edu

# 4. Hessian fly infestations found in southeast Kansas

Hessian flies were found this week on a field of wheat in southeast Kansas. This was on a field of Everest, a variety with a rating of "3" for Hessian fly on a scale of 1-9, with 1 being most resistant and 9 being most susceptible. The long open fall in 2014 may have led to an extended period of adult Hessian fly activity and possible multiple broods. Even varieties with resistance to Hessian fly can occasionally become infested if the insect pressure is high enough, and we are now finding that high temperatures my negatively affect some of the resistance genes.



Figure 1. Field of wheat in southeast Kansas infested with Hessian fly. Photo taken during the week of Feb. 22-26, 2015. All photos by Holly Schwarting, K-State Research and Extension.





Kansas State University Department of Agronomy 2004 Throckmorton Plant Sciences Center | Manhattan, KS 66506 www.agronomy.ksu.edu | www.facebook.com/KState.Agron | www.twitter.com/KStateAgron The Hessian flies seen now would have infested the wheat in the fall. Hessian flies may emerge on warm fall days, usually in September or October. The longer these conditions persist in the fall, the longer Hessian fly activity will continue – even into November at times in Kansas.

Adults lay their eggs in the fall, usually on the upper surface of wheat leaves. After the eggs hatch, about three to 10 days later, the larvae (maggots) will crawl down the plant and begin feeding just above the crown between leaf sheaths and stem. The larvae will feed for up to 30 days, and will finish before cold weather. After feeding, the larvae will form hard, mahogany-colored capsules called "flaxseeds," in which they overwinter. These are the puparia. There may be more than one such cycle in the fall, depending on how warm the weather is and how early the first cycle gets started.

A similar cycle occurs in the spring. Adults will emerge after the weather warms up, anytime from early March through April. The eggs will be deposited on wheat in the same or nearby fields, and flaxseed can later be found on oversummering wheat stubble. More than one such generation can also occur in the spring.

Fall infestations in wheat can be difficult to detect. Shoots will be stunted if infested, and plants may even die. There will be undeveloped central shoots with a broad, thickened and darker green leaf.

Spring infestations can also be hard to detect until harvest. Tissue at the base on an infested plant will stop growing while the remaining, uninfested plant tissue will continue growing. This weakens the stem, leading to partially filled heads or stem breakage at the point of feeding.

-- Jeff Whitworth, Extension Entomology jwhitwor@ksu.edu

-- Holly Schwarting, Research Associate, Entomology holly3@ksu.edu

# 5. Factors that influence Hessian fly infestations

Wheat infested with Hessian flies now could pose a threat to next year's wheat crop planted this fall. It is a good idea to start planning now to minimize this threat to fall-planted fields. Which wheat fields are most likely to be infested with Hessian fly in the fall? It depends on residue management, variety, planting date, the presence of nearby volunteer wheat, the use of insecticide seed treatments, and crop rotation.

Residue management. Undisturbed stubble favors survival. Experience has shown that, where soil management practices allow, thorough incorporation of the stubble can be a useful management technique. Thorough incorporation must be stressed, however. In one study, flaxseeds buried 1 inch below the surface of the soil allowed 26 percent of the population to emerge, at 2 inches only 6 percent emerged, and none emerged where stubble was buried to a depth of 4 inches. In another study, it was determined that double discing was five times more effective than single discing. What about burning and grazing? Studies have shown that burning destroys flaxseeds present on the above-ground portion of the stem. A slow-moving fire is best, but stubble fires are often fast moving and affect top growth instead of burning out the crowns at or below the soil line where the majority of flaxseeds exist.

Variety. Often the best practice is to consider planting a resistant variety, where practicable. Growers should consider this option carefully during times when fly populations appear to be increasing, especially when the intention is to plant early for fall pasture and where other options are limited. Consult with your local K-State Research and Extension agent for more information on performance of varieties in your area. Or see K-State Research and Extension publication MF-991 *Wheat Variety and Disease Insect Ratings*, available at your local Extension office or on the web at: <a href="http://www.ksre.ksu.edu/bookstore/pubs/MF991.pdf">http://www.ksre.ksu.edu/bookstore/pubs/MF991.pdf</a>

Planting date. In theory, waiting to plant until the best pest management planting date (BPMP) allows time for the main fall brood of adult Hessian flies to emerge and die before wheat is planted. Without live wheat plants, emerging females are deprived of a place to lay eggs, minimizing fall infestation. There is still some risk if a nearby infestation exists and a secondary fall brood develops.

The risk of fall infestation is almost always greater where wheat is planted before the BPMP date, especially during years favorable for fly development. Mild fall weather can reduce the effectiveness of using this date as a planting guide. The BPMP date may not always present the best planting date for optimum yield, but on average, it correlates well. The BPMP date can be used on an individual-field basis but will be more effective when it is practiced area wide.

Planting too late is also risky. Growers may be surprised to learn that delaying planting too late in the fall can actually increase the risk of Hessian fly infestation. While late planting dates may protect the field against fall infestation, the result is smaller plants in the spring. And when the spring brood of flies is active in March or April, those females prefer younger plants for egg laying. Thus, if a source of infestation is nearby, very-late-planted wheat of a susceptible variety may suffer extensive damage from spring infestations.

Volunteer wheat. Volunteer wheat that is allowed to grow for two to three weeks, especially in wet summers, can enable the fly to produce an extra brood and infest the planted crop in greater numbers. Volunteer wheat not only increases the population but also may render other practices,

Kansas State University Department of Agronomy 2004 Throckmorton Plant Sciences Center | Manhattan, KS 66506 www.agronomy.ksu.edu | www.facebook.com/KState.Agron | www.twitter.com/KStateAgron such as planting after the BPMP date, less effective. The adult fly is capable of dispersing to adjacent fields to lay eggs, so it is vital to destroy volunteer wheat in the area at least two weeks before the planted crop germinates. This practice also helps reduce the incidence of wheat streak mosaic virus.

Insecticide seed treatments. Studies have shown that systemic seed treatments may provide some control of Hessian fly larvae for up to 30 days. Depending on when the wheat is planted, this may protect plants through the egg-laying period in fall, or at least shorten the period of vulnerability before cold weather stops adult emergence and larval feeding. In either case, Hessian fly impact is reduced.

Crop rotation. The Hessian fly has a limited host range and is not a migratory pest, so populations can be reduced by not planting wheat directly back into infested stubble.

Jeff Whitworth, Extension Entomologist jwhitwor@ksu.edu

# 6. Comparative Vegetation Condition Report: February 10 - 23

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 26-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 Nan An at nanan@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, service climatologist:

## Kansas Vegetation Condition



Period 08: 02/10/2015 - 02/23/2015

Figure 1. The Vegetation Condition Report for Kansas for February 10 – 23 from K-State's Ecology and Agriculture Spatial Analysis Laboratory shows that only a small portion of north central Kansas missed the snow entirely. Unfortunately, the amounts were limited in the northern parts of the state. Heaviest snowfalls were in southwest Kansas at the end of the period.

## Kansas Vegetation Condition Comparison



Mid-February 2015 compared to the Mid-February 2014

Figure 2. Compared to the previous year at this time for Kansas, the current Vegetation Condition Report for February 10 – 23 from K-State's Ecology and Agriculture Spatial Analysis Laboratory shows a pronounced splice line in eastern Kansas. Areas of lower NDVI readings are most concentrated in the area from Norton and Phillips counties south to Trego and Ellis counties. The lower NDVI values in the east are a result of the splicing issues.

# Kansas Vegetation Condition Comparison



Mid-February 2015 compared to the 26-Year Average for Mid-February

Figure 3. Compared to the 26-year average at this time for Kansas, this year's Vegetation Condition Report for February 10 – 23 from K-State's Ecology and Agriculture Spatial Analysis Laboratory shows above-average NDVI values in the southwestern counties. This area has had warmer- and wetter-than-average conditions for the period. The lower photosynthetic activity depicted in northeast Kansas is largely due to the splicing issue.



Figure 4. The Vegetation Condition Report for the Corn Belt for February 10 – 23 from K-State's Ecology and Agriculture Spatial Analysis Laboratory shows that a narrow area of southeastern South Dakota and eastern Nebraska missed the snow. The western portions of the Corn Belt have lower snow amounts that the areas east of the Missouri River.



U.S. Corn Belt Vegetation Condition Comparison Mid-February 2015 Compared to Mid-February 2014

Figure 5. The comparison to last year in the Corn Belt for the period February 10 – 23 from K-State's Ecology and Agriculture Spatial Analysis Laboratory shows that the greatest increase in NDVI readings is in southwestern Minnesota. The difference is due to snowfall. This year the area has had half the snow reported last year. In southeastern Nebraska, where NDVI values are lower, the opposite is true. Lincoln reported almost three times the snow this year compared to last.



### U.S. Corn Belt Vegetation Condition Comparison Mid-February 2015 Compared to the 26-Year Average for Mid-February

Figure 6. Compared to the 26-year average at this time for the Corn Belt, this year's Vegetation Condition Report for February 10 – 23 from K-State's Ecology and Agriculture Spatial Analysis Laboratory shows the impact of snow cover. Higher-than-average NDVI readings are visible from South Dakota through southwestern Minnesota, where snow cover is lower-thanaverage. From southern Missouri through northern Ohio, lower NDVI readings prevail.



Continental U.S. Vegetation Condition Period 08: 02/10/2015 - 02/23/2015

Figure 7. The Vegetation Condition Report for the U.S. for February 10 – 23 from K-State's Ecology and Agriculture Spatial Analysis Laboratory shows that snow is very limited in the Mountain West. This is particularly noticeable from Washington through California.



#### Continental U.S. Vegetation Condition Comparison Mid-February 2015 Compared to Mid-February 2014

Figure 8. The U.S. comparison to last year at this time for the period February 10 – 23 from K-State's Ecology and Agriculture Spatial Analysis Laboratory shows that lack of snow in the West has resulted in higher photosynthetic activity. The higher photosynthetic activity in south Texas is due to improved drought conditions with more favorable temperatures and precipitation.



Continental U.S. Vegetation Condition Comparison Mid-February 2015 Compared to 26-year Average for Mid-February

Figure 9. The U.S. comparison to the 26-year average for the period February 10 – 23 from K-State's Ecology and Agriculture Spatial Analysis Laboratory shows that much higher-thanaverage vegetative activity prevails in the West. This increased biomass production brings concerns for worsening drought in the region. The lack of snow pack is significant. Current snow cover in the Intermountain region is less than 6 percent compared to 30 percent last year.

Mary Knapp, Weather Data Library mknapp@ksu.edu

Kevin Price, Professor Emeritus, Agronomy and Geography, Remote Sensing, GIS

Kansas State University Department of Agronomy 2004 Throckmorton Plant Sciences Center | Manhattan, KS 66506 www.agronomy.ksu.edu | www.facebook.com/KState.Agron | www.twitter.com/KStateAgron Nan An, Graduate Research Assistant, Ecology & Agriculture Spatial Analysis Laboratory (EASAL) <u>nanan@ksu.edu</u>