No-till acres have increased over the past decade, and many growers have had the ability to intensify their crop rotations due to soil moisture conservation. One way to increase farm production has been to drill wheat in the fall following summer row crops. The most common summer row crops in Kansas are corn, grain sorghum, soybeans, and sunflowers. There has been some hesitation to plant wheat following grain sorghum because of grain sorghum’s potentially negative affect on the following winter wheat crop. However, decisions made at sorghum planting can help minimize some of the risks associated with planting wheat behind sorghum.

**Hybrid selection**

Selecting the right grain sorghum hybrid is essential for producers who are hoping to plant wheat after sorghum harvest in the fall. Producers want to be able to maximize sorghum yield, but still have the ability to harvest the crop early enough to drill their wheat near the optimal time. Choosing a hybrid solely based on yield isn’t always the best plan. Look at hybrid characteristics such as early vigor, drydown, disease/insect resistance, and drought tolerance as well.

Earlier maturing hybrids will provide the greatest potential for an early harvest. With the right genetics and management practices many of these early and medium early hybrids can produce yields that compete with the longer-season hybrids.

**Planting**

Optimal planting dates range from May 1st to June 20th across the state depending on location. For about two-thirds of the state, May 15th is the earliest recommended time to plant grain sorghum. Planting towards the earlier end of these dates should result in an earlier harvest.
Sorghum seed will germinate when soil temperatures are about 60-65 degrees Fahrenheit, so soil temperatures should be monitored during planting time. In no-till systems the residue acts as a soil blanket, so temperatures will increase more slowly compared to tilled soil. This could slow seedling emergence and reduce the final population. Planting the seed deeper than the recommended depth could also slow emergence or reduce germination. When planting early into no-till soils, a seed treatment (fungicide and insecticide) and starter fertilizer should reduce the risk of seedling loss.

Cooler soil temperatures can inhibit the uptake of phosphorus. A starter fertilizer that contains a 1:3 ratio of nitrogen and phosphorus could be beneficial when planting early, even where soil tests show an adequate amount of phosphorus. Early plant growth can result in earlier flowering and/or maturity of the crop.

**Row spacing**

Research shows inconsistent yield results when comparing different row widths among sorghum, but in high-yielding environments narrower rows tend to be more favorable. Grain sorghum planted in narrow rows may reduce early weed competition by creating a crop canopy more quickly than sorghum planted in wider rows. Sorghum planted in narrower rows also has the ability to capture more sunlight, increasing the potential for higher yields. Where water is more limited this may not always be the case, and narrow rows may actually reduce yield.

When considering planting wheat in the fall after sorghum harvest, wider rows in the preceding sorghum crop may be beneficial. Sorghum planted into narrow rows tends to produce more biomass, even when yields are not greater. The increase in residue could create wheat planting and early growth issues in the fall.

When using wider rows, it is important to control weeds early and use a good preemergence or preplant herbicide. This will help with early weed competition and give the sorghum crop time to canopy. Make sure to read the herbicide label carefully to ensure there are no rotational restrictions with planting wheat in the fall.

**Summary**

- Select a hybrid that is suitable for your specific situation and that will mature and dry down in time to facilitate timely wheat planting.
- Planting early usually will result in an earlier harvest. Using seed treatments and a starter fertilizer containing phosphorus will help reduce risks of delayed seedling emergence and stand reductions.
- Sorghum planted in wider rows may be more favorable to drill wheat into the following fall.
- Control weeds early and make sure to read the herbicide label carefully for any rotational restrictions.

-- Josh Jennings, CCA, Graduate Research Assistant
jdj3636@ksu.edu

-- Kraig Roozeboom, Cropping Systems and Crop Production Specialist
kraig@ksu.edu
2. Barley yellow dwarf symptoms, yield losses, and control

Barely yellow dwarf had been reported in multiple regions of Kansas this spring. I was in many fields in Marion County with significant yellowing from what I suspect is barley yellow dwarf. Other fields in central and south central Kansas also appear to have low levels of the disease. Historically, barley yellow dwarf is most common in eastern and central Kansas. It can occur anywhere in Kansas, however.

Symptoms

The primary symptoms of barley yellow dwarf are stunting and yellow or red discoloration of the leaf tips. The disease can be uniformly distributed in fields, but it is most commonly found in patches that are 1 to 5 feet in diameter. Stunting is typically most severe near the center of a patch. The color of the symptoms depends on the variety. In most cases, the discoloration of the leaf tips increases over time until eventually the entire leaf is discolored. The midrib of the leaf often remains green longer than the edges of the leaf.

Yellow or purple leaf tips caused by barley yellow dwarf. Photos by Erick DeWolf, K-State Research and Extension.

Barley yellow dwarf often occurs in 1- to 5-foot diameter patches.
Typically, there is no mosaic pattern on the leaf, but sometimes there is some striping at the border between the discolored leaf tip and the green leaf base. In addition, leaves affected with barley yellow dwarf often have small black spots or streaks randomly spaced over the discolored portion of the leaf tip. These are presumably opportunistic infections by bacteria.

Infection by barley yellow dwarf is often associated with the occurrence of dark heads with shriveled grain. These occur in small patches similar to barley yellow dwarf patches. It has not been conclusively proven, but it is suspected that barley yellow dwarf causes the dark heads.

Barley yellow dwarf can be confused with other production problems such as wheat streak mosaic or nutrient deficiency. Accurate serological tests for barley yellow dwarf virus are available from the Plant Diagnostic Lab at Kansas State University.

**Losses**

The amount of yield loss depends on the percentage of plants showing symptoms. Casual observation often overestimates the percentage of infected plants. Collecting random samples while moving through a field in a systematic way will give a more accurate estimate of the incidence of infected plants.

The timing of the infection relative to crop development also influences the potential yield loss associated with barley yellow dwarf. When infection takes place in the fall, the virus has more time to disrupt plant growth and losses can exceed 35 percent. If plants are infected after heading; however, the risk of severe yield loss is reduced.

**Control**

By the time symptoms are visible, there is no way to control barley yellow dwarf. Plants showing symptoms were likely infected weeks or months ago. Producers should start planning a control strategy before planting.

The control of barley yellow dwarf is closely linked to control of the aphids that introduce the virus into the plants. One of the primary means of controlling barley yellow dwarf is to avoid early planting, which often increases the likelihood that aphids will infest a field in the fall. Planting after the Hessian fly-free date reduces the risk of aphid infestation and minimizes the risk of barley yellow dwarf infection. The Hessian fly-free date works well against barley yellow dwarf unless there is a mild fall that allows aphids to survive longer than usual. The aphids that survive these mild conditions can spread the disease and increase the potential for severe yield losses.

Ratings of wheat varieties can be found in *Wheat Variety Disease and Insect Ratings*, MF-991. No wheat varieties have high levels of resistance to barley yellow dwarf, but some are more tolerant than others. Under severe barley yellow dwarf pressure, a moderately resistant variety (rating 4 or 5) might have a loss around 15 percent while a susceptible variety (rating 8 or 9) could have more than a 30 percent loss.

Chemical control of the aphid vectors can suppress barley yellow dwarf. Unfortunately, spraying insecticides for aphid control has not proved practical. First, multiple applications would be required to achieve satisfactory control. Second, it is not possible to wait for obvious aphid populations before spraying because by the time they are detected, significant virus transmission would already
have occurred. Therefore, applications would have to be made on a preventive schedule. Given the unpredictable nature of aphids and barley yellow dwarf epidemics, it is not economical to make several preventive sprays in the fall and early spring.

Seed treatments containing the systemic insecticides (e.g., Gaucho XT, CruiserMaxx Cereals) are labeled for aphid control. These products have shown fair to good suppression of barley yellow dwarf in university trials. The variability in effectiveness is probably due to the timing of aphid infestation. If aphids arrive after the 6- to 8-week period of protection provided by the chemical, then the insecticide will have minimal effect.

Note: This article is based on K-State Plant Pathology’s Fact Sheet “Barley Yellow Dwarf,” at: http://www.ksre.ksu.edu/library/plant2/ep165.pdf

-- Erick DeWolf, Extension Plant Pathology
dewolf1@ksu.edu

3. Preliminary wheat variety reactions to stripe rust and leaf rust

Stripe rust continues to cause problems in many parts of south central and central Kansas. The stripe rust is most severe on varieties previously thought to be resistant to the disease, strongly suggesting the emergence of a new race in the Great Plains.

Below is a preliminary summary of information on the stripe rust reactions of some of the most common varieties. This information may be helpful for setting scouting and fungicide priorities in northern and western Kansas.

Leaf rust was also observed in some demonstration plots in south central Kansas this week. The leaf rust was on varieties known to be susceptible to the disease, including Overley, Fuller, and PostRock.

### Preliminary stripe rust reactions of common wheat varieties 2012

<table>
<thead>
<tr>
<th>Variety</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Armour, Everest, Garrison, Ruby Lee, TAM111, TAM112, 2137, Jagalene, Endurance</td>
<td>Severe stripe rust reported in mid canopy, lesions developing on the flag leaf</td>
</tr>
<tr>
<td>Duster, Fuller*, Shocker*, PostRock*, Overley, Winterhawk, Santa Fe*, Danby*</td>
<td>Stripe rust reported, but disease development is slower than other more susceptible varieties.</td>
</tr>
</tbody>
</table>

* These varieties, on which stripe rust is developing more slowly this year, are known to be susceptible to previous races of the stripe rust fungus. Proceed with caution and verify with observations in your fields on all varieties this year.

-- Erick DeWolf, Extension Plant Pathology
dewolf1@ksu.edu
4. Are fungicides helping slow and stop the development of stripe rust?

I visited some fields in south central Kansas this week that were sprayed with fungicide about a week ago. The fungicides appear to have stopped the development of stripe rust. The stripe rust lesions were now tan and dry instead of the normal bright yellow color of active stripe rust. This indicates to me that the fungicide had killed the stripe rust fungus and stopped the production of new spores.

Gary Cramer, Sedgwick County Agriculture Agent, reports that this has also happened in fields that were treated 7 to 10 days ago. In some situations, there were no symptoms of stripe rust on the flag leaves at the time of application; however, the signs of dead stripe rust lesions are now appearing on these leaves. This suggests that the fungus had already infected the flag leaves and was damaging cells inside the leaf when the fungicide was applied -- even though there were no symptoms on the surface of the leaves. The fungicide killed the fungus inside the leaves and it never had a chance to produce new spores. Interestingly, the leaf where the fungus was already feeding continued to die even after the fungicide was applied resulting in the tan lesions in the images below.

Yes, the fungicides are helping prevent the damage from stripe rust. In some cases, it looks like the fungicides were applied just in time to prevent further damage to the flag leaves and serious yield losses.

Lesions on leaves where the stripe rust fungus was killed by a fungicide application.

Photo by Erick DeWolf, K-State Research and Extension.

-- Erick DeWolf, Extension Plant Pathology
dewolf1@ksu.edu
5. Webinar: Early season stand issues

Doug Jardine, Extension Plant Pathology, will present a public webinar on early season stand issues, including seedling diseases as well as other issues he's seeing on row crops in the state. The webinar will be on Wednesday, May 9, from 9:30 a.m. until 10:55 a.m.

Reserve your webinar seat now at: https://www1.gotomeeting.com/register/634675281

After registering, you will receive a confirmation email containing information about joining the webinar.

**System Requirements**

PC-based attendees
Required: Windows 7, Vista, XP or 2003 Server

Macintosh-based attendees
Required: Mac OS X 10.5 or newer

6. Comparative Vegetation Condition Report: April 3 – 16

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 April 3 – 16 from K-State’s Ecology and Agriculture Spatial Analysis Laboratory shows greatest NDVI values in the eastern half of the state. The band of low NDVI values running from Geary County through Reno County is due to persistent cloud cover in those areas. This artifact continues in all three maps.
Map 2. Compared to the previous year at this time for Kansas, the current Vegetation Condition Report for April 3 – 16 from K-State’s Ecology and Agriculture Spatial Analysis Laboratory shows that the Flint Hills region has much higher photosynthetic activity. Warmer temperatures and an earlier burn season have resulted in an earlier green-up in the region than during this same period last year.
Map 3. Compared to the 23-year average at this time for Kansas, this year’s Vegetation Condition Report for April 3 – 16 from K-State’s Ecology and Agriculture Spatial Analysis Laboratory shows that much of the state has higher photosynthetic activity than average. The areas of low NDVI values are due to persistent cloud cover.
Map 4. The Vegetation Condition Report for the Corn Belt for April 3 – 16 from K-State’s Ecology and Agriculture Spatial Analysis Laboratory shows that photosynthetic activity continues to be high in the southern portions of the Corn Belt. The northern portions of Minnesota, Wisconsin and Michigan also have higher levels of photosynthetic activity.
Map 5. The comparison to last year in the Corn Belt for the period April 3 – 16 from K-State’s Ecology and Agriculture Spatial Analysis Laboratory shows that photosynthetic activity is much greater than last year in both the northern and southern portions of the region. Snow cover has ceased to be a feature, with less than 1% coverage. Last year, the area had 77% coverage at this time.
Map 6. Compared to the 23-year average at this time for the Corn Belt, this year’s Vegetation Condition Report for April 3 – 16 from K-State’s Ecology and Agriculture Spatial Analysis Laboratory shows warm temperatures have spurred earlier-than-average development of photosynthetic activity. Development of photosynthetic activity in southern Minnesota, northern Iowa, and through Central Illinois and Indiana is hindered somewhat by limited moisture in these areas. The latest Drought Monitor has southern Minnesota and northwest Iowa in severe to moderate drought.
Map 7. The Vegetation Condition Report for the U.S. for April 3 – 16 from K-State’s Ecology and Agriculture Spatial Analysis Laboratory shows that a high level of photosynthetic activity continues in the Southern and Eastern U.S. Areas of low NDVI values in central Oklahoma and central Texas are due to persistent clouds, rather than reduced photosynthetic activity.
Map 8. The U.S. comparison to last year at this time for the period April 3 – 16 from K-State’s Ecology and Agriculture Spatial Analysis Laboratory shows that the difference in snow cover, particularly in the Mountain West, has resulted in greater NDVI values. Also, despite the cloud contamination in central Oklahoma and Texas, photosynthetic activity is greater than last year for this same period of time.
Map 9. The U.S. comparison to the 23-year average for the period April 3–16 from K-State’s Ecology and Agriculture Spatial Analysis Laboratory shows higher photosynthetic activity across much of the country. Areas of low NDVI values in central Oklahoma and Texas, as well as along the coast of southern Oregon and northern California are due to persistent cloud cover.

Note to readers: The maps above represent a subset of the maps available from the EASAL group. If you’d like digital copies of the entire map series please contact us 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.

-- 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