1. Wheat disease conditions

Stripe rust remains a significant threat in Kansas. Parts of south central and southwest Kansas near the Oklahoma border have been extremely dry this spring and many growers in those areas are reporting thin stands and expect below-average yields. As one progresses north into central Kansas, the optimism about crop yields improves. The growth stage of the wheat in this area is highly variable, with most fields in the early stages of grain development—although a few fields have just completed flowering. Stripe rust could be easily found on the flag leaves in most fields this week in these areas. The incidence of disease on these upper leaves ranged from trace to more than 20 percent. Severity is generally less than 10% at the current time.

Reports from northeast, north central and northwest Kansas indicate that stripe rust is very active in these regions of the state. I have received a small number of reports of severe stripe rust in fields in north central and northwest Kansas. Severity of stripe rust in these problem fields exceeds 30 percent. The wheat in this area of the state has been heading or flowering this week. Stripe rust is likely to cause severe yield loss in northern Kansas, and many growers have attempted to reduce potential losses with fungicides.

Nearly all varieties with Jagger in the pedigree appear to be moderately or highly susceptible to stripe rust now. Preliminary observations suggest that Jagger, Jagalene, Fuller, Jackpot, PostRock, Santa Fe, Hitch, Smoky Hill, Shocker, Danby, Art, Overley, Protection, and Hawken should be considered vulnerable to stripe rust.

Some varieties with known susceptibility are also affected, including: TAM 112, 2137, Above, and Ripper.

Varieties that appear to have moderate or high levels of resistance to the new races of stripe rust
include TAM 111, Armour, Aspen, and Hatcher. TAM 111 is very popular in western Kansas and this resistance should help reduce the potential yield losses in this region.

Only low levels of leaf rust have been observed in Kansas to date. There are no reports of stem rust.

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2. Nitrogen fertilization of nitrogen-stressed soybeans

Although soybeans can fix most of their own nitrogen (N) if they are well nodulated, this is no guarantee that soybeans will not suffer from nitrogen deficiency at a crucial time in their development. Soybeans are heavy users of N, and need all the N they can fix plus some from the pool of N available in the soil.

Planting soybean without inoculation into soils where soybean has never been grown can result in poor nodulation and N deficiency. Similar problems can occur when inoculation fails, or if soybeans are planted on severely acid soils that limit nodulation. In these situations, it is logical to ask if soybeans will respond to N fertilizers.

In 2009, an opportunity arose to study this situation because of a failure of inoculation in a producer’s field in Saline County. The soybean crop on this field was noticeably N-deficient. The soybean crop was planted no-till into sorghum residue from the previous year on May 20 at 140,000 seeds/acre. A liquid inoculant was sprayed on the soybean seeds as they were loaded into the planter. This field had no history of soybean production.

Nitrogen fertilizer was applied on July 20 to soybeans at the R1 to R2 growth stages. The N was applied as urea by surface-banding the material between the soybean rows. Rainfall occurred within a few hours of N application.

Results are summarized in the table below. There was a nearly straight-line response to N at this location. The soybeans receiving 120 lb/acre N yielded 21 bu/a higher than the unfertilized check. Fertilization was clearly economical in this situation. Additional research will be conducted to further refine appropriate N rates if opportunities develop in the future.

<p>| Effect of Nitrogen Fertilization at R1/R2 Stage on Yield of N-Deficient Soybean, 2009 |
|-------------------------------|------------------|</p>
<table>
<thead>
<tr>
<th>N Rate (lbs/acre)</th>
<th>Yield (bu/acre)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>28</td>
</tr>
<tr>
<td>30</td>
<td>37</td>
</tr>
<tr>
<td>60</td>
<td>42</td>
</tr>
<tr>
<td>90</td>
<td>43</td>
</tr>
<tr>
<td>120</td>
<td>49</td>
</tr>
</tbody>
</table>

This study was conducted in cooperation with Tom Maxwell, Central Kansas District Extension Agent, and Andrew Tucker, graduate student in Agronomy.
3. Causes of yellow wheat in the spring

Many fields of wheat this spring have had areas of yellowish wheat. What are some of the main causes of yellow wheat in the spring? Will it hurt yields?

The most common causes of yellow wheat in the spring are:

* Poor root growth. This may be due to dry soils, waterlogging, or elevated crown height caused by shallow planting depth or excessive residue in the root zone. If the plants have a poor root system, then the plants are yellow because the root systems are not extensive enough to provide enough nutrients.
* Nitrogen deficiency. Nitrogen deficiency causes an overall yellowing of the plant with the lower leaves yellowing and dying from the leaf tips inward. Nitrogen deficiency also results in reduced tillering, top growth, and root growth. The primary causes of nitrogen deficiency are insufficient fertilizer rates, applying the nitrogen too late, leaching from heavy rains, denitrification from saturated soils, and the presence of heavy amounts of crop residue, which immobilize nitrogen.

* Sulfur deficiency. Sulfur deficiency is not as common as nitrogen deficiency, but it can occur where organic matter levels are low -- especially on sandier soils or eroded areas of a field. The symptoms of sulfur deficiency are very similar to nitrogen deficiency. However, sulfur deficiency does differ from sulfur deficiency in that the whole plant is pale with a greater degree of chlorosis in the young leaves. The pattern of chlorosis in the new leaves may show gradation in intensity from tip to base, but they quickly become totally chlorotic and take on a light yellow color.

* Iron chlorosis. Iron chlorosis is not common on wheat in Kansas, but does occur on certain high-pH, calcareous soils in western Kansas. Newly emerging leaves will have green veins, with yellow striping between the veins. Eventually, the entire leaf may turn yellow or white.

* Soilborne mosaic or spindle streak mosaic. Soilborne mosaic and spindle streak mosaic are viral diseases that occur primarily in eastern and central Kansas, but can also occur in western Kansas. These diseases are most common in years with a wet fall, followed by a cool, wet spring. Lower areas of the field are most commonly affected. Symptoms are usually most pronounced in early spring, then fade. Leaves will have a mosaic of green spots on yellowish background; and plants will be stunted.

* Wheat streak mosaic complex. This viral disease is vectored by the wheat curl mite. Yellow areas in field will appear in spring; usually on field edges adjacent to volunteer wheat. Leaves will have a mosaic of yellow streaks, stripes, or mottling. Plants will normally be stunted. Unlike soilborne/spindle streak mosaic, wheat streak mosaic is not associated with any particular type of weather pattern or soil condition.

* Barley yellow dwarf. This viral disease is vectored by bird cherry oat aphids and greenbugs. Small or large patches of yellow plants will occur, typically around boot stage. Leaf tip turns yellow or purple, but midrib remains green. The yellow color is more intense, and in an even distribution pattern on the leaf surface compared to the yellowing caused by the mosaic diseases. Plants are usually, but not always, stunted.

* Freeze injury at the jointing stage. Jointing wheat can usually tolerate temperatures in the mid to upper 20’s with no significant injury. But, if temperatures fall into the low 20’s or even lower for several hours, the lower stems, leaves, or developing head can sustain injury. If the leaves of tillers are yellowish when they emerge from the whorl, this indicates those tillers have been damaged.

-- Jim Shroyer, Extension Agronomy State Leader
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4. Harvesting winter canola in Kansas

Most of the winter canola crop in Kansas is done or nearly done blooming. The crop appears to have survived the growing season well and recent rains and cool weather have aided seed development. Depending on weather, it is likely that winter canola producers will be harvesting in a month or less. As harvest nears, it is important to consider the variety of harvesting options available and what suits an operation best.

When determining what harvest option is best, it is helpful to review some general principles regarding winter canola harvest.

**Winter canola harvest**

- Seed is ready to harvest before the entire plant turns brown. The lower stem will remain green.
- In thinner stands, it is not unusual to have some green pods due to branching and uneven maturity. These green pods will pass through a properly set combine.
- Harvest moisture is 8 to 10%.
- Canola seed harvest moisture can change rapidly, going from too wet to too dry and resulting in shattering.
- Canola is an indeterminate crop and will have some immature seeds at harvest.
- Ripe canola must be harvested as soon as possible to prevent shattering caused either by combining or wind and weather events.
- Harvest is slower for canola than wheat.
- Seed moisture is more critical for controlling shatter and reducing spoilage in canola than for wheat.

There are three harvest methods for winter canola

1. Direct combining
2. Swathing followed by combining
3. Pushing followed by combining

The preferred harvest method depends on weather and crop conditions, the ability to harvest quickly, and equipment availability. In all cases, it is important to set the combine properly and monitor operations frequently, adjusting for changing moisture conditions.

A few general rules apply to combine set up and operation:

- Ground speed is slower than for winter wheat.
- For direct combining, cut just below the seedpods, typically 12” or more above the ground.
- Reel speed should match ground speed.
- Cylinder speeds are typically 450 to 650 rpm.
- Concave clearance should be 3/4” in the front and 1/8” to 1/4” in the rear. Canola threshes easily.
- Fan speed is similar to wheat.
- Always refer to the combine manual. If there is not a listing for canola, there will be one for rapeseed. Start there and make adjustments according to what is coming into the bin.
The primary concerns when harvesting winter canola are to minimize seed loss and to harvest at moisture levels that allow for proper seed storage and handling.

**Direct combining**

Winter canola can be direct combined under the right conditions and offers several key advantages:

- Works well for uniform, tall, well-interlaced, thick stands
- Preferred under hot and dry conditions
- Generally results in the best overall yield and seed quality because the crop is allowed to ripen completely
- Seed is only handled once as compared to swathing or pushing prior to harvest
- Decreased harvesting costs; no additional machinery investment required
- Decreased risk of poor seed quality compared to laying on the ground during moist, cool conditions

There are several key disadvantages to direct combining:

- Must harvest when crop is ready, perhaps interrupting wheat harvest
- For producers with large acreages, winter canola cannot be harvested in a timely manner, increasing the risk for shattering losses
- If relying upon custom cutters, they must be there when the crop is ready
- Nonuniform, thin, uneven stands that result in uneven plant maturity
- Standing canola is more susceptible to seed loss from inclement weather events, including rain, hail, and high winds

**Swathing**

Swathing may be the best option. The key to minimizing swathing losses is swathing at the appropriate crop stage in a timely manner. The optimum time to swath winter canola is when average seed color change on the main stem is 40 to 60% and the seed contains 30 to 40% moisture. The decision to swath should be made based on seed color change and not pod color change. Make sure you open the pods and look at the seed and not just the pod itself. The appearance of the pod will more than likely be green to yellowish-green and the seed will be brown inside. Seed color change occurs rapidly, about 10% change every 2-3 days. Swathing late significantly increases the potential for shattering losses. After swathing, the windrows will then be harvested using a pickup header attachment.

Here are a few general rules to swathing:

- Ideally, the crop should be in windrows for 7 to 10 days
- Windrows should not be placed directly on the ground, but on top of the standing stubble and several inches above the ground.
- A roller attachment will push the windrow into the standing stubble, further protecting it from the wind
- Try to avoid swathing during the heat of the day (over 85 degrees F). This prevents accelerated seed curing and reduces the potential for high green seed count.
- Use a draper, belt-style swather. Do not crimp the windrow!
- Swath just below the lowest pods.
- Start monitoring crop stage about one week after flowering. Continue to monitor for proper stage every 2-3 days following.
• Remember, seed color is the key for determining when to swath, not overall plant or pod color

Advantages to swathing:
• Typically earlier harvest because dry-down is accelerated by cutting off the plant.
• Better ability to manage large acreages of canola.
• Increases doublecropping opportunities with earlier harvest.
• Helps dry up any weeds present in the field that might increase seed moisture content.
• With proper swathing and good, tight windrows, canola can withstand heavy rain and winds with minimal yield loss.
• Helps manage uneven maturities in fields.
• Fewer risks associated with severe weather than with direct combining.

Disadvantages of swathing:
• Potential for 10% yield loss when swathed at optimum stage compared to direct combining
• Swathing during hot, dry conditions (over 85 degrees F) can result in excessive seed shrinkage
• More time, investment, and labor involved
• Tall, tangled, or lodged stands are difficult to swath
• If not placed properly into the standing stubble, windrows can be lost during strong winds

Pushing
Pushing was developed in Canada as an alternative to swathing. It is designed to provide the advantages of direct combining without the risks. Currently, there are six operations in Oklahoma with pushers, but none are known to exist in Kansas.

What is a pusher and pushing? A pusher is hydraulically mounted to the front of a tractor and is driven at relatively high speeds through the field. The pusher force lodges or “pushes” the crop over without cutting the canola plant off from the root system. The concepts involved are to prevent yield losses from weather events by laying the crop over and to allow the crop to mature normally. Vertical sickles are located at both ends of the pusher and directly in front of the tractor tires. These are designed to ensure a clean cut between passes and reduce the amount of canola crushed by the tires.

Once the canola is ripe, it is then combined opposite to the direction it was pushed. The header width of the combine should match the width of the pusher. Harvesting is typically slower than direct combining and swathing due to the amount of material entering the combine. Pushing works best in fields with high yield potential. The crop should be tall with thick stands.

Advantages of pushing:
• Can reduce shattering.
• Allows the crop to ripen completely.

Disadvantages of pushing:
• Shorter, thinner crops do not push well.
• Pushing equipment is currently scarce in Kansas.
• Relatively little data or experience is available for growers in the southern Great Plains.
Desiccants

Desiccants have not been used in this region as they are generally not necessary under normal growing conditions. However, over the past couple of years, situations where desiccants may be of benefit have arisen. Before considering desiccants, make sure to be in compliance with KDHE rules and regulations.

Reasons to consider a desiccant
- Heavy weed infestations
- Excessive lodging
- Uneven crop maturity
- Unable to swath

Custom harvesters

A list of custom harvesters, swathers, and pushers is available at these websites:
- www.greatplainscanola.org
- www.plainsoilseedproducts.com/
- www.canola.okstate.edu/index.htm

Winter canola harvest research at K-State

The following is a study conducted for the 2008-2009 winter canola crop year. A canola harvest management study was conducted at Partridge and Manhattan in 2009. The objective was to compare the optimum timing for swathing prior to harvest and the optimum timing for direct combining. Table 1 summarizes the results of the study. The plots were swathed on June 15 at Partridge and June 19 at Manhattan. Direct combine and swathed plots were harvested with a plot combine on the same day at each location; June 24 at Partridge and June 30 at Manhattan. There were no significant differences for grain yield, test weight, and oil content at Manhattan. However, the direct-combined plots had significantly higher moisture content than the swathed plots. At Partridge, the direct-combined plots had significantly higher grain yield, moisture, and test weight. There was no significant difference in oil content.

The lower moisture content for the swathed plots at both locations is a result of accelerated dry-down. Swathing allows the crop to complete ripening in the windrow, where the seed will generally lose 20-30% of its moisture. Even though a difference exists, both moisture contents are acceptable for harvesting canola. The lower yield for the swathing treatment at Partridge is a result of seed shatter. Because of saturated field conditions, swathing was delayed a few days beyond the optimum date, which allowed the plots to shatter when swathed. The lower test weight is also a result of delayed swathing. Oil content does not appear to be affected negatively by harvest method.

A similar study was conducted at Stillwater, OK, and the swathing treatment resulted in higher yields compared to direct combining (data not shown). This was likely due to the fact that the direct-combined plots lost a significant amount of yield to seed shatter.

Both direct combining and swathing prior to harvest can be performed successfully in Kansas. Our recommendation to producers is to use the harvest method that best fits their farming operation.
Table 1. Results from the 2008-2009 Harvest Management Study

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Yield (lb/a)</th>
<th>Moisture (%)</th>
<th>Test Weight (lb/bu)</th>
<th>Oil (%)</th>
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<tbody>
<tr>
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<td>Swath</td>
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<td>6.7 b</td>
<td>46.1</td>
<td>37.7</td>
</tr>
<tr>
<td>LSD (0.05)</td>
<td>NS</td>
<td>0.4</td>
<td>NS</td>
<td>NS</td>
</tr>
</tbody>
</table>

Partridge, KS – Redd Foundation Field

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Yield (lb/a)</th>
<th>Moisture (%)</th>
<th>Test Weight (lb/bu)</th>
<th>Oil (%)</th>
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</thead>
<tbody>
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<td>7.0 a</td>
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<tr>
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</tbody>
</table>

-- Victor Martin, Annual Forages and Alternative Crops Specialist
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-- Michael Stamm, Canola Breeder, K-State/Oklahoma State University
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5. 2010 Summer Crop Diagnostic Schools

KARA-KSU Field Day
This summer, the Kansas Agribusiness Retailers Association (KARA) and Kansas State University will partner to host an agronomic educational field day. This event is scheduled for July 14-15 at the K-State North Agronomy Farm.

Highlight items for this year’s program include: insects and diseases, crop production problems, weed identification, water quality, and soil fertility. This is an annual program that consistently provides relevant and current trend information. This year’s program will emphasize annual forages including summer annuals and small grains.

Agricultural retailers across the state are encouraged to attend and bring an interested producer with them.

For registration information please go to: www.ksagretailers.org or call (785) 234-0463.

ANR Agent Summer Field Diagnostic School
This diagnostic school is exclusively for K-State Agriculture Extension Agents and Agronomy graduate/undergraduate students. It covers most of the topics of the KARA/K-State Field Day, but at a faster pace. This school provides a great refresher for those with extensive experience in crops and crop production and a great foundation for those whose primary degree was not in Agronomy. Most sessions are very hands-on with lots of opportunity for interaction. The session will start at 5:30 on the evening of July 7 and run from 7:15 am to 5:30 pm on July 8.

For more information or to register, contact Troy Lynn Eckart at sprite@ksu.edu or 785-532-5776.

-- Kraig Roozeboom, Cropping Systems and Crop Production Specialist
6. Comparative Vegetation Condition Report: May 3 – 17

K-State’s Ecology and Agriculture Spatial Analysis Laboratory (EASAL) produces weekly Vegetation Condition Report maps. Detailed information on how the maps are produced is in e-Update No. 239, April 9, 2010, available at: http://www.agronomy.ksu.edu/extension/DesktopDefault.aspx?tabid=58

The most recent VCR maps from EASAL are below:

Map 1. The Vegetation Condition Report for May 3 – 17, from K-State’s Ecology and Agriculture Spatial Analysis Laboratory shows that areas of south central and southeast Kansas, which had been behind normal, have gained enough to reach near average conditions. Favorable moisture and moderate temperatures have allowed for planting and emergence of spring crops, and for growth of spring pastures. The effects of the recent cool weather on plant growth are seen throughout much of the state where many areas remain ahead of normal in greenness (biomass accumulation), but have moved towards more normal conditions as plant growth has been slowed by the cooler temperatures.
Map 2. The U.S. Corn Belt comparison to the 21-year average shows that the rapid plant development seen in earlier weeks has begun to slow. Conditions in eastern South Dakota, central Minnesota, and the upper Michigan peninsula remain behind average. Plant development in these areas is still delayed due to lingering cold conditions.
Map 3. For the U.S. during this period, the most notable feature is the increased vegetative production in the upper New England region. Also, the rate of biomass production has slowed to a more normal pattern. Most of Texas, however, is much greener than normal for this point in the growing season.

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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