1. Alfalfa weevil control decisions

Alfalfa weevils were a significant problem on alfalfa in most of Kansas in 2010, and in recent years prior to that. Many fields were sprayed for alfalfa weevil, often based on economic threshold levels, but control was variable. In some cases, the level of control was less than expected.

The reason that insecticide control may have been less effective than anticipated could be that the insecticides used are no longer as effective as in prior years. But it is more likely due to one or more of the following factors:
(a) Insecticide applications made earlier in the season are more affected by the weather,
(b) Eggs are still hatching earlier in the season, and/or
(c) Some larvae are protected from the insecticide because they are in the leaf litter at the base of the plant during cold weather.

During cool weather, alfalfa weevil larvae will move down into any crop residue that is on the soil surface for protection from the cold. As a result, insecticide applications made in early to mid-April, for example, may miss more alfalfa weevil larvae than an application made just a week later when temperatures are warmer.

This can be seen in the results of a test we did in 2010. At this Dickinson County location, we applied one set of insecticide treatments on April 13, and another set of treatments at another location in the same field on April 18. The field was in third-year alfalfa. The insecticides were applied with 20 gal/acre of carrier, at about 30 psi pressure. The results are below.

<table>
<thead>
<tr>
<th>Earlier Alfalfa Weevil Treatment (April 13)</th>
<th>No. of alfalfa weevil larvae/stem (alfalfa about 8-10” tall)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Treatment</td>
<td>April 13 (treatment date)</td>
</tr>
<tr>
<td></td>
<td>April 21 (8 days after treatment)</td>
</tr>
<tr>
<td></td>
<td>April 25 (12 days after treatment)</td>
</tr>
<tr>
<td>None</td>
<td>1.00</td>
</tr>
<tr>
<td></td>
<td>2.54</td>
</tr>
<tr>
<td></td>
<td>3.07</td>
</tr>
<tr>
<td>Insecticide (average of 13 products and rates)</td>
<td>1.00</td>
</tr>
<tr>
<td></td>
<td>0.72</td>
</tr>
<tr>
<td></td>
<td>0.84</td>
</tr>
</tbody>
</table>
Later Alfalfa Weevil Treatment (April 18)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>April 18 (treatment date)</th>
<th>April 25 (7 days after treatment)</th>
<th>May 2 (15 days after treatment)</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>1.00</td>
<td>3.33</td>
<td>1.13</td>
</tr>
<tr>
<td>Insecticide (average of 14 products and rates)</td>
<td>1.00</td>
<td>0.35</td>
<td>0.41</td>
</tr>
</tbody>
</table>

With the April 13 treatment, the insecticides applied only reduced weevil numbers by about 15-30 percent. A large percentage of the larvae were in the surface residue at the time and were protected from the insecticide applications.

With the April 18 treatment, the insecticides reduced weevil populations by about 60-65 percent. A much higher percentage of the weevils were exposed to the insecticides at this application timing.

There was no significant difference between the different insecticides and rates used in this study.

When deciding on insecticide application timing for alfalfa weevils, the level of insect pressure also plays a role, of course. If weevil pressure is higher than the economic threshold early in the season, it will pay to spray at that time even if the insecticides are not as effective as they would be a week or two later.

But applicators should have realistic expectations about the effectiveness of the insecticide applications. If control does not seem as good as expected, the reason may be related to temperatures and the location of the larvae at the time of the application.

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2. Wheat variety disease index

In 2010, the major disease problem on wheat in Kansas was stripe rust, and many producers are now focusing on minimizing the risk of stripe rust – often through variety selection.

While that is understandable, the tendency to react to the most recent disease can lead to the overuse of just a few varieties that often have the similar genes for resistance to that disease. This can quickly lead to a breakdown of that resistance gene, and the cycle of resistance/susceptibility starts all over again. With each cycle, the diversity of the varieties grown at a regional level is reduced.

It would perhaps be better if producers could focus on the broader spectrum of potential disease problems and select varieties that have the least overall disease risk for the area of the state in which they farm.
The Historical Risk of Disease

The importance of wheat diseases is based on their potential to cause yield loss and how often it reaches damaging levels in eastern, central, and western Kansas. The relative importance of the diseases is the product of historical records of disease losses in the state and expert opinion by wheat disease specialists.

In western Kansas, wheat streak mosaic, leaf rust and stripe rust are among the most damaging and common diseases and these diseases should be top priorities when selecting wheat varieties for that region.

In central Kansas, the environment is often more conducive for disease development, and additional factors should be considered when selecting a variety. Important diseases to consider in central Kansas include: soilborne mosaic, wheat spindle streak mosaic, barley yellow dwarf, leaf rust, stripe rust, tan spot, and Septoria leaf blotch.

The list of potential problems in eastern Kansas includes those already listed for central Kansas, but should be further adjusted to account for a greater risk of head scab and barley yellow dwarf.
The diseases can be ranked by their potential to cause yield loss. I have ranked them on a 1-4 scale, with 1 having the least potential to cause yield loss and 4 having the most.

1: Spindle streak mosaic
2: Powdery mildew
3: Septoria, tan spot, barley yellow dwarf
4: Stripe rust, leaf rust, Fusarium head blight (scab), wheat streak mosaic

**Disease Resistance Index**

We can then combine the historical tendency for diseases to cause yield losses and the severity of losses for each disease with the resistance ratings for each variety to each of the diseases. The result is what I call the “Disease Resistance Index.” The index is customized to each region of Kansas.

Sorting through all the information available about wheat varieties can be a complex and exhausting process. The disease resistance index I have proposed combines the historical estimates of regionally important diseases with the variety disease ratings. *The index weights each disease relative to their historical importance in eastern, central and western Kansas.*

Varieties with genetic resistance to the diseases that are historically important within a region will have a low disease resistance index relative to more susceptible varieties. When considered along with the yield potential and other important agronomic traits of a variety, the index should help narrow the search for acceptable wheat varieties. The specific disease and insect ratings should be consulted once several candidate varieties are identified. *The calculation of the index does not include all diseases and insect pests. Growers may establish their own priorities based previous crop production practices on their farms.*

In the chart below, the lower the number, the better overall resistance a variety has to the diseases most likely to be a problem in a given region.
The figure below shows the correlation of Wheat Disease Index variety ratings and the yield of those varieties in the 2009 and 2010 K-State Performance Tests. While the figure is a bit cluttered, the overall trend is for yield to be higher at the lower Wheat Disease Index ratings, indicating the varieties with better overall disease resistance tend to have higher yields in each given region.
Other Factors

Wheat varieties often have one or more weaknesses that are not adequately addressed by genetic resistance. When resistance is not available, it may be possible to minimize the risk of severe yield losses with other management options. For example, foliar fungicides could be used to manage leaf rust when genetic resistance is lacking in an otherwise desirable variety. Wheat Disease Index ratings can also be used as a guide for which varieties might be more likely to provide an economic yield response to the use of a foliar fungicide.

Pursuing this management option, however, may increase the input costs required to produce the crop if leaf rust emerges as a problem. This approach will be less effective for viral diseases, including soilborne mosaic, wheat streak mosaic, and barley yellow dwarf, because these diseases are difficult to control with other cultural practices.
For more information, see K-State publication MF-991: *Wheat Variety Disease and Insect Ratings 2010* at: [http://www.ksre.ksu.edu/library/plant2/mf991.pdf](http://www.ksre.ksu.edu/library/plant2/mf991.pdf)

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3. Comparative Vegetation Condition Report: December 28 – January 10

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=CRP3Y5NIggw)
[http://www.youtube.com/watch?v=tUdOK94efxc](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 Knapp’s comments:
Map 1. The Vegetation Condition Report for Kansas for December 28 – January 10 from K-State’s Ecology and Agriculture Spatial Analysis Laboratory shows that only a small portion of the state missed on the snowfall. The east central and southeast divisions had snow on the 11th and 12th of January, which will be seen in next week’s report.
Map 2. Compared to last year at this time, this year’s Vegetation Condition Report for December 28 – January 10 from K-State’s Ecology and Agriculture Spatial Analysis Laboratory shows the generally more favorable conditions in eastern Kansas and north central Kansas this year. This is in stark contrast to the southwest and west central regions, where the most intense drought conditions prevail.
Map 3. The Vegetation Condition Report for the Corn Belt for December 28 – January 10 from K-State’s Ecology and Agriculture Spatial Analysis Laboratory shows snow is the big story throughout the Corn Belt, where many areas have seen the most snowfall in several years.
Map 4. The Vegetation Condition Report for the U.S. for December 28 – January 10 from K-State’s Ecology and Agriculture Spatial Analysis Laboratory shows that the penetration of the snow cover reached well into the South. Drier-than-normal conditions, and the resulting lower biomass productivity, can still be seen in the mid-Mississippi River Valley.

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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