1. Comparison of row spacing in wheat in eastern Kansas

In various regions of eastern Kansas, an increasing number of producers are utilizing planters with row units on 15-inch spacings to plant wheat as an alternative to using drills with 7- to 10-inch spacings. Potential perceived benefits for using planters to sow wheat are: equipment savings, better seed placement, better plant emergence, and a perception that planters can manage the residue more effectively than a drill in no-till conditions.

Research evaluating the effect of sowing wheat with 15-inch planters in no-till conditions was evaluated to improve the management practices with this relatively new method of planting wheat in Kansas. The Kansas Wheat Commission funded this research for the 2011-12 season.

**Methods**

Wheat plots were sown on Oct. 21, 2010 and Oct. 12, 2011 at the East Central Experiment Field near Ottawa. We sowed wheat in 7-inch row spacings with a Great Plains Solid Stand No-Till Drill and 15-inch row spacing with a Kinze 3000 planter. Other variables included seeding rate (1 and 1.5 million seeds per acre) and herbicide treatment (none vs. a residual sulfonylurea herbicide). All plots received 95 lbs nitrogen (N) per acre in 2011, and 125 lbs N per acre in 2012.

**Effect on Weed Densities**

In 2011, weed emergence of henbit, Carolina foxtail, and smallflowered bittercress was greater in the 15-inch rows than the 7-inch rows. The increase in emergence in the 15-inch wheat rows is likely because of less shading by the wheat. Seeding rate didn’t affect weed emergence in the drilled wheat. In the 15-inch row plots, more henbit emerged at the seeding rate of 1 million than at 1.5 million. Smallflowered bittercress emergence was greater at the higher seeding rate, however. The row spacing and seeding rate that suppressed the greatest number of weeds from emerging was the 7-inch row spacing at the low seeding rate.
Weed densities on April 7 as affected by wheat row spacing and seeding rate, 2011
East Central Experiment Field

<table>
<thead>
<tr>
<th>Equipment</th>
<th>Row spacing (in.)</th>
<th>Seeding rate (seeds/acre)</th>
<th>Henbit</th>
<th>Carolina foxtail</th>
<th>Smallflowered bittercress</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drill</td>
<td>7</td>
<td>1 million</td>
<td>5.3</td>
<td>4.6</td>
<td>0.1</td>
</tr>
<tr>
<td>Drill</td>
<td>7</td>
<td>1.5 million</td>
<td>7.5</td>
<td>7.5</td>
<td>0.3</td>
</tr>
<tr>
<td>Planter</td>
<td>15</td>
<td>1 million</td>
<td>14.2</td>
<td>11.6</td>
<td>4.2</td>
</tr>
<tr>
<td>Planter</td>
<td>15</td>
<td>1.5 million</td>
<td>10.1</td>
<td>13.9</td>
<td>6.5</td>
</tr>
<tr>
<td>LSD (0.05)</td>
<td></td>
<td></td>
<td>4.0</td>
<td>3.8</td>
<td>2.3</td>
</tr>
</tbody>
</table>

A similar general pattern was seen in 2012, with greater weed emergence with wheat in wider rows. Henbit emergence was about 3.5 times higher in wider rows vs. narrower rows. Common chickweed emergence was also significantly inhibited by wheat shading in the narrow 7-inch vs. 15-inch rows. Seeding rates had no effect.

Weed densities on March 26 as affected by wheat row spacing, 2012
East Central Experiment Field

<table>
<thead>
<tr>
<th>Equipment</th>
<th>Row spacing (in.)</th>
<th>Henbit</th>
<th>Chickweed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drill</td>
<td>7</td>
<td>6.8</td>
<td>0.4</td>
</tr>
<tr>
<td>Planter</td>
<td>15</td>
<td>23.9</td>
<td>2.2</td>
</tr>
<tr>
<td>LSD (0.05)</td>
<td></td>
<td>4.4</td>
<td>1.4</td>
</tr>
</tbody>
</table>

Effect on Yields

Seeding rate had no effect on wheat yield in either 2011 or 2012. Row spacing did have an effect. In 2011, wheat in narrow 7-inch rows yielded 14.2 bu/acre more than in wide 15-inch rows, averaged over seeding rates and herbicide treatments. In 2012, wheat in 7-inch rows had a yield advantage of 18.2 bushels per acre over 15-inch rows.

In the 15-inch rows, the spacing was too wide to maximize yields both years. This is likely too much yield reduction to make up for any perceived benefits from planting wheat with a 15-inch planter compared to a more conventional no-till drill on narrower spacings.

Effect of row spacing on yield of wheat: East Central Experiment Field

<table>
<thead>
<tr>
<th>Equipment</th>
<th>Row spacing</th>
<th>Year</th>
<th>Yield (bu/acre)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drill</td>
<td>7</td>
<td>2011</td>
<td>47.6</td>
</tr>
<tr>
<td>Planter</td>
<td>15</td>
<td>2011</td>
<td>33.4</td>
</tr>
<tr>
<td>Drill</td>
<td>7</td>
<td>2012</td>
<td>51.6</td>
</tr>
<tr>
<td>Planter</td>
<td>15</td>
<td>2012</td>
<td>33.4</td>
</tr>
</tbody>
</table>

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2. Shallow seeding of wheat into hard soils

One of the important factors in the survival and productivity of wheat is proper seeding depth. If the wheat is planted at the optimum depth, the crown will form at the desired depth of about a half-inch. If the wheat is planted too shallowly, the crown will end up closer to the soil surface than you’d like. If the crown is near the soil surface, or is in open air or surrounded with residue instead of in firm soil, it will be more susceptible to cold injury or desiccation.

The photo below shows what can happen when soils are very hard, dry, and compacted. In this case, the wheat was planted late, no-tilled into soybean residue. The drill could not penetrate the soil well. As a result, the seed ended up much too close to the soil surface -- much of it about a quarter-inch or less. Some of the seed is even lying on top of the soil, as is the case in the photo below. The seedling formed in this case has fallen over.

Wheat in this situation is more apt to suffer damage during the winter under normal conditions. If it gets enough moisture, however, that would help its ability to develop roots and increase its chances for survival.

Wheat seed at the soil surface after germination and seedling emergence in this field on December 12, 2012. Planting depth was much too shallow due to hard, dry, compacted soil conditions. Photos by Jim Shroyer, K-State Research and Extension.
The wheat seedling in the photo above came from this field. Overall, the wheat stands are very thin and the plants are too shallow in this no-till wheat planted late into soybean residue.

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3. Comparative Vegetation Condition Report: November 27 – December 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=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.
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 Kevin Price 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.

The maps in this issue of the newsletter 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 November 27 – December 10 from K-State’s Ecology and Agriculture Spatial Analysis Laboratory shows that only a small area of central Kansas continues to have moderate biomass production. Northwest and west central Kansas, which are currently in the exceptional drought category, are showing the lowest biomass production.
Map 2. Compared to the previous year at this time for Kansas, the current Vegetation Condition Report for September November 27 – December 10 from K-State’s Ecology and Agriculture Spatial Analysis Laboratory shows that parts of southwest and eastern Kansas have greater photosynthetic activity than last year. Noteworthy are the much lower productivity values in Greeley and Wichita counties in west central Kansas and Barber and Harper counties in south central Kansas. Lower rainfall in these areas has hampered the establishment of winter wheat. Tribune, in Greeley County, has reported only 6.95 inches for the year-to-date, with no precipitation in November or so far in December. Last year, Tribune ended the year with 22.55 inches, 2.04 which came in November and December.
Map 3. Compared to the 23-year average at this time for Kansas, this year’s Vegetation Condition Report for November 27 – December 10 from K-State’s Ecology and Agriculture Spatial Analysis Laboratory shows that parts of the state have slightly above-average NDVI values, this is due mainly to the milder than average temperatures which have continued in December. In Barber and Harper counties, however, these milder temperatures combined with much lower-than-average rainfall have severely limited biomass production. Anthony, in Harper County, has reported only 0.44 inches from October to present. Normally, by the end of December, that county would have 5.66 inches.
Map 4. The Vegetation Condition Report for the Corn Belt for November 27 – December 10 from K-State’s Ecology and Agriculture Spatial Analysis Laboratory shows that vegetation in most of the region has gone dormant, as would be expected at this time of the year. Snowfall was confined to the northern areas of the Corn Belt, with welcome amounts in North Dakota, Minnesota, and Michigan.
Map 5. The comparison to last year in the Corn Belt for the period October 27 – December 10 from K-State’s Ecology and Agriculture Spatial Analysis Laboratory shows lower NDVI values for the northern areas of the region. Last year, mild temperatures delayed the onset of dormancy. This year, snow and cold have been more noticeable. Marquette, Michigan reported no snow in November 2011. This year, it had almost 6 inches.
Map 6. Compared to the 23-year average at this time for the Corn Belt, this year’s Vegetation Condition Report for November 27 – December 10 from K-State’s Ecology and Agriculture Spatial Analysis Laboratory shows that highest NDVI values are from central Minnesota through upper Michigan. In central Missouri, below-average values are persistent along and to the west of the Mississippi River, a region that is slow in recovering from summer drought conditions.
Map 7. The Vegetation Condition Report for the U.S. for November 27 – December 10 from K-State’s Ecology and Agriculture Spatial Analysis Laboratory shows that snow was present in much of the northern parts of the country and along the Rockies into New Mexico. Active photosynthesis is most prevalent along the northern California coast and from east Texas into Alabama. Thanks to favorable moisture in late November, drought has eased in these areas.
Map 8. The U.S. comparison to last year at this time for the period November 27 – December 10 from K-State’s Ecology and Agriculture Spatial Analysis Laboratory shows that the Pacific Northwest has much lower NDVI values, due mainly to wetter conditions this fall. This resulted in greater cloud cover and some negative effects from flooding and saturated soils. In contrast, the lower biomass production rates in the Southeast are due mainly to a deepening of the drought in that region. Nearly 14 percent of Georgia is in exceptional drought at this time. Last year, at this point, none of the state was in the exceptional drought category.
Map 9. The U.S. comparison to the 23-year average for the period November 27 – December 10 from K-State’s Ecology and Agriculture Spatial Analysis Laboratory shows that lowest NDVI values relative to the 23-year average are in the Pacific Northwest, which experienced persistent storms through the period. Portland, Oregon has reported precipitation every day in December this year, for a total of 5.67 inches, which is 1.33 above normal for December. They are 11.21 inches ahead since the first of October.

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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, 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 cthompson@ksu.edu.