Wheat Seeding Date Effect on Yield

2002-2003 and 2003-2004 growing seasons

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Six soft red winter wheat varieties (Table 1) were seeded at three dates in both 2002 and 2003 near Lexington, KY and near Princeton, KY (Table 2). The wheat was seeded into no-till conditions at a target rate of 40 seeds/ft^2. Phosphorus and potassium applications were made according to soil tests. Two nitrogen applications were made during the spring of each growing season to apply a total of 100 lbs of N/acre. In the 2002-2003 growing season, the first application of 30 lbs of N/acre was made in February and the remainder was applied March. In the 2003-2004 growing season, the first application of 30 or 50 lbs of N/acre was made according to crop growth stage and plant population. The remainder of N was applied in March or April, when wheat was at Feeke's 5. Harmony herbicide was used to control weeds and Warrior insecticide was used to control insects. Tilt or Folicur fungicide was applied to control diseases.

Wheat seed was harvested with small plot combines and bagged for handling. Grain samples were cleaned, weighed, tested for moisture and test weight.

Experimental design was a split-split-plot arrangement within a randomized complete block design. The main plots were the combination of field site and year (site-year). Subplots were planting date, of which there were four replications at each site-year. Sub-subplots were varieties. Data were analyzed with PROC GLM and protected LSD's were determined at P=0.05.

Table 1. Wheat varieties used in the study in 2002-2003 and 2003-2004 growing seasons.

Variety	Growing Season	
	2002-2003	2003-2004
25R23		x
25R37	x	x
25R44	x	
Allegiance	x	x
Declaration	x	
Hopewell	x	
Roane	x	x
Sarah		x
Sisson		x

A site-year by variety interaction required the data to be presented separately for each site-year. Only Allegiance, Pioneer 25R37 and Roane were tested at all four site-years. The yield of Pioneer 25R37 was the highest of any variety in six out twelve seedings and was similar to the highest yield in eleven out twelve seedings (Table 3). Conversely, the yield of Pioneer 25R37 was ranked to lowest of any variety in one out twelve seedings. The yield of Allegiance was the highest of any variety in three out of twelve seedings and similar to the highest yield in eight out of twelve seedings. Conversely, the yield of Allegiance was ranked the lowest in two out of twelve seedings. The yield of Roane was the highest of any variety in one seeding and was similar to the highest yield in seven out of twelve seedings.

Table 2. Seeding dates at each site and year for the wheat varieties.

Site	Year	Seeding Dates
Lexington	2002-2003	October 24
		November 9
		November 21
	2003-2004	October 13
		October 31
		November 26
Princeton	2002-2003	October 8
		October 16
		November 1
	2003-2004	October 15
		November 7
		November 21

The yields of Sarah and Sisson were never the highest yield, but were similar to the highest yield in four out of six seedings. The yields of Pioneer 25R44 and 24R23 were each highest for one out of six seedings and similar to the highest yield in four out of six seedings.

Many of these varieties expressed comparable levels of yield stability over seeding dates, locations and years. Pioneer 25R37 displayed the most yield stability be ranking at the top most frequently.

Later seeding dates resulted in reduced wheat yields (Figure 1). For example, wheat seeded on October 8 (280th day of year) resulted in approximately 95 bushels/acre of grain, while wheat seeded on November 21 (324th day of year) resulted in approximately 50 bushels/acre, or nearly a 50% yield reduction.

Table 3. Yield of wheat varieties planted at timely (1), late (2), and very late (3) planting dates.

Variety	Seeding Date											
	Lexington 2002-2003			Lexington 2003-2004			Princeton 2002-2003			Princeton 2003-2004		
	1	2	3	1	2	3	1	2	3	1	2	3
	Yield (bushels/acre)											
25R23				**74.3**	70.6	34.7				84.0	71.1	44.9
25R37	**88.2**	68.4	48.1	67.1	**79.8**	**46.8**	99.1	93.9	**88.9**	**97.5**	**75.4**	48.9
25R44	80.2	68.2	59.7				**100.2**	92.6	88.4			
Allegiance	63.7	**78.1**	**71.3**	69.7	43.8	44.0	91.6	**94.5**	87.2	84.9	70.0	43.8
Declaration	73.5	71.6	58.1				95.3	85.7	83.5			
Hopewell	77.0	68.9	55.0				96.1	90.9	77.8			
Roane	77.1	71.4	61.0	59.1	66.5	45.2	84.7	86.7	76.9	85.2	69.1	**53.6**
Sarah				69.3	70.5	39.5				85.3	69.9	45.6
Sisson				65.6	66.8	43.6				82.9	74.6	36.5
LSD (0.05)†‡	14.0	9.9	7.3	10.0	22.2	6.8	4.4	8.4	9.2	6.2	8.1	15.1
Average	76.6	71.1	58.9	67.5	66.3	42.3	94.5	90.7	83.8	86.6	71.7	45.5

†Bold number in yield column indicates highest numerical yield in that column.

‡Gray boxes indicate yields statistically similar to the highest yield in that column.

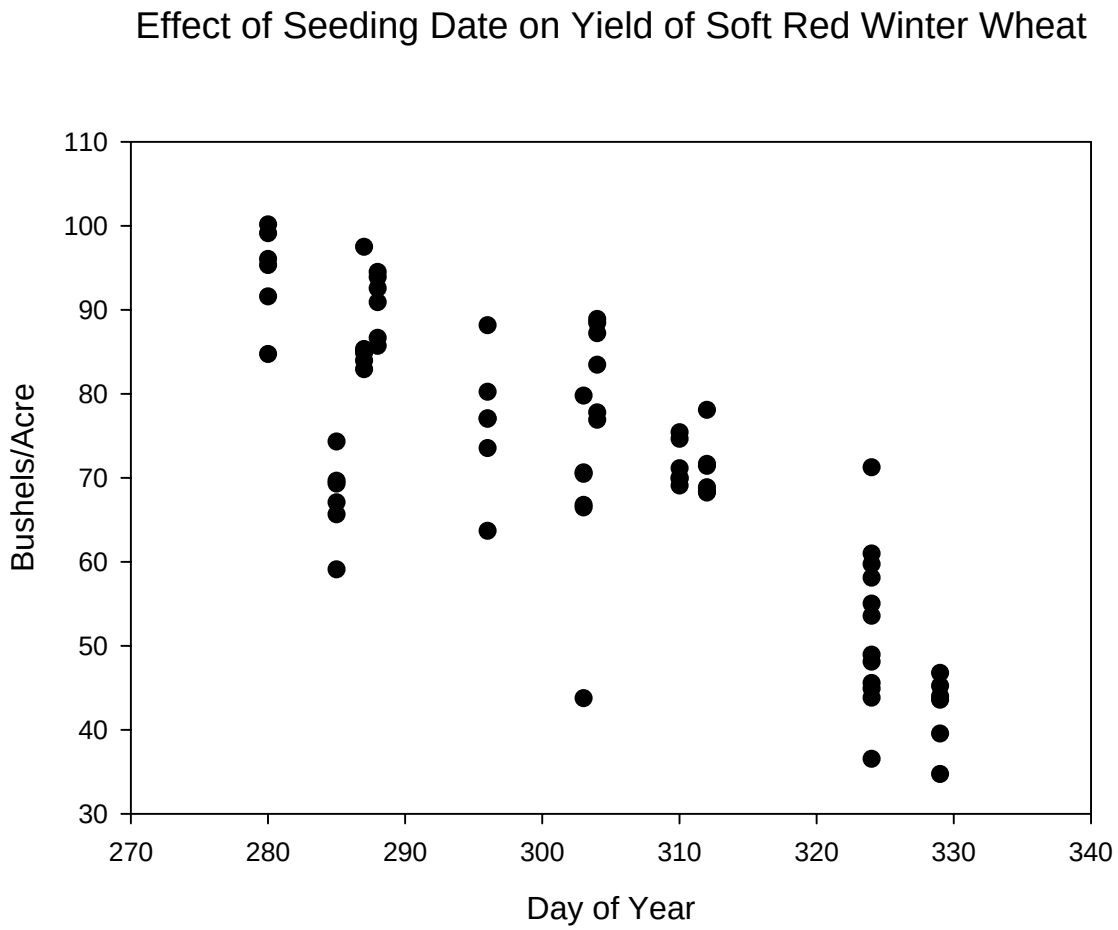

Figure 1. Seeding date (day of year) effect on wheat yield.