

PLANTING DATE EFFECT ON WHEAT YIELD

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INTRODUCTION:

Each year, 20% of the wheat in Kentucky is planted after October 30th, which is considered late. The percentage of late-planted wheat is even higher in the fall of 2004. This study was conducted to determine if wheat varieties differed in response to late planting dates.

MATERIALS AND METHODS:

Six soft red winter wheat varieties (Table 1) were seeded at three dates in both 2002 and 2003 near Lexington and Princeton, Kentucky (Table 2). The wheat was seeded into no-till conditions at a target rate of 40 seeds/ft². 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.

RESULTS:

Many of these varieties expressed comparable levels of yield stability over seeding dates, locations and years. Only Allegiance, Pioneer 25R37 and Roane were tested both years at both locations for a total of twelve plantings. Pioneer 25R37 displayed the most yield stability by ranking at the top most frequently (Table 3). The yield of Pioneer 25R37 was the highest of any variety in six out twelve plantings and was similar to the highest yield in eleven out twelve plantings. The yield of Allegiance was the highest of any variety in three out of twelve plantings and similar to the highest yield in eight out of twelve plantings. 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 plantings.

Of the varieties that were grown at only one year, the yields of Sarah and Sisson were similar to the highest yield in four out of six plantings (Table 3). The yields of Pioneer 25R44 and 24R23 were each highest for one out of six plantings and similar to the highest yield in four out of six plantings.

Wheat varieties typically responded similarly other wheat varieties to late planting dates. Later planting dates resulted in reduced wheat yields across all varieties (Figure 1). For example, wheat planted on October 8 at Princeton resulted in approximately 95 bushels/acre of grain, while wheat planted on November 21 resulted in approximately 50 bushels/acre, or nearly a 50% yield reduction.

CONCLUSIONS:

When selecting wheat varieties for late plantings, farmers should first, expect lower yields from later plantings and second, select varieties that perform well across several planting dates.

TABLE 1. WHEAT VARIETIES USED IN THE STUDY IN 2002-2003 AND 2003-2004 GROWING SEASONS.

Company	Variety	Growing Season	
		2002-2003	2003-2004
Exsegen	Sarah		x
Kentucky American Seed	Allegiance*	x	x
Kentucky American Seed	Declaration*	x	
Pioneer	25R23		x
Pioneer	25R37	x	x
Pioneer	25R44	x	
Public (Ohio State)	Hopewell	x	
Virginia Tech	Roane	x	x
Virginia Tech	Sisson		x

* Developed at the University of Kentucky.

TABLE 2. SEEDING DATES AT EACH SITE AND YEAR FOR THE WHEAT VARIETIES

Site	Year	SEEDING DATES		
		1	2	3
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

TABLE 3. YIELD OF WHEAT VARIETIES PLANTED AT TIMELY (1), LATE (2), AND VERY LATE (3) PLANTING DATES

Variety	Planting 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) -----											
Sarah				69.3	70.5	39.5				85.3	69.9	45.6
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			
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			
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
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. LATER PLANTING DATES REDUCED GRAIN YIELD. EACH DATA POINT IS THE AVERAGE YIELD OF SIX WHEAT VARIETIES ACROSS FOUR REPLICATIONS

