

# **Influence of Row Spacing, Seeding Rate, and Raised Beds on Production of Five Wheat Varieties on a Mississippi River Alluvial Soil**

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## **Introduction**

Wheat acreage fluctuates widely from year to year, primarily due to grain prices and weather patterns. Marketing of small grains in late spring provides much needed cash flow. Statewide yields average 40-50 bu/acre, but vary greatly across locations and years due to factors such as weather, disease pressure, and harvest conditions. Wheat is a versatile crop that integrates well into multiple cropping systems. Wheat is commonly harvested in early to mid-May, and a second crop can be planted after harvest.

This study is designed to look at the effects of planting wheat on wide raised beds in response to increased use of wide beds for soybean production. Some Louisiana soybean growers are using wide beds (72-80 inches) with 15-16 inches drilled rows for soybean production. These wide beds work well for a variety of crops, including cotton, soybean, and sugarcane. Wide beds offer significant advantages in soil moisture control, both irrigation and drainage, and are amenable to narrow row spacing. A wide-bed cropping system that included wheat in the winter would increase flexibility and offer rotational advantages. Such a system must be easy and economical for the producer. Wheat acreage in Louisiana is dependent on weather at planting because of our high rainfall and heavy soils that often make it impossible to prepare land and plant. Wide beds should dry quicker than non-bedded fields and therefore reduce the probability of lost acreage.

Wider row spacing (15-16 inches) has been shown to reduce wheat yield slightly in Ohio. However, wheat in Louisiana continues to grow and tiller all winter so this may compensate for wider rows. An additional question to be answered is whether or not seeding rates should be adjusted with wide rows. This study is designed to evaluate wheat production on raised beds using wider drill spacing, and to compare this with conventional wheat production.

1. Evaluate wheat production on wide beds compared to a traditional flat field.
2. Determine impact of wide versus narrow wheat rows on beds.
  - a. Do the wide rows negatively impact wheat yield?
  - b. Do the wide rows make soybean planting after wheat easier?
3. Evaluate interaction of seeding rate with wide wheat rows.
  - c. Does maintaining seed/acre by doubling seed/linear feet help compensate on wide rows?
4. Determine whether or not there are varietal differences in response to rows width on raised beds versus flat.

## Procedures

A field experiment was conducted in 2006/2007 on Tunica silty clay at the Northeast Research Station (NERS) near St. Joseph evaluating seedbed, row spacing, and seeding rate on yield performance of five wheat varieties. Seedbed treatments were the conventional flat seedbed and 80-inch wide, raised beds. The wide beds were pulled up using a set of modified hippers. Row spacing treatments were the conventional row spacing of 7 inches versus a wide row of 14 inches. For wide rows, every other drill was blocked on a conventional drill. There were nine drills for the 7-inch spacing and five drills for the 14-inch spacing. Seeding rates were 12 and 24 seed/linear ft, which is equivalent to a seeding rate of 50 and 100 lb seed/acre. Five varieties, Terral LA481, AGS 2060, Pioneer brand 26R61, Delta King GR9108 and AgriPro Coker 9553, which differ in tillering ability, were also evaluated. Plant stands were determined shortly after emergence in marked locations in each plot for the flat seedbed treatment only. Just prior to harvest the number of heads were also determined in the marked locations. Tillers per plant were determined from the seedling count and head count. Grain yield and yield components (number of heads/acre, kernel weight and kernels/head) were determined and yield is reported at 13.0%. All drills were harvested for each row-spacing treatment. Statistical analyses were performed using the GLM procedure of SAS at probability level of 0.10.

## Results and Discussion

Rainfall was about normal through the growing season (Table 1). Yields were higher on the flat seedbed than on the raised, wide beds (Table 2) probably because of the lack of above normal rainfall, particularly in the months of February, March, and April.

In addition to the influence of seedbed, variety and seeding rate also influenced yield (Table 2). The interaction between variety and seeding rate and seedbed and seeding rate were significant for yield. Thus, variety and seedbed influenced optimum seeding rate. Yields were similar between row spacings. There were no significant interactions between row spacing and any of the other variables.

Although the 7-inch row spacing produced many more heads than the 14-inch spacing, there were no differences in tiller count between row spacings (Table 3). There was a significant seeding rate and row spacing interaction for tiller count. The relative increase in tiller count for the 50 versus 100 lb seeding rate was higher for the 7-inch row spacing.

Table 1. Rainfall received at St. Joseph, 2007

Month	Rainfall inches
January	6.76
February	2.87
March	1.30
April	3.33
May	1.80

June

0.53

Table 2. Influence of variety (var), seeding rate (SR), seedbed (SB), and row spacing (RS) on wheat yield on Tunica silty clay at St. Joseph, 2007.

Variety	Seeding rate Lb/acre	Flat seedbed		Avg	Wide bed		Avg	Avg <sup>1</sup>
		7-inch spacing	14-inch spacing		7-inch spacing	14-inch spacing		
		-----bu/acre-----						
Terral LA841	50	65.8	65.2	65.5	65.5	55.0	60.3	62.9
	100	68.9	68.4	68.7	57.9	55.8	56.9	62.8
PB 26R61	50	62.9	64.3	63.6	55.4	56.1	55.8	59.7
	100	68.3	77.4	72.9	61.8	65.5	63.7	68.3
AGS 2060	50	72.4	72.1	72.3	60.8	65.5	63.2	67.7
	100	66.3	67.7	67.0	58.3	56.1	57.2	62.1
DG 9108	50	64.0	64.7	64.4	56.8	53.0	54.9	59.6
	100	69.5	69.3	69.4	51.8	55.8	53.8	61.6
Coker 9553	50	70.6	65.0	67.8	60.9	58.8	59.9	63.8
	100	74.6	73.3	74.0	60.1	63.5	61.8	67.9
	Avg.	68.3	68.7		58.9	58.5		
LSD (0.10):								
SB				3.4				
Var				2.7				
SR				1.7				
RS				NS <sup>2</sup>				
Var x SR				3.8				
SB x SR				2.4				

<sup>1</sup>Average yield for each seeding rate and variety averaged across seedbed and row spacing treatments.

<sup>2</sup>NS=non significant at the 0.10 probability level.

Table 3. Influence of variety, seeding rate, and row spacing on number of heads and tillers on flat seedbed on Tunica silty clay at St. Joseph, 2007.

Variety	Seeding rate lb/a	Heads		Tillers	
		7-inch spacing no/a	14-inch spacing no/a	7-inch spacing no/plant	14-inch spacing no/plant
Terral LA841	50	2,353,200	1,517,120	5.1	4.1
	100	2,384,490	1,824,270	2.9	2.7
PB 26R61	50	1,952,650	1,591,580	3.8	4.1
	100	2,328,160	1,774,630	2.0	2.5
AGS 2060	50	2,140,410	1,405,430	5.5	3.2
	100	2,265,580	1,603,990	2.0	2.4
DG 9108	50	2,190,480	1,268,920	5.6	4.0
	100	2,384,490	1,510,920	2.6	3.0
Coker 9553	50	2,127,890	1,182,050	6.2	4.9
	100	2,046,530	1,430,250	2.2	2.9
	Avg.	2,217,390	1,510,920	3.8	3.4
LSD (0.10):					
Var		NS		NS	
SR		150,050		0.7	
RS		150,050		NS	
SR x RS		NS		1.0	