Title: Planting Date and Rate Study with Spring Wheat.
Year: 2010
Location: Western Triangle Research Center, Conrad, MT
Personnel: John H. Miller and Grant Jackson, Western Triangle Ag. Research Center, Conrad, MT.

Introduction: The optimum window of April 7 to May 7 for planting small grains at Conrad was determined from planting date studies conducted nearly 30 years ago[1]. A planting date study for spring grains was initiated in 2007 and continued in 2008, by Dr. Greg Kushnak, 2009 was missed and the study resumed in 2010 to determine whether previous planting-date recommendations are still applicable.

Methods: In 2010, spring wheat 'Choteau' was planted on three dates: April 5, April 20, and May 13. The plan to plant every two weeks from the first date of planting was followed as closely as weather would allow. Being able to start planting in early April allowed for a mid and late planting season date. Within each date, three rates of seeding were applied: 15, 23 and 30 seeds/ft^2. 120-20-20 pounds per acre of fertilizer was applied to the spring wheat.

Results, Spring Wheat Dates: The early April date was planted in cold and dry conditions and the second date was planted when the plot area was dry enough to plant after a significant rainfall event. The second date was followed by more rainfall events and cool temperatures, keeping the soil temperatures cool, delaying germination and emergence of both early planting dates. Essentially, the spring wheat for the early and mid planting season dates stayed at the same growth stages for the entire growing season. The May planting date was about two weeks behind the early planting dates throughout the 2010 growing season. Unusually cold temperatures and wet conditions delayed all plant maturity in 2010. In 2010, yield and test weight, while protein increased for the May 13 planting date (Table 1). These plots also received significant hail events on July 19 and September 5.

Yield for the April plantings were 12 or more bu/a greater than for the May 13 planting. Test weight declined with later planting dates, but was still above 60 lbs/bu. Protein was highest for the May 13 planting. In 2007, protein also increased with delayed planting (Table 2)[1].

Protein decreased slightly with the 30 seeds/ft^2 seeding rate when compared to the 15 seeds/ft^2. Yields were almost 5 bu/a higher for the two higher seeding rates, although, the higher seeding rates were not different from each other with respect to yield. Test weights were slightly higher for the higher seeding rates, whereas, protein was higher for the lowest seeding rate (Table 1).

Results, Barley Dates: The barley plot was lost due to hail on July 19 and again on September 5.

Future Plans**:** The study needs to be redesigned to include four seeding rates between 15 and 21 seeds/ft^2, and to include both day-length sensitive and insensitive varieties[1] of spring wheat and barley.

[1] Dr. Gregory D. Kushnak, Western Triangle Ag. Research Center 2008 Annual Report.

Table 1. Planting dates and seeding rates for 'Choteau' spring wheat.
Western Triangle Ag. Research Center, Conrad, MT. 2010.

Rate (seeds/ft)	Planting Date	Yield (bu/a)	Test Wt (lbs/bu)	Head date 1 Rep	Protein %	Harvest date
15	5-Apr	88.3	62.2	July 6	13.0	8-Sep
23	5-Apr	90.8	62.5	July 6	12.7	8-Sep
30	5-Apr	89.4	62.4	July 6	12.7	8-Sep
5-Apr	means:	89.5 a	62.3 a		12.8 b	
15	20-Apr	82.9	60.8	July 8	13.3	8-Sep
23	20-Apr	89.1	62.1	July 8	13.0	8-Sep
30	20-Apr	90.0	62.8	July 8	12.8	8-Sep
20-Apr	means:	87.3 a	61.9 b		13.0 b	
15	13-May	70.1	61.2	July 16	13.7	27-Sep
23	13-May	75.4	61.2	July 16	13.6	27-Sep
30	13-May	79.7	61.6	July 16	13.4	27-Sep
13-May	means:	75.1 b	61.3 c		13.6 a	
15	5-Apr	88.3	62.2	July 6	13.0	8-Sep
15	20-Apr	82.9	61.2	July 8	13.3	8-Sep
15	13-May	70.1	60.8	July 16	13.7	27-Sep
rate 15	means:	80.4 a	61.4 a		13.3 a	
23	5-Apr	90.8	62.5	July 6	13.6	8-Sep
23	20-Apr	89.1	62.1	July 8	13.0	8-Sep
23	13-May	75.4	61.2	July 16	13.3	27-Sep
rate 23	means:	85.1 b	61.9 b		13.1 ab	
30	5-Apr	89.4	62.4	July 6	12.7	8-Sep
30	20-Apr	90.0	62.8	July 8	12.8	8-Sep
30	13-May	79.7	61.6	July 16	13.4	27-Sep
rate 30	means:	86.4 b	62.2 b		13.0 b	
LSD (.05)		3.70	0.41		0.26	
C.V. %		5.20	0.78		2.35	
Date P		0.0000	0.0001		0.0000	
Rate P		0.0067	0.0008		0.0372	
Interaction P		0.3901 ns	0.0068		0.859 ns	

Planted on conventional fallow.

Fertilizer, actual lbs/a: 120-20-20. Sprayed with Huskie at 11 oz/a and Axial XL at 16.4 oz/a on 6/4/2010.

Table 2. 3-year summary for planting date and rates for 'Choteau' spring wheat. Western Triangle Ag. Research Center, Conrad, MT. 2010.

Planting date	Yield bu/a	Test Wt lbs/bu	Protein %	Ripening date*	PPT* (inches)
Apr 27, 2007	34.9	57.7	15.5	Aug 8	2.95
May 5, 2008	53.3	61.7	13.1	Aug 25	7.79
April 5, 2010	89.5	62.3	12.8	8-Sep	13.46
3-yr avg.	59.2	60.6	13.8		
May 7, 2007	33.7	57.1	16.2	Aug 8	2.61
May 14, 2008	52.2	62.0	12.7	Sep 1	7.45
April 20, 2010	87.3	61.9	13.0	8-Sep	12.47
3-yr avg.	57.7	60.3	14.0		
May 17, 2007	25.7	56.7	16.7	Aug 15	2.61
May 31, 2008	42.7	59.4	13.3	Sep 6	5.80
May 13, 2010	75.1	61.3	13.6	27-Sep	12.27
3-yr avg.	47.8	59.1	14.5		
Seeding Rate** (seeds/ft)					
rate 15	30.0	57.0	16.2		
rate 15	46.2	60.8	13.1		
rate 15	80.4	61.4	13.7		
3-yr avg.	52.2	59.7	14.3		
rate 23	32.3	57.2	16.2		
rate 23	50.7	61.1	13.0		
rate 23	85.1	61.9	13.1		
3-yr avg.	56.0	60.1	14.1		
rate 30	31.9	57.3	16.1		
rate 30	51.3	61.1	13.1		
rate 30	86.4	62.2	13.4		
3-yr avg.	56.5	60.2	14.2		

* Growing season precipitation.

** Seed rates are pure live seeds per square foot: $15/ft^2$ = 653,400 seeds/a; $23/ft^2$ = 1,001,880 seeds/a; and $30/ft^2$ = 1,306,800 seeds/a.