ULTRA EARLY SEEDING OF SPRING WHEAT RESULTS - 2021

Is it possible to seed wheat earlier in the season? If so, can you seed at temperatures between 0 and 10°C? Would cold air and soil temperatures affect yield, test weight, thousand kernel weight and emergence? This experiment aims to answer all of these questions. Two hard red spring wheat varieties (AAC Brandon and AAC Connery) were selected to be seeded as soon as ground temperature was above 0°C (May 6 for the 2021 growing season) at 56.6, 84.9 and 113.2 plants ft-2. Seeding of the same varieties at the same seeding rates also took place later in the season when ground temperatures were above 10°C (May 20).

Table 1. P-values of fixed parameters and their interactions studied for AAC Brandon and AAC Connery wheat varieties sown on May 6 and May 20 at three different seeding rates (56.6, 84.2 and 113.2 plants ft^{-2})

Parameter	Emergence plant	Percentage of moisture content	Yield	Test weight	Thousand kernel weight
Effect					
Seeding date	0.0224	0.0334	0.0334	0.8585	0.6075
Wheat variety	0.7194	0.5687	0.5687	0.0439	0.9528
Rate	0.0325	0.2629	0.2629	0.9071	0.3814
Date X Name	0.4083	0.9014	0.9014	0.5298	0.0936
Date X Rate	0.3102	0.6127	0.6127	0.9156	0.7186
Name X Rate	0.6769	0.2874	0.2874	0.8751	0.3149
Date X Name X Rate	0.1384	0.4988	0.4988	0.5746	0.0564

Numbers below α=0.05 denote significance of the effect in the parameter studied

Table 1 shows all of the P values obtained for each parameter, effect and interactions between these effects. Number of emergent plants was different depending on seeding date and seeding rate. From the results shown in Table 2, it can be argued that greater seeding rates can lead to a greater number of emergent plants and that colder ground temperatures may slow down development and growth.

Counting Wheat Emergence 05/31

Ultra Early Wheat 07/30

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Percentage of moisture content was different according to seeding date, wheat variety and seeding rate. Moisture content was greater in AAC Connery wheat stands seeded on May 20, at the lowest seeding rate compared to wheat stands of the same variety sown on May 6 at the same rate.

Moisture content in AAC Connery at 56.6 plants ft-2 on May 20 was the same as that of AAC Brandon wheat stands sown on the same date and AAC Connery sown on May 6 at 113.2 plants ft -2 (Figure 1). Conversely, AAC Brandon wheat sown on May 6 had a moisture content as low as that of AAC Connery sown on the same date at 56.6 plant ft -2. Warmer temperatures may have increased water flow from melted ice within the pores and hence encouraged seed water absorption. Greater moisture content in AAC Connery on May 6 at the highest seeding rate likely occurred due to disturbance produced by seeding through disk drilling. This may have broken ice pockets within the soil pores and hence increased water availability to the seeds. Moisture content acquisition by the seed may have been further achieved as seed density was greater and individuals were starting to grow closer to each other.

Wheat yield was greater from individuals seeded on May 6 compared to those seeded two weeks later (Table 2). These results coincided with findings reported in 2020 but not in 2019. The growing season in 2020 started with various wet episodes whereas 2019 was unusually dry. It is possible greater yields are feasible from early sown wheat if the soil contains a certain amount of moisture, sufficient enough for seeds to germinate. Dry conditions in 2019 may have halted this, likely by reducing water availability. AAC Connery had a heavier test weight compared to AAC Brandon (Table 2). This is likely due to the higher moisture content in AAC Brandon and the higher protein content in AAC Connery which has more by default. In contrast there was no impact in thousand kernel weight from any of the effects studied.

Figure 1

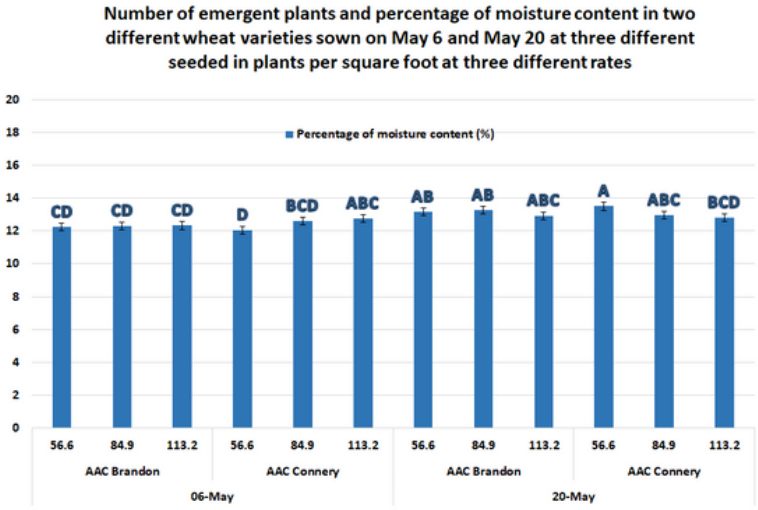

Table 2. Test weight and yield in two different wheat varieties sown on May 6 and May 20, 2021 at 56.6, 84.2 and 113.2 plants ft^{-2}.

		Effect		
Parameter			SE	
Emergence (plants ft^{-2})				
	Seeding rate (plants ft^{-2})			
	54.6	6.54	0.5	B
	84.9	7.52	0.5	AB
	113.2	9.03	0.5	A
	Seeding date			
	May 6	6.62	0.4	B
	May 20	8.78	0.4	A
Yield (bu ac^{-1})				
	May 6	20.42	2.5	A
	May 20	15.79	2.5	B
Test weight (lb bu^{-1})	Wheat variety			
	AAC Brandon	61.34	0.6	A
	AAC Connery	59.92	0.5	B

Different letters mean significance between treatments
SE=Standard error

Seeding, Maintenance, and Harvest Information

Ultra-early seeding of spring wheat - Seeding, Maintenance, and Harvest Information*

Seeding**		Maintenance						Harvest***
		Fertilizer		Herbicide		Insecticide		
Date	Depth	Date	Product	Date	Product	Date	Product	Date
May 6 ◊	1 in.	May 6	46-0-0-0 (140 lb ac^{-1})	May 16	RT 540 (0.66 L ac^{-1})	Jun. 29	Coragen (0.101 L ac^{-1})	Sep. 8 ◊
May 20 ○	1 in.	May 6 ◊	13-33-0-15S (100 lb ac^{-1})	Jun. 10	Prestige A (0.32 L ac^{-1})	Jul. 14	Coragen (0.101 L ac^{-1})	Oct. 2 ○
		May 20 ○	13-33-0-15S (100 lb ac^{-1})	Jun. 10	Prestige B (0.81 L ac^{-1})			
				Sep. 3	Roundup Transorb HC (1 L ac^{-1})			

◊ Wheat Seeding on the Early Date (Soil Temperature = 1°C)
○ Wheat Seeded on the Normal Date (Soil Temperature = 5°C)

* All treatments were set-up as a randomized complete block design (RCBD) with four replicates
** All plots seeded with Fabro no-till disc drill plot seeder equipped with planter-mounted coulters.
*** All plots harvested with Wintersteiger Nurserymaster Expert plot combine.
Note: Dates and treatments applicable to all trials referenced in each respective chart unless specified.