



2013 ADOPT Project Report

Optimal Seeding Rate for Spring Wheat



Prepared by:

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December 2013

1. **Project Title:** Optimal Seeding Rate for Spring Wheat
2. **Project Number:** 20120407
3. **Producer Group Sponsoring the Project:** Conservation Learning Centre Inc
4. **Project Location:** Conservation Learning Centre, Prince Albert, Sask.
Located on the SW 20-46-26 W2, RM 461
5. **Project Start and End Dates:** May 1, 2013 to February 1, 2014
6. **Project Contact Person and Contact Details:** Larry White, A/Manager,
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7. **Project Objectives:** The objective is to provide information on the yields associated with increasing seeding rates in spring wheat
8. **Project Rationale:** Producers may see a benefit of increasing the seeding rate of spring wheat when targeting higher wheat yields with the newer higher yielding spring wheat varieties. Generally a more dense plant stand, which provides a quicker ground cover, allows the crop to better compete with weeds.
Research has shown that spring wheat yields can be increased by increasing seeding rates. There is however a point where the increased plant population benefits are outweighed by the increased seed cost. The project will show area producers what may be the best combination of the seeding rate effect on yields and economic benefit.
9. **Methodology:** Spring wheat was seeded at eight different rates in treatments of a size of 2.5m x 10m. The rates were as follows;
 1. 60 seeds/m²
 2. 120 seeds/m²
 3. 180 seeds/m²
 4. 240 seeds/m²
 5. 300 seeds/m²
 6. 360 seeds/m²
 7. 420 seeds/m²
 8. 480 seeds/m²

There was only one replicate used in this project. The project was planted on Camellina stubble. The variety of spring wheat was Field Star.

A burn off of Pre Pass was applied on May 20, 2013. The soil temperature was 12C. The seed treatment Raxial was used. The treatments were planted on May 27, 2013. The soil temperature was 12C that day. The fertilizer applied with the seed was 57.5 lbs/ac N and 35 lbs/ac P.

All plots were up May 30 but the germination was generally poor due to cool, dry conditions. Cutworms were quite bad in some of the treatments and generally in the three higher seeding rate treatments they were the worst. The treatments were not sprayed for cutworms as a heavy rain on June 8 saw damage cease.

The treatments were sprayed with 2, 4D Amine 600 on June 11, 2013 @ a rate of 0.50 L/ac. The temperature at the time was 14C with a light breeze.

The treatments were sprayed with Headline @ 200 ml/ac in 10 gal/ac of water on July 12, 2013. The temperature was 23C that day.

The treatments were sprayed with Proline 480 SC @ 150 ml/ac on July 25, 2013 as the treatments were showing head blight.

Leaf rust was showing up in all treatments on August 1, 2013.

There was no visual, notable difference in the rate of maturity between treatments. All treatments were sprayed with Maverick 111 @ 1.5 L/ac. The treatments were combined on September 9, 2013.

10. Results:

Plot #	Seed Rate per m2	Bus/ac Rate	*Seed Cost \$/ac	Yield Bus/ac	**Crop Return \$	***Net
1	60	0.25	3.13	66.36	222.31	219.18
2	120	0.50	6.26	73.3	245.56	239.30
3	180	1.0	12.50	72.8	243.88	231.38
4	240	1.25	15.63	65.3	218.76	201.13
5	300	1.50	18.75	64.45	215.91	197.16
6	360	1.75	21.88	63.58	212.99	191.11
7	420	2.0	25.00	56.97	190.85	165.85
8	480	2.25	28.13	61.71	206.73	178.60

*Based on seed cost estimate from Trawin Seeds, Melfort as of December 27, 2013 of \$12.50/bus for certified seed.

**Based on #2 spring wheat 12.0 protein street price at Viterra, Prince Albert, December 27, 2013 of \$3.35/bus.

***the difference between crop return and seed cost. This does not take into account other crop production costs. In this project the other costs of producing the respective yields was virtually the same.

11. **Conclusions and Recommendations:** This project was carried out at five Agri-Arm sites. The results at the CLC in the 2013 growing season found the seeding rate on spring wheat of 120-180 plants m2 to provide the highest yield (0.5-1.0 bus/ac) and highest net return.

The composite report prepared by WARC found that "as the seeding rate increased, plant populations generally increased linearly and plant emergence

decreased. Maximum grain yields were reached at rates of 240 seeds or below at 5 of 8 site years; yields begin to decline at the highest seeding rates at these sites. Maximum yields were achieved with lower than recommended plant densities (between 114 and 178 plants m²) at all site years. It is likely that when best management practises and good growing conditions are combined, fewer plants are required to reach yield potential and prevent lodging".

12. Acknowledgements: The Conservation Learning Centre would like to acknowledge the ADOPT funding provided by the Ministry of Agriculture for the project; to the staff at the CLC for their dedication in planning and delivering the project and to Stu Brandt of NARF for his research expertise.

The CLC would like to recognize the leadership provided to this project by the staff of WARC at Scott.

13. Appendices: N/A

14. Abstract/Summary: The question is whether producers can increase yields on spring wheat varieties with high yield potential by using higher seeding rates. The other benefit may be improved weed control with more dense plant populations. The project compared seeding rates of 60, 120, 180, 240, 420 and 480 seeds m². The project carried out at the CLC in 2013 found the seeding rates between 120 and 180 seeds m² gave the highest yield. The project was carried out at five Agri-ARM sites in 2013. The composite report compiled by WARC found "as seeding rates increased, plant populations increased linearly and plant emergence decreased. Maximum grain yields were reached at rates of 240 seeds or below or below at 5 of 8 site years; yields began to decline at the highest seeding rates at these sites. Despite differences in response to seeding rate, maximum yields were with lower than recommended plant densities (average 140 plant m²) at all site years. It is likely that when best management practises and good growing conditions are combined, fewer plants are required to reach yield potential and prevent lodging".

15. Expenditure Statement:

Financial statement attached