

Agriculture Demonstration of Practices and Technologies (ADOPT) Project Final Report

Project Title: Demonstrating Wheat Varieties and Seeding Rates Against Wheat Stem Sawfly Damage

Project Number: 20230452

Producer Group Sponsoring the Project: Saskatchewan Wheat Development Commission

Project Location(s): *Provide the name or number of the rural municipality, nearest town or legal land location if possible. Provide the name of any cooperating landowner(s).* Scott, Saskatchewan, R.M. #380; Melfort, Saskatchewan, RM #428 Redvers, Saskatchewan, RM #61 Swift Current, Saskatchewan, RM #137

Project start date (month & year): 4/1/2024

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Abstract

In a 2024 trial at four Saskatchewan sites, four spring wheat varieties with different stem types were evaluated using a randomized complete block design with four replicates across seeding rates of 200, 300, and 400 seeds/m². Only the Scott site showed a significant varietal response to stem sawfly incidence. Here, CDC Adamant VB experienced the highest sawfly damage and lowest yield, while CDC Landmark VB had the least damage and high yield. Low sawfly pressure overall hindered clear interactions between stem solidness and resistance. CDC Landmark VB consistently ranked among the top-yielding varieties the majority of locations, making it a reliable choice for producers prioritizing yield stability and sawfly resistance. Conversely, CDC Adamant VB performed rather poorly in comparison, and CDC SKRush's yield was only competitive in Scott, limiting its broader reliability. Seeding rates had minimal overall impact on yield except in Swift Current, where higher rates improved yield. However, higher seeding rates (400 seeds/m²) did enhance protein content in Scott and Redvers. The hypothesized interaction between seeding rate and varietal performance was not observed, likely due to low sawfly pressure and the reclassification of varieties as semi-solid stems.

Project Objectives

This project evaluates the effectiveness of different wheat varieties on wheat stem sawfly damage. It also considers the effectiveness of different seeding rates of each variety on wheat stem sawfly damage and incidence.

Project Rationale

Wheat stem sawfly poses a significant threat to wheat and cereal production in Saskatchewan. The drier conditions of recent growing seasons have promoted the increase of sawfly egg survival, leading to increased crop damage. After hatching in late June to July, the wheat stem sawfly larvae burrow into the developing wheat stem and feed on the pith of the plant. This feeding weakens the plant causing lodging, reduced test weights and premature head death (Saskatchewan Ministry of Agriculture n.d.).

To better understand and mitigate wheat stem sawfly damage, multiple research studies have been conducted. Throughout this research, findings indicate that infestation rates were higher in stems with larger diameters, and solid stemmed wheat varieties were less vulnerable to sawfly damage (Morill, Gabor and Kushnak 1992). With increased research and development into more solid and semi-solid stemmed wheat varieties, wheat stem sawfly damage has been mitigated for producers, but not eradicated.

Studies have also explored the use of 1:1 ratio blends of solid-stemmed to hollow-stemmed varieties in reducing sawfly damage. A study found that a 1:1 blend of solid-stemmed and hollow-stemmed wheat had lower damage levels than hollow-stemmed varieties alone but significantly higher damage than mono-cropped solid-stemmed cultivars (Beres, Carcamo and Bremer 2009). Another study concluded that under low sawfly pressure, blending resistant and susceptible cultivars provided greater benefits than planting a single variety (Beres, Carcamo and Byers 2007). In 2023, Western Applied Research Corporation conducted a study for the Saskatchewan Wheat Development Commission further examining the impact of different varieties and varietal blends against sawfly damage (Slind, 2023). Results suggested that wheat variety and characteristic played a key role in infestation rates and crop losses attained by wheat stem sawfly.

Seeding rate have also been identified as a factor influencing sawfly incidence. Results found that hollow-stemmed cultivars experienced reduced sawfly incidence at higher seeding rates, while solid-stemmed wheat varieties maintained the most stable yield and pith at 300 to 350 seeds/m² (B. L. Beres, et al. 2011). Additionally, AC Avonlea, a hollow-stemmed variety, had the lowest infestation levels, and overall, wheat stem sawfly infestations decreased as seeding rates increased. It was determined to increase yield and decrease wheat stem sawfly incidence that when seeding hollow stemmed varieties to aim for high seeding rates (40 to 45 seeds/ft²) and maintain low to moderate seeding rates when growing solid-stemmed varieties (30 to 35 seeds/ft²) (Beres et al. 2011). Varietal resistance and crop management remain the most effective strategies in mitigating wheat stem sawfly damage. Continued research and additional field trials will help Saskatchewan producers to continue to make informed decisions and refine management practices to reduce the impact of wheat stem sawfly.

Methodology

This trial was arranged as a randomized complete block design (RBCD) with four replicates and twelve treatments at Scott, Melfort, Redvers and Swift Current, SK in 2024 (Table 1). The treatments for this trial consisted of four spring wheat varieties of varying varietal traits and three seeding rates. AAC Viewfield in addition to being a hollow stemmed variety, also has semi-dwarf characteristics, which may contribute to increased straw strength. The remainder of varieties have normal height genetics and vary from hollow (CDC SKRush) to semi-solid (CDC Landmark) and solid (CDC Adamant) stemmed. Seeding rates for this trial were comprised of 18, 27 and 37 seeds/ft², encompassing a low, medium and high range. Plot sizes varied slightly for all the sites.

Table 1. Treatments evaluated in SWDC_334-231120 wheat varieties and seeding rates against wheat stem sawfly damage demonstration trials conducted at Scott (SC), Melfort (ME), Redvers (RE) and Swift Current (SW), SK, in 2024.

TRT	Wheat Variety	Seeding Rate (seeds/ft ²)	Seeding Rate (seeds/m ²)	Stem Solidness	Semi-dwarf
1	AAC Viewfield	19	200	Hollow	Y
2	CDC SKRush			Hollow	N
3	CDC Landmark VB			Semi – solid	N
4	CDC Adamant VB			Solid	N
5	AAC Viewfield	28	300	Hollow	Y
6	CDC SKRush			Hollow	N
7	CDC Landmark VB			Semi – solid	N
8	CDC Adamant VB			Solid	N
9	AAC Viewfield	37	400	Hollow	Y
10	CDC SKRush			Hollow	N
11	CDC Landmark VB			Semi – solid	N
12	CDC Adamant VB			Solid	N

Agronomic management varied across individual sites (Appendix 2). The demonstration was established on canola stubble at Scott, Melfort and Redvers, while Swift Current was established on durum stubble. Plots were seeded using Fabro-build knife opener drills, with 8-inch row spacing at Swift Current, 10-inch at Scott, 12-inch at Melfort, and 12-inch row spacing at Redvers. The varieties listed in the treatment list above were seeded at 1 inch depth at Scott, Melfort, and Redvers and 1.5 inches deep at Swift Current. All fertilizer was applied at seeding, based on each site's spring soil test recommendations (Table 4). Fertility was maintained at non-limiting levels for all macronutrients at all sites. Scott, Redvers and Swift Current side-banded all their fertility, while Melfort placed their nitrogen in the midrow bands and the remaining nutrients in the side bands.

Pre-seed herbicide applications included Glyphosate 540 at Melfort (May 14, 2024), Swift Current (April 23, 2024) and Redvers (May 6, 2024) and Glyphosate 540 with Aim at Scott (May 9th). Seeding commenced on April 24, 2024, at Swift Current, followed by Scott on May 9, Redvers on May 13, and Melfort on May 14. At Scott an in-crop herbicide application

of Buctril M was made on June 18th, followed by a second in-crop herbicide application of Axial Xtreme applied on July 5th. Melfort received an in-crop application of Enforcer M and Axial that was applied on June 9-2024 with a second pass of Enforcer M on July 4, 2024. Swift Current applied a single in-crop pass of Liquid Achieve and Buctril M on June 11, 2024. No in-crop or foliar fungicide applications were made at Redvers. Foliar fungicide was applied only at Scott and Melfort. At Scott, Caramba was applied on July 12th, and Prosaro was applied at Melfort on July 16, 2024. Scott applied a pre-harvest herbicide mix of Glyphosate 540, Heat LQ and Merge on August 30, 2024, making it the only site in the study to use a pre-harvest herbicide or desiccant. Swift Current was the first to harvest on August 6, 2024, using a Zurn plot combine, followed by Redvers on September 1st. Scott harvested on September 2, 2024, using a Wintersteiger plot combine. Melfort was the last to harvest on September 10, 2024.

i. Data Collection

Soil samples were collected as a composite sample of the trial area at each location in the spring of 2024 at two depth increments, 0-6" and 6-24". Wheat stem sawfly incidence was collected at two timings: one in late-July while the wheat was still vegetative and the second timing just prior to harvest. At the vegetative timing, ten plants per plot were collected and split lengthwise to determine the presence of wheat stem sawfly larvae. Each stem with the presence of larvae or the evidence of sawdust was tallied and a percentage then was assigned to each plot. These collections were done on July 24th in both Scott and Melfort, July 22nd in Swift Current and July 30th in Redvers. When plants reached peak growth lodging was assessed. Lodging was determined based on a rating scale of 1-10, where 1 is 10% stem breakage/lodging and 10 is fully lodged (Table 2). At Scott and Swift Current, the second sawfly ratings occurred by counting the total heads in 1m row and then the total number of heads fallen in the same row to determine percent damage. Yields were determined from cleaned harvested grain samples and corrected to 14.5% moisture content. Cleaned grain samples were analyzed for protein content using an NIR machine and test weights using Canadian Grain Commission standards. Daily weather was collected by on-site weather stations and long-term weather data was collected from Environment Canada (1981-2010).

Table 2. Visual stem sawfly incidence scale used in SWDC_334-231120 wheat varieties and seeding rates against wheat stem sawfly damage demonstration trials conducted at Scott (SC), Melfort (ME), Redvers (RE) and Swift Current (SW), SK, in 2024.

Rating	Percentage of Stem Breakage/Lodging
1	10%
2	20%
3	30%
4	40%
5	50%
6	60%
7	70%
8	80%
9	90%

ii. Data Analysis

The data was analysed as a randomized complete block design (RCBD) with four replications using JMP PRO to determine the effects of variety and seeding rate and their interaction on spring wheat sawfly incidence at vegetative and reproductive stages, lodging, yield and protein. A mixed effects model was used with seeding rate and variety as the fixed effects and replicate and location as the random effect. All data met the assumptions of normality and heterogeneity. An analysis of variance (ANOVA) was used to determine significant differences at $p < 0.05$. The means were separated using Tukey's post-hoc test. Different letters indicate a significant difference. A linear regression was also conducted on seeding rate to determine its individual effect on the response variables at a significance level at $p < 0.05$.

Results *(you must provide the following information)*

Present and discuss any project results, including any data or measurements taken to evaluate the demonstration. Include things that didn't appear to work. These results are just as important to share. List extension activities such as field days or workshops. List the activity, the date it occurred, and the number of people who attended.

i. Growing Conditions

The 2024 climatic trends for all four sites, Scott, Melfort, Redvers and Swift Current, were generally similar throughout the year. In April, all the sites experienced above normal temperatures, with Melfort displaying the largest difference from the long-term average temperatures at 2.5°C . May temperatures were generally average, though Scott fell slightly below normal. June was cooler than average at all sites, with a mean temperature of 14°C across all sites. As the temperatures rose in July, they surpassed the long-term average at every site and remained elevated through September. September's mean temperatures were well above the long-term average, with Melfort again displaying the largest deviation at 4.9°C above normal. Throughout the entire growing season, Swift Current consistently recorded the highest temperatures, reaching 111% of the long-term temperature average in 2024.

The mean precipitation at all sites in 2024 was generally high, with all sites either exceeding or falling within 10% of the long-term average. On average late spring to early summer experienced higher than average precipitation, particularly in May and June. Most locations in April exceeded the long-term average precipitation with the exception of Redvers at 19.5 mm compared to 22.8 mm. Precipitation was well above the long-term average in May and June with site averages exceeding it by 26 mm and 24 mm above long-term, respectively. By July, Swift Current had begun to dry out, receiving 20.7 mm less than the long-term average, while the remain sites averaged 47mm above the long-term average.

Precipitation fell below the long-term averages in July and August. Although Scott and Redvers experienced extreme precipitation highs in May and June, both sites saw the largest decline in mean precipitation during July, with reductions of 45.4 mm and 52.1 mm respectively. After July and August, precipitation began to slightly exceed the long-term averages in September, except for Melfort, which remained below the long-term average but still increased in total precipitation from August to September. Overall, Redvers collected the most precipitation across all sites at 390.7 mm and Swift Current received the least amount of precipitation, 232.5 mm. Redvers and Scott both exceeded their long-term precipitation averages throughout the growing season, also collecting the most rain respectively.

Overall, the 2024 growing season conditions were variable. On average April to June was cooler with higher-than-normal precipitation. In July and August temperatures rose and precipitation declined. This created an extreme climate for crop reproductive growth. The climate remained slightly dry into September with only a slight increase from the mean long-term monthly precipitation and a definite increase in mean temperature from the long-term averages.

Table 3. Mean monthly temperatures (°C) and precipitation (mm) along with long-term (1981-2010) averages for the 2024 growing season for field trial sites at Scott, Melfort, Redvers and Swift Current, Saskatchewan.

Site	Year	April	May	June	July	Aug.	Sept.	Average/Sum	% of Long-Term Average ^z
----- Mean Temperature (°C) -----									
Scott	2024	5.7	9.8	13.3	18.9	17.4	14.7	13.3	108%
	Long- Term ^z	3.8	10.8	15.3	17.1	16.5	10.4	12.3	
Melfort	2024	5.3	10.1	13.2	19.4	17.4	15.7	13.5	109%
	Long- Term ^z	2.8	10.7	15.9	17.5	16.8	10.8	12.4	
Redvers	2024	5.4	10.9	14.7	20.0	17.7	15.8	14.1	104.3%
	Long- Term ^z	4.4	11.1	16.2	18.7	18	12.5	13.5	
Swift Current	2024	6.8	10.6	14.3	21.3	19.4	16.7	14.9	111%
	Long- Term ^z	5.2	10.9	15.4	18.5	18.2	12	13.4	
----- Cumulative Precipitation (mm) -----									
Scott	2024	22.1	74.2	112	26.7	42.8	39.5	317.3	116%
	Long- Term ^z	21.6	36.3	61.8	72.1	45.7	36	273.5	
Melfort	2024	24.2	73	84	36.1	31.1	33	281.4	96%
	Long- Term ^z	26.7	42.9	54.3	76.7	52.4	38.7	291.7	
Redvers	2024	19.5	92	156.2	13.4	39	70.6	390.7	121%
	Long- Term ^z	22.8	60	95.2	65.5	46.6	32.7	322.8	
Swift Current	2024	22.2	73.6	52.1	18.6	18.2	47.8	232.5	91%

Long- Term ^z	12.1	43.8	72.8	52.6	41.5	31.5	254.3
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^zLong-term average for all sites (1981-2010); Environment Canada

ii. Soil Test Results

This study ensured to cover the three main soil climatic zones in Saskatchewan: brown, dark brown and black. Each site was sampled from 0-6" and 6-24" in the spring for nutrient concentrations (Table 4), which were used for soil fertility recommendations. Across all locations, residual nitrogen levels in the top 6 inches were generally low. However, Melfort and Swift Current exhibited elevated soil residual nitrate levels deeper in the soil profile. Phosphorus concentration was similar across all sites, with only slightly lower levels in Revers compared to the others. Melfort recorded the highest potassium concentration (420 ppm), followed by Scott (294 ppm), Redvers (267 ppm) and Swift Current (260 ppm). Organic matter was significantly higher in Melfort (9.8%) than compared to the other sites. Scott, Redvers and Swift Current had similar, slightly varying organic matter levels. Soil pH across the sites was generally neutral, except for Scott which was slightly acidic (5.6). Cation exchange capacity was measured at Melfort, Swift Current and Scott with values being highest in Melfort and decreased progressively at the other sites.

Table 4. Selected soil test analyses results for SWDC_334-231120 wheat varieties and seeding rates against wheat stem sawfly damage demonstration trials conducted at Scott (SC), Melfort (ME), Redvers (RE) and Swift Current (SW) in 2024.

		SC-24	ME-24	RE-24	SW-24
Soil Zone		Dark Brown	Black	Black	Brown
Nitrate (NO ₃)- 0-6" depth	lbs/ac	15	9	12	12
Nitrate (NO ₃)- 6-24" depth	lbs/ac	18	33	15	63
Phosphorus (Olsen)	ppm	12	12	8	11
Potassium	ppm	294	420	267	260
Sulphur- 0-6" depth	lbs/ac	16	6	44	8
Sulphur- 6-24" depth	lbs/ac	54	30	360 +	18
Organic Matter	%	4	9.8	3.4	3.1
pH		5.6	6	7.8	7.4
Cation Exchange Capacity	meq	14.1	38.5	-	27.1

i. Wheat Stem Sawfly Incidence (Vegetative & Reproductive Timings)

Sawfly incidence ratings collected at both vegetative and reproductive stages were relatively low at all locations. The highest incidence occurred at Scott, where variety had a significant effect ($p=0.0191$) while seeding rate and their interaction was not significant (Appendix A1). At Scott, the variety CDC Adamant VB, exhibited the highest and third-highest sawfly incidence at the vegetative and reproductive timings, respectively. These ratings also corresponded to the lowest yield (Appendix A2). In contrast, CDC Landmark VB had the lowest sawfly incidence ratings at both timings, resulting in the second-highest yield. Interestingly, CDC SKRush had the second-highest sawfly incidence levels at both timings but achieved the highest yield.

According to the 2024 Sask Seed Guide, CDC Adamant VB and CDC Landmark VB are classified as semi-solid, while CDC SKRush and AAC Viewfield are hollow-stemmed. Initially, CDC Adamant VB was selected for this trial based on its registration as a fully solid-stem variety, though it has since been reclassified as semi-solid (FP Genetics, 2024). Based on these classifications, the semi-solid varieties, CDC Landmark VB and CDC Adamant VB, were expected to perform best against sawfly damage. However, due to low sawfly pressure resulting from precipitation, establishing a clear correlation was challenging.

Scott, which experienced the highest stem sawfly incidence, also recorded the highest sawfly damage in AAC Viewfield and CDC SKRush, aligning with their hollow-stem classifications. Overall, early spring precipitation continuing into July led to low sawfly incidence. Since Scott was the only location with notable sawfly damage, a combined analysis was not conducted.

ii. Yield

Yield analysis focused on three interactions: varieties, seeding rate, and their combined effect (seeding rate * variety). At individual sites, a significant response was observed between varieties on yield at all locations (Appendix A1). CDC Landmark VB achieved the highest yield in Swift Current and Redvers, while CDC SKRush led in Scott, and AAC Viewfield in Melfort (Appendix A2). CDC Adamant VB had the lowest yield in Scott, Melfort, and Swift Current, whereas CDC SKRush yielded the least in Redvers. Yield differences between the highest- and lowest-yielding varieties at individual sites ranged from 6–8 bu/ac.

Notably, CDC Landmark VB consistently performed well across all locations, ranking first or second, regardless of sawfly presence. This suggests it may be a strong varietal choice when sawfly is a concern. In contrast, CDC Adamant VB performed poorly in three out of four locations. CDC SKRush excelled only in Scott, while performing average to below average elsewhere—though still better than CDC Adamant VB.

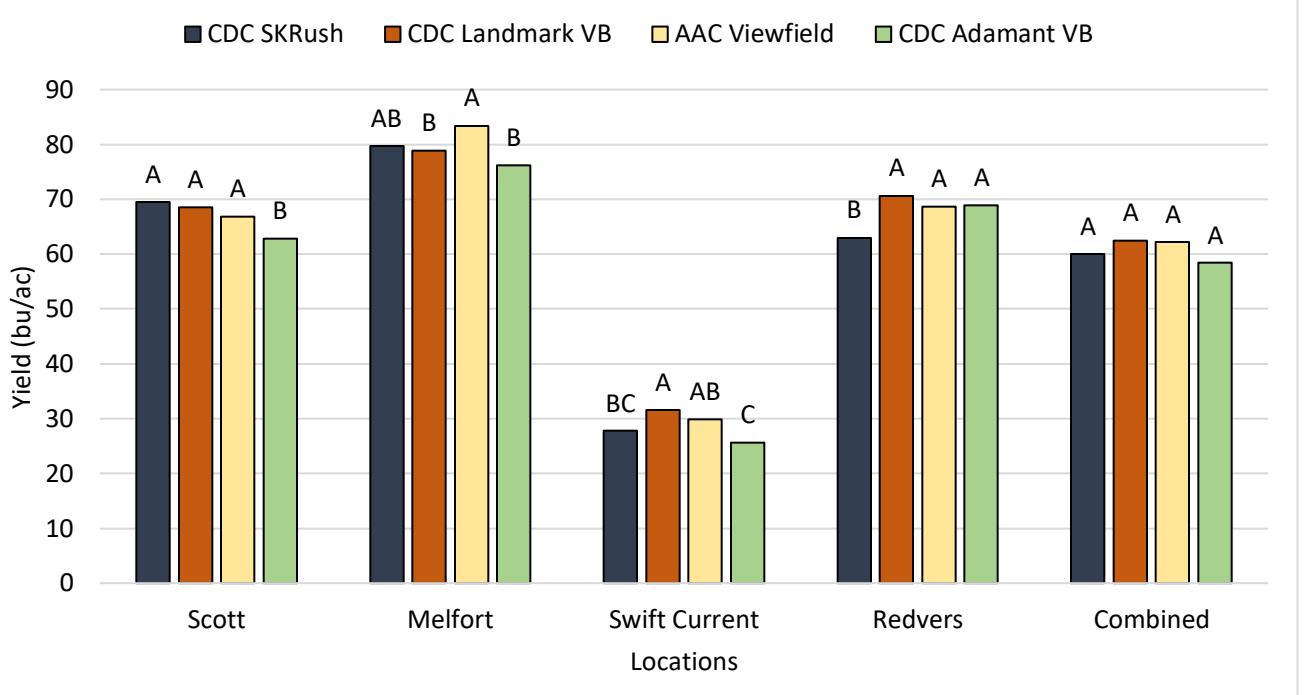


Figure 1. Yield (bu/ac) of wheat varieties (CDC SKRush, CDC Landmark VB, AAC Viewfield and CDC Adamant VB) from four individual locations (Scott, Melfort, Swift Current, and Redvers) and combined in Saskatchewan in 2024.

Seeding rates (200, 300, and 400 seeds/m²) showed no significant yield differences in Scott and Redvers, while Melfort and Swift Current did (Appendix A1). In Melfort, 300 seeds/m² yielded significantly more than 400 seeds/m², while 200 seeds/m² showed no significant difference from either. In Swift Current, yield increased linearly with higher seeding rates. However, in the combined analysis, no significant trends were observed, with only a 2 bu/ac difference between 400 and 200 seeds/m².

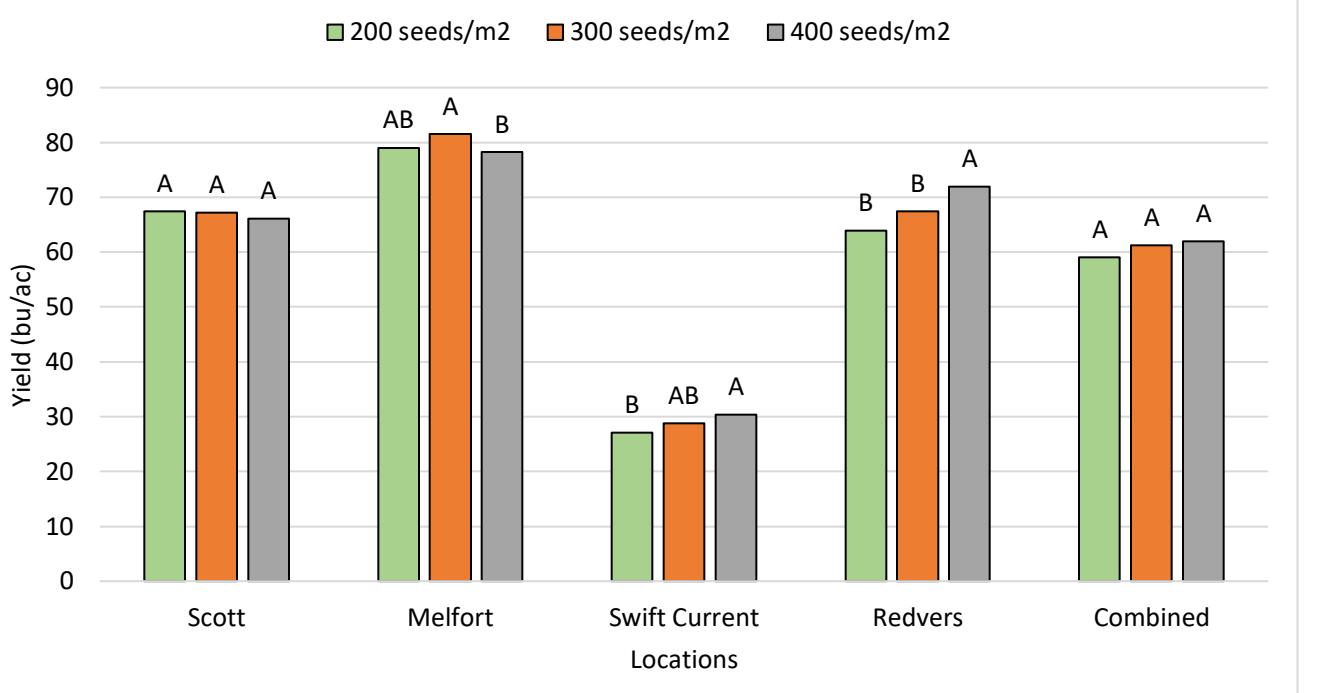


Figure 2. Yield (bu/ac) of seeding rates (200, 300 and 400 seeds/m²) from four individual locations (Scott, Melfort, Swift Current, and Redvers) and combined in Saskatchewan in 2024.

Lastly, no significant interaction was observed between seeding rate and variety, either individually or in the combined analysis (Appendix A1). This suggests that these varieties responded similarly across different agronomic conditions, including temperature, precipitation, soil zone, and fertility, when seeding rates were consistent across sites.

iii. Protein

Significant trends were observed between protein content and variety in Melfort ($p=0.0071$), Swift Current ($p=0.0146$), and Redvers ($p=.0018$), while Scott ($p=0.0026$) and Redvers ($p=<0.0001$) showed a significant effect of seeding rate on protein levels (Appendix A1). However, no location exhibited a significant seeding rate * variety interaction for protein.

CDC Adamant VB had the highest protein levels in Melfort and Swift Current, while CDC SKRush had the highest in Redvers. Across all locations, the lowest-yielding variety produced the highest protein content. In Scott, protein differences among treatments were insignificant, though CDC Adamant VB—also the lowest-yielding variety—had the highest protein.

A significant linear regression was observed at Scott ($p=0.0031$) and Redvers ($p<0.0001$), where 400 seeds/m² had the highest protein content and 200 seeds/m² the lowest. Swift Current also showed a linear trend, but it was not significant ($p=0.0737$).

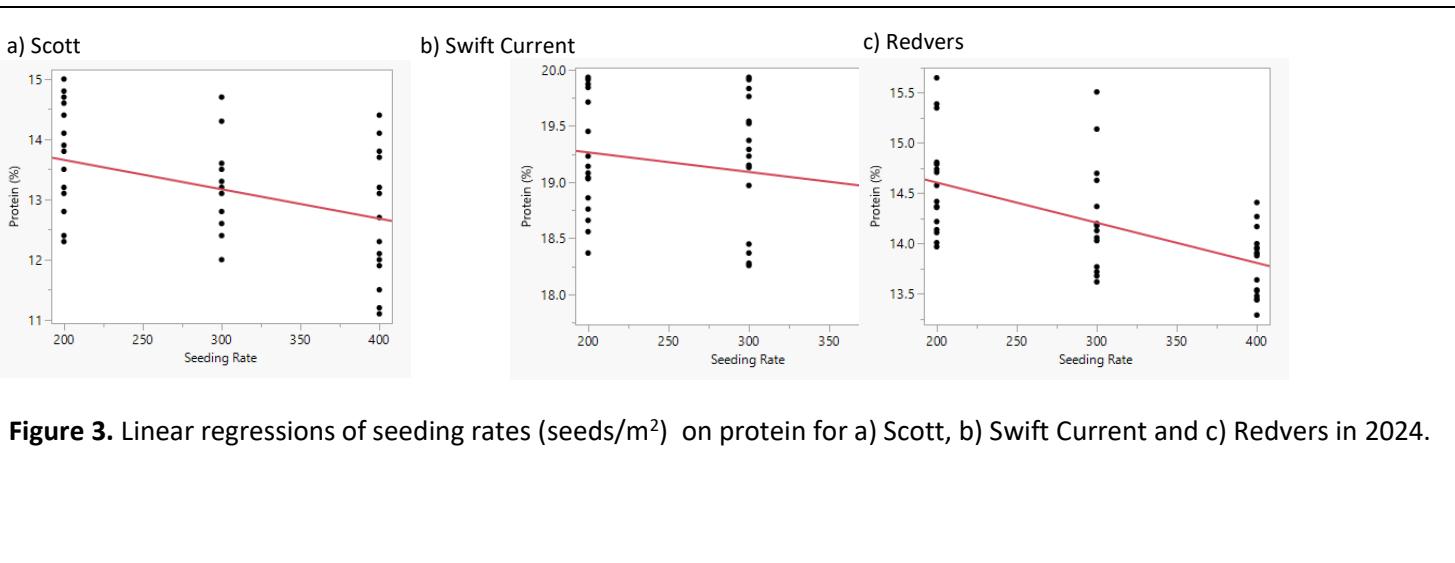


Figure 3. Linear regressions of seeding rates (seeds/m²) on protein for a) Scott, b) Swift Current and c) Redvers in 2024.

Conclusions and Recommendations

This trial, conducted in 2024 at four Saskatchewan sites using a randomized complete block design with four replicates, tested four spring wheat varieties with different stem types and heights across three seeding rates (200, 300, 400 seeds/m²). Scott was the only location where a significant response of varieties on stem sawfly incidence occurred, CDC Adamant VB showing the highest sawfly damage and lowest yield, while CDC Landmark VB had the lowest damage and second-highest yield. Due to low sawfly pressure across most sites, establishing a clear correlation between stem solidness and sawfly resistance was challenging, and a combined analysis was not conducted. CDC Landmark VB consistently ranked among the highest-yielding varieties across locations, while CDC Adamant VB performed the poorest in most sites, and seeding rates had minimal impact on overall yield trends. Protein content varied significantly by variety in Melfort, Swift Current, and Redvers, with the lowest-yielding varieties consistently having the highest protein. Based on the trial results, CDC Landmark VB is the most consistent performer across all locations, ranking among the highest-yielding varieties regardless of sawfly presence. Therefore, it is a strong varietal choice for producers concerned about both yield stability and sawfly resistance. CDC Adamant VB, despite being classified as semi-solid, performed poorly in most locations and is not recommended for maximizing yield. CDC SKRush yielded well in Scott but was inconsistent elsewhere, making it a location-specific option rather than a broadly reliable choice. Seeding rates had minimal impact on yield overall, except for Swift Current, where higher seeding rates resulted in higher yields. However, seeding rate did significantly influence protein content, with higher rates (400 seeds/m²) producing higher protein levels in Scott and Redvers. An interaction between seeding rate and varietal was not significant for any of the response variables. These trends contrast the original hypothesis based on (Beres et al. 2011) that hollow stems perform better at higher seeding rate (400 seeds/m²) while solid stem varieties tend to provide better tolerance to stem sawfly at lower seeding rates (300 seeds/m²). This interaction may not have occurred for two reasons: 1) the overall low presence of sawfly damage and 2)

that the varieties selected were reclassified as a semi solid rather than a true solid stem variety and therefore these varieties may not have acted as a true solid stem variety would. Overall, it was difficult to see a clear interaction between seeding rate and varietal selection to sawfly incidence due to the low sawfly pressure.

Sustainable Canadian Agricultural Partnership (Sustainable CAP) Performance Indicators

a) List of performance indicators

Sustainable CAP Indicator	Total Number
Scientific publications from this project (List the publications under section b)	
• Published	none
• Accepted for publication	
Highly Qualified Personnel (HQPs) trained during this project	
• Master's students	none
• PhD students	
• Post docs	
Knowledge transfer products developed based on this project (presentations, brochures, factsheets, flyers, guides, extension articles, podcasts, videos) ¹ . List the knowledge transfer products under section (c)	Radio discussion- walk the plots in Swift Current

¹ Please only include the number of unique knowledge transfer products.

b) List of scientific journal articles published/accepted for publication from this project. Please ensure that each line includes the following: **Title, Author(s), Journal, Date Published or Accepted for Publication and Link to Article (if available)**. Add additional lines as needed.

1.
2.
3.
4.

c) List of knowledge transfer products/activities developed from this project.

Knowledge Transfer Product or Activity	Event/Location Where Knowledge Transfer Was Conducted	Estimated Number of Producers Participated in Knowledge Transfer	Link (if available)
“Walk the Plots” radio program (Aug 6, 2024)	Country 94.1, Magic 97.1, CKSW 570	Southwest SK	https://wheatlandconservation.ca/news-events/

Acknowledgements

The final report and fact sheet will be distributed on the WARC, NARF, SERF, WCA and Agri-ARM websites.

Appendices

Appendix A1. p values for varieties and seeding rates treatments in wheat and their interactions on early sawfly incidence (%), late sawfly incidence (%), yield (bu/ac), and protein (%) at four sites individually and combined across Saskatchewan in 2024.

Location		Early Sawfly Incidence (%)	Late Sawfly Incidence (%)	Yield (bu/ac)	Protein (%)
Scott	Varieties (Vr)	0.0191	0.151	<0.0001	0.0662
	Seeding Rate (SR)	0.1246	0.4891	0.1963	0.0026
	SR * Vr	0.9869	0.113	0.8297	0.8161
Melfort	Varieties	0.1666	0.3157	0.0004	0.0071
	Seeding Rate	0.3686	0.3779	0.0437	0.2677
	SR * Vr	0.9381	0.7624	0.3728	0.3099
Swift Current	Varieties	1	0.8844	<0.0001	0.0146
	Seeding Rate	1	0.0663	0.0023	0.0871
	SR * Vr	1	0.2037	0.2865	0.1992
Redvers	Varieties	1	NA	0.0006	
	Seeding Rate	1	NA	<0.0001	
	SR * Vr	1	NA	0.9872	
Combined	Varieties			0.1621	0.6336
	Seeding Rate			0.186	0.0112
	SR * Vr			0.8327	0.7995

Appendix A2. Results for varieties and seeding rates on sawfly incidence (%) at vegetative timing and reproductive timing, yield (bu/ac) and protein (%) at a) Scott, b) Melfort, c) Swift Current d) Redvers e) Combined in 2024.

a) Scott	Vegetative Timing of Sawfly Incidence (%)	Reproductive Timing of Sawfly Incidence (%)	Yield (bu/ac)	Protein (%)
Varieties				
CDC SKRush	20.0 AB	3.5	69.5 A	12.6
CDC Landmark VB	11.7 B	2.5	68.6 A	13.3
AAC Viewfield	19.2 AB	4.5	66.8 A	13.1
CDC Adamant VB	30.0 A	3.3	62.8 B	13.6
Seeding Rate				
200 seeds/m ²	24.4	3.5	67.5	12.7 B
300 seeds/m ²	19.4	3.0	67.2	13.2 AB
400 seeds/m ²	16.9	3.9	66.1	13.7 A

b) Melfort	Vegetative Timing of Sawfly Incidence (%)	Reproductive Timing of Sawfly Incidence (%)	Yield (bu/ac)	Protein (%)
Varieties				
CDC SKRush	0.0	0.0	79.7 AB	16.3 B
CDC Landmark VB	0.0	0.1	78.9 B	16.8 AB

AAC Viewfield	0.0	0.0	83.4 A	16.2 B
CDC Adamant VB	0.0	0.0	76.2 B	17.1 A
Seeding Rate				
200 seeds/m ²	0	0	79 AB	16.63
300 seeds/m ²	0	0	81.5 A	16.77
400 seeds/m ²	0	0	78.22 B	16.37
c) Swift Current	Vegetative Timing of Sawfly Incidence (%)	Reproductive Timing of Sawfly Incidence (%)	Yield (bu/ac)	Protein (%)
Varieties				
CDC SKRush	0.0	3.0	27.8 BC	19.1 AB
CDC Landmark VB	0.0	2.7	31.6 A	18.7 B
AAC Viewfield	0.0	2.7	29.9 AB	19.2 AB
CDC Adamant VB	0.0	2.5	25.6 C	19.3 A
Seeding Rate				
200 seeds/m ²	0.0	3.4	27.1 B	19.2
300 seeds/m ²	0.0	2.4	28.7 AB	19.2
400 seeds/m ²	0.0	2.3	30.3 A	18.8
d) Redvers	Vegetative Timing of Sawfly Incidence (%)	Reproductive Timing of Sawfly Incidence (%)	Yield (bu/ac)	Protein (%)
Varieties				
CDC SKRush	NA	NA	63.0 B	14.5 A
CDC Landmark VB	NA	NA	70.6 A	14.1 BC
AAC Viewfield	NA	NA	68.7 A	14.3 AB
CDC Adamant VB	NA	NA	68.9 A	13.9 C
Seeding Rate				
200 seeds/m ²	NA	NA	63.9 B	14.6
300 seeds/m ²	NA	NA	67.5 B	14.2
400 seeds/m ²	NA	NA	72.0 A	13.8
e) Combined	Vegetative Timing of Sawfly Incidence (%)	Reproductive Timing of Sawfly Incidence (%)	Yield (bu/ac)	Protein (%)
Varieties				
CDC SKRush	NA	NA	60.0	15.6
CDC Landmark VB	NA	NA	62.4	15.7
AAC Viewfield	NA	NA	62.2	15.7
CDC Adamant VB	NA	NA	58.4	16.0
Seeding Rate				
200 seeds/m ²	NA	NA	59.0	16.0 A
300 seeds/m ²	NA	NA	61.2	15.8 AB
400 seeds/m ²	NA	NA	62.0	15.4 B

Appendix A3. Agronomic information for the study of “Demonstrating Wheat Varieties and Seeding Rates Against Wheat Stem Sawfly Damage” study at SC-24 (Scott), ME-24 (Melfort), RE-24 (Redvers) and SW-24 (Swift Current), Saskatchewan, 2024.

Activity	SC-24	ME-24	RE-24	SW-24
Previous Crop	Canola	Canola	Canola	Durum
Pre-Emergent Herbicide 1	May 9, 2024 (Glyphosate 540+ Aim)	May 14, 2024 (Glyphosate 540)	May 6, 2024 (Glyphosate 540)	April 23, 2024 (Glyphosate 540)
Seeding Date	May 9, 2024	May 14, 2024	May 13, 2024	April 24, 2024
Row Spacing	10 inches	12 inches	12 inches	8.25 inches
Seeding Depth	1 inch	1 inch	1 inch	1.5 inches
Fertility	69-17-6-8 @ 180 lbs/ac; side-banded	70-22-4-5 @ 430 lbs/ac; N in midrow, PKS side-banded	63-26-5-6 @ 127 lbs/ac	30-15-0-6 @ 300 lbs/ac; side-banded
In-Crop Herbicide 1	June 18, 2024 (Buctril M)	June 9, 2024 (Enforcer M)	N/A	June 11, 2024 (Liquid Achieve)
In-Crop Herbicide 2	July 5, 2024 (Axial Xtreme)	June 9, 2024 (Axial)	N/A	June 11, 2024 (Buctril M)
In-Crop Herbicide 3		July 4, 2024 (Enforcer M)		
Foliar Fungicide 1	July 12, 2024 (Caramba)	July 16, 2024 (Prosaro)	N/A	N/A
Wheat Stem Sawfly Incidence Date	July 24, 2024	July 24, 2024	July 30, 2024	July 22, 2024
Wheat Stem Sawfly Visual Damage Date	August 23, 2024	September 9, 2024	August 28, 2024	August 6, 2024
Pre-Harvest Herbicide or Desiccant	August 30, 2024 (Glyphosate 540 + Heat + Merge)	N/A	N/A	N/A

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Expenditure Statement

Available upon request.