# Strategic Field Program (SFP)
## Project Final Report

Completed reports must be returned by email to Evaluation.Coordinator@gov.sk.ca.

Project Title: Generating Pre-Harvest Sprouting Ratings for Barley Varieties

SFP File Number: 20230435

### Principal Investigator


Full Name: Ashebir Godebo

Organization: Irrigation Saskatchewan

Mailing Address: Box 1460 Outlook, SK S0L 2N0

Phone Number: 306-203-0467

E-mail: Ashebir.Godebo@irrigationsaskatchewan.com


### Collaborators *(add additional lines as needed)*

| C | Manager/Director | Phone Number | Email | Branch/Unit | Mailing Address |
|---|---|---|---|---|---|
| Zoe Galbraith | Assistant Manager | (306) 714-7724 | zgalbraith@saskclc.ca | Conservation Learning Center (CLC) | Box 1903 Stn Main Prince Albert, SK S6V 6J9 Canada |
| Mike Hall | Research Manager | (306) 621-6032 | m.hall@suncrestcollege.ca | East Central Research Foundation (ECRF) | Box 1939 Yorkton, SK S3N 3X3 Canada |
| Jessica Enns | General Manager | (306) 361-8703 | jessica.enns@warc.ca | Western Applied Research Foundation (WARC) | Box 89 HWY 374 Scott, SK S0K 4A0 Canada |
| Bryan Nybo | Manager | (306) 741-7609 | wcanybo@sasktel.net | Wheatland Conservation Area (WCA) | P.O. Box 2015, Swift Current, SK, S9H 4M7 Canada |
| Lana Shaw, Anmoldeep Singh Matharu | Research Manager | (306) 891-5050 | lshaw@serfsk.ca; amatharu@serfsk.ca | South East Research Foundation (SERF) | Box 129, Redvers, SK, S0C 2H0 Canada |

| | | | | | |
|---|---|---|---|---|---|
| Chris Holzapfel | Research Manager | 306-695-7761 | cholzapfel@iharf.ca | Indian Head Agriculture Research Foundation (IHARF) | Box 156, Indian Head, SK S0G 2K0 Canada |
| Matthew Struthers | Dawn Popescul | 306-787-4664 | Matt.struthers@gov.sk.ca | Crops and Irrigation Branch/ Plant Industry | 125-3085 Albert Street Regina, SK S4S 0B1 |
| Allie Noble | Chantal Jacobs | 306-960-2051 | Allie.noble@gov.sk.ca | RSB/CES | 141-800Central Ave, Prince Albert SK, S6V 6Z2 |


## Abstract *(maximum 500 words)*

Detail an outline on overall project objectives, methods, key findings and conclusions for use in publications and in the ministry's database. The abstract should address the following (usually 1–2 sentences per topic):

- Key aspects of the literature review
- Problem under investigation
- Clearly stated hypothesis or hypotheses
- Methods used (including brief descriptions of the study design, sample, and sample size)
- Study results
- Conclusions


Pre-harvest sprouting (PHS) is a recurring challenge for barley production, particularly for malting barley, where even low levels of sprouting can lead to market rejection and economic losses. Barley varieties bred for malting often have reduced grain dormancy to support rapid germination in malt houses, increasing their vulnerability to PHS when wet conditions occur before harvest. Previous studies have shown that PHS expression is influenced by both genetic factors and environmental conditions, yet growers often rely on anecdotal information when selecting varieties, as standardized, field-based resistance ratings are limited.

This project investigated genetic differences in PHS resistance among barley varieties and evaluated the extent to which variety performance interacts with environment and harvest timing. The central hypotheses were that (i) barley varieties differ genetically in their resistance to PHS when exposed to delayed harvest conditions, (ii) genotype-by-environment interactions contribute to variability in PHS expression across sites and years, and (iii) Rapid Visco Analysis (RVA) of grain collected from regional variety performance trials can be used as a practical and reliable tool to generate PHS resistance ratings.

Field trials were conducted over two years at seven locations across Saskatchewan, representing both rainfed and irrigated environments. Two primary sites, Indian Head (rainfed) and Outlook (irrigated), were used to create natural and simulated wetting conditions through delayed harvest, while additional satellite sites allowed broader environmental assessment. Thirty-three barley varieties were evaluated in randomized complete block designs with multiple harvest timings. Grain samples from early and delayed harvests were analyzed using RVA to quantify changes in starch viscosity associated with α-amylase activity and sprout damage. Emergence, agronomic traits, and yield were also measured to provide context for PHS impacts.

Results demonstrated consistent genetic differences among varieties for RVU across locations and years, confirming that PHS resistance is under strong genetic control. Delayed harvest consistently reduced RVU at most sites, although the magnitude of reduction varied by environment. Genotype-by-environment interactions were observed, particularly at sites experiencing severe wetting, but several varieties maintained relatively high RVU values across environments,

indicating stable resistance.

Overall, the study confirms that delayed harvest under natural and simulated rainfall conditions is effective for revealing genetic differences in PHS resistance. RVA proved suitable for generating PHS resistance ratings from regional trial samples and offers a practical approach for integrating PHS assessments into variety development and recommendation systems. These findings support the use of RVA-based ratings to improve variety selection and enhance the consistency and quality of Saskatchewan's malt barley supply.

## Extension Messages *(3 to 5 bullet point in plain language)*

Provide key outcomes and their importance for producers/processors and the relevant industry sector.

1. Barley varieties differ in how well they resist pre-harvest sprouting, and some varieties consistently perform better than others under wet harvest conditions.
2. Delaying harvest after rain greatly increases the risk of sprouting and quality loss, especially for susceptible varieties
3. Weather plays a major role, but variety choice can reduce risk when wet conditions occur before harvest.
4. Rapid Visco Analysis (RVA) can show sprouting damage and can be used to rate barley varieties for PHS resistance.
5. Using proven PHS-resistant varieties and timely harvest can help protect malt quality and reduce economic losses for growers.

## Introduction *(maximum 1,500 words)*

Provide a brief project background and rationale.

Barley, especially malt varieties, are bred with reduced dormancy to facilitate rapid germination in the malt house, including recently harvested barley. Most other cereal grains have some dormancy that prevents PHS under normal conditions. To complicate matters, malt buyers are very selective and will reject barley with more than five per cent PHS (called chitted in the malt industry). Feed barley affected by PHS may not store as well, and its feed quality could be diminished. In 2023, barley farmers in Saskatchewan experienced varying levels of PHS. For instance, a malt producer in the Humboldt region reported his crop reached 38% chitting, resulting in rejection for malt and financial losses of approximately $0.75-$1.50 per bushel, which added up to a significant loss on a 100-bushel-per-acre barley crop. The PHS was triggered by roughly 36 hours of wet conditions. Similar impacts were observed in research plots that year. Around Saskatoon, about 36 hours of mist caused widespread PHS in many barley breeding lines, raising concerns about seed viability for 2024 and potentially slowing breeding progress. Currently, growers mainly depend on anecdotal observations when choosing barley varieties thought to be more resistant to PHS. However, such observations are often influenced by environmental variability. In the Foam Lake area, for instance, early-seeded and early-harvested barley was accepted for malt, while delays in harvest led to rejection. Later-seeded barley, which remained immature during the wet conditions affecting earlier fields, was also deemed suitable for malt. This variability makes it tough for farmers and agronomists to definitively determine whether certain varieties are more susceptible or resistant to PHS. This project aligns with Saskatchewan's Plan for Growth. Saskatchewan-grown malt barley has been in high demand, especially from China, for several years. To maintain these export markets, the barley industry must ensure a consistent supply of high-quality malting barley. Providing growers with information to guide variety selection based on traits that enhance the likelihood of malt suitability will improve the consistency of the malt barley supply, thereby increasing our competitiveness in the market.

## Objectives and Progress *(add additional lines as needed)*

Please list the original objectives and/or revised objectives if ministry-approved revisions have been made to original objectives. A justification is needed for any deviation from original objectives.

| **Objective** | **Progress** *(i.e., completed/in progress)* |
|---|---|
| Determine genetic differences in PHS for barley varieties utilizing natural and irrigated conditions with delayed harvest to display genetic differences | Completed |
| Determine if there are interactions for PHS between genetics and environment | Completed |
| Determine if utilizing the rapid-visco analysis (RVA) methodology on regional variety performance trial grain samples is suitable for generating PHS resistance ratings for future varieties | Completed |

## Methodology *(maximum of five pages)*

Specify project activities undertaken during this reporting period. Include approaches, experimental design, tests, materials, sites, etc. Please note that any significant changes from the original work plan will require written approval from the ministry.

***Study design:***

This study was conducted at two primary locations in Saskatchewan to evaluate PHS resistance in barley. Indian Head

represented a rainfed environment, while Outlook provided an irrigated setting that allowed controlled simulation of rainfall events. A total of 33 barley varieties were selected for testing. Varieties in the SaskSeed Guide registered from 2019 onward were eligible. Older registrations grown on less than 2% of Saskatchewan's insured barley acres were excluded unless niche types or valuable as reference checks. Additional varieties were included to accommodate new registrations and standard checks. The list of varieties evaluated in this trial is provided in the appendix (Table A1).

The trial at both IHARF and ISASK were arranged in a randomized complete block design (RCBD). At ISASK, each of the 33 varieties was harvested at three different dates, with three replications per harvest, resulting in 297 plots. At IHARF, two harvest dates were used with the same number of replications, which resulted in 198 plots. Standard agronomic management practices appropriate for each site were followed. At ICDC, irrigation was applied to simulate approximately 12 mm of rainfall, which is required to trigger the second and third harvest timings.

Harvest dates were scheduled using a natural field weathering approach. The first harvest occurred when the latest maturing variety reached approximately 16 percent grain moisture. The second harvest took place 10 to 25 days later, after at least 12 mm of rainfall or applied irrigation, to ensure exposure to conditions that promote PHS. The third harvest, which was conducted only at ISASK, followed a similar interval. This sequence was designed to create sufficient contrast among varieties in their susceptibility to sprouting under prolonged wetting and drying cycles.

After harvest, all grain samples were cleaned and submitted to the Canadian Malting Barley Technical Centre. Rapid Visco Analysis was the primary measurement used to detect sprout damage. Rapid Visco Analysis is widely used in barley research because it provides a sensitive measure of alpha-amylase activity, which is strongly associated with PHS. RVA results from both primary locations were used to classify varieties by relative sprouting resistance.
To assess environmental interactions, a subset of seven varieties was also evaluated at five additional rainfed sites: Prince Albert, Yorkton, Redvers, Scott, and Swift Current. The selected varieties are also indicated in the appendix (Table A2). These varieties were also included in the main trials to allow direct comparison across locations. All satellite sites followed the two-harvest structure used for Harvest 1 and Harvest 2. Agrometeorological data, such as temperature and precipitation, were collected at each site. These data were used to analyze relationships between PHS outcomes, genetic factors, and environmental conditions.

***Statistical analysis:***

For each site, data were analyzed using an RCBD with three replications. Harvest date and variety were considered fixed effects, while replication was treated as a random effect. Although most sites included two harvest timings, the Outlook site included three, and its data were analyzed with the additional harvest timing included in the same model structure. Analyses were performed using SAS PROC MIXED, and mean comparisons among varieties and harvest dates were conducted using Tukey's HSD test at a 5% significance level. Traits analyzed included emergence rate, plant count, plant height, lodging, grain yield, and RVU, with results reported as least-squares means and standard errors. Model assumptions of normality and homogeneity of variance were checked and found to be met.

## Results and Discussions *(maximum of 30 pages (not including figures or tables))*

Describe project accomplishments during the reporting period under relevant objectives listed under "Objectives and Progress" section. Please accompany a written description of results with tables, graphs and/or other illustrations. Provide discussion necessary to the full understanding of the results. Where applicable, results should be discussed in the context of existing knowledge and relevant literature. Detail any major concerns or project setbacks.

**Growing Season Weather Conditions (2024-2025): Scott (WARC), Redvers (SERF), Yorkton (ECRF), Swift Current (WCA), Prince Albert (CLC), Indian Head (IHARF) and Outlook (ISask) locations.**

**Scott (WARC)**

At Scott, the 2024 growing season was slightly warmer than the long-term average, driven by a notably warm July, despite cooler-than-normal June temperatures. Precipitation in 2024 was above long-term totals, with wet conditions in May and June, followed by a dry July. In contrast, 2025 temperatures were generally warmer than long-term normal during May and June but cooler during July. Seasonal precipitation in 2025 was below the long-term average, largely due to dry conditions in May and September, despite above-average rainfall in June and August (Tables 1 and 2).

**Redvers (SERF)**

The 2024 season at Redvers was warmer than the long-term average, particularly in July and September. Precipitation totals were close to long-term normal, but rainfall distribution was highly skewed, with excessive June precipitation followed by a very dry July. In 2025, temperatures exceeded long-term averages throughout the growing season. Precipitation was more evenly distributed than in 2024, though still slightly below the long-term total. Improved rainfall timing in July likely supported grain filling, despite reduced June moisture relative to long-term values (Tables 1 and 2).

**Yorkton (ECRF)**

In Yorkton, 2024 temperatures were slightly above long-term averages in June and July, with July notably warm. Seasonal precipitation was below normal, primarily due to low rainfall in July. The 2025 growing season experienced moderately warm conditions, with temperatures close to long-term averages overall. Precipitation remained below the long-term total but was more evenly distributed throughout the season than in 2024, particularly with improved rainfall in July and August (Tables 1 and 2).

**Swift Current (WCA)**

The 2024 growing season at Swift Current was warmer than average, particularly in July and August. However, total precipitation was well below the long-term average, with persistent dryness throughout July and August. In 2025, temperatures remained above long-term norms but were slightly cooler than in 2024 during mid-summer. Precipitation totals closely matched the long-term average, with substantial rainfall in July and August (Tables 1 and 2).

**Prince Albert (CLC)**

Prince Albert experienced a cooler-than-normal 2024 season, particularly during May and June. Despite cooler temperatures, total growing-season precipitation was well above the long-term average, driven by rainfall in May and June. In 2025, temperatures were closer to the long-term average. Seasonal precipitation was below normal, with very dry conditions in May, July, and September, although June rainfall was substantially above average (Tables 1 and 2).

**Indian Head (IHARF)**

At Indian Head, the 2024 season was warmer than the long-term average, particularly during July and September. Precipitation was also above normal, with ample rainfall distributed across most of the growing season. The 2025 growing season exhibited near-normal temperatures but significantly below-average precipitation, with particularly dry conditions in June, July, and August (Tables 1 and 2).

**Outlook (ISask)**

In 2024, Outlook experienced warmer-than-average temperatures, especially in July. Precipitation exceeded the long-term total, largely due to wet conditions in May and June, followed by dry weather in August. The 2025 season was consistently warmer than the long-term average. Total precipitation closely aligned with the long-term mean but was unevenly distributed, with dry May and September, counterbalanced by substantial rainfall from June through August. Also, this site received irrigation in both years (Tables 1 and 2).

**Table 1.** Mean monthly temperatures and long-term (1981-2010) averages for the 2024-25 growing seasons at the seven trial locations: Scott (WARC), Redvers (SERF), Yorkton (ECRF), Swift Current (WCA), Prince Albert (CLC), Indian Head (IHARF) and Outlook (ISask).

| Location | Year | May | June | July | August | Sept | Avg. |
|---|---|---|---|---|---|---|---|
| Scott (WARC) | 2024 | 9.8 | 13.3 | 18.9 | 17.4 | 14.7 | 14.82 |
| | 2025 | 12.9 | 14.6 | 15.8 | 17.4 | 14.7 | 15.08 |
| | Long-term | 10.8 | 15.3 | 17.1 | 16.5 | 10.4 | 14.02 |
| Redvers (SERF) | 2024 | 10.9 | 14.7 | 20.0 | 17.7 | 15.8 | 15.82 |
| | 2025 | 13.2 | 16.2 | 17.5 | 18 | 16.9 | 16.36 |
| | Long-term | 11.1 | 16.2 | 18.7 | 18.0 | 12.5 | 15.3 |
| Yorkton (ECRF) | 2024 | 10.5 | 14.2 | 20.3 | 17.7 | - | 15.68 |
| | 2025 | 12.4 | 15.7 | 17.5 | 18.3 | 15 | 15.78 |
| | Long-term | 10.4 | 15.5 | 17.9 | 17.1 | - | 15.23 |
| Swift Current (WCA) | 2024 | 10.6 | 14.3 | 21.3 | 19.4 | 16.7 | 16.46 |
| | 2025 | 13.1 | 15.9 | 18 | 19 | 16.7 | 16.54 |
| | Long-term | 11.5 | 16.3 | 19 | 18.6 | 13.5 | 14.94 |
| Prince Albert (CLC) | 2024 | 8.4 | 11.3 | 18.1 | 15.2 | 12.7 | 13.14 |
| | 2025 | 11.2 | 12.7 | 14.9 | 17.1 | 13.9 | 13.96 |
| | Long-term | 11.2 | 16.0 | 18.3 | 16.7 | 11.6 | 14.76 |
| Indian Head (IHARF) | 2024 | 10.6 | 13.6 | 19.5 | 17.9 | 15.9 | 15.5 |
| | 2025 | 12.7 | 15.3 | 17 | 17.8 | 15.3 | 15.62 |
| | Long-term | 10.8 | 15.8 | 18.2 | 17.4 | 11.5 | 14.74 |
| Outlook (ISask) | 2024 | 10.98 | 14.2 | 20.4 | 18.3 | 16.2 | 16.02 |
| | 2025 | 13.6 | 16.2 | 17.4 | 19 | 16 | 16.44 |
| | Long-term | 11.3 | 16.2 | 18.7 | 17.9 | 12.9 | 15.4 |

**Table 2.** Monthly precipitation totals and long-term (1981-2010) averages for the 2024-25 growing seasons at the seven trial locations: Scott (WARC), Redvers (SERF), Yorkton (ECRF), Swift Current (WCA), Prince Albert (CLC), Indian Head (IHARF) and Outlook (ISask).

| Location | Year | May | June | July | August | Sept | Total |
|---|---|---|---|---|---|---|---|
| Scott (WARC) | 2024 | 74.2 | 112.0 | 27.7 | 42.8 | 39.5 | 296.2 |
| | 2025 | 11.8 | 103.7 | 28.7 | 64.5 | 0.7 | 209.4 |
| | Long-term | 36.3 | 61.8 | 72.1 | 45.7 | 36.0 | 251.9 |
| Redvers (SERF) | 2024 | 9.6 | 156.2 | 13.4 | 39 | 70.6 | 288.8 |
| | 2025 | 65 | 27 | 80 | 40 | 48 | 260 |
| | Long-term | 60 | 95.2 | 65.5 | 46.6 | 32.7 | 300 |
| Yorkton (ECRF) | 2024 | 56 | 120.4 | 22.9 | 42.3 | - | 241.6 |
| | 2025 | 23.6 | 63.4 | 36.8 | 71.2 | 37.3 | 232.3 |
| | Long-term | 51 | 80 | 78 | 62 | - | 271 |
| Swift Current (WCA) | 2024 | 73.6 | 52.1 | 18.6 | 18.2 | 47.8 | 160.3 |
| | 2025 | 34.2 | 31.3 | 78.2 | 92.6 | 0.8 | 237.1 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | Long-term | 43.4 | 60.5 | 56.4 | 40.4 | 37.3 | 238 |
| Prince Albert (CLC) | 2024 | 69.6 | 118.8 | 31.4 | 42.0 | 27.4 | 289.2 |
| | 2025 | 2.2 | 137.6 | 8.6 | 51.2 | 3.8 | 203.4 |
| | Long-term | 36.5 | 66.8 | 61.3 | 43.6 | 30.7 | 238.9 |
| Indian Head (IHARF) | 2024 | 63.7 | 74.9 | 37.4 | 71.8 | 44.4 | 292.2 |
| | 2025 | 42.6 | 39.4 | 27.1 | 26.9 | 43.1 | 179.1 |
| | Long-term | 51.7 | 77.4 | 63.8 | 51.2 | 35.3 | 279.4 |
| Outlook (ISask)* | 2024 | 62.6 | 122 | 19.1 | 3.8 | 52.7 | 260.2 |
| | 2025 | 6.2 | 83.1 | 59.4 | 60.9 | 3.9 | 213.5 |
| | Long-term | 41.0 | 62.7 | 54.7 | 43.2 | 30.9 | 212.5 |

*The Outlook site also received irrigation in both the 2024 and 2025 growing seasons.

**Emergence Rate and Plant Count**

**Scott (WARC)**

Emergence rating at Scott was significantly influenced by variety in both 2024 and 2025, while harvest time and the harvest time by variety interaction were not significant in either year (Table 3). In 2024, emergence ratings showed clear varietal separation, with high values for AB Foothills and AAC Connect and lower values for CDC Austenson. In 2025, overall emergence ratings were slightly lower and varietal separation was reduced, though variety effects remained statistically significant (Table 4). Plant count at Scott showed a significant varietal effect in 2024, with differences among entries in stand establishment, whereas no varietal differences were detected in 2025 (Table 5).

**Table 3.** 2024 and 2025 trial p-values of the factors for Harvest time, variety, and their interaction after performing Analysis of Variance (ANOVA) for *Generating Pre-Harvest Sprouting Ratings for Barley Varieties* trial at seven locations: Scott (WARC), Redvers (SERF), Yorkton (ECRF), Swift Current (WCA), Prince Albert (CLC), Indian Head (IHARF) and Outlook (ISask).

| Location | Outcome Variable | 2024 Source of Variation | | | CV (%) | Outcome Variable | 2025 Source of Variation | | | CV (%) |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Harvest Time | Variety | Harvest Time Vs Variety | | | Harvest Time | Variety | Harvest Time Vs Variety | |
| **Scott** | Emergence Rating | 0.351 | <0.0001 | 0.659 | 10.1 | Emergence Rating | 0.227 | 0.009 | 0.901 | 14.9 |
| | Plant Count | NA | 0.003 | NA | 10.1 | Plant Count | NA | 0.99 | NA | 7.1 |
| | Yield | 0.026 | <0.0001 | 0.621 | 3.7 | Yield | 0.0003 | 0.035 | 0.212 | 7.6 |
| | RVU | <0.0001 | <0.0001 | <0.0001 | 12.1 | RVU | 0.0291 | 0.0008 | 0.136 | 18.4 |
| **Redvers** | Plant Count | 0.949 | 0.0003 | 0.5 | 6.8 | Plant Count | 0.991 | <0.0001 | 0.111 | 10.4 |
| | Lodging | | | | | Lodging | 0.001 | 0.011 | 0.011 | 35.3 |
| | Yield | 0.011 | 0.002 | 0.408 | 6.6 | Yield | 0.0005 | <0.0001 | 0.011 | 5.6 |
| | RVU | 0.0003 | <0.0001 | <0.0001 | 5.9 | RVU | 0.001 | 0.093 | 0.099 | 51.5 |
| **Yorkton** | Plant Count | 0.436 | 0.0009 | 0.47 | 10.0 | Plant Count | 0.309 | <0.0001 | 0.928 | 9.4 |
| | Lodging | 0.4 | <0.0001 | 0.636 | 25.2 | Lodging | | | | |
| | Yield | 0.009 | <0.0001 | 0.121 | 4.14 | Yield | 0.259 | 0.501 | 0.777 | 28.1 |
| | RVU | 0.073 | <0.0001 | 0.268 | 18.25 | RVU | <0.0001 | <0.0001 | <0.0001 | 26.4 |
| **Swift Current** | Plant counts | 0.383 | <0.0001 | 0.845 | 9.64 | Plant counts | 0.94 | 0.002 | 0.952 | 7.1 |
| | Yield | 0.861 | 0.0002 | 0.401 | 9.38 | Yield | 0.024 | 0.001 | 0.339 | 14.4 |
| | RVU | 0.895 | <0.0001 | 0.709 | 2.39 | RVU | 0.057 | <0.0001 | 0.029 | 46.5 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Prince Albert** | Plant Count | 0.187 | <0.0001 | 0.644 | 11.8 | Plant Count | 0.209 | 0.037 | 0.468 | 28.03 |
| | Lodging | 0.904 | 0.437 | 0.601 | 72.3 | Lodging | 0.158 | 0.0002 | 0.373 | 29.4 |
| | Yield | 0.792 | 0.002 | 0.42 | 8.5 | Yield | 0.575 | 0.021 | 0.238 | 9.1 |
| | RVU | 0.52 | 0.029 | 0.002 | 75.7 | RVU | 0.036 | <0.0001 | 0.143 | 25 |
| **Indian Head** | Emergence Rating | 1 | <0.0001 | 0.245 | 2.4 | Emergence Rating | 0.681 | <0.0001 | 0.418 | 2.9 |
| | Plant Count | NA | 0.145 | NA | 6.2 | Plant Count | NA | 0.003 | NA | 8.5 |
| | Yield | 0.126 | <0.0001 | 0.999 | 13.1 | Yield | 0.006 | <0.0001 | 0.216 | 5.6 |
| | RVU | 0.0003 | <0.0001 | <0.0001 | 11.8 | RVU | <0.0001 | <0.0001 | <0.0001 | 8.9 |
| **Outlook** | Plant Count | 0.896 | 0.137 | 0.804 | 7.5 | Plant Count | 0.949 | 0.071 | 0.785 | 7.1 |
| | Height | 0.223 | <0.0001 | 0.992 | 6.4 | Height | 0.962 | <0.0001 | 0.527 | 8 |
| | Yield | 0.55 | <0.0001 | 0.924 | 8.4 | Yield | 0.779 | <0.0001 | 0.608 | 7.9 |
| | Grain Protein | 0.585 | <0.0001 | 0.388 | 7.6 | Grain Protein | 0.678 | <0.0001 | 0.658 | 5.7 |
| | RVU | <0.0001 | <0.0001 | 0.0005 | 8.59 | RVU | 0.001 | <0.0001 | <0.0001 | 12.5 |

**Table 4.** 2024 and 2025 Treatment means for emergence rating (1-9) after conducting pairwise comparisons using Tukey's test at alpha = 0.05 for Scott (WARC). Means followed by the same letter within a column in each effect row do not significantly differ.

| **Scott 2024 Emergence rate** | | | | | | **Scott 2025 Emergence rate** | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Effect | Harvest Time | Variety | Mean | Standard Error | Tukey Grouping | Effect | Harvest Time | Variety | Mean | Standard Error | Tukey Grouping |
| Harvest Time | Late | NA | 7.00 | 0.27 | A | Harvest Time | Early | NA | 6.04 | 0.18 | A |
| | Early | NA | 6.61 | 0.27 | A | | Late | NA | 5.70 | 0.18 | A |
| Variety | NA | AB Foothills | 8.13 | 0.30 | A | Variety | NA | AAC Connect | 6.69 | 0.31 | A |
| | NA | AAC Connect | 7.88 | 0.30 | A | | NA | CDC Churchill | 6.44 | 0.31 | AB |
| | NA | AAC Prairie | 6.88 | 0.30 | B | | NA | AB Foothills | 6.06 | 0.31 | AB |
| | NA | CDC Fraser | 6.75 | 0.30 | B | | NA | AAC Prairie | 5.75 | 0.31 | AB |
| | NA | CDC Churchill | 6.63 | 0.30 | B | | NA | CDC Fraser | 5.63 | 0.31 | AB |
| | NA | AC Metcalfe | 6.38 | 0.30 | B | | NA | CDC Austenson | 5.38 | 0.31 | AB |
| | NA | CDC Austenson | 5.00 | 0.30 | C | | NA | AC Metcalfe | 5.13 | 0.31 | B |
| Harvest Time Vs Variety | Early | AB Foothills | 8.25 | 0.42 | A | Harvest Time Vs Variety | Early | CDC Churchill | 6.88 | 0.44 | A |
| | Early | AAC Connect | 7.50 | 0.42 | A | | Early | AAC Connect | 6.75 | 0.44 | A |
| | Early | AAC Prairie | 6.75 | 0.42 | A | | Early | AB Foothills | 6.38 | 0.44 | A |
| | Early | CDC Churchill | 6.50 | 0.42 | A | | Early | AAC Prairie | 6.00 | 0.44 | A |
| | Early | CDC Fraser | 6.50 | 0.42 | A | | Early | CDC Fraser | 5.75 | 0.44 | A |
| | Early | AC Metcalfe | 6.25 | 0.42 | A | | Early | AC Metcalfe | 5.25 | 0.44 | A |
| | Early | CDC Austenson | 4.50 | 0.42 | A | | Early | CDC Austenson | 5.25 | 0.44 | A |
| Harvest Time Vs Variety | Late | AAC Connect | 8.25 | 0.42 | A | Harvest Time Vs Variety | Late | AAC Connect | 6.63 | 0.44 | A |
| | Late | AB Foothills | 8.00 | 0.42 | A | | Late | AAC Prairie | 5.50 | 0.44 | A |
| | Late | AAC Prairie | 7.00 | 0.42 | A | | Late | AB Foothills | 5.75 | 0.44 | A |
| | Late | CDC Fraser | 7.00 | 0.42 | A | | Late | AC Metcalfe | 5.00 | 0.44 | A |
| | Late | CDC Churchill | 6.75 | 0.42 | A | | Late | CDC Austenson | 5.50 | 0.44 | A |
| | Late | AC Metcalfe | 6.50 | 0.42 | A | | Late | CDC Churchill | 6.00 | 0.44 | A |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Late | CDC Austenson | 5.50 | 0.42 | A | | Late | CDC Fraser | 5.50 | 0.44 | A |

**Table 5.** 2024 and 2025 Treatment means for plant count (Plants/m2) after conducting pairwise comparisons using Tukey's test at alpha = 0.05 for Scott. Means followed by the same letter within a column do not significantly differ.

| Scott 2024 Plant count | | | | Scott 2025 Plant count | | | |
|---|---|---|---|---|---|---|---|
| Variety | Mean (Plants/m2) | Standard Error | Tukey Grouping | Variety | Mean (Plants/m2) | Standard Error | Tukey Grouping |
| AAC Connect | 219 | 9.75 | A | AAC Connect | 209.5 | 7.45 | A |
| AAC Prairie | 195 | 9.75 | A | AAC Prairie | 210.8 | 7.45 | A |
| AB Foothills | 232 | 9.75 | A | AB Foothills | 210.0 | 7.45 | A |
| AC Metcalfe | 223 | 9.75 | A | AC Metcalfe | 206.8 | 7.45 | A |
| CDC Austenson | 161 | 9.75 | AB | CDC Austenson | 209.8 | 7.45 | A |
| CDC Churchill | 214 | 9.75 | AB | CDC Churchill | 214.5 | 7.45 | A |
| CDC Fraser | 202 | 9.75 | B | CDC Fraser | 206.8 | 7.45 | A |

**Redvers (SERF)**

Emergence rating was not measured at Redvers. Plant count showed significant varietal effects in both 2024 and 2025, while harvest time and interactions were not significant (Table 3). In both years, CDC Austenson consistently exhibited lower plant counts than other varieties. Stand density increased substantially in 2025 compared with 2024, but varietal rankings were generally consistent across years (Tables 6 and 7).

**Table 6.** 2024 Treatment means for plant count (Plants/m2) after conducting pairwise comparisons using Tukey's test at alpha = 0.05 for Redvers. Means followed by the same letter within a column across each effect do not significantly differ.

| Effect | Harvest Time | Variety | Mean (Plats/m2) | Standard Error | Tukey Grouping |
|---|---|---|---|---|---|
| Harvest Time | Early | NA | 170 | 6.05 | A |
| | Late | NA | 170 | 6.05 | A |
| Variety | NA | AAC Connect | 182 | 6.14 | A |
| | NA | CDC Fraser | 182 | 6.14 | A |
| | NA | AB Foothills | 175 | 6.14 | A |
| | NA | AAC Prairie | 170 | 6.14 | A |
| | NA | AC Metcalfe | 168 | 6.14 | A |
| | NA | CDC Churchill | 166 | 6.14 | A |
| | NA | CDC Austenson | 146 | 6.14 | B |
| Harvest Time*Variety | Early | AAC Connect | 184 | 8.68 | A |
| | Early | CDC Fraser | 181 | 8.68 | A |
| | Early | AC Metcalfe | 173 | 8.68 | A |
| | Early | CDC Churchill | 171 | 8.68 | A |
| | Early | AB Foothills | 168 | 8.68 | A |
| | Early | AAC Prairie | 166 | 8.68 | A |
| | Early | CDC Austenson | 148 | 8.68 | B |
| Harvest Time*Variety | Late | CDC Fraser | 183 | 8.68 | A |
| | Late | AB Foothills | 182 | 8.68 | A |
| | Late | AAC Connect | 180 | 8.68 | A |
| | Late | AAC Prairie | 174 | 8.68 | A |
| | Late | AC Metcalfe | 163 | 8.68 | AB |

| | | | | | |
|---|---|---|---|---|---|
| | Late | CDC Churchill | 161 | 8.68 | AB |
| | Late | CDC Austenson | 144 | 8.68 | B |

**Table 7.** 2025 Treatment means for plant count (Plants/m2) after conducting pairwise comparisons using Tukey's test at alpha = 0.05 for Redvers. Means followed by the same letter within a column across each effect do not significantly differ.

| Effect | Harvest Time | Variety | Mean | Standard Error | Tukey Grouping |
|---|---|---|---|---|---|
| Harvest Time | Early | NA | 211 | 5.63 | A |
| | Late | NA | 211 | 5.63 | A |
| Variety | NA | AB Foothills | 246 | 8.93 | A |
| | NA | AAC Connect | 234 | 8.93 | A |
| | NA | AC Metcalfe | 221 | 8.93 | AB |
| | NA | CDC Churchill | 220 | 8.93 | AB |
| | NA | CDC Fraser | 212 | 8.93 | AB |
| | NA | CDC Austenson | 186 | 8.93 | B |
| | NA | AAC Prairie | 158 | 8.93 | C |
| Harvest Time*Variety | Early | AB Foothills | 236 | 12.62 | A |
| | Early | CDC Fraser | 229 | 12.62 | A |
| | Early | AC Metcalfe | 219 | 12.62 | A |
| | Early | AAC Connect | 217 | 12.62 | A |
| | Early | CDC Churchill | 215 | 12.62 | A |
| | Early | CDC Austenson | 199 | 12.62 | A |
| | Early | AAC Prairie | 162 | 12.62 | A |
| Harvest Time*Variety | Late | AB Foothills | 256 | 12.62 | A |
| | Late | AAC Connect | 250 | 12.62 | A |
| | Late | CDC Churchill | 225 | 12.62 | A |
| | Late | AC Metcalfe | 223 | 12.62 | A |
| | Late | CDC Fraser | 195 | 12.62 | A |
| | Late | CDC Austenson | 173 | 12.62 | A |
| | Late | AAC Prairie | 154 | 12.62 | A |

**Yorkton (ECRF)**

Plant count at Yorkton was significantly affected by variety in 2024 and 2025, with no significant impact of harvest time or interactions (Table 3). In 2024, overall plant counts were relatively low and varietal separation was clear, particularly for CDC Austenson, which had reduced establishment. In 2025, plant counts increased markedly across all entries, though varietal differences persisted (Tables 8 and 9).

**Table 8.** 2024 Treatment means for plant count (Plants/m2) after conducting pairwise comparisons using Tukey's test at alpha = 0.05 for Yorkton. Means followed by the same letter within a column across each effect do not significantly differ.

| Effect | Harvest Time | Variety | Mean | Standard | Tukey Grouping |
|---|---|---|---|---|---|

| | | | | Error | |
|---|---|---|---|---|---|
| Harvest Time | Early | NA | 79.1 | 1.7 | A |
| | Late | NA | 77.0 | 1.7 | A |
| Variety | NA | CDC Churchill | 86.5 | 3.2 | A |
| | NA | AB Foothills | 84.7 | 3.2 | A |
| | NA | AC Metcalfe | 84.5 | 3.2 | A |
| | NA | AAC Connect | 77.0 | 3.2 | AB |
| | NA | AAC Prairie | 76.0 | 3.2 | AB |
| | NA | CDC Fraser | 71.7 | 3.2 | B |
| | NA | CDC Austenson | 66.0 | 3.2 | C |
| Harvest Time*Variety | Early | AB Foothills | 89.0 | 4.5 | A |
| | Early | CDC Churchill | 88.0 | 4.5 | A |
| | Early | AC Metcalfe | 84.3 | 4.5 | AB |
| | Early | AAC Prairie | 80.3 | 4.5 | AB |
| | Early | AAC Connect | 79.3 | 4.5 | AB |
| | Early | CDC Fraser | 71.3 | 4.5 | B |
| | Early | CDC Austenson | 61.3 | 4.5 | C |
| Harvest Time*Variety | Late | CDC Churchill | 85.0 | 4.5 | A |
| | Late | AC Metcalfe | 84.7 | 4.5 | A |
| | Late | AB Foothills | 80.3 | 4.5 | AB |
| | Late | AAC Connect | 74.7 | 4.5 | BC |
| | Late | CDC Fraser | 72.0 | 4.5 | BC |
| | Late | AAC Prairie | 71.7 | 4.5 | BC |
| | Late | CDC Austenson | 70.7 | 4.5 | C |

**Table 9.** 2025 Treatment means for plant count (Plants/m2) after conducting pairwise comparisons using Tukey's test at alpha = 0.05 for Yorkton. Means followed by the same letter within a column across each effect do not significantly differ.

| Effect | Harvest Time | Variety | Mean | Standard Error | Tukey Grouping |
|---|---|---|---|---|---|
| Harvest Time | Early | NA | 236 | 8.4 | A |
| | Late | NA | 222 | 8.4 | A |
| Variety | NA | AC Metcalfe | 259 | 8.8 | A |
| | NA | AAC Prairie | 251 | 8.8 | A |
| | NA | AAC Connect | 250 | 8.8 | A |
| | NA | AB Foothills | 235 | 8.8 | B |
| | NA | CDC Churchill | 225 | 8.8 | B |
| | NA | CDC Fraser | 209 | 8.8 | B |
| | NA | CDC Austenson | 176 | 8.8 | C |
| Harvest Time*Variety | Early | AAC Prairie | 260 | 12.4 | A |

| | | | | | |
|---|---|---|---|---|---|
| | Early | AC Metcalfe | 260 | 12.4 | A |
| | Early | AAC Connect | 254 | 12.4 | A |
| | Early | AB Foothills | 245 | 12.4 | A |
| | Early | CDC Austenson | 236 | 12.4 | A |
| | Early | CDC Churchill | 215 | 12.4 | A |
| | Early | CDC Fraser | 181 | 12.4 | A |
| Harvest Time*Variety | Late | AC Metcalfe | 257 | 12.4 | A |
| | Late | AAC Connect | 245 | 12.4 | A |
| | Late | AAC Prairie | 241 | 12.4 | A |
| | Late | AB Foothills | 224 | 12.4 | A |
| | Late | CDC Churchill | 213 | 12.4 | A |
| | Late | CDC Fraser | 203 | 12.4 | A |
| | Late | CDC Austenson | 171 | 12.4 | A |

**Swift Current (WCA)**

At Swift Current, plant count was strongly influenced by variety in both years, while harvest time effects were not significant (Table 3). In 2024, wide differences in stand density were observed among varieties, with AAC Connect and CDC Austenson showing lower counts. In 2025, plant counts were more uniform, though varietal differences remained statistically significant (Tables 10 and 11).

**Table 10.** 2024 Treatment means for plant count (Plants/m2) after conducting pairwise comparisons using Tukey's test at alpha = 0.05 for Swift Current. Means followed by the same letter within a column across each effect do not significantly differ.

| Effect | Harvest Time | Variety | Mean | Standard Error | Tukey Grouping |
|---|---|---|---|---|---|
| Harvest Time | Early | NA | 170 | 4.4 | A |
| | Late | NA | 170 | 4.4 | A |
| Variety | NA | AAC Prairie | 184 | 5.6 | A |
| | NA | AAC Connect | 177 | 5.6 | AB |
| | NA | CDC Churchill | 175 | 5.6 | AB |
| | NA | AB Foothills | 172 | 5.6 | AB |
| | NA | CDC Fraser | 163 | 5.6 | BC |
| | NA | CDC Austenson | 162 | 5.6 | BC |
| | NA | AC Metcalfe | 159 | 5.6 | C |
| Harvest Time*Variety | Early | AAC Prairie | 184 | 7.0 | A |
| | Early | CDC Churchill | 177 | 7.0 | A |
| | Early | AAC Connect | 176 | 7.0 | A |
| | Early | AB Foothills | 171 | 7.0 | A |
| | Early | CDC Fraser | 165 | 7.0 | A |
| | Early | AC Metcalfe | 161 | 7.0 | A |
| | Early | CDC Austenson | 158 | 7.0 | A |
| Harvest Time*Variety | Late | AAC Prairie | 183 | 7.0 | A |
| | Late | AAC Connect | 179 | 7.0 | A |
| | Late | AB Foothills | 173 | 7.0 | A |
| | Late | CDC Churchill | 173 | 7.0 | A |

| | | | | | |
|---|---|---|---|---|---|
| | Late | CDC Austenson | 165 | 7.0 | A |
| | Late | CDC Fraser | 162 | 7.0 | A |
| | Late | AC Metcalfe | 158 | 7.0 | A |

**Table 11.** 2024 Treatment means for plant count (Plants/m2) after conducting pairwise comparisons using Tukey's test at alpha = 0.05 for Swift Current. Means followed by the same letter within a column across each effect do not significantly differ

| Effect | Harvest Time | Variety | Mean | Standard Error | Tukey Grouping |
|---|---|---|---|---|---|
| Harvest Time | Early | NA | 2326.4 | 109.5 | A |
| | Late | NA | 2120.5 | 109.5 | B |
| Variety | NA | CDC Churchill | 2666.2 | 145.7 | A |
| | NA | CDC Austenson | 2477.0 | 145.7 | AB |
| | NA | AB Foothills | 2231.2 | 145.7 | BC |
| | NA | CDC Fraser | 2130.3 | 145.7 | BC |
| | NA | AAC Connect | 2128.5 | 145.7 | BC |
| | NA | AC Metcalfe | 2022.3 | 145.7 | CD |
| | NA | AAC Prairie | 1908.5 | 145.7 | D |
| Harvest Time*Variety | Early | CDC Churchill | 2719.0 | 184.7 | A |
| | Early | CDC Austenson | 2495.7 | 184.7 | A |
| | Early | AB Foothills | 2483.3 | 184.7 | A |
| | Early | AAC Connect | 2308.0 | 184.7 | A |
| | Early | AC Metcalfe | 2266.0 | 184.7 | A |
| | Early | CDC Fraser | 2181.0 | 184.7 | A |
| | Early | AAC Prairie | 1831.7 | 184.7 | A |
| Harvest Time*Variety | Late | CDC Churchill | 2613.3 | 184.7 | A |
| | Late | CDC Austenson | 2458.3 | 184.7 | A |
| | Late | CDC Fraser | 2079.7 | 184.7 | A |
| | Late | AAC Prairie | 1985.3 | 184.7 | A |
| | Late | AB Foothills | 1979.0 | 184.7 | A |
| | Late | AAC Connect | 1949.0 | 184.7 | A |
| | Late | AC Metcalfe | 1778.7 | 184.7 | A |

**Prince Albert (CLC)**

Plant count at Prince Albert was significantly affected by variety in both 2024 and 2025, with no effect of harvest time or interaction. In 2024, stand density was low and variable, with clear separation among varieties and the lowest counts again observed for CDC Austenson (Tables 12 and 13). In 2025, plant counts were higher overall but variability increased, as reflected by higher coefficients of variation (Table 3).

**Table 12.** 2024 Treatment means for plant count (Plants/m2) after conducting pairwise comparisons using Tukey's test at alpha = 0.05 for Prince Albert. Means followed by the same letter within a column across each effect do not significantly differ

| Effect | Harvest Time | Variety | Mean (Plants/m2) | Standard Error | Tukey Grouping |
|---|---|---|---|---|---|

| | | | | | |
|---|---|---|---|---|---|
| Harvest Time | Early | NA | 48.4 | 1.52 | A |
| | Late | NA | 45.0 | 1.52 | A |
| Variety | NA | AC Metcalfe | 57.5 | 2.35 | A |
| | NA | CDC Fraser | 50.0 | 2.35 | B |
| | NA | AB Foothills | 49.8 | 2.35 | B |
| | NA | CDC Churchill | 47.8 | 2.35 | B |
| | NA | AAC Connect | 46.0 | 2.35 | BC |
| | NA | AAC Prairie | 38.7 | 2.35 | C |
| | NA | CDC Austenson | 37.2 | 2.35 | D |
| Harvest Time*Variety | Early | AC Metcalfe | 61.0 | 3.33 | A |
| | Early | AB Foothills | 52.7 | 3.33 | A |
| | Early | CDC Fraser | 51.7 | 3.33 | A |
| | Early | AAC Connect | 47.7 | 3.33 | A |
| | Early | CDC Churchill | 45.7 | 3.33 | A |
| | Early | CDC Austenson | 40.3 | 3.33 | A |
| | Early | AAC Prairie | 40.0 | 3.33 | A |
| Harvest Time*Variety | Late | AC Metcalfe | 54.0 | 3.33 | A |
| | Late | CDC Churchill | 50.0 | 3.33 | A |
| | Late | CDC Fraser | 48.3 | 3.33 | A |
| | Late | AB Foothills | 47.0 | 3.33 | A |
| | Late | AAC Connect | 44.3 | 3.33 | A |
| | Late | AAC Prairie | 37.3 | 3.33 | A |
| | Late | CDC Austenson | 34.0 | 3.33 | A |

**Table 13.** 2025 Treatment means for plant count (Plants/m2) after conducting pairwise comparisons using Tukey's test at alpha = 0.05 for Prince Albert. Means followed by the same letter within a column across each effect do not significantly differ

| Effect | Harvest Time | Variety | Mean (Plants/m2) | Standard Error | Tukey Grouping |
|---|---|---|---|---|---|
| Harvest Time | Early | NA | 190.1 | 21.1 | A |
| | Late | NA | 145.5 | 21.1 | A |
| Variety | NA | AC Metcalfe | 192.0 | 19.2 | A |
| | NA | AAC Connect | 180.0 | 19.2 | AB |
| | NA | AAC Prairie | 179.0 | 19.2 | AB |
| | NA | CDC Fraser | 178.0 | 19.2 | AB |
| | NA | AB Foothills | 164.3 | 19.2 | AB |
| | NA | CDC Churchill | 153.7 | 19.2 | AB |
| | NA | CDC Austenson | 127.7 | 19.2 | B |
| Harvest Time*Variety | Early | AC Metcalfe | 232.0 | 27.2 | A |
| | Early | AAC Connect | 214.7 | 27.2 | A |
| | Early | AAC Prairie | 208.0 | 27.2 | A |
| | Early | CDC Fraser | 192.0 | 27.2 | A |

| | | | | | |
|---|---|---|---|---|---|
| | Early | AB Foothills | 186.7 | 27.2 | A |
| | Early | CDC Churchill | 162.7 | 27.2 | A |
| | Early | CDC Austenson | 134.7 | 27.2 | A |
| Harvest Time*Variety | Late | CDC Fraser | 164.0 | 27.2 | A |
| | Late | AC Metcalfe | 152.0 | 27.2 | A |
| | Late | AAC Prairie | 150.0 | 27.2 | A |
| | Late | AAC Connect | 145.3 | 27.2 | A |
| | Late | CDC Churchill | 144.7 | 27.2 | A |
| | Late | AB Foothills | 142.0 | 27.2 | A |
| | Late | CDC Austenson | 120.7 | 27.2 | A |

**Indian Head (IHARF)**

Emergence ratings at Indian Head were uniformly high and consistent across both years. Variety had a significant effect on emergence rating in 2024 and 2025, while harvest time and the interaction term were not significant (Table 3). In 2024, nearly all varieties achieved the maximum emergence rating of 9, with only a few varieties showing slightly lower values. In 2025, emergence ratings remained high, though modest differentiation among varieties was observed (Table 14). Very low coefficients of variation indicate strong experimental precision and minimal environmental influence on emergence at this site. Plant count at Indian Head did not differ significantly among varieties in 2024, indicating uniform stand establishment across entries. In 2025, however, a significant varietal effect was detected, with higher plant densities for AC Metcalfe, CDC Churchill, and CDC Fraser, and lower counts for AAC Prairie (Table 15).

**Table 14.** 2024 and 2025 Treatment means for emergence rating (1-9) after conducting pairwise comparisons using Tukey's test at alpha = 0.05 for Indian Head (IHARF) location. Means followed by the same letter within a column do not significantly differ.

| Indian Head 2024 Emergence rate | | | | Indian Head 2025 Emergence Rating | | | |
|---|---|---|---|---|---|---|---|
| Variety | Mean (1-9) | Standard Error | Tukey Grouping | Variety | Mean (1-9) | Standard Error | Tukey Grouping |
| AAC Connect | 9.0 | 0.087 | A | AAC Lariat | 9.00 | 0.10 | A |
| AAC Lariat | 9.0 | 0.087 | A | AB Brewnet | 9.00 | 0.10 | A |
| AAC Prairie | 9.0 | 0.087 | A | AB Dram | 9.00 | 0.10 | A |
| AAC Synergy | 9.0 | 0.087 | A | AB Hague | 9.00 | 0.10 | A |
| AB Advantage | 9.0 | 0.087 | A | CDC Copeland | 9.00 | 0.10 | A |
| AB Brewnet | 9.0 | 0.087 | A | Esma | 9.00 | 0.10 | A |
| AB Dram | 9.0 | 0.087 | A | Sirish | 9.00 | 0.10 | A |
| AB Foothills | 9.0 | 0.087 | A | SY Stanza | 9.00 | 0.10 | A |
| AB Prime | 9.0 | 0.087 | A | Torbellino | 9.00 | 0.10 | A |
| AB Tofield | 9.0 | 0.087 | A | AAC Connect | 8.92 | 0.10 | AB |
| AB Wrangler | 9.0 | 0.087 | A | AAC Synergy | 8.92 | 0.10 | AB |
| AC Metcalfe | 9.0 | 0.087 | A | AB Advantage | 8.92 | 0.10 | AB |
| CDC Churchill | 9.0 | 0.087 | A | AB Foothills | 8.92 | 0.10 | AB |
| CDC Copeland | 9.0 | 0.087 | A | AB Wrangler | 8.92 | 0.10 | AB |
| CDC Copper | 9.0 | 0.087 | A | AC Metcalfe | 8.92 | 0.10 | AB |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| CDC Fraser | 9.0 | 0.087 | A | CDC Austenson | 8.92 | 0.10 | AB |
| CDC Goldstar | 9.0 | 0.087 | A | CDC Copper | 8.92 | 0.10 | AB |
| CDC Maverick | 9.0 | 0.087 | A | CDC Fraser | 8.92 | 0.10 | AB |
| CDC Renegade | 9.0 | 0.087 | A | Claymore | 8.92 | 0.10 | AB |
| Claymore | 9.0 | 0.087 | A | RGT Planet | 8.92 | 0.10 | AB |
| Esma | 9.0 | 0.087 | A | CDC Churchill | 8.83 | 0.10 | AB |
| KWS Kellie | 9.0 | 0.087 | A | CDC Durango | 8.83 | 0.10 | AB |
| RGT Planet | 9.0 | 0.087 | A | CDC Renegade | 8.83 | 0.10 | AB |
| SY Stanza | 9.0 | 0.087 | A | AB Prime | 8.75 | 0.10 | AB |
| Torbellino | 9.0 | 0.087 | A | AB Tofield | 8.75 | 0.10 | AB |
| AB Hague | 8.8 | 0.087 | A | CDC Maverick | 8.75 | 0.10 | AB |
| CDC Austenson | 8.8 | 0.087 | A | CDC Goldstar | 8.67 | 0.10 | ABC |
| CDC Durango | 8.8 | 0.087 | A | KWS Kellie | 8.67 | 0.10 | ABC |
| Sirish | 8.8 | 0.087 | A | Legacy | 8.42 | 0.10 | BCD |
| Legacy | 8.7 | 0.087 | A | AAC Prairie | 8.17 | 0.10 | CD |
| CDC Clear | 8.2 | 0.087 | B | CDC Clear | 7.92 | 0.10 | DE |
| HB21355 | 7.8 | 0.087 | B | HB21355 | 7.84 | 0.11 | E |
| HB20351 | 7.3 | 0.087 | C | HB20351 | 7.08 | 0.10 | F |

**Table 15.** 2025 Treatment means for plant count (Plants/m2) after conducting pairwise comparisons using Tukey's test at alpha = 0.05 for Indian Head (IHARF). Means followed by the same letter within a column do not significantly differ.

| Indian Head Plant Count 2025 | | | |
|---|---|---|---|
| Variety | Mean (Plants/m2) | Standard Error | Tukey Grouping |
| AC Metcalfe | 333.0 | 20.5 | A |
| CDC Churchill | 321.0 | 20.5 | A |
| CDC Fraser | 318.8 | 20.5 | A |
| AAC Connect | 304.6 | 20.5 | A |
| CDC Austenson | 293.1 | 20.5 | AB |
| AB Foothills | 276.1 | 20.5 | AB |
| AAC Prairie | 223.1 | 20.5 | B |

**Outlook (ISask)**

Emergence rating was not assessed at Outlook. Plant count showed no significant effects of harvest time, variety, or their interaction in either 2024 or 2025 (Table 3). Mean plant densities were similar across early, mid, and late harvest treatments and among varieties in both years indicating uniform stand establishment at this irrigated site, with minimal expression of genetic or management-related differences in early plant density (Tables 16 and 17).

**Table 16.** 2024 Treatment means for plant count (Plants/m2) after conducting pairwise comparisons using Tukey's test at alpha = 0.05 for Outlook. Means followed by the same letter within a column across each effect do not significantly differ.

| Effect | Harvest Time | Variety | Mean (Plants/m2) | Standard Error | Tukey Grouping |
|---|---|---|---|---|---|

| | | | | | |
|---|---|---|---|---|---|
| Harvest Time | Early | NA | 226.7 | 12.9 | A |
| | Late | NA | 228.9 | 12.9 | A |
| | Mid | NA | 220.6 | 12.9 | A |
| Variety | NA | AAC Connect | 236.0 | 15.3 | A |
| | NA | AAC Prairie | 212.2 | 15.3 | A |
| | NA | AB Foothills | 260.1 | 15.3 | A |
| | NA | AC Metcalfe | 220.3 | 15.3 | A |
| | NA | CDC Austenson | 205.9 | 15.3 | A |
| | NA | CDC Churchill | 233.0 | 15.3 | A |
| | NA | CDC Fraser | 210.2 | 15.3 | A |
| Harvest Time*Variety | Early | AAC Connect | 244.3 | 26.5 | A |
| | Early | AAC Prairie | 234.3 | 26.5 | A |
| | Early | AB Foothills | 267.0 | 26.5 | A |
| | Early | AC Metcalfe | 209.3 | 26.5 | A |
| | Early | CDC Austenson | 175.0 | 26.5 | A |
| | Early | CDC Churchill | 245.0 | 26.5 | A |
| | Early | CDC Fraser | 212.0 | 26.5 | A |
| Harvest Time*Variety | Late | AAC Connect | 217.0 | 26.5 | A |
| | Late | AAC Prairie | 227.7 | 26.5 | A |
| | Late | AB Foothills | 260.7 | 26.5 | A |
| | Late | AC Metcalfe | 230.0 | 26.5 | A |
| | Late | CDC Austenson | 217.7 | 26.5 | A |
| | Late | CDC Churchill | 228.3 | 26.5 | A |
| | Late | CDC Fraser | 221.0 | 26.5 | A |
| Harvest Time*Variety | Mid | AAC Connect | 246.7 | 26.5 | A |
| | Mid | AAC Prairie | 174.7 | 26.5 | A |
| | Mid | AB Foothills | 252.7 | 26.5 | A |
| | Mid | AC Metcalfe | 221.7 | 26.5 | A |
| | Mid | CDC Austenson | 225.0 | 26.5 | A |
| | Mid | CDC Churchill | 225.7 | 26.5 | A |
| | Mid | CDC Fraser | 197.7 | 26.5 | A |

**Table 17.** 2025 Treatment means for plant count (Plants/m2) after conducting pairwise comparisons using Tukey's test at alpha = 0.05 for Outlook. Means followed by the same letter within a column across each effect do not significantly differ.

| Effect | Harvest Time | Variety | Mean (Plants/m2) | Standard Error | Tukey Grouping |
|---|---|---|---|---|---|
| Harvest Time | Early | NA | 245.6 | 11.4 | A |
| | Late | NA | 247.3 | 11.4 | A |
| | Mid | NA | 242.2 | 11.4 | A |
| Variety | NA | AAC Connect | 251.9 | 12.8 | A |
| | NA | AAC Prairie | 234.8 | 12.8 | A |
| | NA | AB Foothills | 277.1 | 12.8 | A |
| | NA | AC Metcalfe | 242.6 | 12.8 | A |
| | NA | CDC Austenson | 224.0 | 12.8 | A |
| | NA | CDC Churchill | 252.2 | 12.8 | A |
| | NA | CDC Fraser | 232.8 | 12.8 | A |
| Harvest Time*Variety | Early | AAC Connect | 261.3 | 22.2 | A |
| | Early | AAC Prairie | 258.0 | 22.2 | A |

| | | | | | |
|---|---|---|---|---|---|
| | Early | AB Foothills | 277.3 | 22.2 | A |
| | Early | AC Metcalfe | 233.0 | 22.2 | A |
| | Early | CDC Austenson | 198.7 | 22.2 | A |
| | Early | CDC Churchill | 258.7 | 22.2 | A |
| | Early | CDC Fraser | 232.3 | 22.2 | A |
| Harvest Time*Variety | Mid | AAC Connect | 253.7 | 22.2 | A |
| | Mid | AAC Prairie | 201.7 | 22.2 | A |
| | Mid | AB Foothills | 276.3 | 22.2 | A |
| | Mid | AC Metcalfe | 244.3 | 22.2 | A |
| | Mid | CDC Austenson | 245.3 | 22.2 | A |
| | Mid | CDC Churchill | 249.3 | 22.2 | A |
| | Mid | CDC Fraser | 224.7 | 22.2 | A |
| Harvest Time*Variety | Late | AAC Connect | 240.7 | 22.2 | A |
| | Late | AAC Prairie | 244.7 | 22.2 | A |
| | Late | AB Foothills | 277.7 | 22.2 | A |
| | Late | AC Metcalfe | 250.3 | 22.2 | A |
| | Late | CDC Austenson | 228.0 | 22.2 | A |
| | Late | CDC Churchill | 248.7 | 22.2 | A |
| | Late | CDC Fraser | 241.3 | 22.2 | A |

**Plant Height at Outlook (ISask)**

Plant height was measured at the Outlook location. Variety had a significant effect on plant height at Outlook in both 2024 and 2025, while harvest time and the harvest time by variety interaction were not significant in either year (Table 3). This indicates that differences in plant height were driven primarily by genetic factors rather than by harvest timing or environmental conditions during the growing season (Table 18).

In 2025, clear and consistent separation among varieties was observed (Table 19). Mean plant height ranged from over 112 cm for the tallest varieties to approximately 74 cm for the shortest. CDC Maverick and AB Advantage were the tallest entries, while KWS Kellie exhibited the shortest stature and formed a distinct lowest group. Most varieties fell into intermediate groupings. Overall, plant height at Outlook was highly variety-dependent and consistent across management treatments. These results provide useful information, particularly where straw strength, lodging risk, or compatibility with specific production systems are considerations.

**Table 18.** 2024 and 2025 Treatment means for plant height (cm), at alpha = 0.05 for Outlook. Means followed by the same letter within a column do not significantly differ.

| Outlook Height 2024 | | | | Outlook Height 2025 | | | |
|---|---|---|---|---|---|---|---|
| Variety | Mean (cm) | Standard Error | Tukey Grouping | Variety | Mean (cm) | Standard Error | Tukey Grouping |
| CDC Maverick | 101.1 | 1.7 | A | CDC Maverick | 112.6 | 2.5 | A |
| AB Advantage | 100.1 | 1.7 | A | AB Advantage | 112.5 | 2.5 | A |
| CDC Renegade | 94.3 | 1.7 | B | CDC Clear | 101.8 | 2.5 | B |
| Legacy | 90.2 | 1.7 | B | AB Tofield | 101.6 | 2.5 | B |
| AB Tofield | 88.5 | 1.7 | C | AB Brewnet | 99.6 | 2.5 | B |
| AB Hague | 86.1 | 1.7 | CD | HB21355 | 98.5 | 2.5 | B |
| Claymore | 85.9 | 1.7 | CD | HB20351 | 98.4 | 2.5 | B |
| AB Brewnet | 84.8 | 1.7 | CD | CDC Renegade | 97.9 | 2.5 | BC |
| AB Prime | 84.4 | 1.7 | CD | AB Prime | 97.1 | 2.5 | BC |
| CDC Fraser | 82.9 | 1.7 | DE | CDC Fraser | 96.5 | 2.5 | BC |
| CDC Clear | 82.8 | 1.7 | DE | CDC Copeland | 96.2 | 2.5 | BC |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| AB Foothills | 82.7 | 1.7 | DE | Claymore | 96.1 | 2.5 | BC |
| AAC Prairie | 82.4 | 1.7 | DE | Legacy | 95.0 | 2.5 | BC |
| AC Metcalfe | 82.2 | 1.7 | DE | AB Hague | 93.4 | 2.5 | CD |
| HB21355 | 82.0 | 1.7 | DE | CDC Austenson | 93.0 | 2.5 | CD |
| CDC Copeland | 81.3 | 1.7 | DEF | AB Foothills | 92.6 | 2.5 | CD |
| HB20351 | 81.3 | 1.7 | DEF | AB Dram | 92.2 | 2.5 | CD |
| AAC Lariat | 81.2 | 1.7 | DEF | AAC Lariat | 92.1 | 2.5 | CD |
| AB Wrangler | 81.1 | 1.7 | DEF | AB Wrangler | 91.7 | 2.5 | CD |
| AAC Connect | 80.7 | 1.7 | DEF | AAC Prairie | 91.4 | 2.5 | CD |
| CDC Durango | 80.4 | 1.7 | DEF | CDC Durango | 90.7 | 2.5 | CD |
| AB Dram | 80.0 | 1.7 | DEF | CDC Goldstar | 90.6 | 2.5 | CD |
| AAC Synergy | 79.7 | 1.7 | EF | AAC Synergy | 90.4 | 2.5 | CD |
| CDC Goldstar | 79.7 | 1.7 | EF | AC Metcalfe | 90.3 | 2.5 | CD |
| CDC Austenson | 78.8 | 1.7 | FG | AAC Connect | 88.0 | 2.5 | DE |
| CDC Churchill | 77.2 | 1.7 | FG | CDC Copper | 87.2 | 2.5 | DE |
| CDC Copper | 74.4 | 1.7 | GH | CDC Churchill | 86.9 | 2.5 | DE |
| RGT Planet | 73.4 | 1.7 | GH | Sirish | 83.2 | 2.5 | E |
| Torbellino | 73.3 | 1.7 | GH | SY Stanza | 82.8 | 2.5 | E |
| Esma | 71.6 | 1.7 | H | Esma | 81.9 | 2.5 | EF |
| Sirish | 70.6 | 1.7 | H | Torbellino | 81.3 | 2.7 | EF |
| SY Stanza | 70.5 | 1.7 | H | RGT Planet | 79.2 | 2.5 | F |
| KWS Kellie | 69.4 | 1.7 | H | KWS Kellie | 73.5 | 2.5 | G |

**Lodging**

Lodging was assessed at Redvers, Yorkton, and Prince Albert to evaluate varietal differences in stand stability and the influence of harvest timing. The results indicate that lodging responses varied by location and year, with both harvest time and variety contributing to differences (Table 3).

**Redvers (SERF)**

At Redvers in 2025, lodging was significantly affected by both harvest time and variety, and a significant harvest time by variety interaction was also observed (Table 3). Late-harvested plots had higher lodging scores than early-harvested plots (Table 19), indicating increased lodging risk associated with delayed harvest. Varietal means showed a range of responses, with AB Foothills and AC Metcalfe exhibiting the highest lodging scores, while AAC Connect showed the lowest. The interaction results indicate that lodging differences among varieties were primarily expressed under late-harvest conditions, where AB Foothills and AC Metcalfe showed markedly higher lodging than other entries, whereas lodging was minimal and uniform across varieties under early harvest (Table 19).

**Table 19.** 2025 Treatment means for lodging (1-9 rating scale), at alpha = 0.05 for Redvers. Means followed by the same letter within a column do not significantly differ.

| Effect | Harvest Time | Variety | Mean | Standard Error | Tukey Grouping |
|---|---|---|---|---|---|
| Harvest Time | Late | NA | 2.71 | 0.14 | A |
| | Early | NA | 1.00 | 0.14 | B |
| Variety | NA | AB Foothills | 2.50 | 0.27 | A |

| | | | | | |
|---|---|---|---|---|---|
| | NA | AC Metcalfe | 2.50 | 0.27 | A |
| | NA | AAC Prairie | 2.00 | 0.27 | AB |
| | NA | CDC Austenson | 1.67 | 0.27 | AB |
| | NA | CDC Fraser | 1.67 | 0.27 | AB |
| | NA | CDC Churchill | 1.50 | 0.27 | AB |
| | NA | AAC Connect | 1.17 | 0.27 | B |
| Harvest Time*Variety | Early | AAC Prairie | 1.00 | 0.38 | A |
| | Early | CDC Austenson | 1.00 | 0.38 | A |
| | Early | CDC Churchill | 1.00 | 0.38 | A |
| | Early | AAC Connect | 1.00 | 0.38 | A |
| | Early | AB Foothills | 1.00 | 0.38 | A |
| | Early | CDC Fraser | 1.00 | 0.38 | A |
| | Early | AC Metcalfe | 1.00 | 0.38 | A |
| Harvest Time*Variety | Late | AB Foothills | 4.00 | 0.38 | A |
| | Late | AC Metcalfe | 4.00 | 0.38 | A |
| | Late | AAC Prairie | 3.00 | 0.38 | AB |
| | Late | CDC Austenson | 2.33 | 0.38 | AB |
| | Late | CDC Fraser | 2.33 | 0.38 | AB |
| | Late | CDC Churchill | 2.00 | 0.38 | AB |
| | Late | AAC Connect | 1.33 | 0.38 | B |

**Yorkton (ECRF)**

At Yorkton in 2024, lodging was significantly influenced by variety, while harvest time and the interaction term were not significant (Table 3). Lodging scores were generally high at this site, reflecting strong lodging pressure during the season. AC Metcalfe, CDC Churchill, and AB Foothills recorded the highest lodging values, whereas CDC Austenson consistently showed the lowest lodging. Similar varietal rankings were observed within early and late harvest treatments, indicating stable varietal responses across harvest timings despite high overall lodging levels.

**Table 20.** 2024 Treatment means for lodging (1-9 rating scale), at alpha = 0.05 for Yorkton. Means followed by the same letter within a column across each effect do not significantly differ.

| Effect | Harvest Time | Variety | Mean | Standard Error | Tukey Grouping |
|---|---|---|---|---|---|
| Harvest Time | Early | NA | 4.7 | 0.25 | A |
| | Late | NA | 4.4 | 0.25 | A |
| Variety | NA | AC Metcalfe | 6.0 | 0.47 | A |
| | NA | CDC Churchill | 5.8 | 0.47 | A |
| | NA | AB Foothills | 5.5 | 0.47 | A |
| | NA | AAC Connect | 4.8 | 0.47 | AB |
| | NA | AAC Prairie | 4.5 | 0.47 | AB |
| | NA | CDC Fraser | 3.2 | 0.47 | BC |

| | | | | | |
|---|---|---|---|---|---|
| | NA | CDC Austenson | 2.0 | 0.47 | C |
| Harvest Time*Variety | Early | CDC Churchill | 6.0 | 0.66 | A |
| | Early | AB Foothills | 5.7 | 0.66 | A |
| | Early | AC Metcalfe | 5.7 | 0.66 | A |
| | Early | AAC Connect | 5.3 | 0.66 | AB |
| | Early | AAC Prairie | 4.3 | 0.66 | AB |
| | Early | CDC Fraser | 4.0 | 0.66 | BC |
| | Early | CDC Austenson | 2.0 | 0.66 | C |
| Harvest Time*Variety | Late | AC Metcalfe | 6.3 | 0.66 | A |
| | Late | CDC Churchill | 5.7 | 0.66 | A |
| | Late | AB Foothills | 5.3 | 0.66 | AB |
| | Late | AAC Prairie | 4.7 | 0.66 | BC |
| | Late | AAC Connect | 4.3 | 0.66 | BC |
| | Late | CDC Fraser | 2.3 | 0.66 | CD |
| | Late | CDC Austenson | 2.0 | 0.66 | D |

**Prince Albert (CLC)**

At Prince Albert, lodging levels were low in both years, and responses were less variable than at Redvers or Yorkton. In 2024, no significant effects of harvest time, variety, or their interaction were detected (Table 3), and mean lodging scores were at minimum rating across all treatments. In 2025, marginal significant varietal effect was observed, with AC Metcalfe showing a slight lodging than other varieties, although absolute lodging levels remained low. Harvest time again had no significant effect at this site, and interaction effects were not detected (Tables 21 and 22).

**Table 21.** 2024 Treatment means for lodging (1-9 rating scale), at alpha = 0.05 for Prince Albert. Means followed by the same letter within a column across each effect do not significantly differ.

| Effect | Harvest Time | Variety | Mean (1-9) | Standard Error | Tukey Grouping |
|---|---|---|---|---|---|
| Harvest Time | Early | NA | 1.33 | 0.26 | A |
| | Late | NA | 1.29 | 0.26 | A |
| Variety | NA | CDC Churchill | 1.83 | 0.40 | A |
| | NA | AB Foothills | 1.67 | 0.40 | A |
| | NA | AC Metcalfe | 1.67 | 0.40 | A |
| | NA | AAC Connect | 1.00 | 0.40 | A |
| | NA | AAC Prairie | 1.00 | 0.40 | A |
| | NA | CDC Austenson | 1.00 | 0.40 | A |
| | NA | CDC Fraser | 1.00 | 0.40 | A |
| Harvest Time*Variety | Early | AC Metcalfe | 2.33 | 0.57 | A |
| | Early | AB Foothills | 1.67 | 0.57 | A |
| | Early | CDC Churchill | 1.33 | 0.57 | A |
| | Early | AAC Connect | 1.00 | 0.57 | A |

| | | | | | |
|---|---|---|---|---|---|
| | Early | AAC Prairie | 1.00 | 0.57 | A |
| | Early | CDC Austenson | 1.00 | 0.57 | A |
| | Early | CDC Fraser | 1.00 | 0.57 | A |
| Harvest Time*Variety | Late | CDC Churchill | 2.33 | 0.57 | A |
| | Late | AB Foothills | 1.67 | 0.57 | A |
| | Late | AAC Connect | 1.00 | 0.57 | A |
| | Late | AAC Prairie | 1.00 | 0.57 | A |
| | Late | AC Metcalfe | 1.00 | 0.57 | A |
| | Late | CDC Austenson | 1.00 | 0.57 | A |
| | Late | CDC Fraser | 1.00 | 0.57 | A |

**Table 22.** 2025 Treatment means for lodging (1-9 rating scale), at alpha = 0.05 for Prince Albert. Means followed by the same letter within a column across each effect do not significantly differ.

| Effect | Harvest Time | Variety | Estimate | Standard Error | Tukey Grouping |
|---|---|---|---|---|---|
| Harvest Time | Early | NA | 1.4 | 0.1 | A |
| | Late | NA | 1.1 | 0.1 | A |
| Variety | NA | AC Metcalfe | 2.0 | 0.2 | A |
| | NA | CDC Churchill | 1.5 | 0.2 | AB |
| | NA | AB Foothills | 1.3 | 0.2 | B |
| | NA | AAC Prairie | 1.2 | 0.2 | B |
| | NA | AAC Connect | 1.0 | 0.2 | B |
| | NA | CDC Austenson | 1.0 | 0.2 | B |
| | NA | CDC Fraser | 1.0 | 0.2 | B |
| Harvest Time*Variety | Early | AAC Connect | 1.0 | 0.2 | A |
| | Early | AAC Prairie | 1.3 | 0.2 | A |
| | Early | AB Foothills | 1.7 | 0.2 | A |
| | Early | AC Metcalfe | 2.3 | 0.2 | A |
| | Early | CDC Austenson | 1.0 | 0.2 | A |
| | Early | CDC Churchill | 1.7 | 0.2 | A |
| | Early | CDC Fraser | 1.0 | 0.2 | A |
| Harvest Time*Variety | Late | AAC Connect | 1.0 | 0.2 | A |
| | Late | AAC Prairie | 1.0 | 0.2 | A |
| | Late | AB Foothills | 1.0 | 0.2 | A |
| | Late | AC Metcalfe | 1.7 | 0.2 | A |
| | Late | CDC Austenson | 1.0 | 0.2 | A |
| | Late | CDC Churchill | 1.3 | 0.2 | A |
| | Late | CDC Fraser | 1.0 | 0.2 | A |

**Yield**

Grain yield was evaluated across all locations in 2024 and 2025. Based on the ANOVA results (Table 3) and treatment mean, yield responses varied by environment, with consistent effects of harvest timing at some sites and strong varietal

influences across most locations.

**Scott (WARC)**

At Scott, harvest time had a significant effect on yield in both years, with early harvest producing higher yields than late harvest in 2024 and 2025. Variety also had a significant effect in both years, whereas the harvest time by variety interaction was not significant, indicating that varietal rankings were relatively stable across harvest timings. In 2024, CDC Churchill and AAC Connect were among the highest-yielding varieties, while AC Metcalfe yielded less. In 2025, yields were generally lower overall, but AAC Prairie and CDC Churchill ranked among the higher-yielding entries. These results indicate that delayed harvest negatively affected yield at this site, likely due to weathering losses, while varietal differences remained evident.

**Table 23.** 2024 Treatment means for grain yield (kg/ha), at alpha = 0.05 for Scott. Means followed by the same letter within a column across each effect do not significantly differ.

| Effect | Harvest Time | Variety | Mean | Standard Error | Tukey Grouping |
|---|---|---|---|---|---|
| Harvest Time | Early | NA | 5390.1 | 144.42 | A |
| | Late | NA | 4788.3 | 144.42 | B |
| Variety | NA | CDC Churchill | 5382.0 | 119.05 | A |
| | NA | AAC Conn | 5289.3 | 119.05 | A |
| | NA | AAC Prai | 5169.1 | 119.05 | AB |
| | NA | AB Footh | 5112.5 | 119.05 | AB |
| | NA | CDC Aust | 5040.1 | 119.05 | AB |
| | NA | CDC Fras | 4865.3 | 119.05 | AB |
| | NA | AC Metca | 4766.1 | 119.05 | B |
| Harvest Time*Variety | Early | AAC Conn | 5554.8 | 168.36 | A |
| | Early | AAC Prai | 5515.3 | 168.36 | A |
| | Early | AB Footh | 5333.3 | 168.36 | A |
| | Early | AC Metca | 5115.5 | 168.36 | A |
| | Early | CDC Aust | 5417.5 | 168.36 | A |
| | Early | CDC Churchill | 5655.0 | 168.36 | A |
| | Early | CDC Fras | 5139.8 | 168.36 | A |
| Harvest Time*Variety | Late | AAC Conn | 5023.8 | 168.36 | A |
| | Late | AAC Prai | 4823.0 | 168.36 | A |
| | Late | AB Footh | 4891.8 | 168.36 | A |
| | Late | AC Metca | 4416.8 | 168.36 | A |
| | Late | CDC Aust | 4662.8 | 168.36 | A |
| | Late | CDC Churchill | 5109.0 | 168.36 | A |
| | Late | CDC Fras | 4590.8 | 168.36 | A |

**Table 24.** 2025 Treatment means for grain yield (kg/ha), at alpha = 0.05 for Scott. Means followed by the same letter within a column across each effect do not significantly differ.

| Effect | Harvest Time | Variety | Mean | Standard Error | Tukey Grouping |
|---|---|---|---|---|---|
| Harvest Time | Early | NA | 5003.0 | 99.3 | A |
| | Late | NA | 3979.1 | 99.3 | B |
| Variety | NA | AAC Prai | 4755.9 | 122.1 | A |

| | | | | | |
|---|---|---|---|---|---|
| | NA | CDC Churchill | 4604.4 | 122.1 | AB |
| | NA | CDC Aust | 4581.0 | 122.1 | AB |
| | NA | AB Footh | 4528.4 | 122.1 | AB |
| | NA | CDC Fras | 4358.9 | 122.1 | AB |
| | NA | AC Metca | 4316.9 | 122.1 | AB |
| | NA | AAC Conn | 4292.0 | 122.1 | B |
| Harvest Time*Variety | Early | CDC Aust | 5268.8 | 172.6 | A |
| | Early | CDC Churchill | 5163.5 | 172.6 | A |
| | Early | AAC Prai | 5131.8 | 172.6 | A |
| | Early | AB Footh | 4988.8 | 172.6 | A |
| | Early | AAC Conn | 4962.0 | 172.6 | A |
| | Early | AC Metca | 4783.5 | 172.6 | A |
| | Early | CDC Fras | 4722.5 | 172.6 | A |
| Harvest Time*Variety | Late | AAC Prai | 4380.0 | 172.6 | A |
| | Late | AB Footh | 4068.0 | 172.6 | A |
| | Late | CDC Churchill | 4045.3 | 172.6 | A |
| | Late | CDC Fras | 3995.3 | 172.6 | A |
| | Late | CDC Aust | 3893.3 | 172.6 | A |
| | Late | AC Metca | 3850.3 | 172.6 | A |
| | Late | AAC Conn | 3622.0 | 172.6 | A |

**Redvers (SERF)**

At Redvers, harvest time had consistent effect on yield in both 2024 and 2025, with significantly higher yields under early harvest. Variety effects were also significant in both years. In 2024, most varieties performed similarly under early harvest, while AC Metcalfe consistently yielded less (Table 25). In 2025, CDC Austenson achieved the highest yields, followed by CDC Churchill and AAC Connect, whereas AB Foothills and AC Metcalfe produced lower yields (Table 26). Although harvest time by variety interactions were not statistically significant overall, late harvest tended to amplify yield differences among varieties.

**Table 25.** 2024 Treatment means for grain yield (kg/ha), at alpha = 0.05 for Redvers. Means followed by the same letter within a column across each effect do not significantly differ.

| Effect | Harvest Time | Variety | Mean | Standard Error | Tukey Grouping |
|---|---|---|---|---|---|
| Harvest Time | Early | NA | 6356.9 | 142.5 | A |
| | Late | NA | 5451.3 | 142.5 | B |
| Variety | NA | AAC Connect | 6190.2 | 178.1 | A |
| | NA | CDC Austenson | 6047.8 | 178.1 | A |
| | NA | CDC Fraser | 6043.2 | 178.1 | A |
| | NA | CDC Churchill | 6035.5 | 178.1 | A |
| | NA | AB Foothills | 5945.7 | 178.1 | A |
| | NA | AAC Prairie | 5935.0 | 178.1 | A |
| | NA | AC Metcalfe | 5131.2 | 178.1 | B |
| Harvest Time*Variety | Early | CDC Churchill | 6668.3 | 251.8 | A |
| | Early | AAC Connect | 6631.7 | 251.8 | A |
| | Early | CDC Fraser | 6628.7 | 251.8 | A |
| | Early | AB Foothills | 6420.3 | 251.8 | A |

| | | | | | |
|---|---|---|---|---|---|
| | Early | AAC Prairie | 6265.3 | 251.8 | A |
| | Early | CDC Austenson | 6206.0 | 251.8 | A |
| | Early | AC Metcalfe | 5677.7 | 251.8 | B |
| Harvest Time*Variety | Late | CDC Austenson | 5889.7 | 251.8 | A |
| | Late | AAC Connect | 5748.7 | 251.8 | AB |
| | Late | AAC Prairie | 5604.7 | 251.8 | AB |
| | Late | AB Foothills | 5471.0 | 251.8 | B |
| | Late | CDC Fraser | 5457.7 | 251.8 | B |
| | Late | CDC Churchill | 5402.7 | 251.8 | B |
| | Late | AC Metcalfe | 4584.7 | 251.8 | C |

**Table 26.** 2025 Treatment means for grain yield (kg/ha), at alpha = 0.05 for Redvers. Means followed by the same letter within a column across each effect do not significantly differ.

| Effect | Harvest Time | Variety | Mean | Standard Error | Tukey Grouping |
|---|---|---|---|---|---|
| Harvest Time | Early | NA | 7497.7 | 135.5 | A |
| | Late | NA | 5537.1 | 135.5 | B |
| Variety | NA | CDC Austenson | 7419.2 | 148.6 | A |
| | NA | CDC Churchill | 6897.2 | 148.6 | AB |
| | NA | AAC Connect | 6633.7 | 148.6 | BC |
| | NA | CDC Fraser | 6460.3 | 148.6 | BC |
| | NA | AAC Prairie | 6287.3 | 148.6 | C |
| | NA | AB Foothills | 5978.3 | 148.6 | D |
| | NA | AC Metcalfe | 5946.0 | 148.6 | D |
| Harvest Time*Variety | Early | CDC Austenson | 7921.0 | 210.1 | A |
| | Early | CDC Churchill | 7860.7 | 210.1 | A |
| | Early | CDC Fraser | 7599.3 | 210.1 | A |
| | Early | AAC Connect | 7536.7 | 210.1 | A |
| | Early | AAC Prairie | 7452.3 | 210.1 | A |
| | Early | AB Foothills | 7064.0 | 210.1 | A |
| | Early | AC Metcalfe | 7050.0 | 210.1 | A |
| Harvest Time*Variety | Late | CDC Austenson | 6917.3 | 210.1 | A |
| | Late | CDC Churchill | 5933.7 | 210.1 | A |
| | Late | AAC Connect | 5730.7 | 210.1 | A |
| | Late | CDC Fraser | 5321.3 | 210.1 | A |
| | Late | AAC Prairie | 5122.3 | 210.1 | A |
| | Late | AB Foothills | 4892.7 | 210.1 | A |
| | Late | AC Metcalfe | 4842.0 | 210.1 | A |

**Yorkton (ECRF)**

At Yorkton in 2024, both harvest time and variety significantly affected yield (Table 3), with early harvest resulting in higher yields. Several varieties, including CDC Fraser and CDC Austenson, performed well under early harvest conditions (Table 27). In 2025, yield variability increased substantially, and no significant effects of harvest time or variety were

detected. Mean yields were numerically higher under early harvest, but large variability reduced statistical separation among treatments (Table 28).

**Table 27.** 2024 Treatment means for grain yield (kg/ha), at alpha = 0.05 for Yorkton. Means followed by the same letter within a column across each effect do not significantly differ.

| Effect | Harvest Time | Variety | Mean | Standard Error | Tukey Grouping |
|---|---|---|---|---|---|
| Harvest Time | Early | NA | 5981.9 | 62.3 | A |
| | Late | NA | 5563.7 | 62.3 | B |
| Variety | NA | CDC Fraser | 6042.0 | 97.8 | A |
| | NA | CDC Austenson | 6021.7 | 97.8 | A |
| | NA | AAC Prairie | 5931.0 | 97.8 | A |
| | NA | CDC Churchill | 5915.7 | 97.8 | A |
| | NA | AAC Connect | 5860.7 | 97.8 | A |
| | NA | AB Foothills | 5352.0 | 97.8 | B |
| | NA | AC Metcalfe | 5286.3 | 97.8 | B |
| Harvest Time*Variety | Early | CDC Austenson | 6445.3 | 138.3 | A |
| | Early | CDC Fraser | 6155.0 | 138.3 | A |
| | Early | CDC Churchill | 6042.0 | 138.3 | A |
| | Early | AAC Connect | 6039.0 | 138.3 | A |
| | Early | AAC Prairie | 6031.0 | 138.3 | A |
| | Early | AC Metcalfe | 5650.7 | 138.3 | A |
| | Early | AB Foothills | 5510.0 | 138.3 | A |
| Harvest Time*Variety | Late | CDC Fraser | 5929.0 | 138.3 | A |
| | Late | AAC Prairie | 5831.0 | 138.3 | A |
| | Late | CDC Churchill | 5789.3 | 138.3 | A |
| | Late | AAC Connect | 5682.3 | 138.3 | A |
| | Late | CDC Austenson | 5598.0 | 138.3 | A |
| | Late | AB Foothills | 5194.0 | 138.3 | A |
| | Late | AC Metcalfe | 4922.0 | 138.3 | A |

**Table 28.** 2025 Treatment means for grain yield (kg/ha), at alpha = 0.05 for Yorkton. Means followed by the same letter within a column across each effect do not significantly differ.

| Effect | Harvest Time | Variety | Mean | Standard Error | Tukey Grouping |
|---|---|---|---|---|---|
| Harvest Time | Early | NA | 6206.4 | 828.3 | A |
| | Late | NA | 4664.8 | 828.3 | A |
| Variety | NA | AAC Prairie | 5734.3 | 622.7 | A |
| | NA | CDC Austenson | 5615.7 | 622.7 | A |
| | NA | CDC Fraser | 5609.3 | 622.7 | A |
| | NA | AB Foothills | 5354.3 | 622.7 | A |
| | NA | AC Metcalfe | 5320.2 | 622.7 | A |

| | | | | | |
|---|---|---|---|---|---|
| | NA | CDC Churchill | 5280.3 | 622.7 | A |
| | NA | AAC Connect | 5135.0 | 622.7 | A |
| Harvest Time*Variety | Early | CDC Fraser | 6612.0 | 880.6 | A |
| | Early | AAC Prairie | 6483.7 | 880.6 | A |
| | Early | CDC Austenson | 6292.3 | 880.6 | A |
| | Early | CDC Churchill | 6226.0 | 880.6 | A |
| | Early | AAC Connect | 5982.0 | 880.6 | A |
| | Early | AB Foothills | 5938.0 | 880.6 | A |
| | Early | AC Metcalfe | 5910.7 | 880.6 | A |
| Harvest Time*Variety | Late | AAC Prairie | 4985.0 | 880.6 | A |
| | Late | CDC Austenson | 4939.0 | 880.6 | A |
| | Late | AB Foothills | 4770.7 | 880.6 | A |
| | Late | AC Metcalfe | 4729.7 | 880.6 | A |
| | Late | CDC Fraser | 4606.7 | 880.6 | A |
| | Late | CDC Churchill | 4334.7 | 880.6 | A |
| | Late | AAC Connect | 4288.0 | 880.6 | A |

**Swift Current (WCA)**

At Swift Current, harvest time did not affect yield in 2024, but variety differences were significant (Table 3), with CDC Churchill and AAC Prairie among the higher-yielding entries and CDC Austenson yielding the least (Table 29). In 2025, both harvest time and variety significantly influenced yield, with higher yields under early harvest (Table 3). CDC Churchill produced the highest yields, while AAC Prairie and AC Metcalfe were among the lower-yielding varieties (Table 30).

**Table 29.** 2024 Treatment means for grain yield (kg/ha), at alpha = 0.05 for Swift Current. Means followed by the same letter within a column across each effect do not significantly differ.

| Effect | Harvest Time | Variety | Mean (kg/ha) | Standard Error | Tukey Grouping |
|---|---|---|---|---|---|
| Harvest Time | Late | NA | 1443.7 | 37.62 | A |
| | Early | NA | 1433.8 | 37.62 | A |
| Variety | NA | CDC Churchill | 1612.3 | 55.10 | A |
| | NA | AAC Prairie | 1551.0 | 55.10 | AB |
| | NA | AAC Connect | 1463.7 | 55.10 | BC |
| | NA | AC Metcalfe | 1451.0 | 55.10 | BC |
| | NA | CDC Fraser | 1429.0 | 55.10 | BC |
| | NA | AB Foothills | 1383.8 | 55.10 | CD |
| | NA | CDC Austenson | 1180.5 | 55.10 | D |
| Harvest Time*Variety | Early | CDC Churchill | 1589.3 | 77.92 | A |
| | Early | AAC Prairie | 1519.3 | 77.92 | A |
| | Early | CDC Fraser | 1512.3 | 77.92 | A |
| | Early | AC Metcalfe | 1446.7 | 77.92 | A |
| | Early | AB Foothills | 1437.3 | 77.92 | A |
| | Early | AAC Connect | 1400.3 | 77.92 | A |
| | Early | CDC Austenson | 1131.3 | 77.92 | A |
| Harvest Time*Variety | Late | CDC Churchill | 1635.3 | 77.92 | A |
| | Late | AAC Prairie | 1582.7 | 77.92 | A |
| | Late | AAC Connect | 1527.0 | 77.92 | A |

| | | | | | |
|---|---|---|---|---|---|
| | Late | AC Metcalfe | 1455.3 | 77.92 | A |
| | Late | CDC Fraser | 1345.7 | 77.92 | A |
| | Late | AB Foothills | 1330.3 | 77.92 | A |
| | Late | CDC Austenson | 1229.7 | 77.92 | A |

**Table 30.** 2025 Treatment means for grain yield (kg/ha), at alpha = 0.05 for Swift Current. Means followed by the same letter within a column across each effect do not significantly differ.

| Effect | Harvest Time | Variety | Mean | Standard Error | Tukey Grouping |
|---|---|---|---|---|---|
| Harvest Time | Early | NA | 2326.4 | 109.5 | A |
| | Late | NA | 2120.5 | 109.5 | B |
| Variety | NA | CDC Churchill | 2666.2 | 145.7 | A |
| | NA | CDC Austenson | 2477.0 | 145.7 | AB |
| | NA | AB Foothills | 2231.2 | 145.7 | BC |
| | NA | CDC Fraser | 2130.3 | 145.7 | BC |
| | NA | AAC Connect | 2128.5 | 145.7 | BC |
| | NA | AC Metcalfe | 2022.3 | 145.7 | CD |
| | NA | AAC Prairie | 1908.5 | 145.7 | D |
| Harvest Time*Variety | Early | CDC Churchill | 2719.0 | 184.7 | A |
| | Early | CDC Austenson | 2495.7 | 184.7 | A |
| | Early | AB Foothills | 2483.3 | 184.7 | A |
| | Early | AAC Connect | 2308.0 | 184.7 | A |
| | Early | AC Metcalfe | 2266.0 | 184.7 | A |
| | Early | CDC Fraser | 2181.0 | 184.7 | A |
| | Early | AAC Prairie | 1831.7 | 184.7 | A |
| Harvest Time*Variety | Late | CDC Churchill | 2613.3 | 184.7 | A |
| | Late | CDC Austenson | 2458.3 | 184.7 | A |
| | Late | CDC Fraser | 2079.7 | 184.7 | A |
| | Late | AAC Prairie | 1985.3 | 184.7 | A |
| | Late | AB Foothills | 1979.0 | 184.7 | A |
| | Late | AAC Connect | 1949.0 | 184.7 | A |
| | Late | AC Metcalfe | 1778.7 | 184.7 | A |

**Prince Albert (CLC)**

At Prince Albert, harvest time did not significantly affect yield in either year. Variety effects were significant in both 2024 and 2025 (Table 3). In 2024, CDC Churchill and CDC Austenson were among the highest-yielding varieties, while AC Metcalfe produced lower yields (Table 31). In 2025, AAC Prairie ranked highest, followed by CDC Churchill, with several varieties clustering closely in the mid-yield range (Table 32).

**Table 31.** 2024 Treatment means for grain yield (kg/ha), at alpha = 0.05 for Swift Current. Means followed by the same letter within a column across each effect do not significantly differ

| Effect | Harvest Time | Variety | Mean (kg/ha) | Standard Error | Tukey Grouping |
|---|---|---|---|---|---|
| Harvest Time | Early | NA | 5099.7 | 342.5 | A |
| | Late | NA | 5236.1 | 342.5 | A |
| Variety | NA | CDC Churchill | 5563.3 | 293.4 | A |
| | NA | CDC Austenson | 5540.7 | 293.4 | A |

| | | | | | |
|---|---|---|---|---|---|
| | NA | AAC Connect | 5362.8 | 293.4 | A |
| | NA | AAC Prairie | 5229.7 | 293.4 | AB |
| | NA | CDC Fraser | 5127.7 | 293.4 | AB |
| | NA | AB Foothills | 4925.3 | 293.4 | AB |
| | NA | AC Metcalfe | 4425.7 | 293.4 | B |
| Harvest Time*Variety | Early | CDC Austenson | 5472.3 | 414.9 | A |
| | Early | AAC Prairie | 5355.7 | 414.9 | A |
| | Early | CDC Fraser | 5205.3 | 414.9 | A |
| | Early | CDC Churchill | 5159.7 | 414.9 | A |
| | Early | AAC Connect | 5158.7 | 414.9 | A |
| | Early | AB Foothills | 4941.7 | 414.9 | A |
| | Early | AC Metcalfe | 4404.3 | 414.9 | A |
| Harvest Time*Variety | Late | CDC Churchill | 5967.0 | 414.9 | A |
| | Late | CDC Austenson | 5609.0 | 414.9 | A |
| | Late | AAC Connect | 5567.0 | 414.9 | A |
| | Late | AAC Prairie | 5103.7 | 414.9 | A |
| | Late | CDC Fraser | 5050.0 | 414.9 | A |
| | Late | AB Foothills | 4909.0 | 414.9 | A |
| | Late | AC Metcalfe | 4447.0 | 414.9 | A |

**Table 32.** 2025 Treatment means for grain yield (kg/ha), at alpha = 0.05 for Swift Current. Means followed by the same letter within a column across each effect do not significantly differ

| Effect+O32:T56 | Harvest Time | Variety | Estimate | Standard Error | Tukey Grouping |
|---|---|---|---|---|---|
| Harvest Time | Early | NA | 4264.7 | 151.7 | A |
| | Late | NA | 4133.9 | 151.7 | A |
| Variety | NA | AAC Prairie | 4532.2 | 156.9 | A |
| | NA | CDC Churchill | 4379.0 | 156.9 | AB |
| | NA | AC Metcalfe | 4261.7 | 156.9 | B |
| | NA | CDC Austenson | 4204.3 | 156.9 | B |
| | NA | CDC Fraser | 4122.7 | 156.9 | B |
| | NA | AAC Connect | 4009.0 | 156.9 | B |
| | NA | AB Foothills | 3886.2 | 156.9 | B |
| Harvest Time*Variety | Early | CDC Churchill | 4593.0 | 221.8 | A |
| | Early | AAC Prairie | 4508.3 | 221.8 | A |
| | Early | CDC Austenson | 4366.7 | 221.8 | A |
| | Early | CDC Fraser | 4158.7 | 221.8 | A |
| | Early | AAC Connect | 4086.3 | 221.8 | A |
| | Early | AB Foothills | 4085.3 | 221.8 | A |
| | Early | AC Metcalfe | 4054.3 | 221.8 | A |
| Harvest Time*Variety | Late | AAC Prairie | 4556.0 | 221.8 | A |
| | Late | AC Metcalfe | 4469.0 | 221.8 | A |
| | Late | CDC Churchill | 4165.0 | 221.8 | A |

| | | | | | |
|---|---|---|---|---|---|
| | Late | CDC Fraser | 4086.7 | 221.8 | A |
| | Late | CDC Austenson | 4042.0 | 221.8 | A |
| | Late | AAC Connect | 3931.7 | 221.8 | A |
| | Late | AB Foothills | 3687.0 | 221.8 | A |

**Indian Head (IHARF)**

At Indian Head, yield was influenced by variety in both years (Table 3). In 2024, SY Stanza achieved the highest yield, followed by KWS Kellie and AAC Synergy (Table 33). In 2025, yields increased overall, and KWS Kellie ranked highest, followed by Esma and AB Tofield. Harvest-time effects were significant in 2025 (Table 33), but varietal rankings remained broadly consistent, indicating that genetic differences in yield potential were stable.

**Table 33.** 2024 and 2025 Treatment means for grain yield (kg/ha), at alpha = 0.05 for Indian Head. Means followed by the same letter within a column across each effect do not significantly differ

| Indian Head Grain Yield, 2024 | | | | Indian Head Grain Yield, 2025 | | | |
|---|---|---|---|---|---|---|---|
| Harvest Time | Estimate | Standard Error | Tukey Grouping | Harvest Time | Mean (kg/ha) | Standard Error | Tukey Grouping |
| Early | 5121.68 | 317.9 | A | Early | 6284.36 | 63 | A |
| Late | 5271.25 | 317.9 | A | Late | 5797.56 | 92.9 | B |
| Variety | | | | Variety | | | |
| SY Stanza | 6128.2 | 278.6 | A | KWS Kellie | 6908.5 | 133.1 | A |
| KWS Kellie | 5927.2 | 278.6 | AB | Esma | 6785.8 | 133.1 | AB |
| AAC Synergy | 5893.3 | 278.6 | AB | AB Tofield | 6680.7 | 133.1 | ABC |
| Sirish | 5846.2 | 278.6 | AB | CDC Durango | 6463.3 | 133.1 | ABCD |
| Esma | 5783.0 | 278.6 | AB | CDC Churchill | 6453.8 | 133.1 | ABCD |
| AB Tofield | 5740.7 | 278.6 | AB | SY Stanza | 6427.3 | 133.1 | ABCD |
| AB Prime | 5585.7 | 278.6 | AB | AB Prime | 6415.3 | 133.1 | ABCD |
| CDC Durango | 5551.3 | 278.6 | ABC | CDC Renegade | 6397.7 | 133.1 | ABCD |
| CDC Churchill | 5502.0 | 278.6 | ABC | Claymore | 6368.8 | 133.1 | ABCD |
| AAC Lariat | 5495.5 | 278.6 | ABC | CDC Goldstar | 6343.5 | 133.1 | ABCD |
| RGT Planet | 5493.2 | 278.6 | ABC | AAC Lariat | 6317.2 | 133.1 | ABCD |
| AAC Prairie | 5406.7 | 278.6 | ABC | AAC Synergy | 6317.0 | 133.1 | ABCD |
| AAC Connect | 5387.2 | 278.6 | ABC | AAC Prairie | 6275.7 | 133.1 | ABCD |
| AB Foothills | 5350.3 | 278.6 | ABC | Torbellino | 6229.5 | 133.1 | ABCDE |
| Claymore | 5320.5 | 278.6 | ABC | AB Advantage | 6210.8 | 133.1 | ABCDE |
| CDC Fraser | 5244.7 | 278.6 | ABC | AB Foothills | 6159.0 | 133.1 | BCDE |
| AB Advantage | 5242.8 | 278.6 | ABC | AAC Connect | 6084.8 | 133.1 | BCDE |
| Torbellino | 5120.5 | 278.6 | ABC | AB Hague | 6065.0 | 133.1 | BCDE |
| CDC Copper | 5104.8 | 278.6 | ABC | Sirish | 6030.5 | 133.1 | CDE |
| CDC Goldstar | 5071.7 | 278.6 | ABC | CDC Austenson | 6015.8 | 133.1 | CDE |
| AC Metcalfe | 5061.7 | 278.6 | ABC | RGT Planet | 5994.2 | 133.1 | DE |
| AB Brewnet | 5022.5 | 278.6 | ABC | CDC Copper | 5935.0 | 133.1 | DE |
| CDC Austenson | 4978.5 | 278.6 | ABC | CDC Copeland | 5908.8 | 133.1 | DE |
| CDC Copeland | 4965.3 | 278.6 | ABC | AB Wrangler | 5882.5 | 133.1 | DEF |
| AB Dram | 4834.5 | 278.6 | ABC | AB Brewnet | 5877.8 | 133.1 | DEF |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| AB Hague | 4820.2 | 278.6 | ABC | Legacy | 5858.2 | 133.1 | DEF |
| AB Wrangler | 4765.2 | 278.6 | ABC | AB Dram | 5788.2 | 133.1 | DEF |
| Legacy | 4724.2 | 278.6 | ABC | AC Metcalfe | 5742.3 | 133.1 | DEF |
| CDC Renegade | 4682.3 | 278.6 | ABC | CDC Fraser | 5518.7 | 133.1 | EFG |
| CDC Maverick | 4606.2 | 278.6 | ABC | HB21355 | 5212.2 | 147.8 | FGH |
| HB20351 | 4546.7 | 278.6 | BC | CDC Clear | 4926.0 | 133.1 | GH |
| CDC Clear | 4179.7 | 278.6 | C | HB20351 | 4921.5 | 133.1 | GH |
| HB21355 | 4101.2 | 278.6 | C | CDC Maverick | 4695.8 | 133.1 | H |

**Outlook (ISask)**

At Outlook, yield was significantly influenced by variety in both 2024 and 2025, while harvest time and interaction effects were not significant. In 2024, CDC Durango, CDC Fraser, and Claymore were among the highest-yielding varieties, whereas several varieties produced lower yields (Table 34). In 2025, AAC Lariat achieved the highest yield, followed closely by CDC Durango, CDC Austenson, and CDC Churchill. Yield differences were well defined, reflecting strong varietal expression under irrigated conditions.

**Table 34.** 2024 and 2025 Treatment means for grain yield (kg/ha), at alpha = 0.05 for Outlook. Means followed by the same letter within a column across each effect do not significantly differ

| Outlook Grain Yield, 2024 | | | | Outlook Grain Yield, 2025 | | | |
|---|---|---|---|---|---|---|---|
| Variety | Estimate | Standard Error | Tukey Grouping | Variety | Estimate | Standard Error | Tukey Grouping |
| CDC Durango | 6726.7 | 236 | A | AAC Lariat | 6800.1 | 143.1 | A |
| CDC Fraser | 6644.7 | 236 | A | CDC Durango | 6538.7 | 143.1 | A |
| Claymore | 6618.0 | 236 | A | CDC Austenson | 6527.7 | 143.1 | A |
| SY Stanza | 6574.8 | 236 | A | CDC Churchill | 6502.2 | 143.1 | A |
| AB Tofield | 6511.1 | 236 | A | AB Foothills | 6476.9 | 143.1 | A |
| Esma | 6493.4 | 236 | A | KWS Kellie | 6433.6 | 143.1 | AB |
| AAC Lariat | 6451.5 | 246 | AB | Claymore | 6419.9 | 143.1 | AB |
| CDC Renegade | 6329.6 | 236 | AB | CDC Copper | 6412.6 | 143.1 | AB |
| CDC Austenson | 6278.0 | 236 | AB | AB Advantage | 6341.0 | 143.1 | AB |
| Sirish | 6228.1 | 236 | B | AB Tofield | 6340.0 | 143.1 | B |
| AB Hague | 6206.3 | 236 | B | CDC Goldstar | 6305.2 | 143.1 | B |
| CDC Churchill | 6185.2 | 236 | B | Esma | 6279.1 | 143.1 | B |
| AB Foothills | 6171.2 | 236 | B | AAC Synergy | 6218.4 | 143.1 | B |
| AB Prime | 6170.2 | 236 | B | AB Wrangler | 6098.3 | 143.1 | BC |
| KWS Kellie | 6092.6 | 236 | BC | AAC Connect | 6061.9 | 143.1 | C |
| AAC Synergy | 6077.9 | 236 | BC | AAC Prairie | 6052.0 | 143.1 | C |
| Torbellino | 6044.7 | 236 | BC | AB Hague | 6042.7 | 143.1 | C |
| AAC Connect | 5999.0 | 236 | C | AB Prime | 5970.4 | 143.1 | C |
| AAC Prairie | 5988.7 | 236 | C | CDC Fraser | 5923.6 | 143.1 | CD |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| AB Advantage | 5902.8 | 236 | C | CDC Copeland | 5889.9 | 143.1 | D |
| CDC Copper | 5842.2 | 236 | C | RGT Planet | 5860.8 | 143.1 | D |
| AC Metcalfe | 5721.3 | 236 | CD | Legacy | 5847.1 | 143.1 | D |
| CDC Goldstar | 5708.3 | 236 | CD | AB Dram | 5842.8 | 143.1 | D |
| Legacy | 5619.4 | 236 | D | AB Brewnet | 5808.6 | 143.1 | D |
| AB Wrangler | 5558.9 | 236 | D | Sirish | 5797.4 | 143.1 | DE |
| CDC Copeland | 5490.4 | 236 | D | AC Metcalfe | 5797.2 | 143.1 | DE |
| RGT Planet | 5454.2 | 236 | D | CDC Renegade | 5655.0 | 143.1 | E |
| AB Dram | 5438.1 | 236 | D | CDC Maverick | 5294.2 | 143.1 | F |
| AB Brewnet | 5434.7 | 236 | D | CDC Clear | 5263.8 | 143.1 | EF |
| CDC Maverick | 5258.8 | 236 | E | HB21355 | 4768.3 | 143.1 | G |
| HB20351 | 4854.1 | 236 | E | HB20351 | 4732.3 | 143.1 | G |
| CDC Clear | 4452.4 | 236 | F | SY Stanza | 6610.3 | 143.1 | H |
| HB21355 | 4347.0 | 236 | F | Torbellino | 5758.0 | 143.1 | H |

**Relative Viscosity Units (RVU)**

Relative Viscosity Unit (RVU) values were used as an indicator of pre-harvest sprouting (PHS) damage due to their association with α-amylase activity. Lower RVU values indicate greater sprout damage, while higher values indicate stronger resistance to PHS. RVU was assessed at all locations, and responses showed strong and consistent effects of harvest timing, variety, and, in some environments, their interaction.

**Scott (WARC)**

At Scott, RVU was strongly influenced by both harvest time and variety in 2024 and 2025, with significant harvest-time-by-variety interactions in 2024 (Table 3). In 2024, early-harvest grain had substantially higher RVU values than late-harvest grain, indicating marked sprout damage following delayed harvest. CDC Austenson consistently exhibited the highest RVU values under both harvest times, while AAC Prairie and AC Metcalfe showed the greatest reductions under late harvest. The interaction revealed substantial differences among varieties in susceptibility to RVU decline when harvest was delayed (Table 35).

In 2025, harvest time and variety again had significant effects, although their interaction was not significant. Late-harvest grain generally showed higher RVU than early-harvest grain this year, reflecting different environmental conditions compared with 2024. CDC Austenson and CDC Churchill recorded the highest RVU values, while AAC Prairie showed consistently lower values (Table 36).

**Table 35.** 2024 Treatment means for RVU, at alpha = 0.05 for Scott. Means followed by the same letter within a column across each effect do not significantly differ.

| Effect | Harvest Time | Variety | Mean | Standard Error | Tukey Grouping |
|---|---|---|---|---|---|
| Harvest Time | Early | NA | 167.9 | 5.26 | A |
| | Late | NA | 40.9 | 5.27 | B |
| Variety | NA | CDC Austenson | 152.6 | 4.55 | A |
| | NA | CDC Churchill | 109.1 | 4.72 | B |
| | NA | AC Metcalfe | 95.5 | 4.55 | C |

| | | | | | |
|---|---|---|---|---|---|
| | NA | AB Foothills | 95.3 | 4.55 | C |
| | NA | CDC Fraser | 93.0 | 4.55 | C |
| | NA | AAC Connect | 92.9 | 4.55 | C |
| | NA | AAC Prairie | 92.2 | 4.55 | C |
| Harvest Time*Variety | Early | CDC Austenson | 182.2 | 6.44 | A |
| | Early | AC Metcalfe | 173.8 | 6.44 | AB |
| | Early | CDC Churchill | 170.2 | 6.44 | AB |
| | Early | AAC Prairie | 167.5 | 6.44 | ABC |
| | Early | AB Foothills | 160.7 | 6.44 | BC |
| | Early | AAC Connect | 160.6 | 6.44 | BC |
| | Early | CDC Fraser | 159.9 | 6.44 | C |
| Harvest Time*Variety | Late | CDC Austenson | 123.0 | 6.44 | A |
| | Late | CDC Churchill | 48.0 | 6.90 | B |
| | Late | AB Foothills | 29.9 | 6.44 | C |
| | Late | CDC Fraser | 26.1 | 6.44 | C |
| | Late | AAC Connect | 25.1 | 6.44 | C |
| | Late | AC Metcalfe | 17.2 | 6.44 | CD |
| | Late | AAC Prairie | 16.9 | 6.44 | D |

**Table 36.** 2025 Treatment means for RVU, at alpha = 0.05 for Scott. Means followed by the same letter within a column across each effect do not significantly differ.

| Effect | Harvest Time | Variety | Mean | Standard Error | Tukey Grouping |
|---|---|---|---|---|---|
| Harvest Time | Late | NA | 156.0 | 7.0 | A |
| | Early | NA | 127.9 | 7.0 | B |
| Variety | NA | AAC Connect | 140.0 | 9.2 | BC |
| | NA | AAC Prairie | 119.9 | 9.2 | C |
| | NA | AB Foothills | 143.6 | 9.2 | BC |
| | NA | AC Metcalfe | 128.3 | 9.2 | C |
| | NA | CDC Austenson | 170.5 | 9.2 | A |
| | NA | CDC Churchill | 163.2 | 9.2 | AB |
| | NA | CDC Fraser | 128.3 | 9.2 | C |
| Harvest Time*Variety | Early | AAC Connect | 124.2 | 13.1 | A |
| | Early | AAC Prairie | 88.8 | 13.1 | A |
| | Early | AB Foothills | 127.0 | 13.1 | A |
| | Early | AC Metcalfe | 104.2 | 13.1 | A |
| | Early | CDC Austenson | 170.3 | 13.1 | A |
| | Early | CDC Churchill | 156.0 | 13.1 | A |
| | Early | CDC Fraser | 125.0 | 13.1 | A |
| Harvest Time*Variety | Late | AAC Connect | 155.7 | 13.1 | A |
| | Late | AAC Prairie | 151.0 | 13.1 | A |
| | Late | AB Foothills | 160.1 | 13.1 | A |
| | Late | AC Metcalfe | 152.4 | 13.1 | A |

| | | | | | |
|---|---|---|---|---|---|
| | Late | CDC Austenson | 170.7 | 13.1 | A |
| | Late | CDC Churchill | 170.5 | 13.1 | A |
| | Late | CDC Fraser | 131.6 | 13.1 | A |

**Redvers (SERF)**

At Redvers, RVU was significantly affected by harvest time and variety in 2024 and displayed a strong harvest-time response in the severe sprouting conditions observed in late harvest. Early harvest produced substantially higher RVU values, while late harvest resulted in major reductions across most varieties. CDC Austenson showed the greatest stability, maintaining higher RVU values under both harvest timings, whereas AAC Prairie and CDC Fraser showed pronounced declines under late harvest (Table 37).

In the second year of assessment, RVU values under late harvest were low across all varieties, resulting in limited varietal separation under that treatment. However, early-harvest RVU values still showed varietal differences, again with CDC Austenson and AB Foothills ranking highest (Table 38).

**Table 37.** 2024 Treatment means for RVU, at alpha = 0.05 for Redvers. Means followed by the same letter within a column across each effect do not significantly differ.

| Effect | Harvest Time | Variety | Mean | Standard Error | Tukey Grouping |
|---|---|---|---|---|---|
| Harvest Time | Early | NA | 151.13 | 2.07 | A |
| | Late | NA | 115.13 | 2.07 | B |
| Variety | NA | CDC Austenson | 164.85 | 3.20 | A |
| | NA | CDC Churchill | 150.08 | 3.20 | B |
| | NA | AB Foothills | 146.45 | 3.20 | B |
| | NA | AC Metcalfe | 136.28 | 3.20 | B |
| | NA | AAC Connect | 118.27 | 3.20 | CD |
| | NA | AAC Prairie | 113.33 | 3.20 | CD |
| | NA | CDC Fraser | 102.65 | 3.20 | D |
| Harvest Time*Variety | Early | CDC Austenson | 168.83 | 4.53 | A |
| | Early | AC Metcalfe | 163.97 | 4.53 | AB |
| | Early | CDC Churchill | 157.73 | 4.53 | BC |
| | Early | AB Foothills | 150.93 | 4.53 | CD |
| | Early | AAC Prairie | 149.80 | 4.53 | CD |
| | Early | AAC Connect | 133.77 | 4.53 | D |
| | Early | CDC Fraser | 132.87 | 4.53 | D |
| Harvest Time*Variety | Late | CDC Austenson | 160.87 | 4.53 | A |
| | Late | CDC Churchill | 142.43 | 4.53 | BC |
| | Late | AB Foothills | 141.97 | 4.53 | BC |
| | Late | AC Metcalfe | 108.60 | 4.53 | CD |
| | Late | AAC Connect | 102.77 | 4.53 | CD |
| | Late | AAC Prairie | 76.87 | 4.53 | D |
| | Late | CDC Fraser | 72.43 | 4.53 | D |

**Table 38.** 2025 Treatment means for RVU, at alpha = 0.05 for Redvers. Means followed by the same letter within a column across each effect do not significantly differ.

| Effect | Harvest Time | Variety | Mean | Standard Error | Tukey Grouping |
|---|---|---|---|---|---|
| Harvest Time | Early | NA | 110.0 | 9.0 | A |

| | | | | | |
|---|---|---|---|---|---|
| | Late | NA | 2.1 | 9.0 | B |
| Variety | NA | CDC Austenson | 78.5 | 11.8 | A |
| | NA | AB Foothills | 77.2 | 11.8 | A |
| | NA | CDC Churchill | 54.5 | 11.8 | A |
| | NA | AAC Connect | 49.8 | 11.8 | A |
| | NA | AAC Prairie | 47.0 | 11.8 | A |
| | NA | CDC Fraser | 43.2 | 11.8 | A |
| | NA | AC Metcalfe | 42.0 | 11.8 | A |
| Harvest Time*Variety | Early | CDC Austenson | 154.7 | 16.7 | A |
| | Early | AB Foothills | 152.0 | 16.7 | A |
| | Early | CDC Churchill | 107.0 | 16.7 | A |
| | Early | AAC Connect | 97.7 | 16.7 | A |
| | Early | AAC Prairie | 92.0 | 16.7 | A |
| | Early | CDC Fraser | 84.3 | 16.7 | A |
| | Early | AC Metcalfe | 82.0 | 16.7 | A |
| Harvest Time*Variety | Late | CDC Austenson | 2.3 | 16.7 | A |
| | Late | AB Foothills | 2.3 | 16.7 | A |
| | Late | AAC Prairie | 2.0 | 16.7 | A |
| | Late | CDC Churchill | 2.0 | 16.7 | A |
| | Late | AAC Connect | 2.0 | 16.7 | A |
| | Late | CDC Fraser | 2.0 | 16.7 | A |
| | Late | AC Metcalfe | 2.0 | 16.7 | A |

**Yorkton (ECRF)**

At Yorkton in 2024, RVU was significantly affected by variety but not by harvest time, reflecting more moderate sprouting pressure. CDC Austenson recorded the highest RVU values, followed by CDC Churchill, while AAC Prairie and AC Metcalfe had lower RVU values (Table 39). In 2025, harvest time had a strong impact, with late-harvest RVU values dropping across all varieties to nearly zero. Despite this, early-harvest RVU values showed varietal differences, with CDC Churchill and CDC Austenson maintaining the highest viscosity (Table 40).

**Table 39.** 2024 Treatment means for RVU, at alpha = 0.05 for Yorkton. Means followed by the same letter within a column across each effect do not significantly differ.

| Effect | Harvest Time | Variety | Mean | Standard Error | Tukey Grouping |
|---|---|---|---|---|---|
| Harvest Time | Early | NA | 108.6 | 7.63 | A |
| | Late | NA | 82.5 | 7.63 | A |
| Variety | NA | AAC Connect | 104.2 | 8.52 | BC |
| | NA | AAC Prairie | 45.5 | 8.52 | E |
| | NA | AB Foothills | 93.7 | 8.52 | BC |
| | NA | AC Metcalfe | 54.8 | 8.52 | DE |

| | | | | | |
|---|---|---|---|---|---|
| | NA | CDC Austenson | 169.6 | 8.52 | A |
| | NA | CDC Churchill | 127.4 | 8.52 | B |
| | NA | CDC Fraser | 73.6 | 8.52 | CD |
| Harvest Time*Variety | Early | AAC Connect | 117.9 | 12.05 | A |
| | Early | AAC Prairie | 62.3 | 12.05 | A |
| | Early | AB Foothills | 106.3 | 12.05 | A |
| | Early | AC Metcalfe | 82.6 | 12.05 | A |
| | Early | CDC Austenson | 170.0 | 12.05 | A |
| | Early | CDC Churchill | 136.4 | 12.05 | A |
| | Early | CDC Fraser | 84.5 | 12.05 | A |
| Harvest Time*Variety | Late | AAC Connect | 90.5 | 12.05 | A |
| | Late | AAC Prairie | 28.6 | 12.05 | A |
| | Late | AB Foothills | 81.1 | 12.05 | A |
| | Late | AC Metcalfe | 26.9 | 12.05 | A |
| | Late | CDC Austenson | 169.2 | 12.05 | A |
| | Late | CDC Churchill | 118.4 | 12.05 | A |
| | Late | CDC Fraser | 62.6 | 12.05 | A |

**Table 40.** 2025 Treatment means for RVU, at alpha = 0.05 for Yorkton. Means followed by the same letter within a column across each effect do not significantly differ.

| Effect | Harvest Time | Variety | Mean | Standard Error | Tukey Grouping |
|---|---|---|---|---|---|
| Harvest Time | Early | NA | 140.0 | 5.2 | A |
| | Late | NA | 3.6 | 5.2 | B |
| Variety | NA | AAC Connect | 88.8 | 7.7 | A |
| | NA | AAC Prairie | 35.1 | 7.7 | D |
| | NA | AB Foothills | 78.9 | 7.7 | B |
| | NA | AC Metcalfe | 46.5 | 7.7 | C |
| | NA | CDC Austenson | 97.2 | 7.7 | A |
| | NA | CDC Churchill | 103.0 | 7.7 | A |
| | NA | CDC Fraser | 53.2 | 7.7 | C |
| Harvest Time*Variety | Early | AAC Connect | 174.8 | 11.0 | AB |
| | Early | AAC Prairie | 68.1 | 11.0 | D |
| | Early | AB Foothills | 154.8 | 11.0 | B |
| | Early | AC Metcalfe | 90.9 | 11.0 | CD |
| | Early | CDC Austenson | 184.5 | 11.0 | A |
| | Early | CDC Churchill | 202.6 | 11.0 | A |
| | Early | CDC Fraser | 104.1 | 11.0 | C |
| Harvest Time*Variety | Late | AAC Connect | 2.8 | 11.0 | E |
| | Late | AAC Prairie | 2.0 | 11.0 | E |
| | Late | AB Foothills | 3.0 | 11.0 | E |

| | | | | | |
|---|---|---|---|---|---|
| | Late | AC Metcalfe | 2.1 | 11.0 | E |
| | Late | CDC Austenson | 9.9 | 11.0 | E |
| | Late | CDC Churchill | 3.4 | 11.0 | E |
| | Late | CDC Fraser | 2.3 | 11.0 | E |

**Swift Current (WCA)**

In Swift Current, RVU responses varied across years. In 2024, neither harvest time nor the interaction was significant, while variety effects were present but moderate. RVU values were generally high across both harvest timings, indicating limited sprouting damage at this site (Table 41).

In 2025, overall RVU values were very low, and variety became the main source of variation. CDC Austenson had higher RVU values than all other entries, while AAC Prairie, AAC Connect, and AC Metcalfe showed low viscosity. Harvest time effects were not significant, indicating uniformly severe sprouting-related enzyme activity across treatments (Table 42).

**Table 41.** 2024 Treatment means for RVU, at alpha = 0.05 for Swift Current. Means followed by the same letter within a column across each effect do not significantly differ.

| Effect | Harvest Time | Variety | Mean | Standard Error | Tukey Grouping |
|---|---|---|---|---|---|
| Harvest Time | Late | NA | 163.62 | 4.75 | A |
| | Early | NA | 162.68 | 4.75 | A |
| Variety | NA | AAC Connect | 176.00 | 4.71 | A |
| | NA | AC Metcalfe | 174.58 | 4.71 | A |
| | NA | AAC Prairie | 170.88 | 4.71 | AB |
| | NA | CDC Churchill | 164.65 | 4.71 | BC |
| | NA | AB Foothills | 160.58 | 4.71 | BC |
| | NA | CDC Fraser | 148.08 | 4.71 | C |
| | NA | CDC Austenson | 147.28 | 4.71 | C |
| Harvest Time*Variety | Early | AC Metcalfe | 174.53 | 6.66 | A |
| | Early | AAC Connect | 173.27 | 6.66 | A |
| | Early | AAC Prairie | 172.50 | 6.66 | A |
| | Early | CDC Churchill | 163.90 | 6.66 | A |
| | Early | AB Foothills | 163.00 | 6.66 | A |
| | Early | CDC Fraser | 149.77 | 6.66 | A |
| | Early | CDC Austenson | 141.80 | 6.66 | A |
| Harvest Time*Variety | Late | AAC Connect | 178.73 | 6.66 | A |
| | Late | AC Metcalfe | 174.63 | 6.66 | A |
| | Late | AAC Prairie | 169.27 | 6.66 | A |
| | Late | CDC Churchill | 165.40 | 6.66 | A |
| | Late | AB Foothills | 158.17 | 6.66 | A |
| | Late | CDC Austenson | 152.77 | 6.66 | A |
| | Late | CDC Fraser | 146.40 | 6.66 | A |

**Table 42.** 2025 Treatment means for RVU, at alpha = 0.05 for Swift Current. Means followed by the same letter within a column across each effect do not significantly differ.

| Effect | Harvest Time | Variety | Mean | Standard Error | Tukey Grouping |
|---|---|---|---|---|---|
| Harvest Time | Late | NA | 5.16 | 0.55 | A |

| | | | | | |
|---|---|---|---|---|---|
| | Early | NA | 3.91 | 0.55 | A |
| Variety | NA | AAC Connect | 2.80 | 0.89 | B |
| | NA | AAC Prairie | 2.63 | 0.89 | B |
| | NA | AB Foothills | 3.92 | 0.89 | B |
| | NA | AC Metcalfe | 2.75 | 0.89 | B |
| | NA | CDC Austenson | 13.45 | 0.89 | A |
| | NA | CDC Churchill | 3.88 | 0.89 | B |
| | NA | CDC Fraser | 2.33 | 0.89 | B |
| Harvest Time*Variety | Early | AAC Connect | 2.70 | 1.22 | C |
| | Early | AAC Prairie | 2.60 | 1.22 | C |
| | Early | AB Foothills | 3.90 | 1.22 | B |
| | Early | AC Metcalfe | 2.67 | 1.22 | C |
| | Early | CDC Austenson | 9.67 | 1.22 | A |
| | Early | CDC Churchill | 3.67 | 1.22 | C |
| | Early | CDC Fraser | 2.20 | 1.22 | C |
| Harvest Time*Variety | Late | AAC Connect | 2.90 | 1.22 | C |
| | Late | AAC Prairie | 2.67 | 1.22 | C |
| | Late | AB Foothills | 3.93 | 1.22 | C |
| | Late | AC Metcalfe | 2.83 | 1.22 | C |
| | Late | CDC Austenson | 17.23 | 1.22 | C |
| | Late | CDC Churchill | 4.10 | 1.22 | C |
| | Late | CDC Fraser | 2.47 | 1.22 | C |

**Prince Albert (CLC)**

At Prince Albert, RVU showed no significant harvest-time effect in 2024, and varietal differences were large but defined by high variability. Some varieties, including AC Metcalfe and AAC Prairie, maintained relatively higher RVU under early harvest, while others showed declines (Table 43). In 2025, both harvest time and variety significantly affected RVU. Early harvest resulted in higher RVU values overall, and CDC Austenson and CDC Churchill ranked highest, while AAC Prairie showed the lowest values under both harvest timings (Table 44).

**Table 43.** 2024 Treatment means for RVU, at alpha = 0.05 for Prince Albert. Means followed by the same letter within a column across each effect do not significantly differ.

| Effect | Harvest Time | Variety | Mean | Standard Error | Tukey Grouping |
|---|---|---|---|---|---|
| Harvest Time | Early | NA | 74.20 | 11.32 | A |
| | Late | NA | 62.83 | 11.32 | A |
| Variety | NA | AC Metcalfe | 106.52 | 21.18 | A |
| | NA | AAC Prairie | 96.53 | 21.18 | AB |
| | NA | CDC Fraser | 91.65 | 21.18 | AB |
| | NA | AAC Connect | 81.57 | 21.18 | AB |
| | NA | CDC Churchill | 58.20 | 21.18 | AB |
| | NA | CDC Austenson | 38.23 | 21.18 | AB |
| | NA | AB Foothills | 6.90 | 21.18 | B |
| Harvest Time*Variety | Early | CDC Fraser | 178.43 | 29.95 | A |
| | Early | AAC Prairie | 125.43 | 29.95 | A |
| | Early | AC Metcalfe | 96.13 | 29.95 | A |

| | | | | | |
|---|---|---|---|---|---|
| | Early | CDC Austenson | 67.57 | 29.95 | A |
| | Early | AAC Connect | 34.97 | 29.95 | A |
| | Early | AB Foothills | 9.93 | 29.95 | A |
| | Early | CDC Churchill | 6.90 | 29.95 | A |
| Harvest Time*Variety | Late | AAC Connect | 128.17 | 29.95 | A |
| | Late | AC Metcalfe | 116.90 | 29.95 | A |
| | Late | CDC Churchill | 109.50 | 29.95 | A |
| | Late | AAC Prairie | 67.63 | 29.95 | A |
| | Late | CDC Austenson | 8.90 | 29.95 | A |
| | Late | CDC Fraser | 4.87 | 29.95 | A |
| | Late | AB Foothills | 3.87 | 29.95 | A |

**Table 44.** 2025 Treatment means for RVU, at alpha = 0.05 for Prince Albert Current. Means followed by the same letter within a column across each effect do not significantly differ.

| Effect | Harvest Time | Variety | Estimate | Standard Error | Tukey Grouping |
|---|---|---|---|---|---|
| Harvest Time | Early | NA | 135.2 | 12.5 | A |
| | Late | NA | 80.5 | 12.5 | B |
| Variety | NA | CDC Austenson | 173.1 | 11.0 | A |
| | NA | CDC Churchill | 155.3 | 11.0 | AB |
| | NA | AB Foothills | 141.2 | 11.0 | B |
| | NA | AAC Connect | 106.2 | 11.0 | C |
| | NA | CDC Fraser | 67.7 | 11.0 | D |
| | NA | AC Metcalfe | 61.4 | 11.0 | D |
| | NA | AAC Prairie | 49.9 | 11.0 | E |
| Harvest Time*Variety | Early | AB Foothills | 186.8 | 15.6 | A |
| | Early | CDC Austenson | 186.7 | 15.6 | A |
| | Early | CDC Churchill | 176.6 | 15.6 | A |
| | Early | AAC Connect | 142.7 | 15.6 | B |
| | Early | CDC Fraser | 107.2 | 15.6 | C |
| | Early | AC Metcalfe | 73.7 | 15.6 | D |
| | Early | AAC Prairie | 72.6 | 15.6 | D |
| Harvest Time*Variety | Late | CDC Austenson | 159.5 | 15.6 | A |
| | Late | CDC Churchill | 133.9 | 15.6 | B |
| | Late | AB Foothills | 95.6 | 15.6 | C |
| | Late | AAC Connect | 69.7 | 15.6 | D |
| | Late | AC Metcalfe | 49.1 | 15.6 | DE |
| | Late | CDC Fraser | 28.2 | 15.6 | E |
| | Late | AAC Prairie | 27.3 | 15.6 | E |

**Indian Head (IHARF)**

At the Indian Head location, RVU was significantly affected by harvest time, variety, and their interaction in 2024, and showed a harvest-time response with severe sprouting conditions observed in late harvest (Figure 1). Varieties, including

CDC Maverick, CDC Durango, CDC Renegade, and AB Prime, maintained high RVU values even under late harvest conditions.

In 2025, harvest-time responses by variety again showed stratification. Early harvest RVU values were consistently high, whereas late-harvest RVU values varied from moderate to low depending on the variety. CDC Maverick, CDC Renegade, and CDC Durango maintained the highest RVU values under late harvest, while some varieties had RVU values near zero, indicating severe sprouting susceptibility.

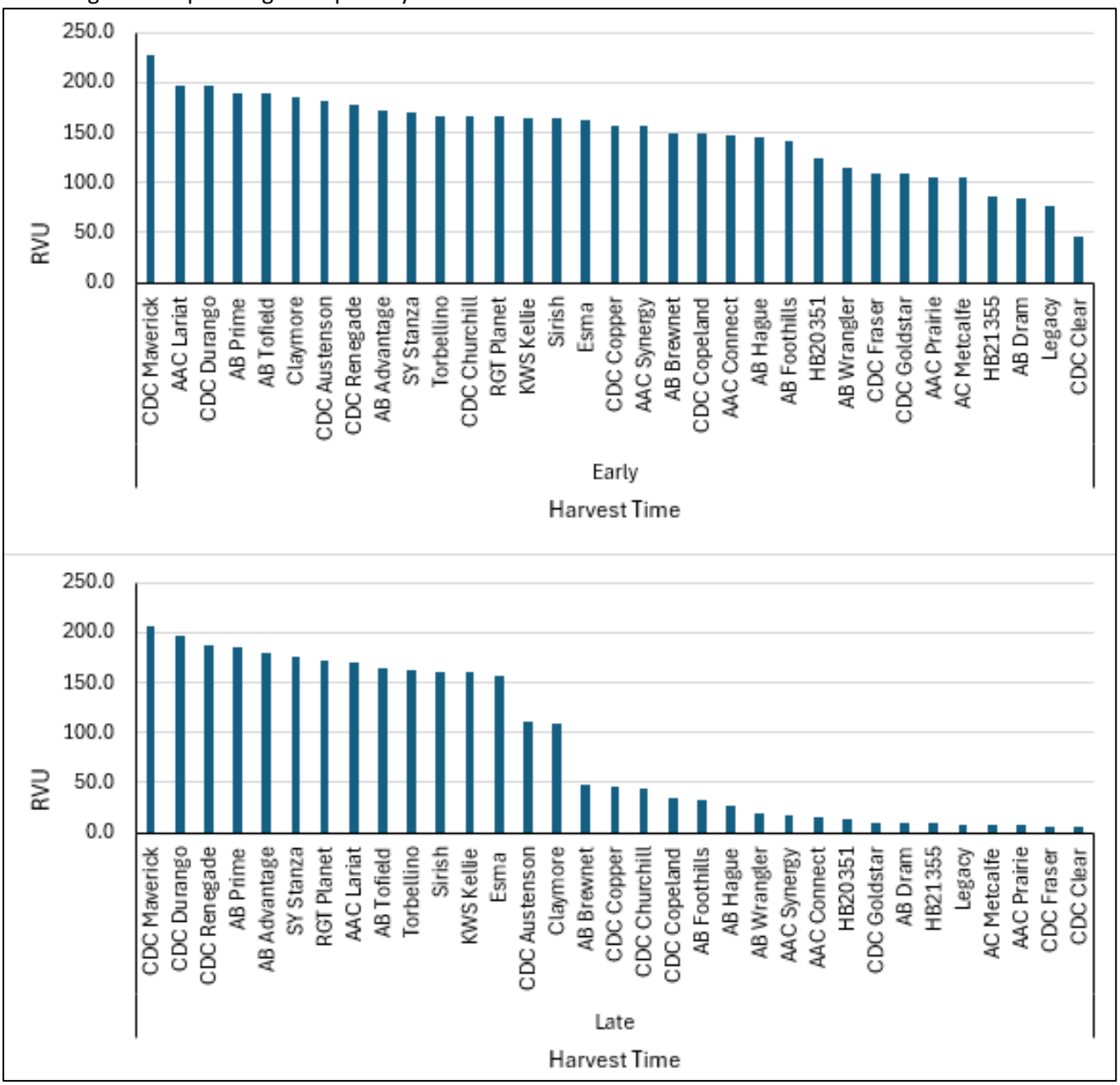


**Figure 1.** 2024 Treatment means for distribution of RVU for the Indian Head location.

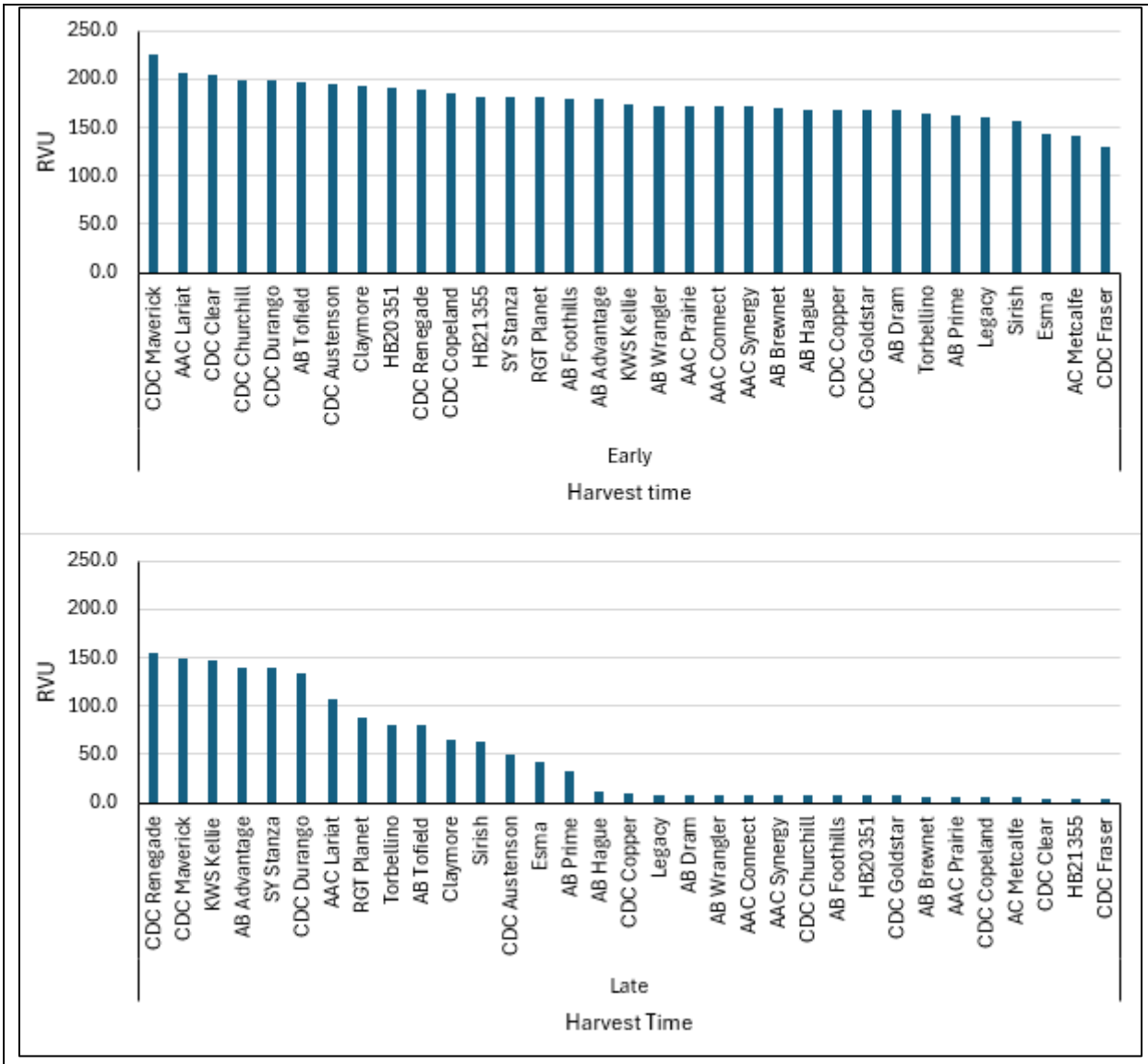


**Figure 2.** 2025 Treatment means for the distribution of RVU for the Indian Head location.

**Outlook (ISask)**

At Outlook, RVU was highly sensitive to simulated rainfall and harvest timing, with strong harvest-time-by-variety patterns. In 2024, early- and mid-harvest treatments produced high RVU values across most varieties, indicating limited sprouting damage, whereas late harvest reduced RVU in most entries. Only a few varieties maintained moderate RVU values under late harvest (Figure 3). In 2025, varietal differences were again observed. While harvest time effects were significant, variety remained the dominant factor influencing RVU. Several (Figure 4).

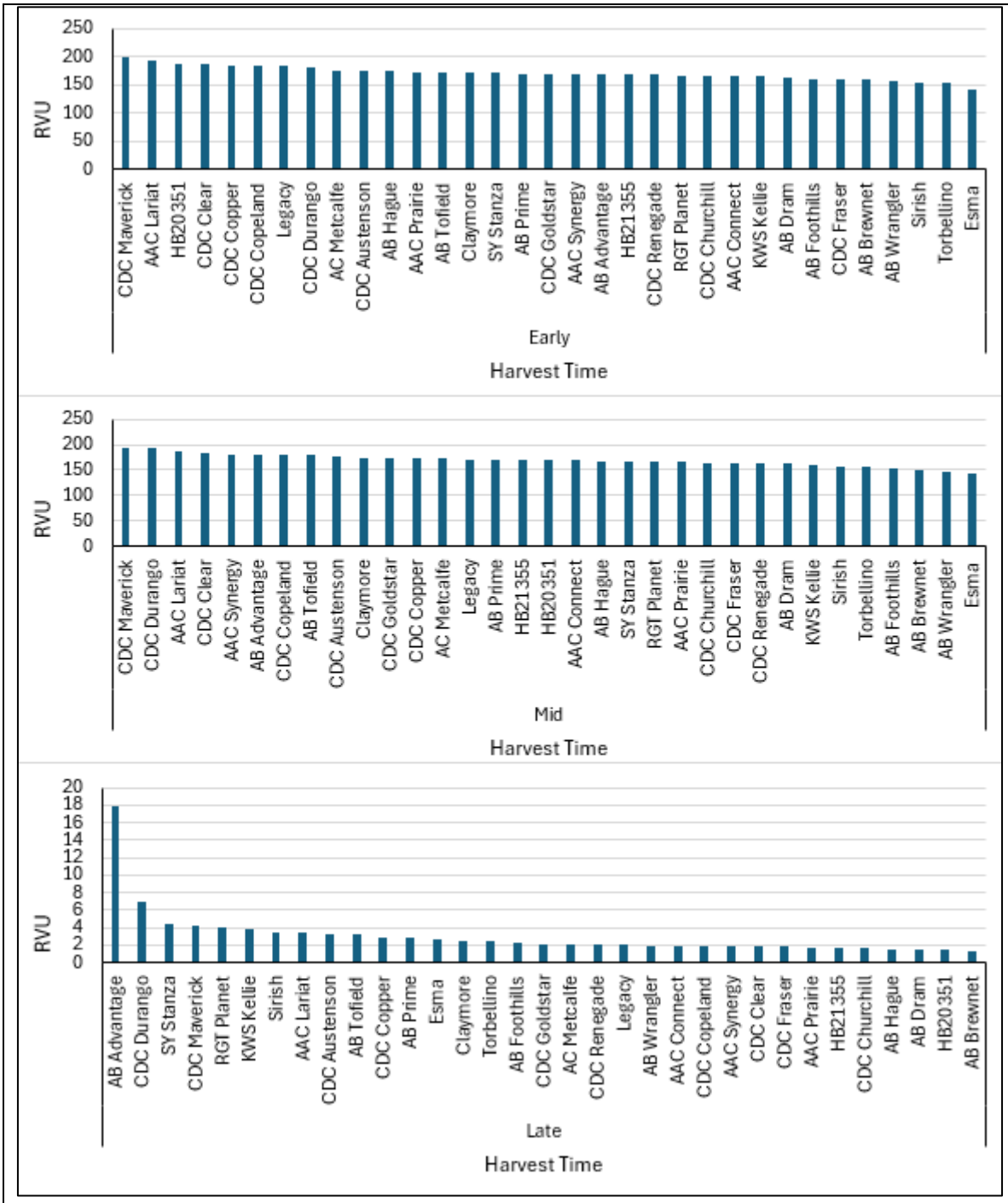


**Figure 3.** 2024 Treatment means for RVU for Outlook location.

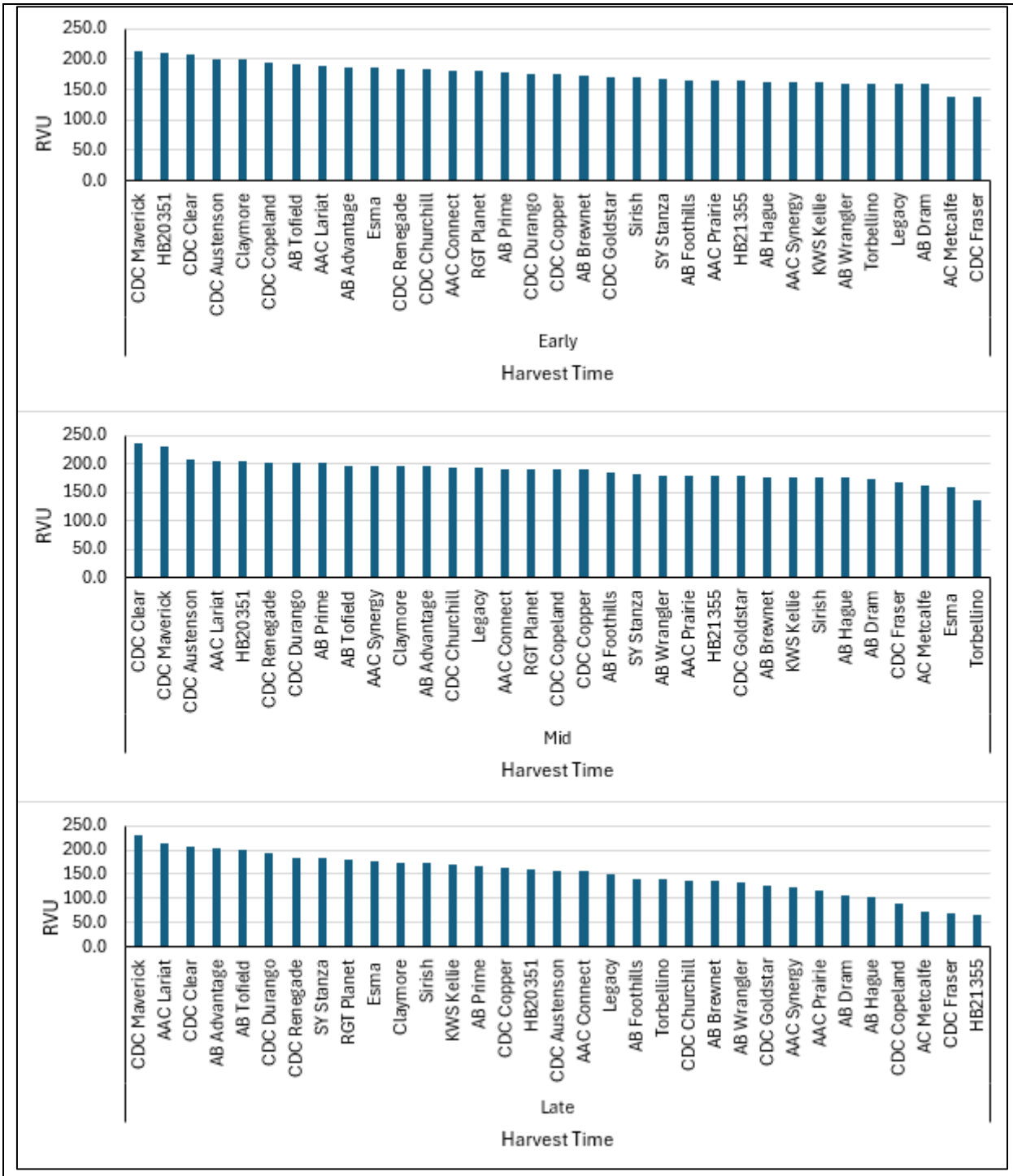


**Figure 4.** 2025 Treatment means for RVU for Outlook location.

## Conclusions and Recommendations *(maximum 500 words)*

Highlight significant conclusions based on the findings of this project, with emphasis on the project objectives specified above. Provide recommendations for the application and adoption of the project findings.

This study demonstrated that pre-harvest sprouting resistance in barley is strongly influenced by genetic differences among varieties, with delayed harvest under wet conditions clearly exposing susceptibility to sprouting. Relative Viscosity Units (RVU), measured using Rapid Visco Analysis, consistently detected sprouting damage across environments and years, making it a reliable indicator of PHS resistance. While environmental conditions played a major role in the severity of sprouting, several varieties showed stable performance across locations, indicating that genetic resistance can mitigate risk even under challenging harvest conditions. Genotype-by-environment interactions were present but did not obscure the identification of consistently more resistant varieties.

Based on these findings, it is recommended that PHS resistance ratings derived from RVA be integrated into regional variety performance testing and variety selection tools. This would provide growers, agronomists, and the malt industry with objective, field-based information to support variety choice and risk management. Growers are encouraged to prioritize varieties with demonstrated PHS resistance, particularly in regions prone to late-season rainfall, and to harvest susceptible varieties as early as feasible to reduce quality losses. Incorporating RVA-based screening into breeding programs will also help accelerate the development of new barley varieties with improved sprouting resistance, supporting a more stable and competitive malt barley supply for Saskatchewan.

## Follow-up Work

Please identify if there is a need to conduct further work. Detail any further projects and/or communication needs arising from this project.

While the study clearly demonstrated genetic differences in pre-harvest sprouting resistance, not all site-year results were fully consistent between the first and second years. At some locations, varietal rankings for RVU and related PHS indicators shifted between years, likely reflecting differences in weather patterns, timing and duration of wetting events, and overall environmental stress during grain maturation and harvest. These inconsistencies indicate the strong influence of environment on PHS expression and underscore the need for additional temporal replication to distinguish stable genetic resistance from year-specific effects.

As future work, extending the study by at least one additional year would strengthen confidence in varietal PHS resistance ratings and improve understanding of genotype-by-environment interactions. Additional years would increase the likelihood of capturing a broader range of natural weather scenario. Expanding the number of sites or repeating selected high-contrast locations would further improve the robustness of resistance classifications.

## Patents/ IP generated/ Commercialized Products

List any products developed from this project.

NA

## 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 | 0 |
| • Accepted for publication | 0 |

| HQPs trained during this project | |
|---|---|
| • Master's students | 0 |
| • PhD students | 0 |
| • Post docs | 0 |
| Knowledge transfer products developed based on this project (presentations, brochures, factsheets, flyers, guides, extension articles, podcasts, videos)[1] | 4 |

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

b) List of scientific journal articles published/accepted for publication from this project.

| Title | Author(s) | Journal | Date Published or Accepted for Publication | Link (if available) |
|---|---|---|---|---|
| | | | | |
| | | | | |
| | | | | |

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/Processors Participated In Knowledge Transfer | Link (if available) |
|---|---|---|---|
| M. Japp (SBDC) at the Outlook irrigation field day | Outlook | 200 | NA |
| M. Japp (SBDC) and C. Holzapfel (IHARF), Plot Tour | Crop Management Field Day, Indian Head, SK (Jul-16-2024) | 145 | https://iharf.ca/indian-head-crop-management-field-day/ |
| C. Holzapfel (IHARF) and M. Japp (SBDC) plot tour / presentation | Indian Head Crop Management Field Day (Indian Head, Jul-15-2025) | 157 | https://iharf.ca/indian-head-crop-management-field-day/ |
| C. Holzapfel (IHARF) plot tour | BASF Global Herbicide Group / IHARF Plot Tour. (Indian Head, Jul-16-2025) | 26 | NA |

## Contributions and Support

List any industry contributions or support received.

Zoe Galbraith - Conservation Learning Center (CLC)
Mike Hall - East Central Research Foundation (ECRF)
Jessica Enns - Western Applied Research Foundation (WARC)
Bryan Nybo - Wheatland Conservation Area (WCA)
Lana Shaw - South East Research Foundation (SERF)
Chris Holzapfel - Indian Head Agriculture Research Foundation (IHARF)
Matthew Struthers- Crops and Irrigation Branch/ Plant Industry

## Acknowledgements

Include actions taken to acknowledge support by the Ministry of Agriculture, the Canadian Agriculture Partnership (for projects approved between 2017 and 2023) and the Sustainable Canadian Agriculture Partnership (for projects approved between 2023 and 2028).

Financial support was provided by the Sustainable Canadian Agriculture Partnership. The Swift Current (Wheatland Conservation Area Inc.) site was managed by Bryan Nybo. Prince Albert (Conservation Learning Center ) site was managed by Zoe Galbraith, Yorkton (East Central Research Foundation) site was managed by Mike Hall, Scott (Western Applied Research Foundation) skite was managed by Jessica Enns, Swift Current (Wheatland Conservation Area) site was managed by Bryan Nybo, the Redvers (South East Research Farm) site was managed by Lana Shaw, and the Outlook (Irrigation Saskatchewan) site was managed by Ashebir Godebo. Each site would like to recognize the support of technical and summer staff for conducting this project. Statistical analysis and report were written by Ashebir Godebo.

## Appendices

Include any additional materials supporting the previous sections, e.g. detailed data tables, maps, graphs, specifications, literature cited (Use a consistent reference style throughout).

**Table A1.** List of varieties evaluated at the Outlook and Indian Head trial sites.

| Treatment | Variety | Treatment | Variety | Treatment | Variety |
|---|---|---|---|---|---|
| 1 | AAC Connect | 12 | AC Metcalfe | 23 | CDC Renegade |
| 2 | AAC Lariat | 13 | AB Advantage | 24 | Claymore |
| 3 | AAC Prairie | 14 | CDC Austenson | 25 | Esma |
| 4 | AAC Synergy | 15 | CDC Churchill | 26 | HB20351 |
| 5 | AB Brewnet | 16 | CDC Clear | 27 | HB21355 |
| 6 | AB Dram | 17 | CDC Copeland | 28 | KWS Kellie |
| 7 | AB Foothills | 18 | CDC Copper | 29 | Legacy |
| 8 | AB Hague | 19 | CDC Durango | 30 | RGT Planet |
| 9 | AB Prime | 20 | CDC Fraser | 31 | Sirish |
| 10 | AB Tofield | 21 | CDC Goldstar | 32 | SY Stanza |
| 11 | AB Wrangler | 22 | CDC Maverick | 33 | Torbellino |

**Table A2.** List of varieties evaluated as the Prince Albert, Yorkton, Redvers, Scott, and Swift Current trial sites.

| Treatment # | Varieties |
|---|---|
| 1 | Ac Metcalfe |
| 2 | CDC Austenson |
| 3 | AAC Connect |
| 4 | CDC Fraser |
| 5 | CDC Churchill |
| 6 | AAC Prairie |
| 7 | AB Foothills |