

Introduction

- Grain corn hybrids have improved over the years and agronomic practices have been re-evaluated by farmers as a result.
- With improved genetics comes a stronger ability for a corn hybrid to perform in specific plant populations; sometimes higher or lower than a farmer's standard practices.
- In Manitoba, typical grain corn planting populations are between 32,000 to 36,000 plants per acre (ppa).

Objective

- To quantify the agronomic and economic impacts of reducing and increasing a farmer's standard planting rate in corn.

Materials and Methods

- Thirty field-scale Research on the Farm trials were established from 2020 – 2022 on farmers' fields across Manitoba, using their own equipment and typical management practices.
- Each replication is split into three planting rates; a standard rate for the farmer, about 10% below standard planting rate and 10% higher than standard rate. This is randomized and replicated four times.
- Strips are harvested separately, weighed using a weigh wagon or the farmer's grain cart.



Results

- Typical stand losses of 5 – 10% are expected from planting to emergence. Common practice for a farmer would be to increase planting rate by about 5% above desired plant stand.
- Actual planting rate was compared against plant stand at V2 growth stage at each of the 3 planting rates. The trends remained consistent in all 3 planting rates. Sites that had significant losses prior to V2 also had consistent losses in all three planting rates, proving that there were likely environmental conditions determining losses.

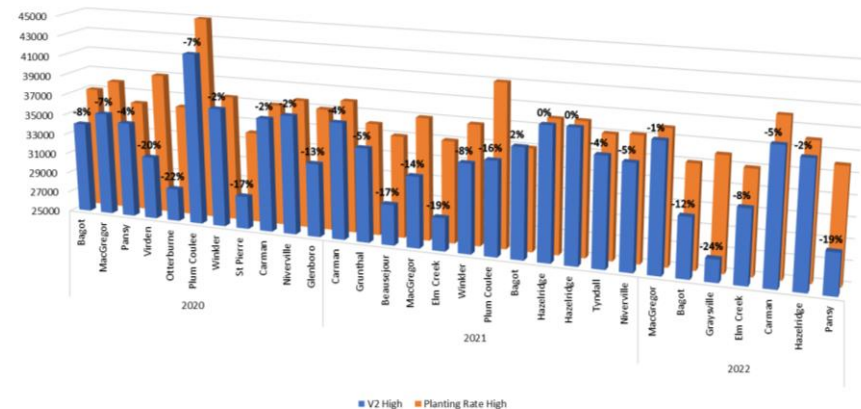


Figure 1. Mortality rate in “high” planting rate at corn growth stage V2.

- Mortality rate was calculated and averaged in all 3 population rates of 30 site years. It was expected that mortality rates would increase as planting population increased, due to plant competition.
 - “Low” Planting Rate – 5% average mortality
 - “Normal” Planting Rate – 6% average mortality
 - “High” Planting Rate – 9% average mortality
- Farmers changing their planting practices should alter their planting rates to allow for mortality losses.
- Only four of the 30 site years had significantly differing yields between planting populations.
- Of those site years that had significantly differing yields, in one site year, the low plant stand had the statistically highest yield. In another site year, the “normal” plant stand had the statistically highest yield. In two other site years, the “high” plant stand had the statistically highest yield.



Results Cont'd

- The Grunthal (2021) data is removed from Figure 3 because poor environmental conditions resulted in high coefficient of variation (cv). CV shows the extent of dispersion of data points around the mean. A high CV indicates that there was significant in-field variation, and the data may not be reliable.

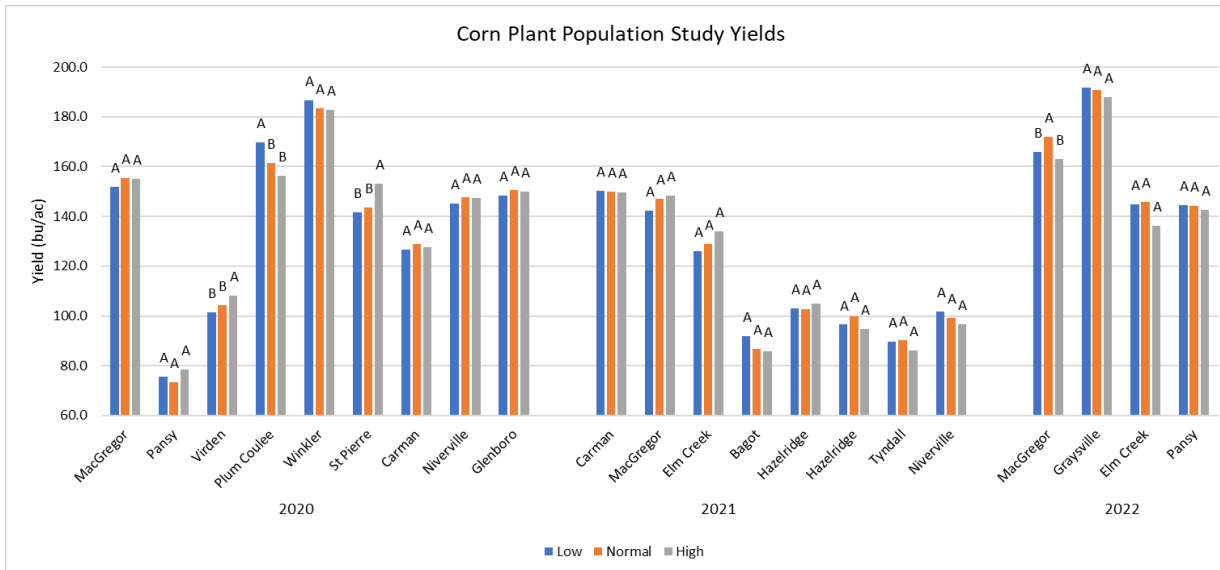


Figure 3. Yields and statistical significance between planting populations. At a single trial site, the letters A or B indicate whether the yields are statistically different. All A's are very similar in yield and all B's are similar in yield, however A's and B's are statistically different from each other.

Summary

- This study looks at the ability to increase or decrease planting populations from what the farmer normally does, in order to improve yields.
- Management practices can be changed with improved hybrid availability, including changing planting populations in grain corn.
- 22 of 30 site years had statistically significant differences in final plant population between the low, normal and high plant stands at V2 corn stage.

Summary

- Farmers changing their planting practices should alter their planting rates to allow for mortality losses. The data shows a 10% increase in seed should be considered when increasing populations significantly.
- Only four of 30 sites showed a significant difference in yield between the 3 populations.
- Economically, it doesn't appear to make sense to change planting rates but it can be argued that small changes can yield positive results.
- For details on individual trials and economic data, visit <https://mbcropalliance.ca/projects/evaluation-of-corn-plant-populations>







Acknowledgements

Manitoba Crop Alliance would like to thank the farmers who participated in this trial in 2020, 2021 and/or 2022, and Tone Ag Consulting for their hard work running the ROTF trials.

Connect With Us

This project contains additional valuable data. For more information, contact daryl@mbcropalliance.ca

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