

Fall rye acres have dramatically declined since peaking in the 1980s due to herbicides, other profitable crop options and limited markets. However, the introduction of new hybrid varieties in western Canada has led to renewed interest in the crop. Traditionally, fall rye has been grown as a low-input crop, likely because it has relatively high nitrogen use efficiency compared to winter wheat and tends to be grown on less productive land. Averaged across the major provincial zones, the five currently available hybrids yield 111-127% (119% on average) of the current check and highest yielding open pollinated (OP) variety Hazlet. When transitioning to hybrids, nutrient requirements for this crop may also increase. It is possible that farmers may require higher rates of nitrogen fertilizer to achieve the maximum yield potential of these modern fall rye varieties.

The objective of this project was to demonstrate the yield potential and nitrogen response of open-pollinated versus hybrid fall rye. Field trials were conducted at Melfort (2015), Scott (2015), Redvers (2016) and Indian Head (2015, 2016, 2017). The fall rye varieties used were Hazlet (open pollinated) and Brasetto (hybrid) combined with nitrogen rates of 0, 50, 100, 150, 200 or 250 kg N/ha.

The open pollinated variety was 12% taller than the hybrid and was more susceptible to lodging at high nitrogen rates past 100 kg N/ha, while the hybrid had negligible lodging regardless of nitrogen rate. Yields for the hybrid were 25-27% higher than the OP variety across nitrogen rates at Indian Head 2015-2017 (Figure 1). Percent protein was lower with the hybrid variety, potentially due to the dilution effects that the extra yield in Brasetto had on the varieties' percent protein.

Across all five site-years, the nitrogen response curves were similar between the two varieties. Yields were maximized at 190 kg N/ha (Scott 2015, Melfort 2015, Indian Head 2015-2017) while at Redvers 2016 yield was maximized at the 80 kg/ha nitrogen rate.

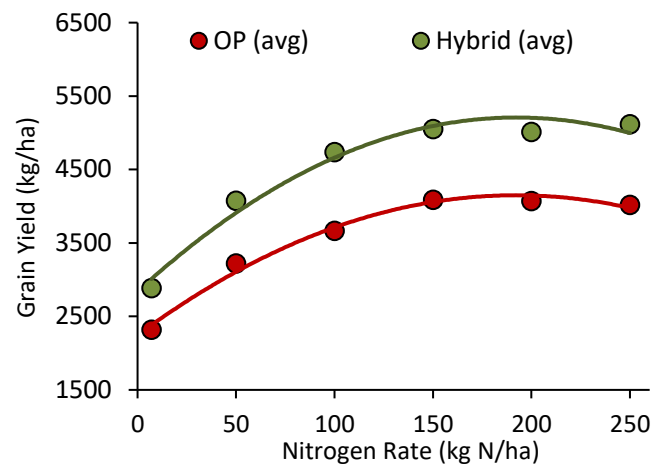


Figure 1. Average nitrogen fertilizer rate effects on fall rye (hybrid versus open pollinated) grain yield over a three-year period at Indian Head (2015-2017).

Percent ergot increased with increasing nitrogen rate, and quality loss was greatest when excessive nitrogen rates were applied. At Indian Head across all three years, the probable economic optimum rates were found to be between 100-150 kg N/ha depending on grain and fertilizer prices.

In conclusion, despite the higher overall yield potential with the hybrid Brasetto, yields for the two varieties were optimized at similar nitrogen rates. Overall, Brasetto was found to have a higher nitrogen use efficiency and greater yields with a lower protein content compared to Hazlet. These results show that rye responds well to higher nitrogen fertilizer rates than have been traditionally applied, but too much nitrogen can potentially lead to quality loss such as higher ergot levels.

Financial support was provided through the Agricultural Demonstration of Practices and Technologies (ADOPT) initiative under the Canada-Saskatchewan Growing Forward 2 bi-lateral agreement.