Nitrogen Response of Modern Fall Rye Varieties

Recent breeding efforts have improved the yield potential and other agronomic qualities of fall rye. Hazlet, the newest fall rye variety released by AAFC has 13 % higher yield potential than the older variety, Prima, in Saskatchewan's Zone 1 & 2 (SaskSeed Guide, 2015). New European fall rye varieties have shown up to 30 % higher yields (Winter Cereals Canada, 2013). Fall rye is traditionally grown as a low-input crop, likely because it has relatively high nitrogen (N) use efficiency compared to winter wheat. However, farmers may require higher rates of N fertilizer to reach maximum yield potential of modern fall rye varieties. The objective of this trial was to demonstrate the N requirements and yield capacities of a hybrid versus conventional fall rye variety.

This study was demonstrated at Indian Head, Melfort, and Scott in 2014 as a randomized complete block design with four replicates. A complete 2 x 6 factorial set of treatments include two rye varieties (Hazlet and Brasetto) and six N fertilizer rates (0, 50, 100, 150, 200, 250 kg N/ha).

The open-pollinated conventional variety (Hazlet) was 20 % taller and more susceptible to lodging compared to the new, hybrid variety (Brasetto). Brasetto is less prone to lodging and is able to allocate less energy for stem elongation and more for seed production to result in a yield increase. Brasetto produced 16 % more yield compared to Hazlet using the same amount of fertilizer N applied (Figure 1). This indicated that Brasetto had higher N use efficiency, as it utilized the same amount of N to reach a greater maximum yield compared to Hazlet. However, Hazlet had a 6% greater protein content compared to Brasetto. This result was expected as a high yielding variety typically results in a lower protein content as more N is partitioned for seed production rather than protein synthesis.

The application of N had the most significant ($P < .0001$) effect on protein content, as protein levels increased linearly with incremental increases of applied N (Figure 2). A 27 % increase in protein level was noted when available N ranged from 0 to 250 kg of N/ha. Protein content increased as a greater amount of seed N was available for protein production. However, both varieties did not reach their maximum protein content. It was concluded that an application of 308 kg of N / ha would be required to reach a maximum protein level of 12.7%.

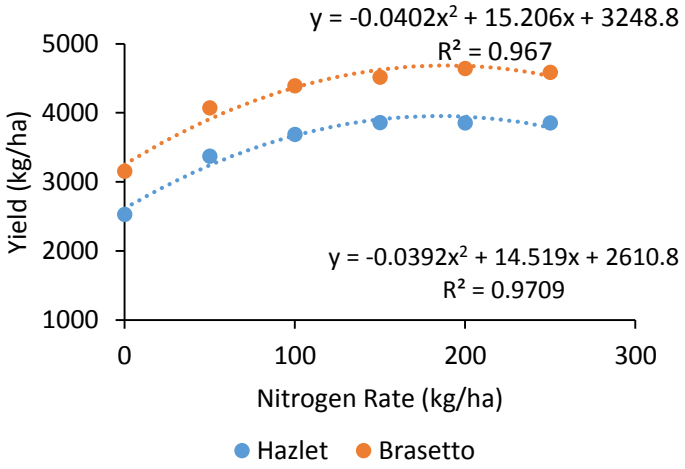

Figure 1. Yield response of Hazlet and Brasetto to N applications at Indian Head and Melfort, 2015

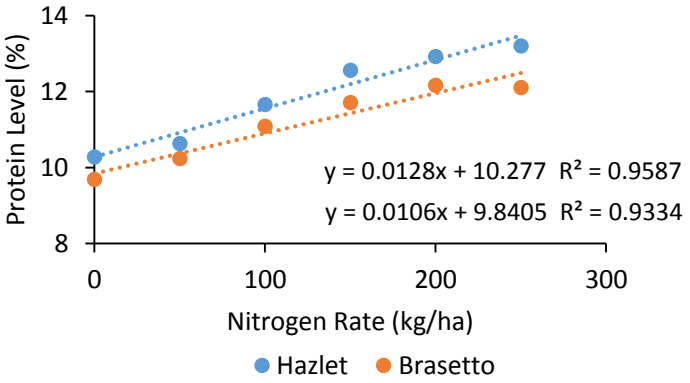

Figure 2. Protein percent response of Hazlet and Brasetto to N applications at Indian Head, Scott and Melfort, 2015

Overall, Brasetto has the same N requirements but is better able to utilize the available N to produce greater yields. Brasetto has a greater yield potential, a shorter height and is less prone to lodging while Hazlet provided better protein content. Therefore, depending on the target market (i.e. bread making vs. feed production) both varieties have value within their respective markets.

Read the full report at:
http://www.westernappliedresearch.com/research/warc-annual-reports/2015/

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