Factsheet: Nitrogen Response to Modern Fall Rye Varieties

Objective:

The objective of this trial was to demonstrate the nitrogen requirements of a hybrid versus conventional fall rye variety. This demonstration will show farmers the yield potential, as well as compare the benefits and negative attributes of conventional vs hybrid fall rye varieties under high input systems.

Methodology:

At Scott, Indian Head and Melfort, the demonstration was set up 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 nitrogen (N) fertilizer rate (ranging from 0 to 250 kg N/ha). At Scott and prior to seeding, soil samples were collected at three depth increments (0-15cm, 15-30cm and 15-60 cm) in order to determine fertilizer rates. Fall rye seed was treated with Cruiser Maxx at a rate of 225 ml/ 1000 kg of seed prior to seeding. On August 29th 2014, the fall rye was direct seeded into chem-fallow using 10" row spacing at 61 kg/ ha. At seeding, nitrogen was applied as urea and side-banded, while 25 lb of phosphorous (11-52-0) was applied in the seed-row.

Table 1. Fall rye varieties and nitrogen rates

Treatment #	Fall Rye Variety	N Rate (kg/ha)
1	Hazlet	0
2	Hazlet	50
3	Hazlet	100
4	Hazlet	150
5	Hazlet	200
6	Hazlet	250
7	Brasetto	0
8	Brasetto	50
9	Brasetto	100
10	Brasetto	150
11	Brasetto	200
12	Brasetto	250

Key Findings:

- 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. 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.
- 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 effect on protein content, as protein levels increased linearly with incremental increases of applied N.

The full report is available at www.warc.ca. This project was supported by the Agricultural Demonstration of Practices and Technologies (ADOPT) initiative under the Canada-Saskatchewan Growing Forward 2 bi-lateral agreement.
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- 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%.
- 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.

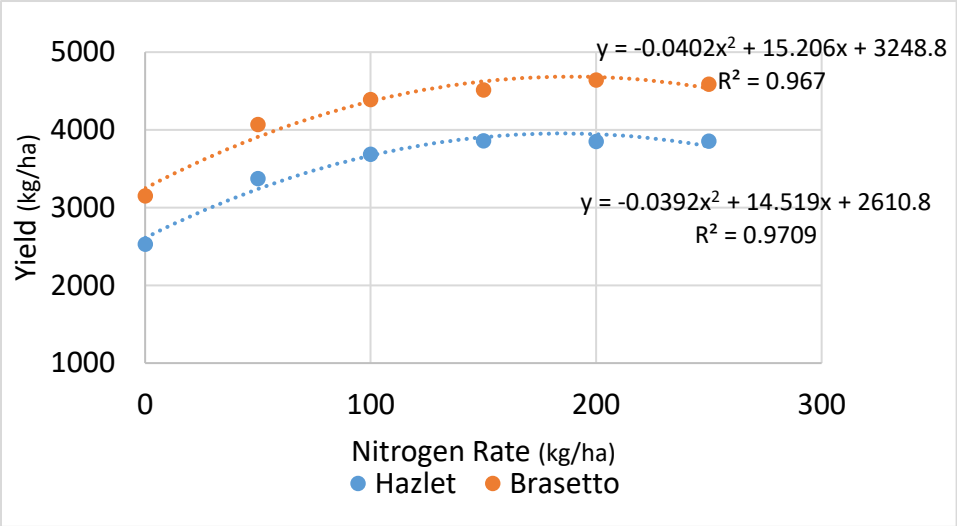

Figure 1. Yield response of Hazlet and Brasetto to N applications at Indian Head and Melfort, 2015

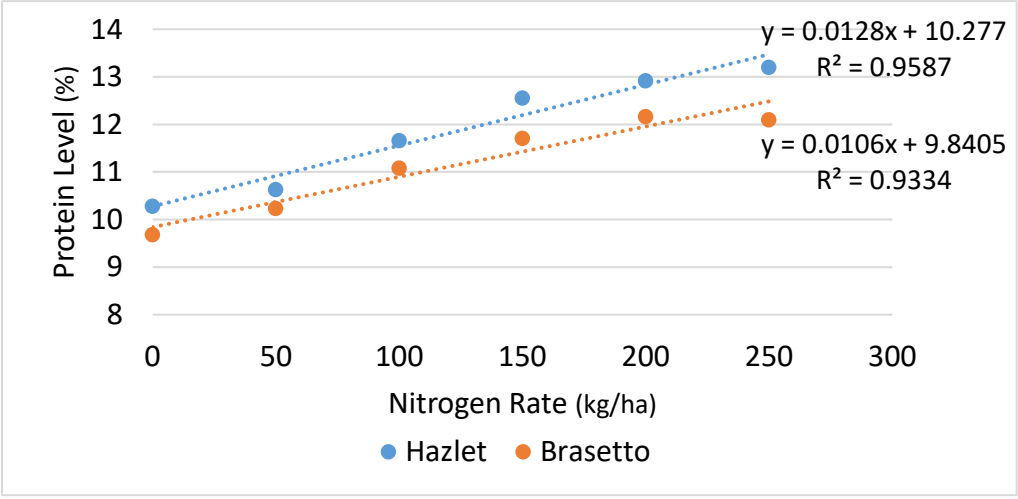

Figure 2. Protein percent response of Hazlet and Brasetto to N applications at Indian Head, Scott and Melfort, 2015

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