

SMART Barley 2013 - N Rate and Fungicide (Leeds SCIA Major Grant)

Purpose:

Assess the impact of different combinations of fungicides, nitrogen (N) rates and growth regulator on disease incidence and grain yields and grain quality in spring barley

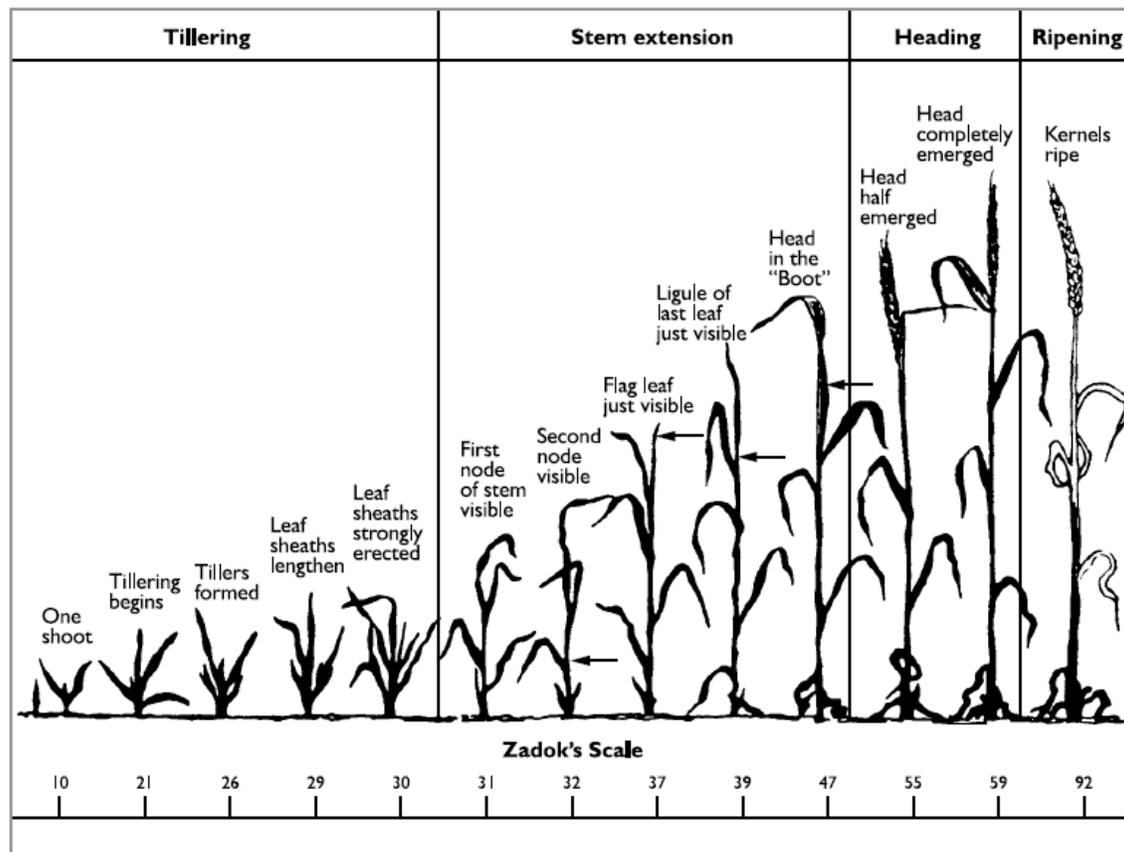
Methods:

A combination of 3 to 5 of the following treatments were used and replicated twice at each site respectively:

1. 90 lbs. N with Fungicide - No Growth Regulator
2. 90 lbs. N with Fungicide plus Growth Regulator
3. 90 lbs. N plus Growth Regulator & No Fungicide
4. 45 lbs./ac with Fungicide
5. 45 lbs./ac & No Fungicide

All nitrogen treatments were applied at planting. The fungicide and growth regulator were applied between Zadok's Stage 32 to 39 (second node to flag leaf stage).

Figure 1: Cereal Growth Stages – Zadok's Scale



Picture 1: Plot layout and harvest of trial – George Webster, Lansdowne, ON



At harvest, grain weights were collect and moisture measurer to adjust yield. Test weight was measured and grain samples were collected and analyzed for toxin levels (VOM ppm) for quality.

Summary:

June 2013 was extremely wet between 200 to 220% above normal (Figure 1). This negatively impacted barley yields at Site A & B which are heavier texture soils. Site C is tiled drained and a sandy-loam soil, resulting in less negative yield impact form the excessive rainfall in June.

The application of a fungicide at the 45 lbs./ac N rate, resulted in a yield advantage of 10 bu/ac & 3.9 bu/ac, at sites A & B respectively. The addition of another 45 lbs./ac of N (90 lbs.ac N) at site A did not result in any yield advantage. However, at Site B, the addition of another 45 lbs./ac of N (90 lbs N plus Growth Regulator & No Fungicide) had a yield gain of 7.5 bu/ac.

Results:**Table1: Yield and Grain Quality response to Nitrogen and Fungicide use in Barley**

Site	Treatment	Yield (bu/ac)	Yield Advantage (bu/ac) ¹	# of Reps	Protein %	VOM (ppm)
A	90 lbs N with Fungicide plus Growth Regulator	48.3	10.5	2		
	90 lbs N plus Growth Regulator & No Fungicide	44.4	6.7	2		
	45 lbs/ac with Fungicide	47.8	10.0	2		
	45 lbs/ac & No Fungicide	37.8		2		
B	90 lbs N with Fungicide plus Growth Regulator	47.5	6.3	2	10.5	3.1
	90 lbs N with Fungicide - No Growth Regulator	54.0	12.7	2	10.6	2.1
	90 lbs N plus Growth Regulator & No Fungicide	48.7	7.5	2	11.0	2.9
	45 lbs/ac with Fungicide	45.1	3.9	2	10.7	3.9
	45 lbs/ac & No Fungicide	41.2		2	11.0	2.6
C	110 lbs N with Fungicide plus Growth Regulator	77.5	12.4	2	8.9	2.7
	83 lbs N with Fungicide plus Growth Regulator	72.8	7.7	5	9.0	2.8
	40 lbs/ac, No Fungicide, No Growth Regulator	65.1		2	9.2	2.6

¹Yield Advantage (bu/ac) over the low N (40 or 45lbs/ac), no fungicide treatment.

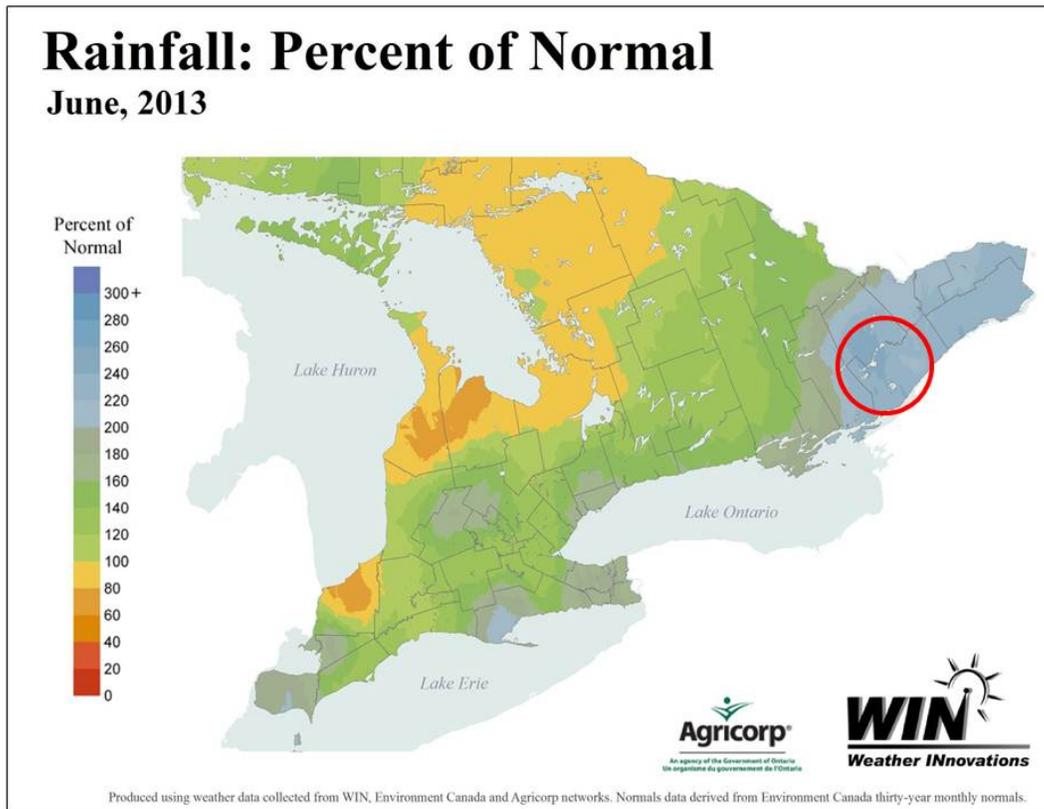
At site B, the inclusion of the growth regulator appears to have stressed the crop resulting in a lower yield (12.7 – 6.3) of 6.4 bu/ac than the 90 lbs./ac N with the fungicide and no growth regulator.

The addition of a fungicide at the 90 lbs./ac N rate in Site A, had a yield gain of (10.5 - 6.7) of 3.8 bu/ac.

Site C showed an increase in yield of 7.7 and $(7.7 + 4.8) = 12.5$ bu/ac by increasing the N rate from 40 to 83 and 110 lbs. N/ac, respectively and the use of a fungicide.

The use of a fungicide and/or increasing the N rate appears not to have any benefit in increasing grain protein content or impact on the mycotoxin level (VOM ppm) of the grain.

Figure 1: Rainfall Percent of Normal for June 2013



Next Steps:

A weather can significantly impact the response to fungicides and N rates, this project should be continued again in 2014.

Acknowledgements:

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Location of Project Final Report:

Crop Advances, Ontario Soil & Crop Improvement Association at:
<http://www.ontariosoilcrop.org/en/resources/cropadvances.htm>