

SMART Spring Wheat Evaluations of Nitrogen and Fungicide

(Final Report)

Purpose:

Assess the impact of different combinations of fungicides and nitrogen (N) rates on disease incidence and grain yields and grain quality in hard red spring wheat (HRSW).

Methods:

Intensive on-farm, field scale plots sites were established across eastern Ontario in 2010, 2011 and 2012 with the following treatments in HRSW:
 Standard Nitrogen Rate (80-90 pounds per acre N), with No Fungicide
 Standard Nitrogen Rate (80-90 pounds per acre N), with Fungicide at Heading Stage
 High Nitrogen Rate (additional 40 pounds per acre N), with Fungicide at Heading Stage

Results:

The tables represent the yield data of spring wheat with a fungicide applied at heading versus no fungicide and high nitrogen rate versus standard nitrogen rate treatments for each of the year's 2010, 2011 and 2012, respectively.

Table 1: 2010 Smart Spring Wheat

Site	Treatment	Yield Treat Avg. @14.5% (bu/ac)	Yield Diff. @14.5% (bu/ac)	Protein %
Lanark, ON	Stnd.N no Fungicide	65.3		13.5
Lanark, ON	Stnd. N + Fung.	66.7	1.4	13.4
Lanark, ON	High N no Fungicide	66.8	1.6	15.2
Lanark, ON	High N + Fung.	70.3	5.0	14.4
Vars, ON	Standard Rate	67.6		15.2
Vars, ON	High Rate	61.1	-6.5	15.9
Williamstown, ON	Stnd. N no Fungicide	53.9		14.9
Williamstown, ON	Stnd. N + Fungicide	62.8	8.9	14.5
Williamstown, ON	High N + Fungicide	64.1	8.7	14.8
Carleton Place, ON	Standard Rate	68.9		11.9
Carleton Place, ON	High Rate	73.6	4.7	12.2

Table 2: 2011 SMART Spring Wheat

Site	Treatment	Yield (bu/ac)	Yield Difference High vs. Std. N	Yield Difference High N vs. Std. N no Fungicide	Protein %
Lanark, ON	High N. Fungicide	66.6	-4.5	3.9	12.7
Lanark, ON	Std N. Fungicide	71.1			12.6
Lanark, ON	Std N. No Fungicide	62.7			12.5
Braeside, ON	High N + Fungicide	71.4	-1.5	11.7	13.3
Braeside, ON	Std N. Fungicide	72.9			12.9
Braeside, ON	Std N. No Fungicide	59.7			12.5
Carleton Pl, ON	High N. Fungicide	77.5	-0.5	9	11.3
Carleton Pl, ON	Std N. Fungicide	78			11.4
Carleton Pl, ON	Std N. No Fungicide	68.5			11.7
Douglas, ON	2X Nitrogen	85.9	7	12.7	12
Douglas, ON	Std N. Fungicide	78.9			11.3
Douglas, ON	Std N. No Fungicide	73.2			11.9

Summary:

Most co-operators' used a standard nitrogen rate between 80 to 90 pounds of actual nitrogen per acre (lbs./ac). The high nitrogen strips were usually 40 lbs./ac of additional nitrogen. The cost of this additional 40 lbs./ac of N at about \$0.75 per pound of actual N is \$30.00 per acre. If the price HRSW is \$8.00 per bushel, then the break-even additional yield required is 3.75 bu/ac. Were a fungicide was applied at heading, the yield increase was between 3 to 12 bu/ac. The cost of the Prosaro® or Caramba® fungicide is about \$24.00 per acre for product and application plus trampling of approximately 1.5 bu/ac at \$8.00 per bushel is \$36.00 per acre. At \$8.00 per bushel the break-even for the fungicide is about 4.5 bushels per acre.

Given today's wheat prices, this data over the three years shows that the high nitrogen strips did not have an economical increase yield, however in 2 out of 3 years it was economical to apply the fungicide at heading to control FHB. It is interesting to note the amount of residue Soil Inorganic N available post-harvest as in Table 3 would be sufficient N for a cover crop such as oats.

Next Steps:

Based on the results of this project, the N recommendation for HRSW should be 80 to 90 lbs./ac and the use of a fungicide at heading to control FHB is economical at today's prices.

Table 3: 2012 Smart Spring Wheat

Site:	Treatment	Average Yield (bu/ac)	Yield Difference (bu/ac)	Protein %	Post Harvest Soil Test Total Inorganic N
Braeside, ON	High Rate -125 lbs. N + Caramba	62.7	2.0	13.8	62.8
Braeside, ON	Standard N - 85 lbs./ac + Caramba	60.7		12.8	97.6
Lanark, ON	High Rate -125 lbs. N + Caramba	66.1	-1.6	13.7	87.2
Lanark, ON	Standard N - 85 lbs./ac + Caramba	67.7		14.0	74.8
Douglas, ON	High Rate -125 lbs. N + Caramba	58.3	-1.7	13.6	166.8
Douglas, ON	Standard N - 75 lbs./ac + Caramba	60.0		13.4	104.8
Douglas, ON	Standard Field N, + Caramba vs. No Fungicide	57.0	3.0	13.8	114
Lanark, ON	Standard Field N, + Caramba vs. No Fungicide	63.9	3.8	13.6	77.6

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