

Objective:

The objectives of this project were:

- 1) To demonstrate the effects of foliar fungicide applications at different crop stages on winter wheat disease levels and yield.
- 2) To demonstrate the effects of using seed treatments and/or higher seeding rates to improve winter wheat establishment.
- 3) To investigate potential interactions between plant populations, seed treatments and foliar fungicide applications for winter wheat.

Methodology:

Two separate field demonstrations were established at both Indian Head and Scott, Saskatchewan in the fall of 2013. The purpose of Demonstration #1 was to measure the individual and combined benefits of seeding rates, seed treatments and foliar fungicides on winter wheat establishment and yield. In Demonstration #2, the purpose was to separate the effects of different timings of fungicide applications to determine which fungicide timing provides the greatest benefits while demonstrating the need to choose appropriate products and timings for the specific diseases being targeted. Similar demonstrations were also conducted in 2012-13 at Indian Head with funding from Ducks Unlimited and therefore results from these are also included in the current report. All treatments were replicated four times and arranged in either an RCBD or split plot design with fungicide as the main plots in Demonstration #1 in 2014. The treatments evaluated in the two demonstrations are described below.

Table 1: Demonstration 1 Treatment List

Treatment	Seeding Rate	Seed Treatments	Fungicide
1	200 seeds m ²	Untreated seed	Check
2	300 seeds m ²	Untreated seed	Check
3	400 seeds m ²	Untreated seed	Check
4	200 seeds m ²	Treated seed*	Check
5	300 seeds m ²	Treated seed	Check
6	400 seeds m ²	Treated seed	Check
7	200 seeds m ²	Untreated seed	Foliar Fungicide**
8	300 seeds m ²	Untreated seed	Foliar Fungicide
9	400 seeds m ²	Untreated seed	Foliar Fungicide
10	200 seeds m ²	Treated seed	Foliar Fungicide
11	300 seeds m ²	Treated seed	Foliar Fungicide
12	400 seeds m ²	Treated seed	Foliar Fungicide

*325 ml/ac Raxil Pro

**Twinline at flag-leaf and Prosaro at anthesis

Table 2: Demonstration 2 Treatment List

Treatment	Fungicide	Timing
1	Check	No foliar fungicide applied
2	202 ml/ac Twinline/Tilt	Flag-leaf stage
3	324 ml/ac Prosaro	Anthesis
4	Twinline and Prosaro	Dual application

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

WARC Project #4-G

ADOPT Project #20130312

Key Findings:

- At all three sites, significant benefits to both seed treatments and foliar fungicides were detected.
- When spring plant densities were measured, seed treatments increased populations by 30-100% and, in both years at Indian Head, NDVI values at the start of stem elongation were higher when treated seed was used.
- Seed treatments, on average resulted in yield increases of 2-15% depending on the site with the most profound results at Indian Head in 2013 when the crop was seeded into extremely dry soil and did not emerge in the fall.
- In these particular trials, failure to apply foliar fungicides also resulted in significant yield losses due to leaf and head disease.
- On average, winter wheat yields were 15-37% higher when foliar fungicides were applied. Separate field trials demonstrated the effects of timing of fungicide application on winter wheat disease levels, yield and quality.
- These showed that the flag-leaf and anthesis fungicide timings resulted in similar yield increases; however, while fungicide applied at anthesis still provided reasonable protection against leaf disease, the flag-leaf application did not reduce FHB infection or provide the potential quality improvements of the later application.
- Therefore, unless disease pressure is high and symptoms are already progressing to the upper canopy at the early flag-leaf stage, a single application at early heading will likely be the most cost effective option for winter wheat producers.

Table 3. Least squares means for main effects of fungicide, seed treatment and seeding rate on winter wheat at Scott, SK in 2014. Values within a column followed by the same letter do not significantly differ (Fisher's protected LSD test; $P \leq 0.05$).

Main Effect	Spring Density (plants/m ²)	Yield (kg/ha)	Test Weight (g/0.5 L)	TKW (g/1000 seeds)
<u>Fungicide</u>				
1) Untreated	113 a	4144 b	384.9 b	35.0 b
2) Treated ^z	120 a	5342 a	397.6 a	38.2 a
S.E.	14.6	427.5	2.17	0.66
<u>Seed Treatment</u>				
1) Untreated	101 b	4539 b	390.9 a	36.6 a
2) Treated ^y	131 a	4947 a	391.6 a	36.6 a
S.E.	14.6	427.5	2.17	0.66
<u>Seeding Rate</u>				
1) 200 seeds m ⁻²	91 b	4617 a	390.7 a	36.8 a
2) 300 seeds m ⁻²	125 a	4632 a	390.4 a	36.2 a
3) 400 seeds m ⁻²	133 a	4981 a	392.6 a	36.7 a
S.E.	15.1	437.3	2.24	0.67

^z 0.2 l/ac Twinline at the flag leaf stage and 0.324 l/ac Prostaro 250 EC at anthesis

^y 325 ml/100 kg seed Raxil Pro

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

WARC Project #4-G

ADOPT Project #20130312