Factsheet: Input Contributions to Spring Wheat Yield Components, Grain Quality and Profits

Objective:

The objective of this project was to demonstrate agronomic and economic responses of CWRS Utmost wheat to various crop inputs both individually and collectively. The project will provide a unique opportunity to explore individual yield components (i.e. number of plants, spikes per plant, kernels per spike and kernel size) along with how they are impacted by various inputs and contribute to overall grain yield and quality.

Methodology:

The demonstration was arranged as a randomized complete block design (RCBD) with four replicates and seven treatments at Scott, SK 2018 (Table 1). The proposed treatments are a combination of CWRS wheat input combinations where five major crop inputs will be varied. The inputs that will be varied are 1) seed-applied fungicide, 2) seeding rate, 3) overall fertility, 4) plant growth regulator, and 5) foliar-applied fungicide.

Table 1: Treatment list of Contributions to Spring Wheat Yield Components

#	Name	Seed – Applied Fungicide (no/yes)	Seed Rate (seeds/m2)	Fertility (kg/ha N-P2O5 – K2O – S)	Manipulator PGR (no/yes)	Foliar Applied Fungicide (no/yes)
1	Low Input	No	250	90-20-10-10	No	No
2	Seed- Applied Fungicide	Yes	250	90-20-10-10	No	No
3	Seed Rate	No	400	90-20-10-10	No	No
4	Fertility	No	250	135-40-20-20	No	No
5	PGR	No	250	90-20-10-10	Yes	No
6	Fungicide	No	250	90-20-10-10	No	Yes
7	High Input	Yes	400	135-40-20-20	Yes	Yes

Yield:

Overall, yields at Scott were lower than expected due to hail and drier conditions. There were significant yield differences between the seven treatments ($p<0.0001$). As to be expected, the high input treatment resulted in the highest yield averaged at 38.7 bu ac^{-1}. The conventional + low input had an average yield of 33.9 bu ac^{-1} which was the middle of all the treatments. Conventional + high seeding rate resulted in the lowest average yield at 30.9 bu ac^{-1} this could be an effect of a drier growing season resulting in limited growing space and available nutrients for the crop. Figure 1 shows the average yield of all the treatments.

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

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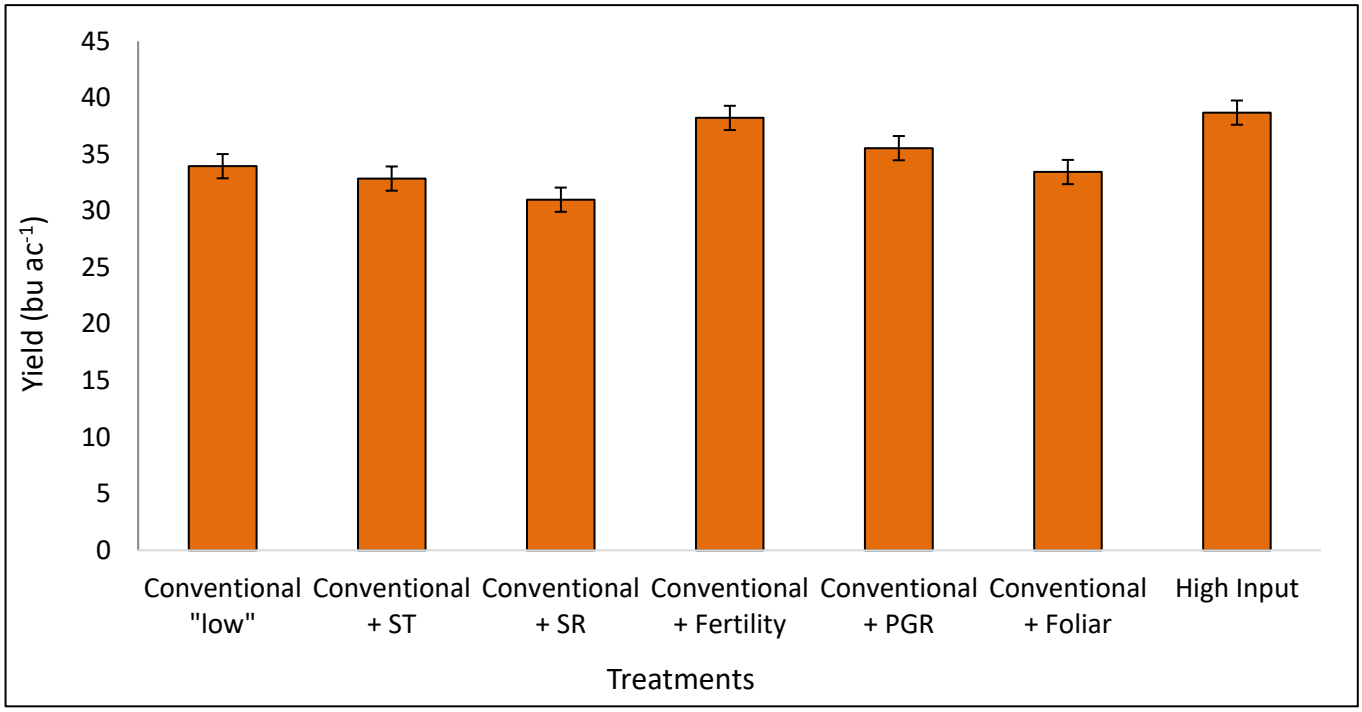

Figure 1: Average yield response to various crop inputs from Scott, SK in 2018

Key Findings:

- The high input treatment had the highest yield, as expected, of 39 bu ac^{-1}; this can mainly be contributed to the higher fertility.
- The conventional + fertility treatment had the second highest yield at 38 bu ac^{-1}.
- As these two treatments had the greatest yields it can be concluded that higher fertility had the highest impact between all the treatments.
- The conventional "low" input treatment had a yield within the middle of the seven treatments, this shows that additional treatment factors such as fungicide, seed treatment and seeding rate did not have a beneficial impact on yield.
- The lack of moisture throughout the growing season resulted in little to no disease pressure; this can possibly explain why the fungicide and seed treatment management strategies did not have a positive impact on yield.
- Fusarium head blight percentage of 0.15 was evaluated by Intertek, indicating how low disease was throughout the 2018 growing season.
- The conventional low input treatment having a relatively average yield along with a low total cost resulted in the highest economical return at \$169.16 ac^{-1}.
- The high input treatment had the greatest yield (39 bu ac^{-1}) it resulted in the lowest economic return at \$104.25 ac^{-1} because of the additional costs associated with the extra treatments.

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