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

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. 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.

#	Name	Seed-Applied Fungicide (no/yes)	Seed Rate (seeds/m^2)	Fertility (kg/ha N-P_2O_5-K_2O-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

Between seven treatments all with different agronomic factors, the high input treatment had the highest yield, as expected, of 39 bu ac^{-1}; this can mainly be contributed to the higher fertility. This is established from the fact that 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, also known as the "check", 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}. In comparison, while the high input treatment had the greatest yield (39 bu ac^{-1}) it resulted in the lowest economic return at $104.25 ac^{-1} because of the additional costs associated with the extra treatments. The economic equation took into consideration the yield (bushel per acre) per treatment and price per bushel to determine gross income ($ per ac) minus the total cost to determine net grain ($ per acre). In a year with adequate rainfall we anticipate a greater yield response to these additional treatments resulting in a higher return, therefore, repetition of this study is recommended.

Full report at: www.warc.ca

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