

# Factsheet: Optimal Seeding Rate with Plant Growth Regulators (PGRs) and Fungicides for Spring Wheat



## Objective:

The objective of this demonstration was to provide information on the yield benefits associated with increasing seeding rate in spring wheat accompanied by plant growth regulators to reduce risk of crop lodging and fungicides to reduce risk of leaf and head disease.

## Methodology:

This demonstration was conducted at the AAFC Scott Research Farm in 2015. The demonstration was a 2 x 2 x 4 (PGR, fungicides and seeding rate, respectively) factorial in a randomized complete block design with four replicates. Plots were seeded at 100, 200, 300 or 400 seeds/m<sup>2</sup>. A PGR (Manipulator™) was either applied to plots at Zadoks growth stage 31 or left "untreated". A fungicide (Caramba) was either applied to plots at 50 % anthesis or left "untreated". A lodging susceptible spring wheat variety, (Shaw VB) was direct seeded using an R-Tech plot drill in 10 inch row spacing and at a depth of 3-4cm (See Table 1 for complete treatment list). Fertilizer was applied at seeding according to soil test recommendations. Weeds were controlled using a pre-seed burndown and registered in-crop herbicides and fungicide was applied according to the treatments.

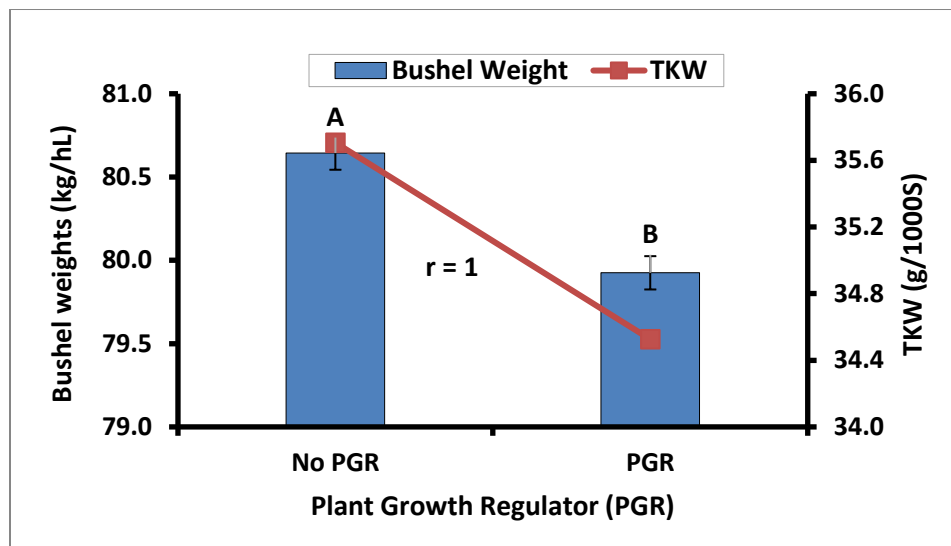
**Table 1.** Detailed treatment list for the "Optimal Seeding Rate with Plant Growth Regulators (PGRs) and Fungicides for Spring Wheat" at Scott, Saskatchewan, 2015.

Treatment #	Seeding Rate (seeds/m <sup>2</sup> )	PGR	Fungicide
1	100	No	No
2	200	No	No
3	300	No	No
4	400	No	No
5	100	Yes	No
6	200	Yes	No
7	300	Yes	No
8	400	Yes	No
9	100	No	Yes
10	200	No	Yes
11	300	No	Yes
12	400	No	Yes
13	100	Yes	Yes
14	200	Yes	Yes
15	300	Yes	Yes
16	400	Yes	Yes

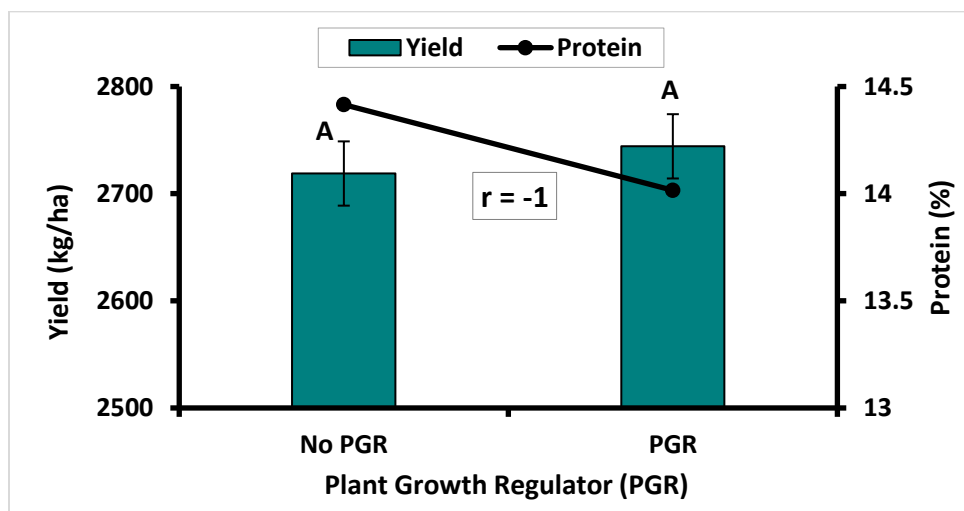
## Key Findings:

- There was a significant effect of seeding rate on yield and most of the quality parameters, with maximum yield of 2894.6 kg/ha obtained at a seeding rate of 271 seed/m<sup>2</sup>.
- There was no yield advantage of seeding above 300 seed/m<sup>2</sup> so farmers may target between 200-300 seed/m<sup>2</sup> to get an appreciable yield and acceptable quality.
- Fungicide application resulted in a yield and bushel weight increase with a decline in protein content. This could be attributed to a prolonged grain filling period via delayed senescence of the flag leaf to result in an increase in bushel weight and yield.

- The decline in protein content could be linked to the yield increase, as higher yields typically result in lower protein.
- PGR application served its intended purpose of height reduction but as no lodging occurred, we could not see its actual effects on crop stand-ability. PGR did not increase yield, but it did have a negative effect on the measured yield quality parameters (protein, TKW and bushel weights).
- In conclusion, the benefits associated with PGR application in terms yield and seed quality may not outweigh the cost of application, especially in drier years. In a drier season such as 2015, application of fungicides should be decided based on disease pressure and its projected impacts on yield.
- PGR effect based on this study requires further investigation, however, if seeding rate is high and a wet growing condition are predicted, it may be worth an investment to apply PGR.



**Figure 3:** Relationship between bushel weight (*columns*) (kg/hL) and TKW (*line*) (g/1000s) with the application of PGR for the 2015 growing season at Scott, SK. Vertical bars followed by the same letters are not significantly different according to Tukey's Honestly Significant Difference (HSD) ( $P > 0.05$ ).



**Figure 2:** Relationship between wheat grain yield (*columns*) (kg/ha) and protein (*line*) (%) with the application of PGR for the 2015 growing season at Scott, SK. Vertical bars followed by the same letters are not significantly different according to Tukey's Honestly Significant Difference (HSD) ( $P > 0.05$ ).