

# What You need to Know About Managing Your High Yielding Spring Wheat

## Speakers:

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## Objectives:

To demonstrate the effect of fertility timing, fertility rates, and Plant Growth Regulators on protein contents and yield of wheat

**Collaborator:** University of Manitoba. Double Diamond Farm Supply.

## Demonstration Treatments:

1. Standard rate of N for high yield (140 lb/ac)
2. Reduced rate of N (70 lb/ac)
3. Split N 70 (at seeding) + 70 (at flag leaf) lb/ac (Surface Broadcast)
4. Controlled Release N (40:100) urea: ESN blend
5. Standard rate of N for high yield (140 lb/ac) with Single application of PGR Moddus
6. Standard rate of N for high yield (140 lb/ac) with Single application of PGR Manipulator
7. Standard rate of N for high yield (140 lb/ac) with split application of PGR Manipulator

## Demonstration Summary:

Plant growth regulators (PGRs) have become increasingly popular over the last few years. The Manitoba Wheat and Barley Growers Association (MWBGA) have been involved in numerous research projects focusing on PGRs and their potential to benefit Manitoba farmers. Like each farming operation, not all PGR products are alike. The functions of the products range which means there is a lot for farmers to learn about them.

Plant growth regulators (PGRs) are synthetic compounds that are foliar applied to crops and alter the hormonal activity to modify plant growth and development. Common cereal PGRs inhibit the synthesis of the hormone gibberellin, which results in decreased cell division and cell elongation in the stem. PGR's are used worldwide for several purposes but most commonly in cereal grain production to improve lodging resistance by shortening and strengthening plant stems. Lodging can cause severe yield loss in cereals if conditions are favorable (ie. med-high rainfall and high fertility). Yield loss is greatest in wheat when lodging occurs during grain fill following anthesis (14-21 days after FHB fungicide application timing).

PGRs vary in their best application timing. A big takeaway concerning PGR timing is the importance of closely monitoring the crops development. Growing conditions may increase or

decrease plant development and targeted growth staging is extremely important for proper PGR usage. There are a few PGRs that can have a negative effect on yield if not applied at the correct growth stage. Chlormequat chloride (manipulator) has a wide application window, but the optimum timing would be when the wheat is at growth stage 30-32. This is when the main stem is beginning to elongate and the first node is approximately one inch above the ground.

Individual PGRs will have various optimum application timings but common PGRs used in cereals (Manipulator and Pallisade) have a wide application window, from 2-leaf to flag leaf. For greatest efficacy Manipulator should be applied at growth stage 31 (node 1 detectable) to growth stage 32 (2nd node detectable). Proper staging requires slicing of the stem length-wise to see node formation as nodes will not yet be swollen.

I would suggest that producers should expect yield increases or advantages such as increased protein in the wheat or increased efficiencies with harvest and straw management. However, it can be difficult to measure the ROI (return on investment) concerning harvest efficiencies. The manipulator work that I have personally been involved with has delivered higher wheat yields with the same protein as the check. The treated wheat protein did not increase but it also did not decrease with a higher yield, which might have been expected.

Research shows that when PGRs are applied at optimum timing there can be a small but significant yield increase (3-5 bu/ac) in a field with moderate to high yield potential. This yield increase is not a guarantee and research is underway to try understand what is driving yield responses to PGR applications. Every field deserves a profiling conversation concerning the PGR practice. I would suggest that cereals that are conducive to lodging are more likely to deliver an increased ROI over Varieties that stand well.

PGR applications will not always be justified. Growers should take into consideration the management history of the field in question and determine if it is high-risk for lodging. Fields that are pushing yield potential with large amounts of N fertilizer applications, history of manure applications and high seeding rates are most prone to lodging and will most likely benefit from a PGR application. It's important to note that not every variety or species of cereal will respond the same to PGR applications, the reason for this is still being researched.