

# Should I use a plant growth regulator in my winter wheat?

*Plant growth regulators (PGRs) are applied to winter wheat to reduce plant height and increase stem thickness. Reducing the risk of lodging or delaying the onset and amount of lodging that occurs makes it easier to manage and harvest wheat. PGRs can also improve yields, particularly where moderate to severe lodging occurs.*

## The simple answer

The decision to use a PGR is a function of variety selection, management, particularly the amount of nitrogen applied and the seasonal growing conditions (temperature, rainfall, etc.).

## A little more information

The use of a PGR will bring the most benefit when:

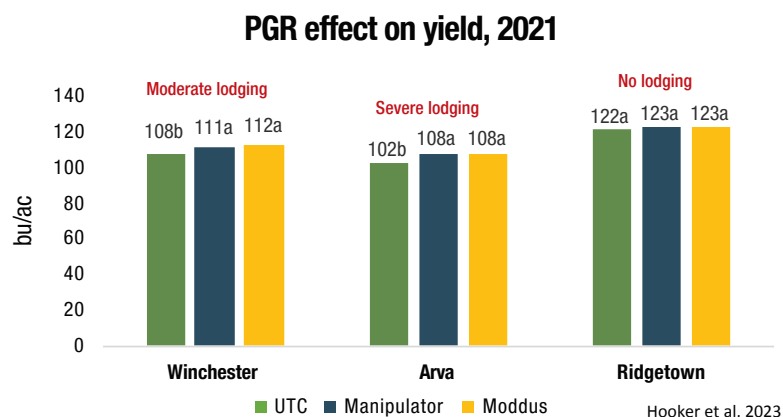
- The variety has a high lodging score (check ratings at [www.GoCereals.ca](http://www.GoCereals.ca)) or there is high lodging potential
- Winter wheat is planted early and has a thick crop canopy
- The field has a history of manure applications or high soil organic matter levels
- There is high yield potential, and an intensive management program is used including early planting, high seeding rates and aggressive nitrogen rates ( $\geq 150$  lb/ac)

The use of PGR has less value when:

- The variety has a low lodging rating and there is lower lodging potential
- Split nitrogen applications are used in conjunction with lower nitrogen rates
- There is lower yield potential due to a late planting date and significant tillering and growth is not a concern
- High rates of manure are not used in current or previous years

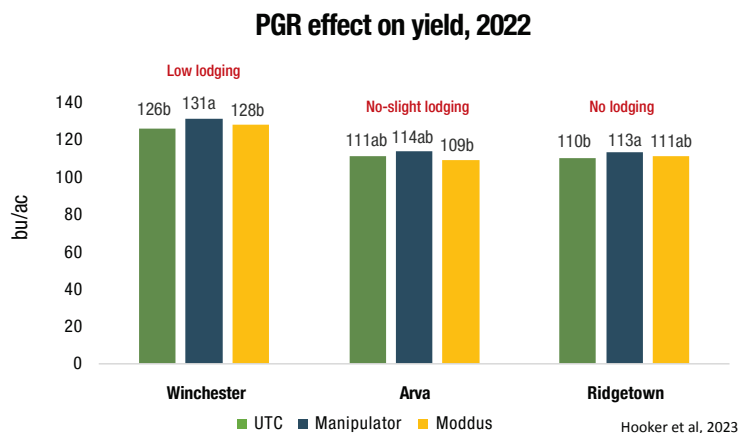
## The full story

In trials conducted by Dr. Dave Hooker, at the University of Guelph, Ridgetown Campus between 2021 and 2023, there were varying yield and lodging score responses to PGR applications. In 2021, when there was moderate to severe lodging, there was a significant yield response to a PGR application compared to the untreated check (UTC) (Figure 1). Lodging scores were also significantly reduced by a PGR application compared to the UTC across all locations (data not shown). Figure 1 shows that at locations with moderate to severe lodging there was a significant yield benefit to a PGR application over the untreated check. All plots received 150 lb/ac of nitrogen (N).

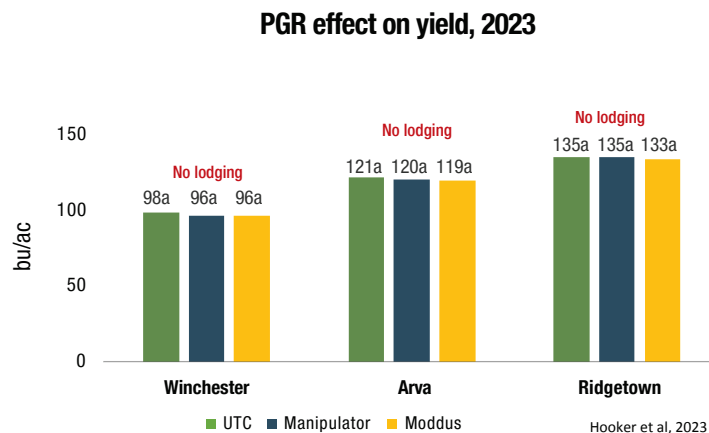


**Figure 1.** PGR effect on winter wheat yield at three locations in 2021 with no, moderate and severe lodging. Bars with the same letters are not statistically different.

In contrast, there was little to no lodging in 2022 and 2023 resulting in low yield responses in 2022 and no significant yield differences between the PGR treatments and UTC in 2023 (Figure 2 and 3).



**Figure 2.** PGR effect on winter wheat yield at three locations in 2022 with little to no lodging. All plots received 150 lb/ac of N. Bars with the same letters are not statistically different.



**Figure 3.** PGR effect on winter wheat yield at three locations in 2023 with little to no lodging. All plots received 150 lb/ac of N. Bars with the same letters are not statistically different.

Based on Ontario field research conducted to date, when there is a high risk of lodging, PGRs can be an effective tool at reducing or delaying the amount of lodging that occurs. Where moderate to severe lodging has occurred, PGRs can increase yields. However, when there is a low risk of lodging, you are unlikely to see a benefit and an economic response.

When making the decision to use a PGR or not, consider the following factors:

- A variety’s response to PGRs.
- Crop establishment (planting date, seeding rate, etc.).
- The nitrogen management strategy being used – rate and application method (single vs split apps).
- Field-specific characteristics (organic matter levels, history of manure applications, etc.).

### A look at the costs of a PGR application

**Table 1. Application costs associated with and without a PGR application at 150 lb/ac of nitrogen applied.**

	Single Application: ~GS30, No PGR, 150 lb N/ac	Split Application: <GS30, ~GS32-39, No PGR, 150 lb N/ac	Single Application: ~GS30, PGR, 150 lb N/ac	Split Application: <GS30, ~GS32-39, PGR, 150 lb N/ac
N Application (includes mixing and delivery)	\$17.00	\$17.00 x 2	\$17.00	\$17.00 x 2
Nitrogen cost	\$151.50	\$151.50	\$151.50	\$151.50
PGR Application	-	-	\$18.65	\$18.65
Total Cost	\$168.50/ac	\$185.50/ac	\$187.15/ac	\$204.15/ac
Additional yield needed to pay for a PGR application	-	<b>2.28 bu/ac</b> (compared to single N application, no PGR)	<b>2.50 bu/ac</b> (compared to single N application, no PGR)	<b>2.50 bu/ac</b> (compared to split N application, no PGR)

All costs are derived from *Publication 60: OMAFRA Cost of Production Budgets*.

Soft Red Winter (SRW) wheat price used was forward price of \$7.45 bu/ac. price per lb of N was \$1.01.