

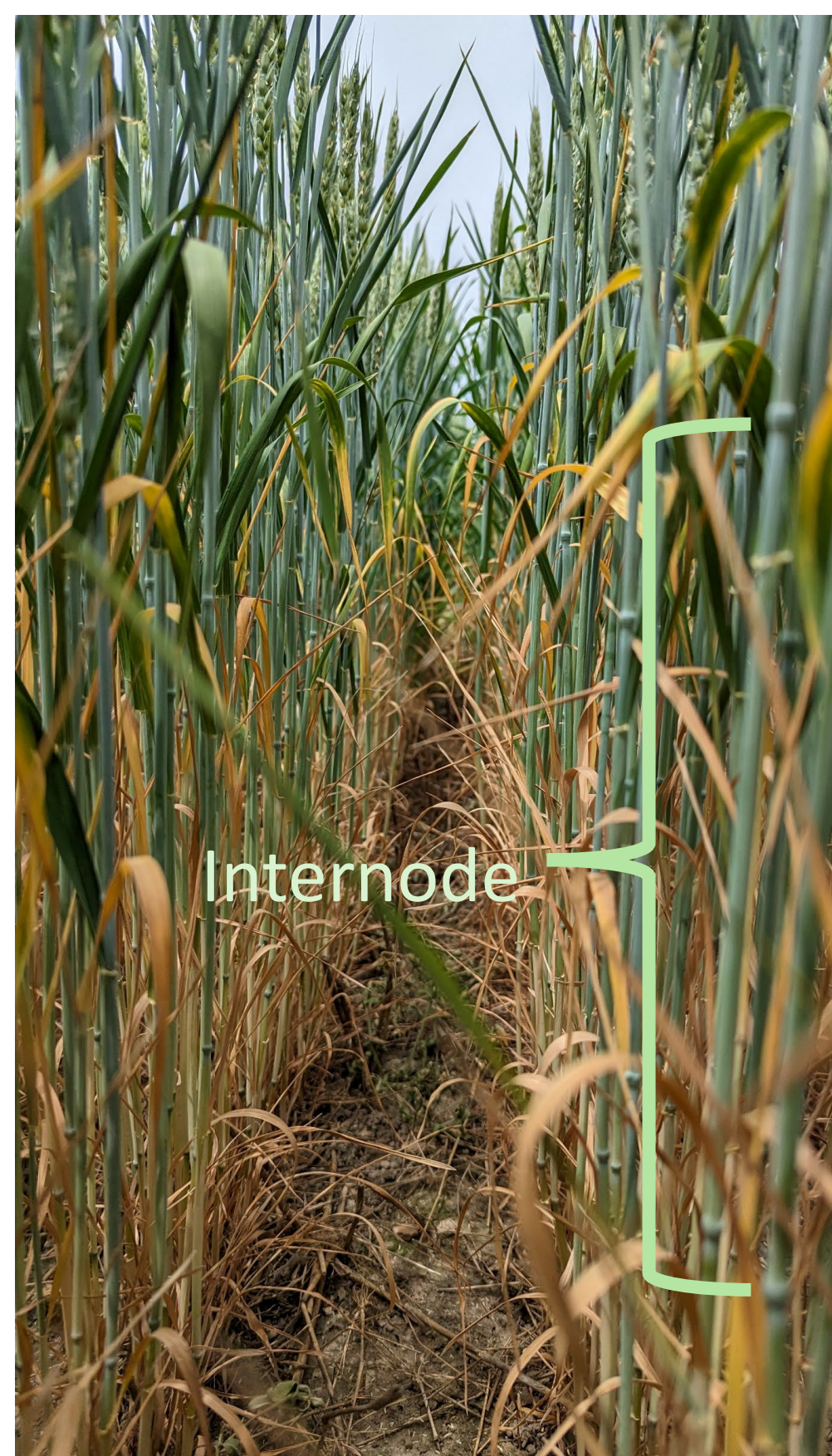
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## What is PGR?

- PGR is a **Plant Growth Regulator**.

## Why Use PGRs?

- Reduce lodging
- Stimulate root development
- Reduce apical dominance
- Factors to consider for PGRs
  - Planting date
  - Seeding rate
  - Fall tillering
  - Nitrogen rate



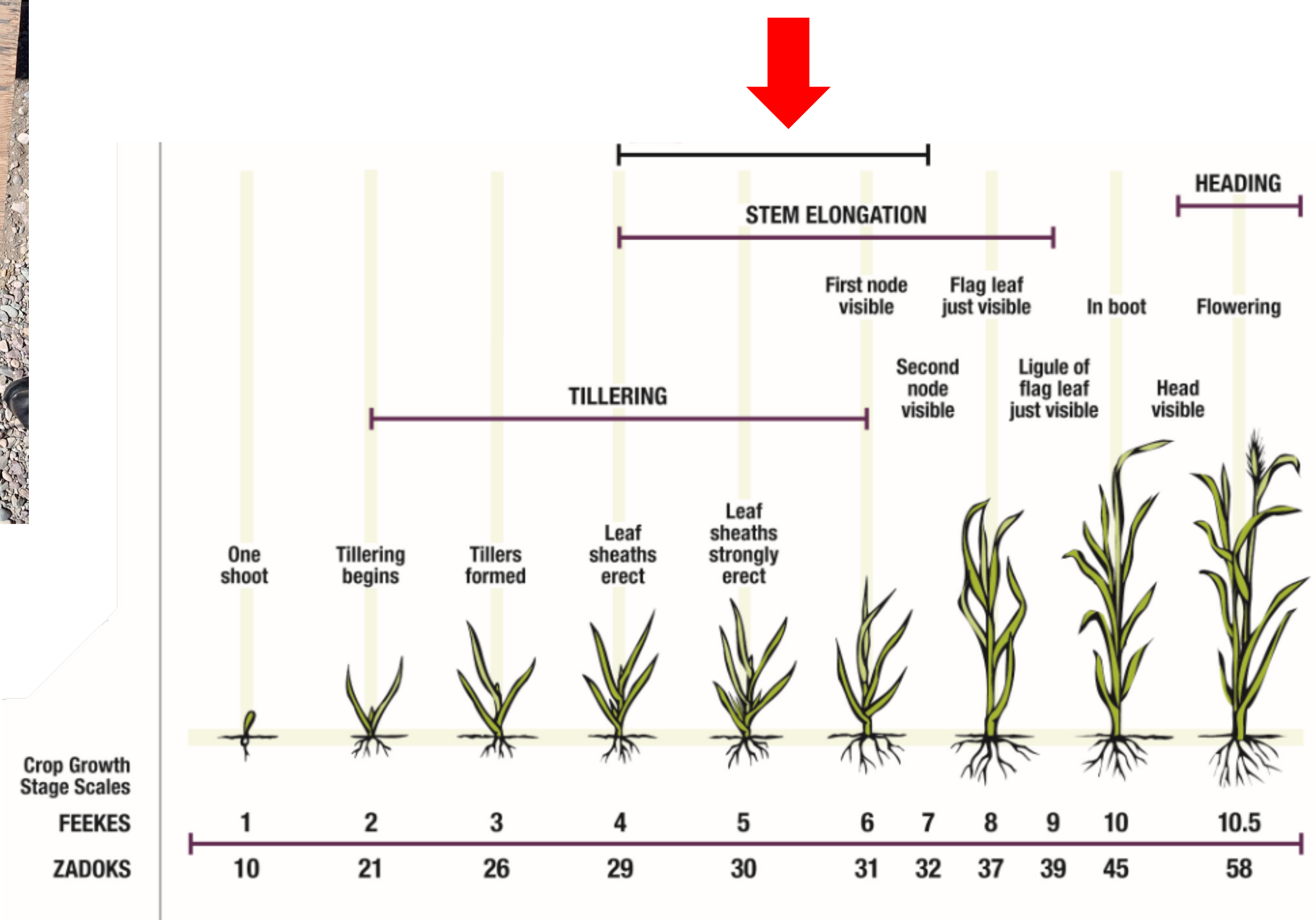
## How PGRs Work

- PGRs are similar to plant hormones.
  - They alter the hormone balance to modify plant development.
- Early plant development
  - High Auxin levels stimulate rooting
  - Tiller formation triggers gibberellins
  - Gibberellins trigger stem cells growth and stem elongation
- Use of PGRs in wheat:
  - Trinexpac ethyl and chlormequate chloride (CCC) blocks synthesis of gibberellic acid responsible for cell elongation
  - Results in:
    - ❖ Yield Improvement in absence of lodging
    - ❖ Reduced apical dominance → ear-bearing tillers → increased ear number (with proper crop density, fertilization, and disease protection)
    - ❖ Increased root growth, length, and mass
    - ❖ Reduced straw length
  - Prevention of lodging
    - ❖ Reduced internode lengths
    - ❖ Thicker lignified stems
    - ❖ Increased root growth to strengthen foundations
    - ❖ Maintain grain quality – HFN and test weight



Natural Plant Hormones	Produced in:	Effects
<b>Auxins</b>	Developing Leaves and Stems	Stimulation of early root growth
<b>Cytokinins</b>	Roots and Shoots	Stimulation of cell multiplication in roots and tillers
<b>Gibberellins</b>	Young Tissues	Stimulation of the development of all plant organs, elongation, and division of cells. Inhibition of root and shoot growth
<b>Ethylene</b>	Whole Plant	Blockage of auxins contributing to cell walls thickening and maturation
<b>Abscisic acid</b>	Grain, Shoots, and Fruit	Inhibition of plant growth, ripening

## Optimum Application Timing



- Between Feekes 4 and 7
  - Best single application time: Feekes 5-7
  - Best split application time: Feekes 4 and 7

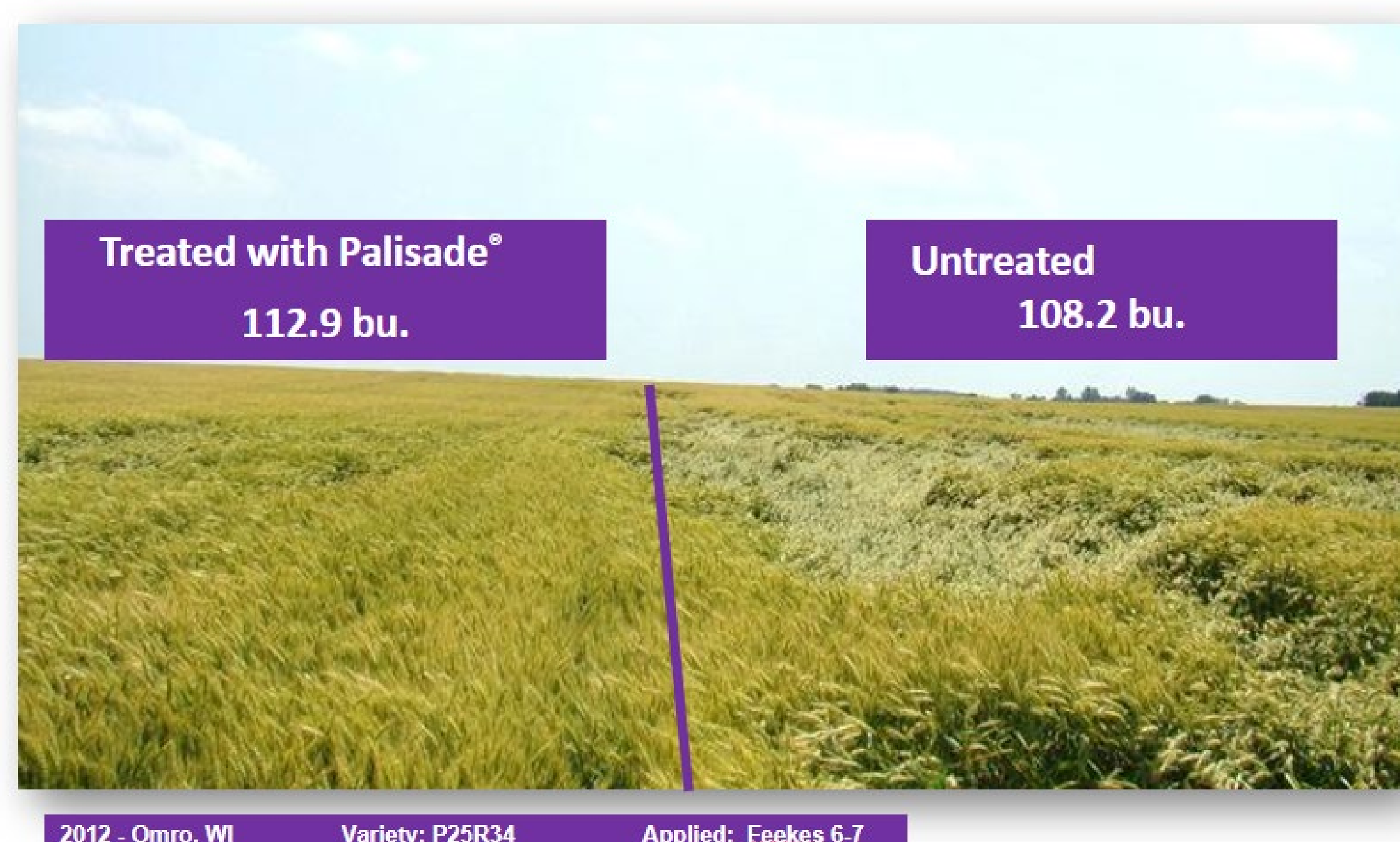


Untreated vs treated at Feekes 6



## PGR Myths

- ❖ PGRs **do not eliminate lodging** in highly susceptible crops – they may delay the onset of lodging or lessen lodging.
- ❖ In the absence of lodging, PGRs have **variable effects on yield** sometimes they increase yield, decrease yield, or have no impact
- ❖ Morphological effects are accompanied by **alterations in developmental and physiological behavior**
- ❖ The **green color of foliage is intensified**
- ❖ An **extended longevity** of plants has been regularly observed, retardation of senescence (*Source: Grossman, 1992; Berry et al., 2004*)
- ❖ **Optimum temperatures** are generally above **41 degrees Fahrenheit** (Berry et al., 2004)
- ❖ Temporary, **short term height reduction** (Rajala and Peltonen-Sainio, 2002)
- ❖ Increased tillering; potentially **late unproductive tillers**
- ❖ **Reduced grain weight** (Rajala and Peltonen-Sainio, 2002)



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