Starter Fertilizer Placement and Rates for No-Tillage Wheat Production in the Mid-Atlantic Coastal Plain

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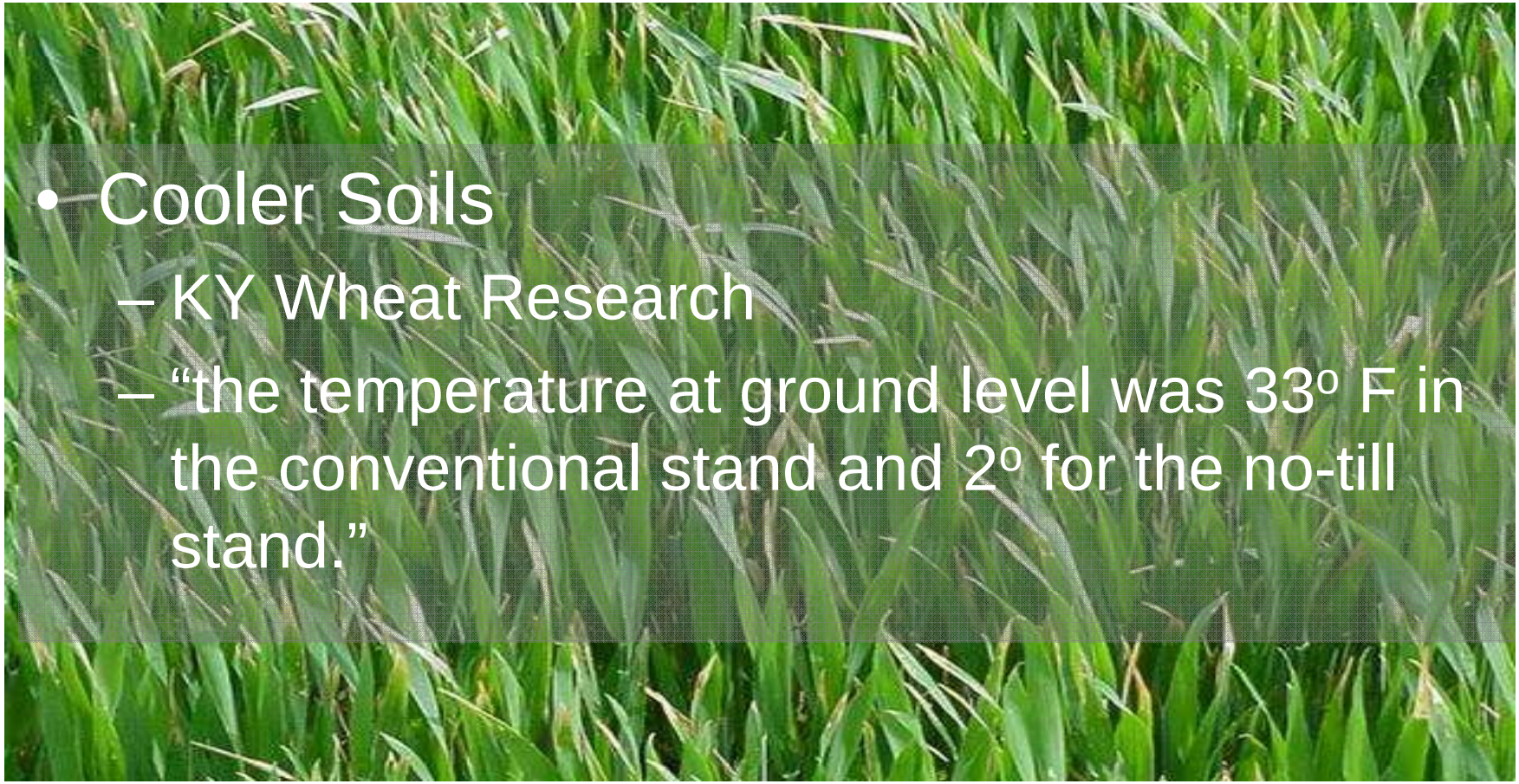
Current Situation

- Lower Rate of Tillering

Current Situation



- Cooler Soils
  - KY Wheat Research
  - “the temperature at ground level was 33º F in the conventional stand and 2º for the no-till stand.”

Current Situation

- **Management**
  - **Earlier planting**

  - **“Thanksgiving” N application**

Rationale

- **Research with no-till corn in Virginia has shown a clear advantage to applying N and P in close proximity to the seed and below the surface residue levels (Alley and Martz, 1997).**
- **For no-till winter wheat, supplying fertilizer nutrients in close proximity to the seed at planting, and below the surface residue may increase fall tiller and root system development and lead to higher yields.**

Rationale

- **Nutrient placement is the only process available with the potential to counter the problem of slow fall growth and limited tiller development in no-till winter wheat.**
  - **Earlier planting can only occur on limited acres due to previous crop harvests**
  - **Excessively early planting increases risks for insects and diseases**

Objectives

- Evaluate wheat tiller density, fall/winter biomass, and grain yield response to at-planting fertilizer placement methods.
- Determine the effect of starter fertilizer rates, nutrients, and combinations placed with the seed at planting on wheat tiller density, fall/winter biomass, and grain yield.

Methods – Expt 1

Treatment No.	Fertilizer Placement	Source	Nutrients Applied N-P-K-S** (kg /ha)
1	DD	15-15-5-3.3S	28-28-9-6
2	IC	15-15-5-3.3S	28-28-9-6
3	BP	15-15-5-3.3S	28-28-9-6
4	Broadcast	15-15-5-3.3S	28-28-9-6
5	DD	20-10-5-3.3S	37-19-9-6
6	IC	20-10-5-3.3S	37-19-9-6
7	BP	20-10-5-3.3S	37-19-9-6
8	Broadcast	20-10-5-3.3S	37-19-9-6
9	Check	----------	0-0-0-0
10	Grower Standard	15-15-5-3.3S Broadcast at Planting + UAN Broadcast in Dec	28-28-9-6 + 28

*DD = Between double disc openers.
IC = With NT injection coulter in front of the double disc openers.
BP = Behind press-wheel, over the row.
**Nutrient sources are ammonium polyphosphate, urea-ammonium nitrate solution (30%N), and potassium thiosulfate solution(0-0-25-17S).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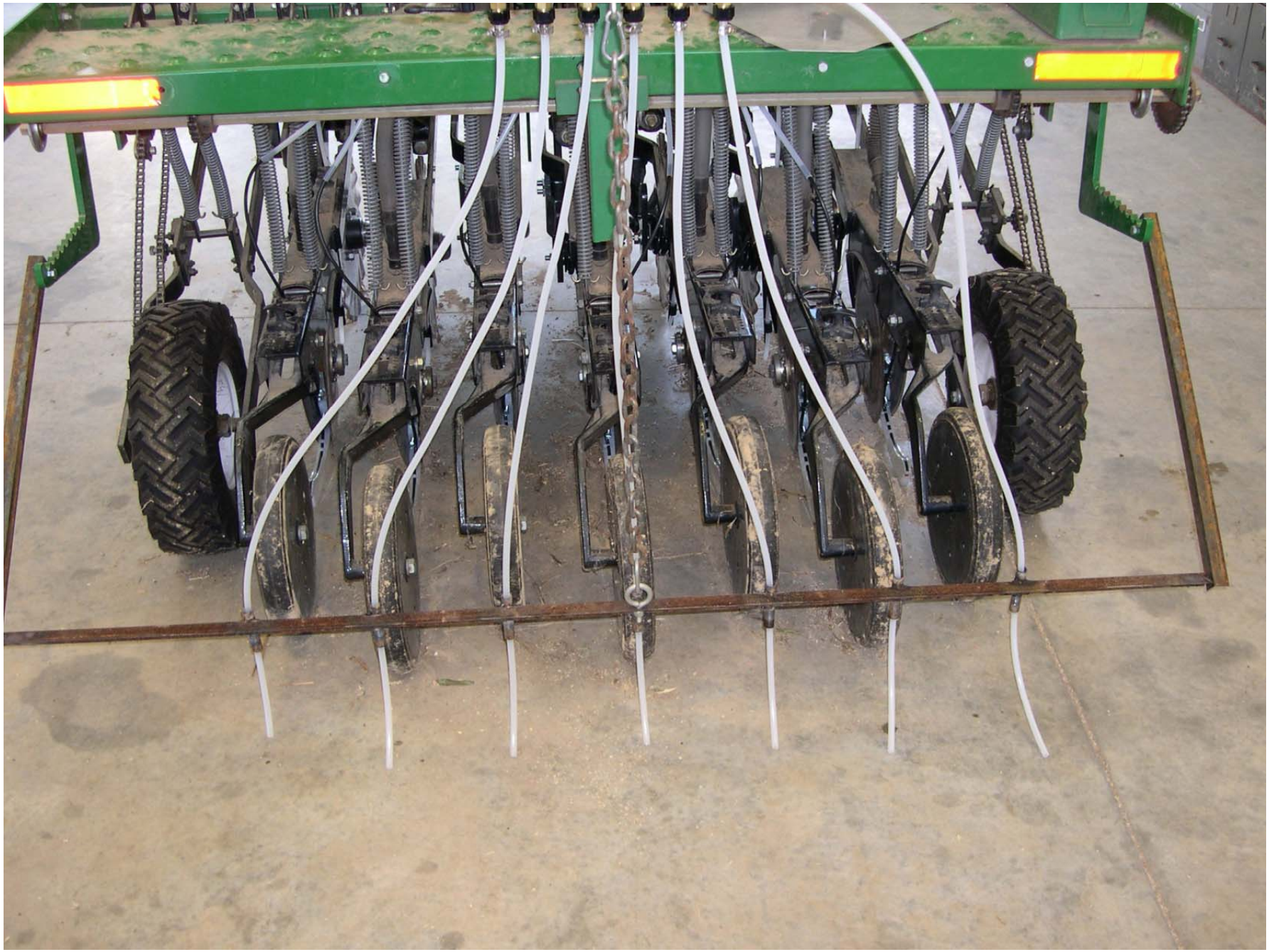
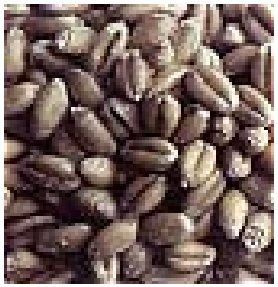
AUSHERMAN GP



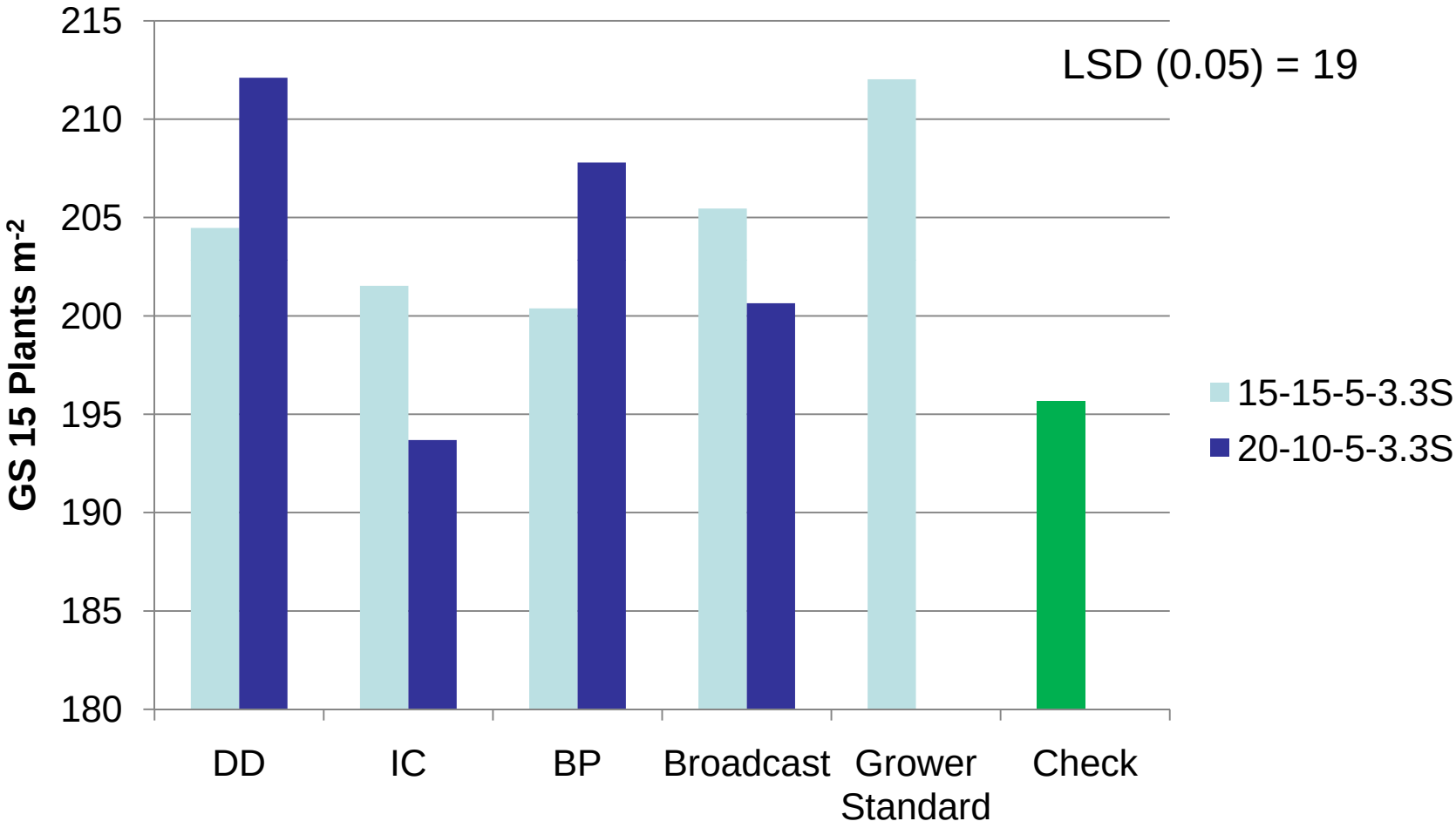

Fertilizer

Results

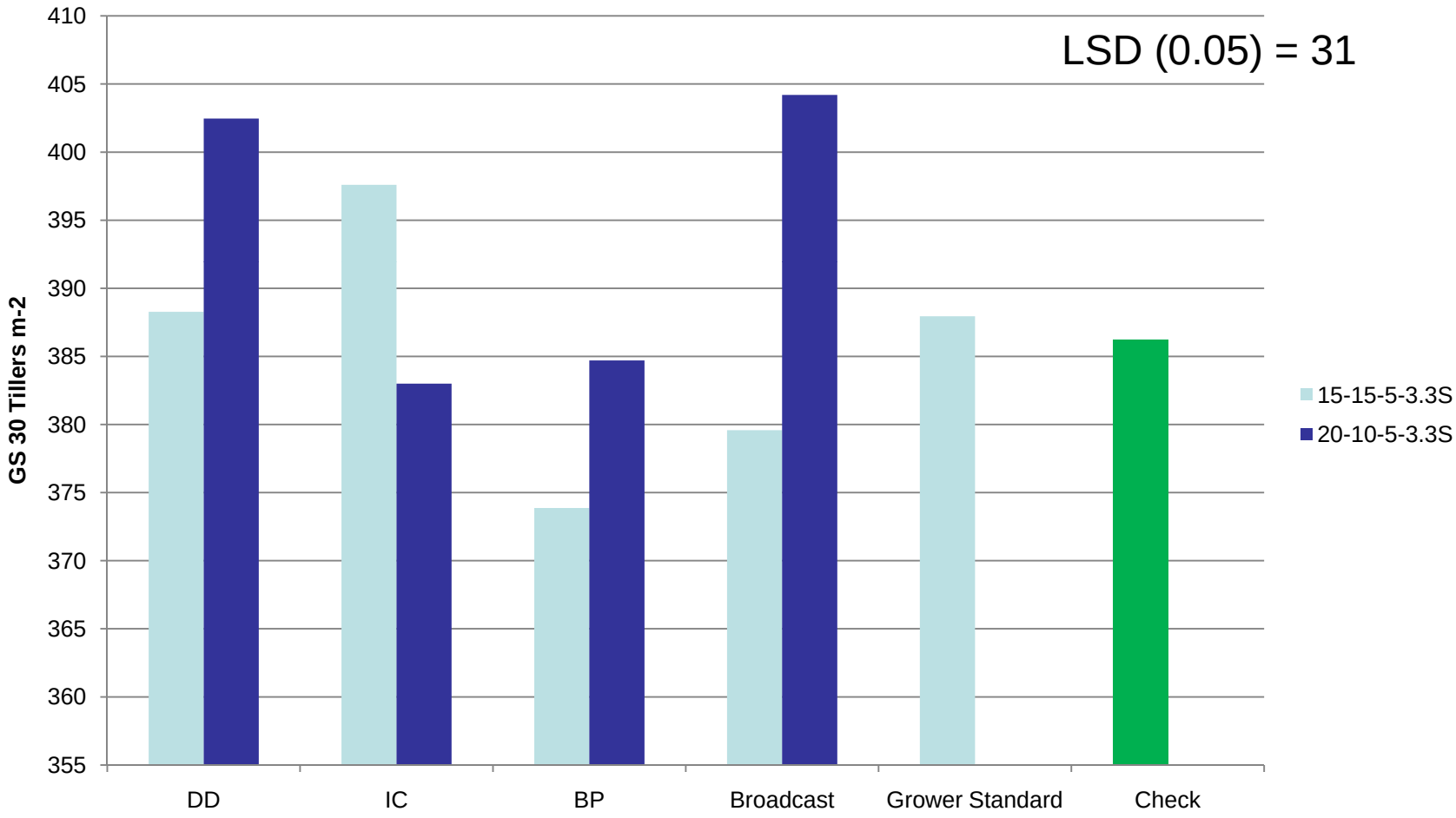
- 4 Site years (combined)
  - Spring Tillers
  - Kernels/head
  - 1000 kwt
  - Grain Yield
  - Test Weight
  - Grain Protein



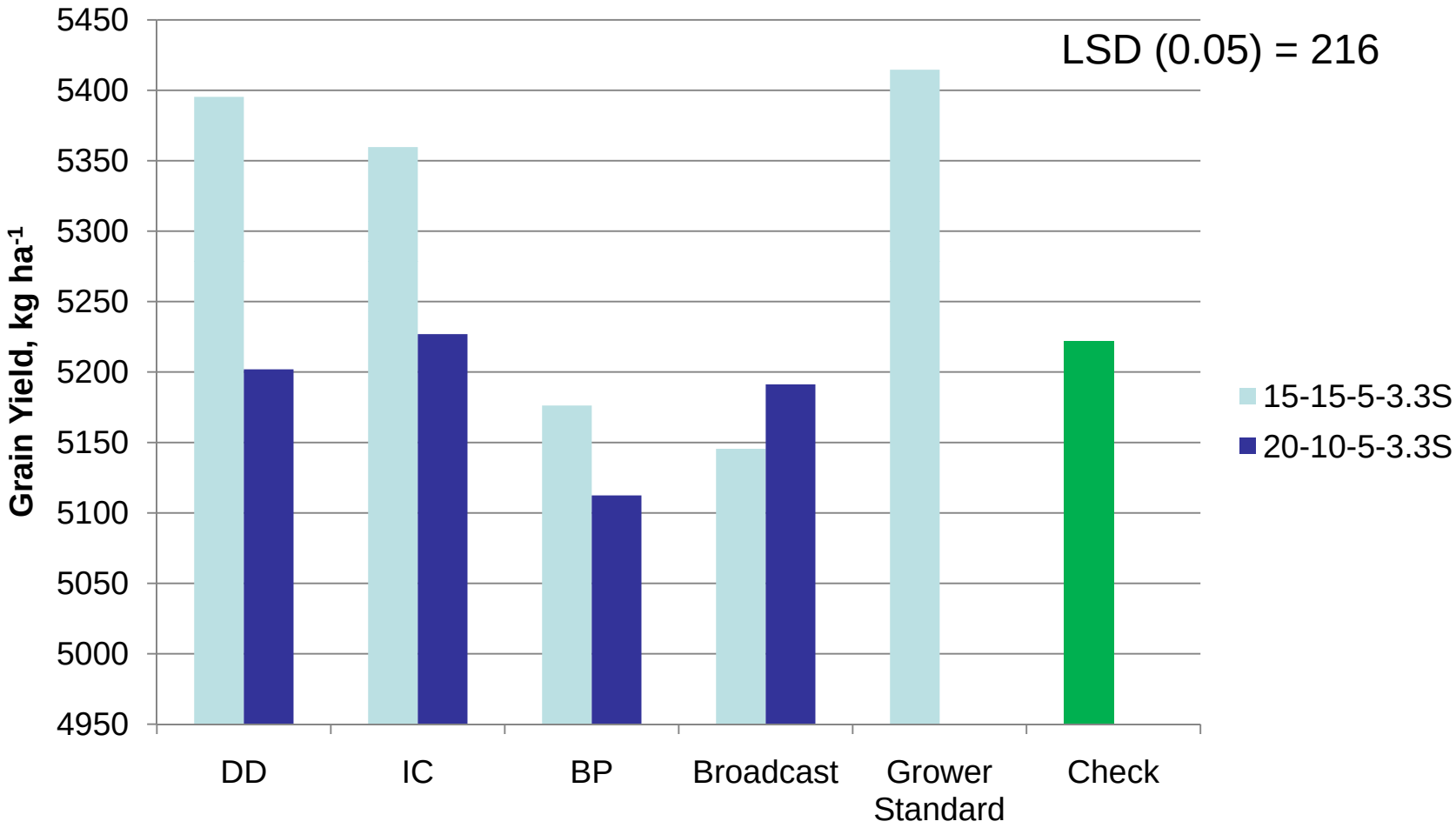
Results – Placement Studies
GS15 Plants m^{-2}



Results – Placement Studies
GS 30 Tillers m^{-2}



Results – Placement Studies
Grain Yields



Conclusions
Placement Studies

- Early season plant stands were similar between the Grower Standard and Broadcast treatment – as expected.

- Fewer GS 15 plants were observed in the check and with 20-10-5.5 injected behind a rolling coulter compared to either source placed between the double disc openers.

Conclusions
Placement Studies

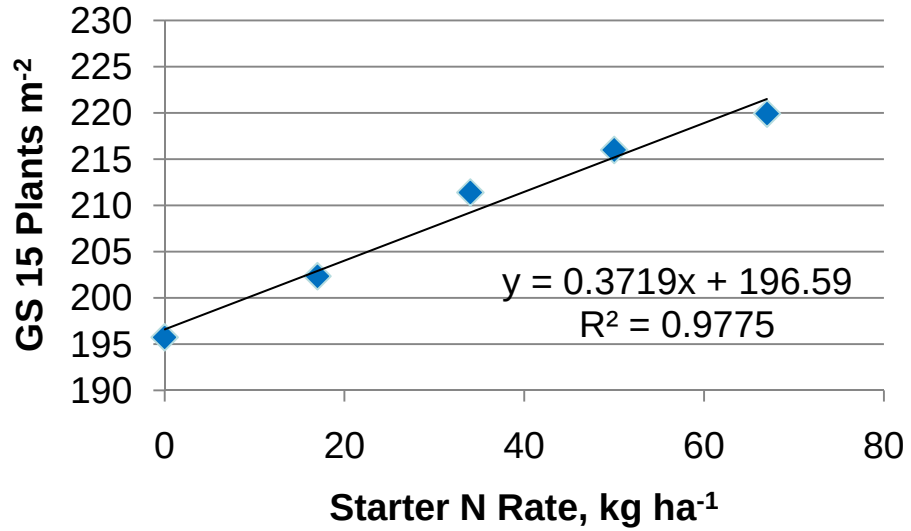
- Similar to the GS 15 results, at GS 30 fewer tillers per unit area were observed when 20-10-5.5 was injected behind a rolling coulter compared to other treatments.
- Grain yield was numerically highest in the grower standard treatment, but was not different from the check with yield levels of 5.4 t/ha (80 bu/acre)

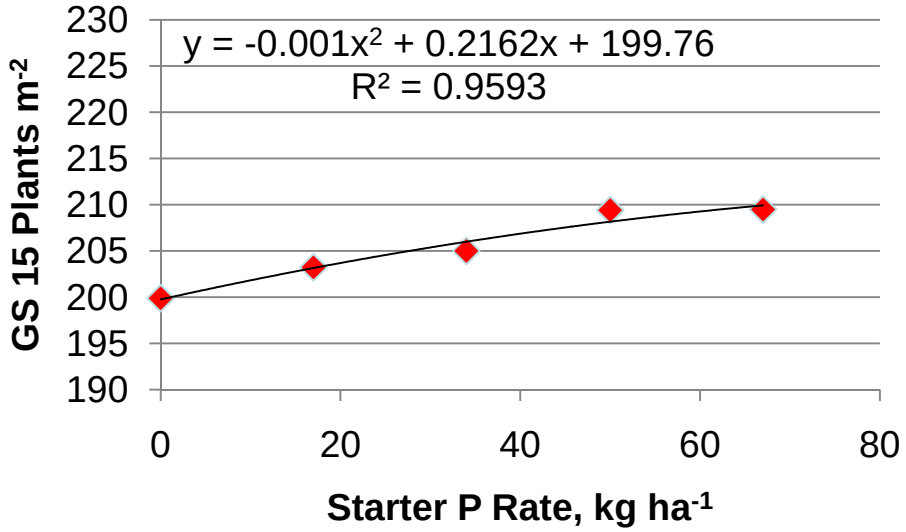
Methods – Expt 2

Treatment No.	Nutrients* N-P-K-S (kg/ha)
1	0-0-0-0
2	17-34-9-6
3	34-34-9-6
4	50-34-9-6
5	67-34-9-6
6	34-0-9-6
7	34-17-9-6
8	34-34-0-0
9	34-50-9-6
10	34-67-9-6

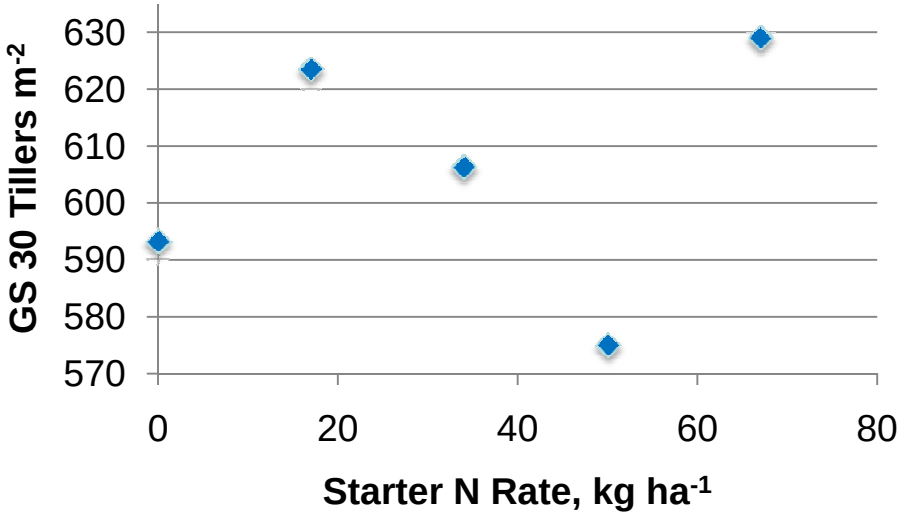
Nutrients placed between the double-disc openers at planting using seed firmers.
Nutrient sources were ammonium polyphosphate solution, urea-ammonium nitrate solution (30% N), and potassium thiosulfate solution(0-0-25+17S).

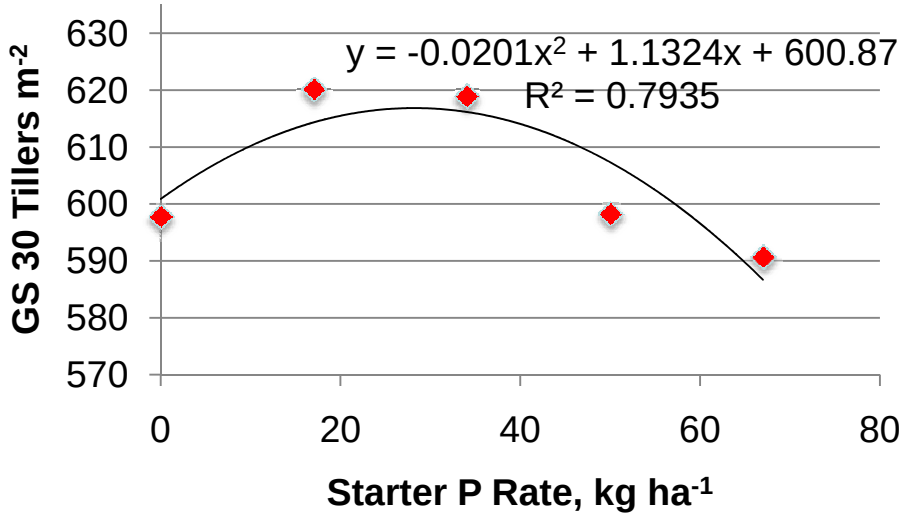
Results – Rate Studies (4 site years)
GS 15 Plants m^{-2}



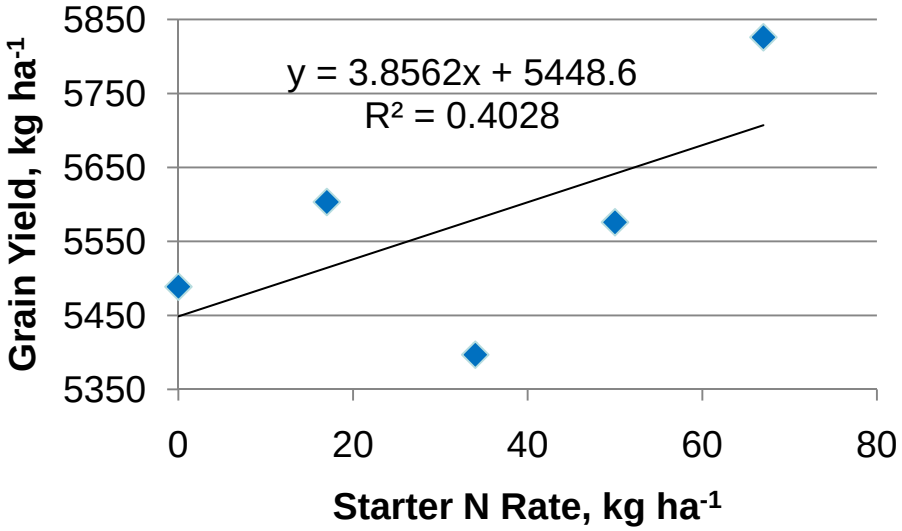


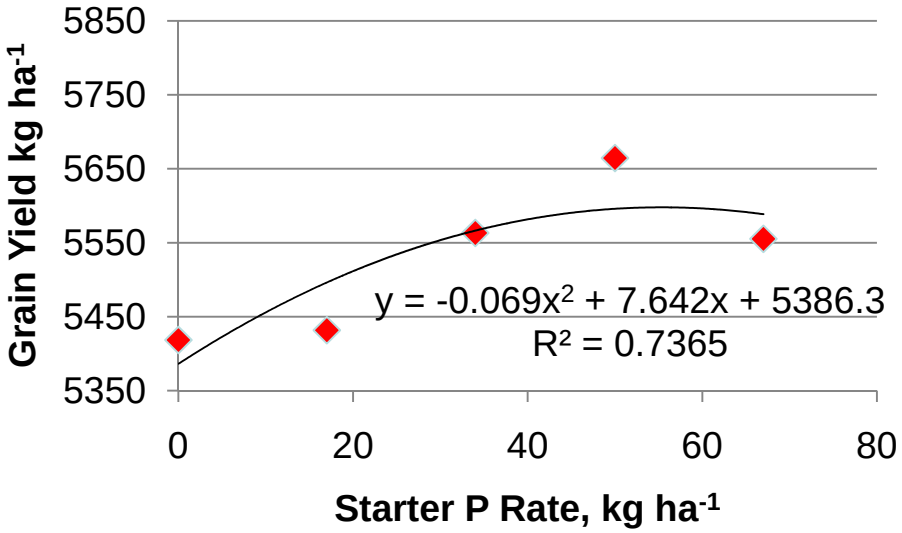
Results – Rate Studies
GS 30 Tillers m^{-2}





Results – Rate Studies
Grain Yields





Conclusions

Rate Studies

- Increasing rates of starter N increased early season plant numbers and grain yield.

- Starter P rates up to 50 and 67 kg ha^{-1} increased grain yield and early season plant counts, respectively.

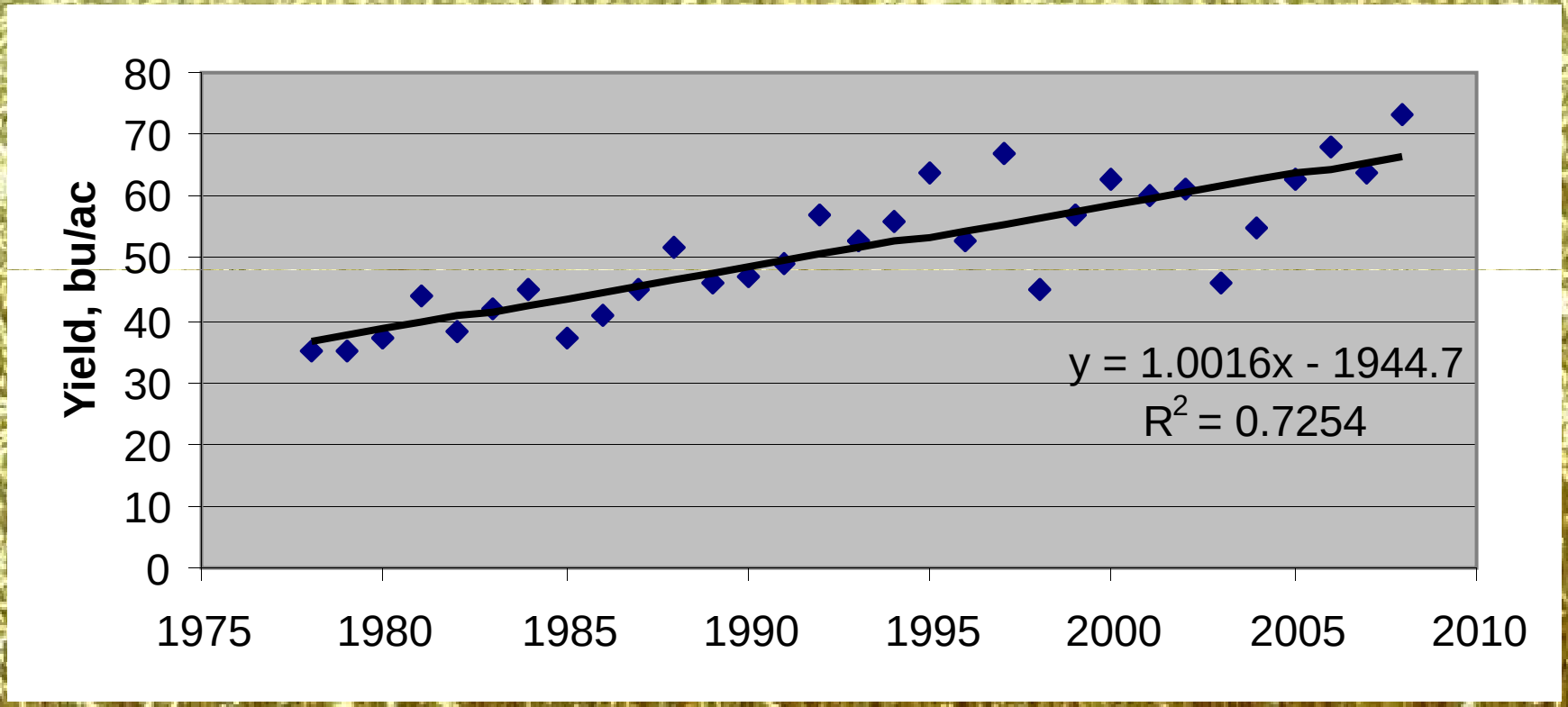
Conclusions
Rate Studies

- Tiller density impact at GS 30 was variable.

- Based on placement work conducted concurrently, it is likely that these results could be achieved with standard surface application techniques (broadcast at-planting + “Thanksgiving Application”

Third Year is “In the ground”

ADVANCED INTENSIVE MANAGEMENT PROJECT



Virginia Wheat Yield Contest 2008

1. **131.7 bu/ac**
2. **130.0 bu/ac**
3. **111.1**

Press Releas

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CHESAPEAKE BAY FOUNDATIO

July 31, 2008
For Immediate Release
Contact: Chuck Epes, 804/780-1392

Chesapeake Bay Foundation Applauds Virginia's Top Wheat Farmers For Producing Outstanding Yields Using Bay-Friendly Farming Techniques

RICHMOND, VA. -- The Chesapeake Bay Foundation (CBF) today congratulated Virginia's top wheat farme for producing record yields while using conservation practices critical to restoring the health of the Chesapeak Bay and Virginia rivers and streams.

Ann F. Jennings, CBF Virginia Executive Director, praised the wheat farmers "for their leadership in production and for their leadership in using conservation practices that assist Virginia in meeting its goal of improving water quality in rivers, streams, and the Chesapeake Bay."