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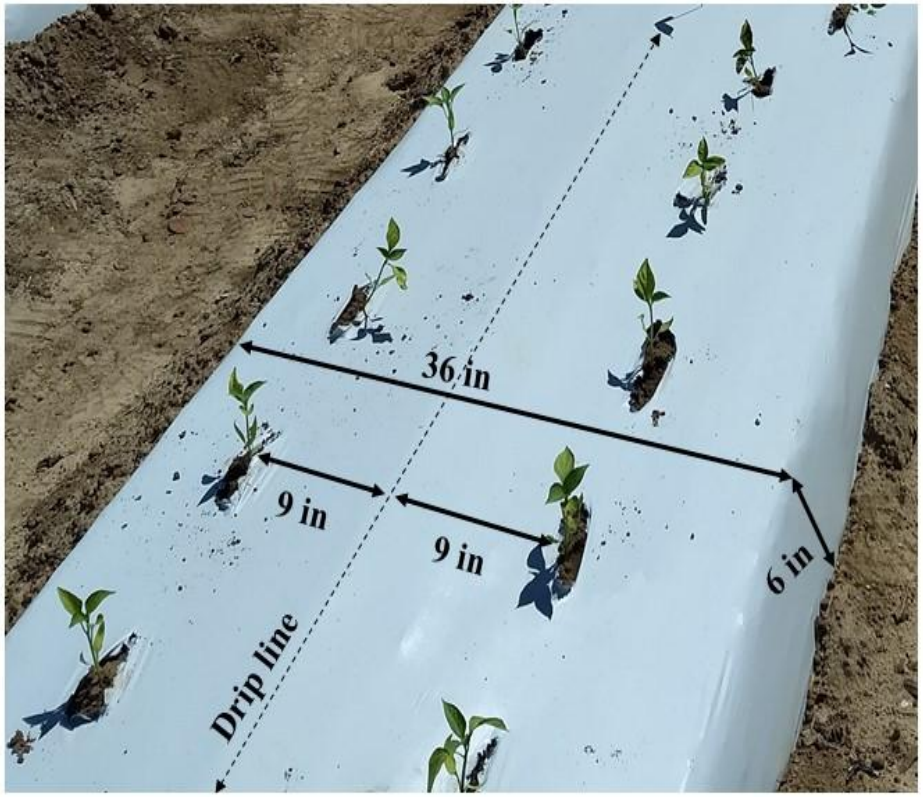
Identifying the Optimum Row Spacing for Bell Pepper Production in Sandy Soils

S. Hollifield & A. da Silva

Brooks County Commercial Bell Pepper Production

- Production primarily on plastic mulch with drip irrigation
- Grown in sandy and loamy sand soils



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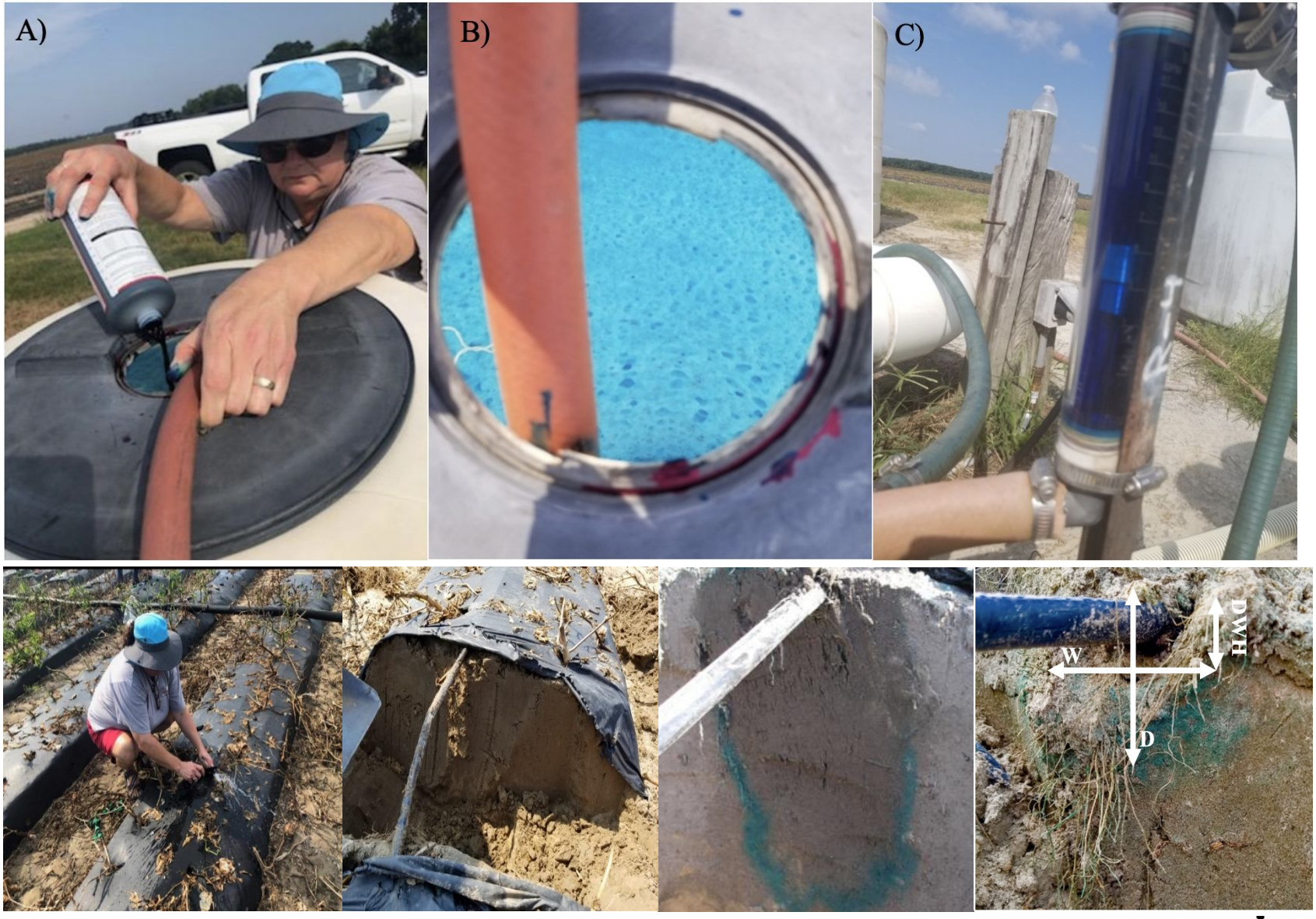
Blue Dye Field Test



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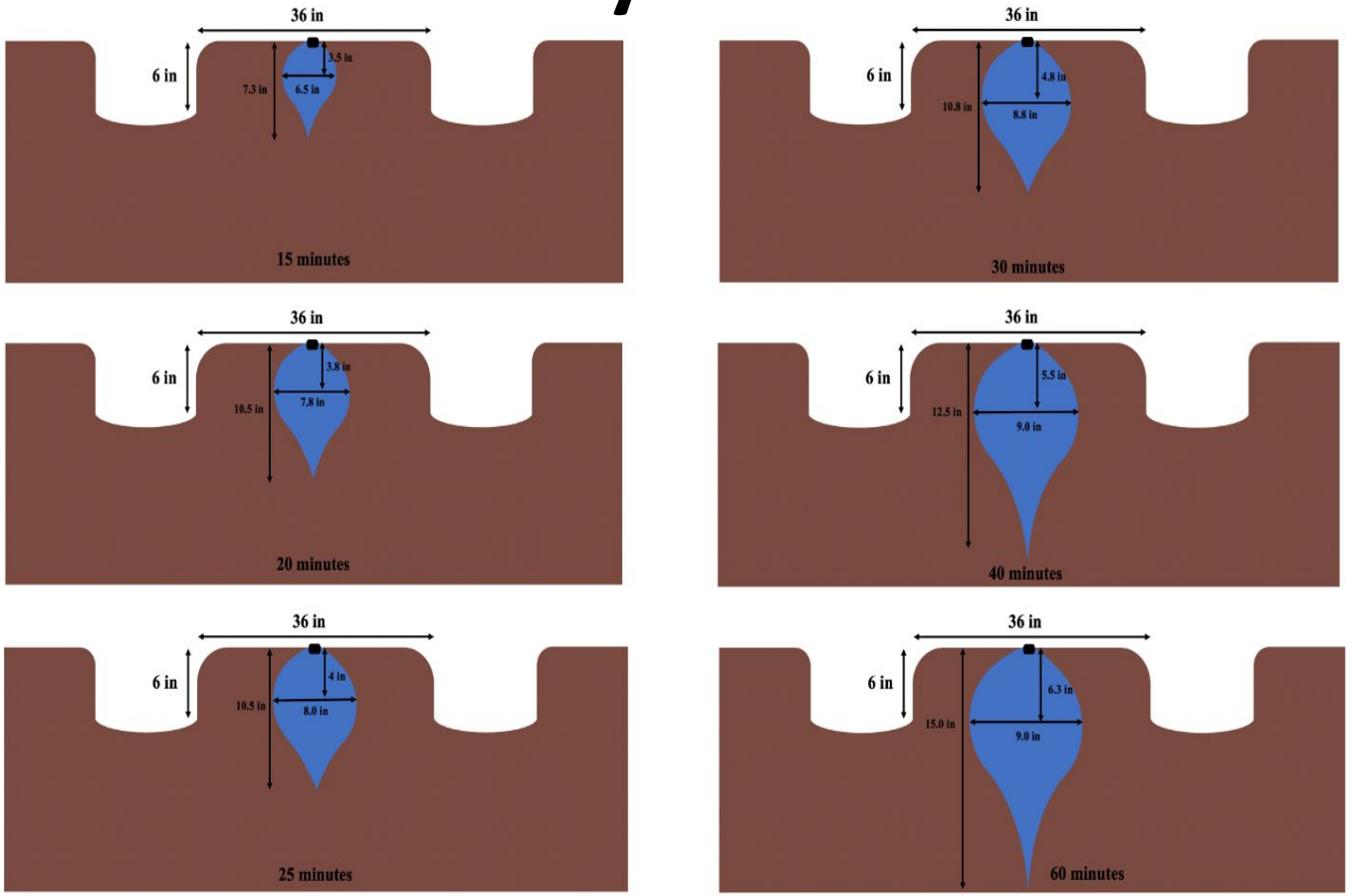
Blue Dye Results



Evaluated 6 treatments: 15, 20, 25, 30, 40, and 60 minutes of irrigation at 500 gpm and 60 psi.

Distance between bed surface and deepest dye observation (D), maximum wetted width in the wet zone (W), and distance from bed surface down to measured width (DHW). Irrigation events exceeding 40 minutes only represented downward water movement. Lateral soil water movement had a plateau at 9 inches from the drip line at 40 minutes of irrigation.

Proposed Hypothesis

- Theory was developed that reduced lateral soil water movement, after irrigation events in the sandy soils, may justify a decrease in the spacing between rows.
- **Hypothesis -** Decreased plant row spacing may positively influence bell pepper crop potential and yield.

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Objective

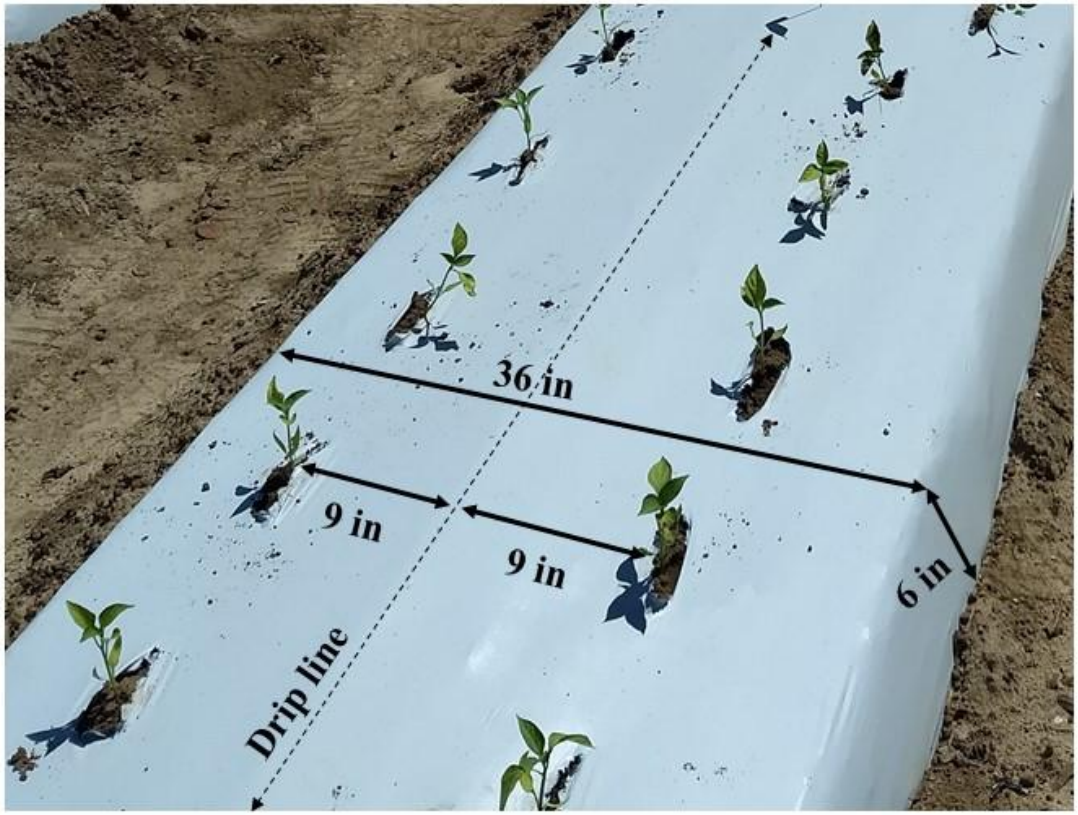
- Identify the optimum row spacing within beds for bell pepper production in sandy soils, sequentially assisting bell pepper producers with management of irrigation and fertigation requirements for maximum yield potential and profit.

Material and methods

- Planted Bell pepper cultivar Autry.
- Plots were flagged representative of 4 treatments with 3 replications in 20 foot plots.

Material and methods

- Planted in plastic mulch raised (6 inch) beds with single center drip line.



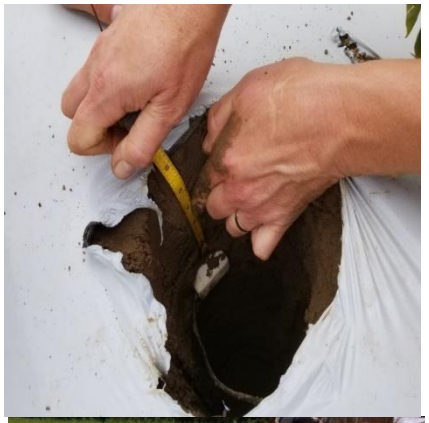
Material and methods

Treatments included:

- 1 = 12 inches (6” from drip line)
- 2 = 14 inches (7” from drip line)
- 3 = 16 inches (8” from drip line)
- 4 = 18 inches (9”from drip line).

Data Collection

Decagon Em50G soil moisture sensor was installed to monitor soil moisture availability throughout the growing season.



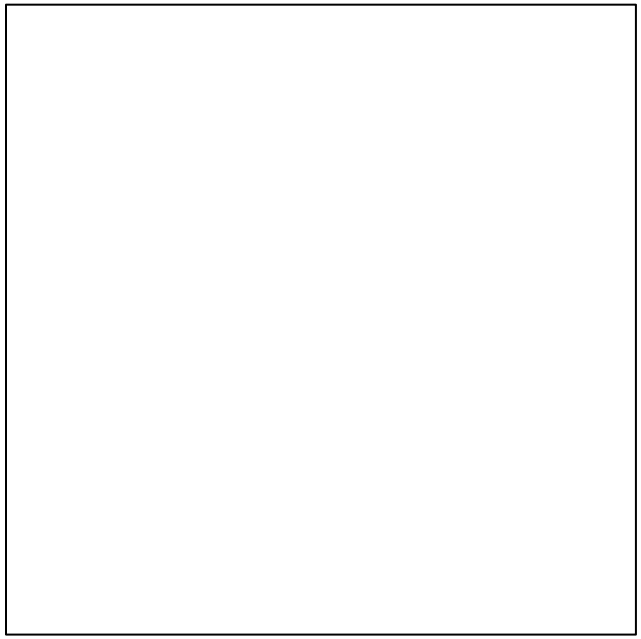
Data Collection

- Stand count assessment used for evaluation of early plant survivability and vigor after transplant.

Data Collection

- Tissue samples collected at transplanting, vegetative, flowering, and fruiting.
- Harvested to evaluate yield of bell pepper as it relates to row spacing treatments.

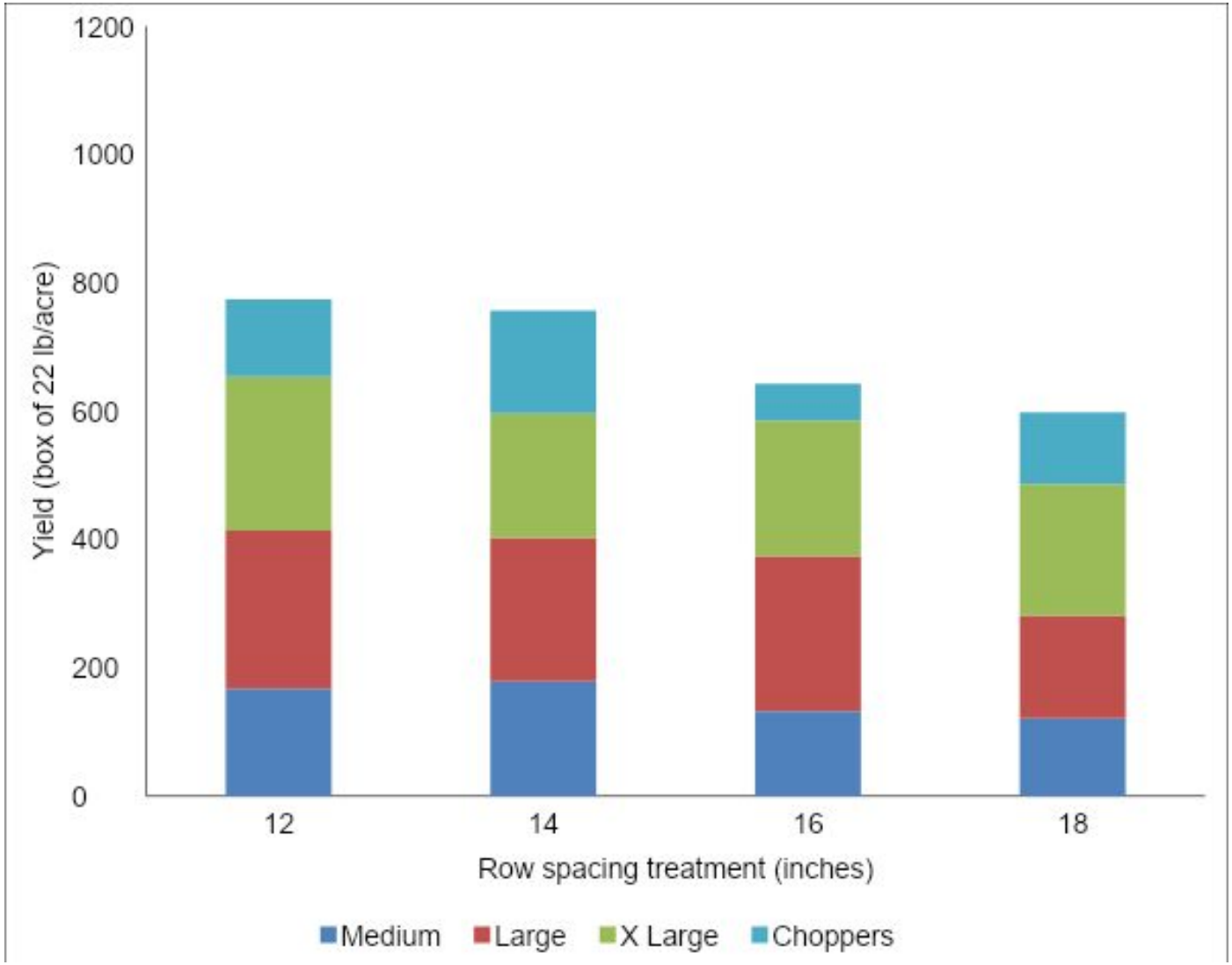
Results



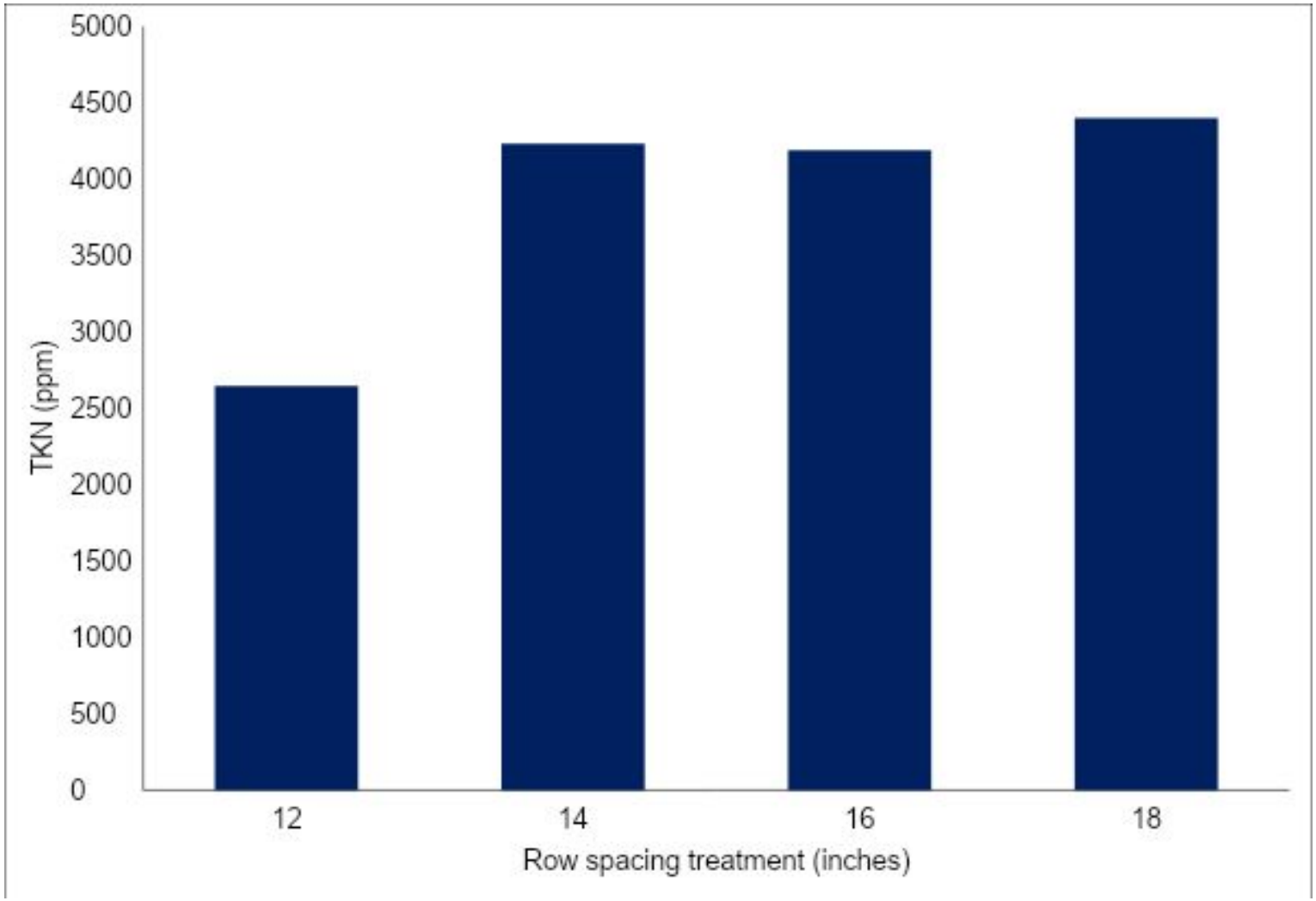
Soil moisture averaged:

- 12 in = 0.37 in^3/in^3
- 14 in = 0.33 in^3/in^3
- 16 in = 0.30 in^3/in^3
- 18 in = 0.26 in^3/in^3

Results


1200
1000
800
600
400
200
0
Yield (box of 22 lb/acre)
12
14
16
18
Row spacing treatment (inches)
Medium
Large
X Large
Choppers

Results


5000
4500
4000
3500
3000
2500
2000
1500
1000
500
0
TKN (ppm)
12
14
16
18
Row spacing treatment (inches)

Economic Impact

- 112.4 more boxes harvested/acre at 14 inch row spacing (7 inches on each side of drip line) equates to $2,922.40 more income received per acre, at $26.00/box.

Summary

- Results emphasized the importance of plant row spacing and the significant role soil moisture availability, factors into plant yield capabilities.
- Data also determined that too large reduction in plant row spacing may decrease nutrient availability.

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Acknowledgements

Grower Cooperator, DeWitt Farms – Randy & Brandon DeWitt and Dr. Andre da Silva, Assistant Professor/Vegetable Specialist Auburn University

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