

S-SARE Young Scholar Internship: Extending the Market Season with High Tunnel Technology for Sustainable Organic Fruit Production; an Internship and Apprenticeship for Sustainable Horticulture

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Fig. 3. 'Natchez' high tunnel blackberries.

Introduction

The S-SARE project (LS12-250) aims to develop environmentally and economically sustainable organic berry production systems combining high tunnel and field production to provide season extension, expanded production and crop protection.

The Young Scholar Enhancement Program granted a student the opportunity to study the relationship between blackberry production system (tunnel-in-tunnel, high tunnel, and field) and the effect on fruit and storage quality. Additionally, the student conducted a project on the potential for mist cooling systems to serve as a temperature regulation system in high tunnel primocane blackberry production.

Internship Purpose and Objectives

The goal of the Young Scholar Enhancement project was to provide an experiential environment for learning sustainable organic crop management, research operations, experimentation, and communicating information.

Internship Objectives

1. To participate in the research of organic management of primocane blackberries and raspberries for extended autumn production, and florican blackberries and blueberries for advanced spring production in high tunnel and field production systems, including data collection and sampling, data entry, and data assessments
2. To assist in the management of organic blackberries, raspberries, and blueberries, including management of water, competitive vegetation, temperature, nutrition, irrigation, and pests
3. To conduct research studies on the postharvest quality of high tunnel and field blackberries
4. To implement and study a mist system for temperature management in a screened high tunnel
5. To use this research as the basis for an Honors Thesis as well as a Sustainability Minor Capstone Project
6. To participate in sustainable fruit production workshops
7. To prepare a research poster to be presented on campus, and at regional and national horticulture conferences



Fig. 1. SARE-YSE apprentice Kenneth Buck (L) and REU intern Bailey Smith (R) harvest 'Natchez' blackberries for use in post-harvest analysis.

Materials and Methods

Post-Harvest Study

- Managing canes including: thinning, pruning, tipping, and tying canes
- Harvesting 'Natchez' blackberry
- Analyzing pre-storage quality metrics including soluble solids (brix), titratable acidity, and percent marketability
- Analyzing and comparing post-storage quality metrics including soluble solids, titratable acidity, red drupe count, and leakiness

High Tunnel Cooling Mist System Study

- Installing an overhead misting system in the primocane blackberry high tunnel
- Monitoring the environmental effects of the mist system on tunnel conditions, specifically temperature
- Analyzing plant health, berry yield, and berry quality to determine the potential benefits of incorporating the system

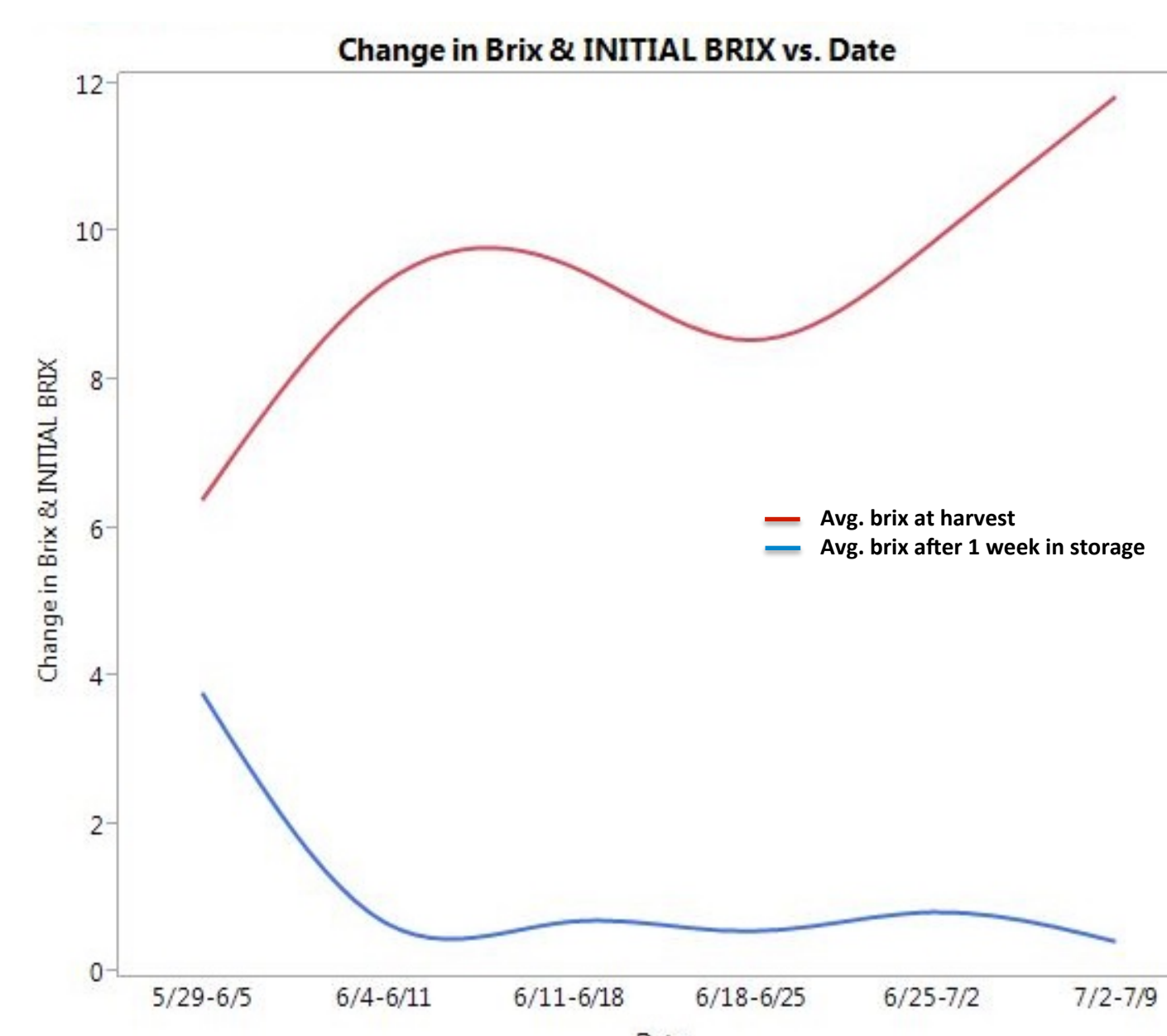


Fig. 2. As brix increased across the harvest season (red line), the post-storage brix (blue line) became less volatile and stayed close to pre-storage readings.

Internship Observations & Lessons Learned

- Learned principles of experimental design and considerations involved in research-related decisions
- Developed knowledge about organic production management
Learned horticultural management of blackberries, raspberries, and blueberries
- Gained crucial knowledge concerning the identification of common pest and diseases in organic blackberry, raspberry, and blueberry production
- Became familiar and comfortable with the operation of equipment commonly used in horticultural research labs and fruit quality evaluation
- Acquired proficiency with common professional analytical software such as Excel, SAS and JMP

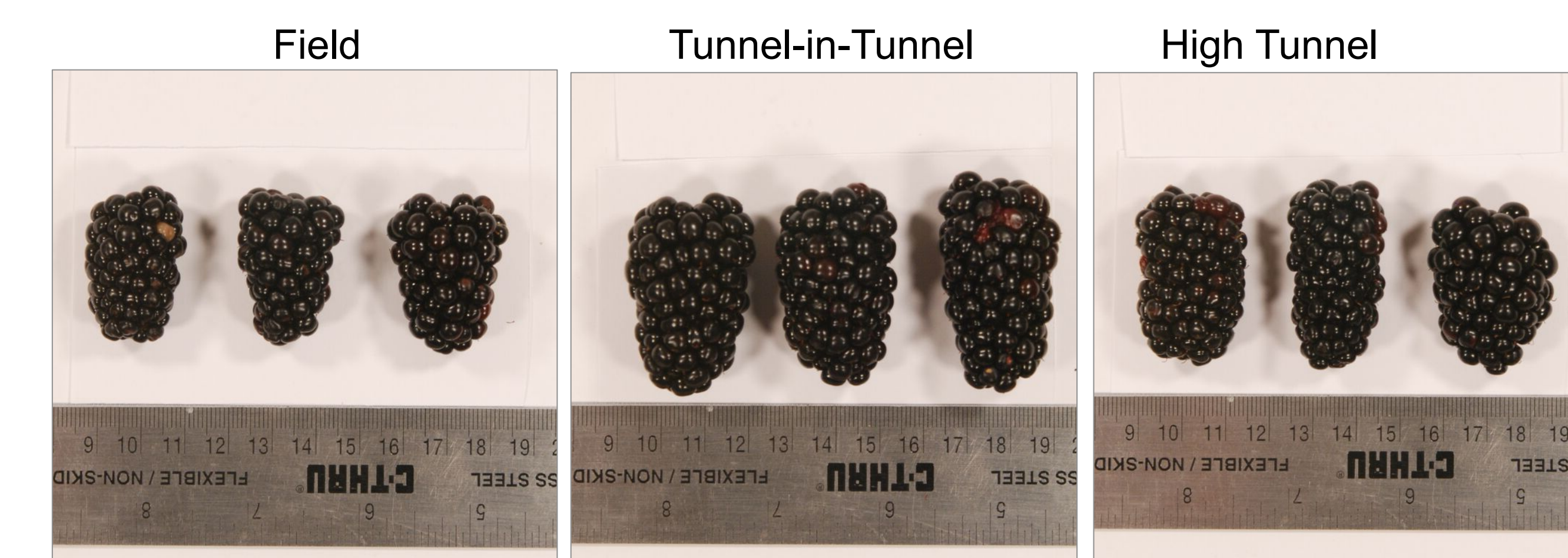


Fig. 4. A pre-storage comparison of size and berry quality between three production treatments. 'Natchez' blackberries harvested on June 11th.

Summary

High tunnels are a potential means of extending the cropping season and protecting high value crops from environmental damage and pests. High tunnels complement field production systems and contribute to economic sustainability. The tunnel-in-tunnel system was created by placing another layer of greenhouse poly inside the tunnel with the intention of forcing earlier flowering and extending the harvest season past frost. This project attempted to establish a scientific link between high tunnels and improved fruit quality. Data is currently being analyzed. Preliminary results indicate no significant differences in post-harvest quality among the treatments. The S-SARE Young Scholar Enhancement internship provided an undergraduate student with an opportunity for the application of classroom learning and the development of hands-on skills in preparation for a career in sustainable agriculture.

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