Vegetables and Herbs Under High and Low Tunnels: Completion Report

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Introduction
Growing vegetables and herbs in unheated high tunnels, either alone or in combination with low tunnel row covers, may help producers overcome some of Wyoming’s climate obstacles. The goal of this project was to successfully grow fresh tomatoes, peppers, green beans, and basil in two high tunnels (one north–south [NS] oriented, one east–west [EW]) with and without low tunnel row covers. The project was completed in 2016.

Objectives
Our main objective was to determine any differences in yields when vegetables and an herb were grown under high tunnels alone or with low tunnel row covers within the high tunnels. Another objective was to determine any differences in yields depending on location within each of the two high tunnels.

Materials and Methods
Three species of vegetables and one herb were grown in each of the two high tunnels at the Laramie Research and Extension Center greenhouse complex. Fresh ‘Ace 55’ tomato, ‘Anaheim Chili’ pepper, and ‘Thai Asian’ basil seeds were sown in the greenhouse April 4, 2016, and were transplanted to the high tunnels May 26, 2016. Fresh seeds of ‘Earli Serve’ green beans were directly sown into the high tunnels May 26.

Three tomatoes, four peppers, 10 bean seeds, and five basils were planted in northeast, southeast, northwest, and southwest locations within each high tunnel. All plants in the NE and NW sections of the N–S tunnel, and the NE and SE sections of the E–W high tunnel, were covered with white fabric low tunnel row covers suspended over metal hoops (Figure 1). The plants in the other sections were left uncovered.

Yield data collected were tomato, pepper, and green bean fruit weights per plant; fruit were harvested as needed all summer. Yield data on basil was the fresh weight of each plant, harvested August 19, 2016. The study ended the same day.

Results and Discussion

Basil: The locations with the highest average basil fresh weights were both SE corners. Highest average fresh weight was in the uncovered SE spot of the N–S high tunnel (3.5 oz), but the next highest, 3.1 oz, was in the covered SE section of the E–W tunnel (Figure 2). Overall average of basil plant weights were 2.5 oz in the covered low-tunnel plots and 2.0 oz in the uncovered plots. Overall, basil plant weights were 2.3 oz in the N–S tunnel and 2.3 oz in the E–W tunnel.

Beans: For unknown reasons, green bean seed germination was very poor with zero germination in the E–W tunnel in the NE and SE corners, both of which were covered with low tunnels. Of those that germinated, 44% of the plants produced no fruit. Of those that did produce fruit, the highest average was 1.3 oz (N–S SW section).

Figure 1. Some plants in the test were covered with white fabric low tunnel row covers suspended over metal hoops.
Chili peppers: 39% of the plants produced no fruit. The highest average fruit weights were in the N–S NE (1.3 oz) and E–W SE (1.3 oz) sections, both low tunnel-covered.

Tomatoes: 67% of the tomato plants produced no fruit by the end of the study. Of those that did flower and fruit, the highest average fruit weights were in the E–W NE low tunnel-covered plot (3.9 oz) and N–S NW low tunnel-covered section (3.0 oz).

Results indicated no particular yield advantage to either tunnel. Low tunnel row covers did seem to help increase yields with basil, chili peppers, and tomatoes, but made little difference with green beans. Less evapotranspiration, less exposure to wind, and potentially more consistent temperatures under the low tunnels may have contributed to slightly higher yields.

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