

Economics of high tunnels examined in southwestern United States

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Used throughout the world in horticulture and agriculture production, high tunnels are less complex and less expensive versions of greenhouses. The structures' passive heating and cooling capabilities can offer growers a cost-effective way to extend the growing season for high-value crops such as fruits, vegetables, and cut flowers. High tunnels can provide protection against some insects, early freezes, hail, and other weather events. A new study recommends the best high tunnel designs for growing lettuce and spinach during the winter season in the southwestern United States.

Using high tunnels can be an important advantage to local farmers, helping to extend growing seasons for fruits and vegetables as well as allowing them to offer locally grown products during off seasons. The authors of a new study published in *HortTechnology* say that extending the season with high tunnels has the added benefits of providing farmers with a more constant income flow and the ability to do better market planning.

Mark Uchanski and colleagues from New Mexico State University evaluated three models of high tunnels for winter production of spinach and lettuce. "Our (research) emphasis was on low-cost, practical structures that are applicable to farmers with limited resources and who may wish to test winter production before making larger investments in more advanced greenhouses," Uchanski said. The experiments, which were implemented over three growing seasons, were designed to measure differences between three passive solar high tunnel designs of different

expense and heat retention capacities, and to evaluate growth and yield of spinach and lettuce planted at two different dates in each tunnel. The team conducted economic analyses in order to develop a risk model to determine relative probability of profitability of each tunnel design.

Three high tunnel designs were used at two locations in New Mexico; designs included a single layer covering the house, a double layer inflated with air, and a double layer inflated with air and containing black water barrels to store heat. "The single-layer and double-layer designs appear to be the more appropriate technology for both locations for spinach, whereas the third model (double layer with water barrels) might be a reasonable option for lettuce in more-northern locations," Uchanski said. "Overall, the single layer and double layer models provided adequate protection for growing crops, were less expensive to build, provided more interior growing space, and resulted in higher probabilities of producing positive returns compared with the double layer with water barrel design."

The authors noted that the double-layer design performed similarly to the single-layer design, but required running electricity to the structure to power the inflation fan, which added to the cost. As a result, expected returns in all cases were higher using the single-layer design, based on the results of the sensitivity analyses.

"This study combining the risk and the sensitivity analyses provides growers with a unique evaluation process to make high tunnel design, planting date, and crop choices," the authors said.

More information: The complete study and abstract are available on the ASHS HortTechnology electronic journal web site:

horttech.ashspublications.org/...tent/24/1/7.abstract

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