

## **Abstract**

Increasing average global surface temperatures and severe climatic events can lead to an increase in the severity and frequency of droughts. With increases in global populations, methods to increase food resources and water conservation are needed to meet demands. The purpose of high tunnels is to extend the growing season, allowing for more crop production, with the high tunnel covers used to trap in heat. While high tunnels are useful, high tunnel irrigation creates significant water waste and a negative dependence on other water sources. The research conducted here aims to provide a way to collect rainwater off a high tunnel, with the future intention of using it for irrigation purposes. A scaled high tunnel structure was constructed to simulate a high tunnel environment, and on that structure four different materials were tested. Of the four materials, the PVC loofah mat performed the best but was estimated to be too heavy for high tunnel usage, so a half-as-thick PVC loofah mat was tested. There was not a statistically significant difference between the two materials when a Mann-Whitney U test was used ( $U = 10$ , critical U value of 2). The half-thickness PVC loofah mat presents an example of a material that could be used on a high tunnel to increase the amount of rainwater that could be collected off the high tunnel. The research presented here could be used in the future as part of a larger system that collects, stores, and distributes water to plants within a high tunnel structure.

*Keywords:* high tunnels, water resource management, high tunnel cover, water collection, nature, materials