Horticulture

EXTENSION
UtahStateUniversity

extension.usu.edu

December 2019 Horticulture/HighTunnel/2019-04

High Tunnel Site Selection

Tiffany Maughan, Dan Drost, and ***Brent Black***

High tunnels are an effective tool for extending the growing season and providing protection to high value crops. Although high tunnels are not considered permanent structures, most growers leave their tunnel in the same place for many years. Deliberate planning upfront to determine the best location on your property for a high tunnel is critical for success. This fact sheet details several factors you need to consider as you plan for a high tunnel.

Size

High Tunnels come in many shapes and sizes. Tunnel selection depends on space available, the crop being grown, equipment access needed, and expected wind and snow load issues. High tunnels can be constructed using commercial kits or built from scratch following design plans. Visit tunnel.usu.edu to see detailed construction plans for several different tunnels that have worked well in Utah.

Figure 1. High tunnels of different size and length.

Sunlight

Sunlight is one of the most important factors to consider when selecting a site for a high tunnel. Since high tunnels are an investment and the space inside is highly valuable, do not limit growth by limiting sunlight. Care should be taken to avoid placing the high tunnel where it will be shaded. Remember that during the fall and spring, when high tunnels provide the most benefit, the sun is at a low angle and casts longer shadows than during the summer. If there is a building south or west of the proposed site, set the high tunnel back 2 to 2.5 times the height of the building. When high tunnels will be next to each other, they can be built closer together (1 to 1.5 times the height of adjacent tunnels). When planting hear trees, remember tree height is not static. Since high tunnels remain in the same spot for several years, overtime, a small tree will become a large tree with significant shading potential.

Orientation

In general, orienting a high tunnel East/West maximizes sunlight exposure during the low-light period of winter and is best for late-fall, winter, and early-spring production. A North/South orientation has less crop shading (an important consideration for tall crops) and warms up more quickly in the morning, requiring earlier ventilation. For locations well above 40°N, East/West orientation is recommended. However, prevailing wind direction and topography should also be considered when deciding tunnel orientation and are covered in following sections.

Soil

High tunnels are used for very intensive production. It is critical that the soil in the high tunnel is healthy, free draining, and fertile. Avoid sites with compaction, soil-borne diseases, excessive weed pressure, water-logging issues, or locations where the same crop as you plan to grow has been growing for multiple years. Before building a high tunnel, have the soil tested and use this information to make soil improvements. USU's Analytical Laboratory tests soil and provides information on proper sample collection and test pricing.

Drainage/Topography

High tunnels displace rainfall. For example, a 30' x 96' structure sheds 1,728 gallons of water for every inch of rain. As the water runs down the sides of the tunnel, it needs to have a place to go that will not create issues for the high tunnel or surrounding crops, buildings, or roads. Consider creating a drainage ditch (figure 2) to direct water to where you would like it to flow. Avoid building a high tunnel in low spots or at the bottom of a hill to help prevent runoff flowing into or through the tunnel. Creating an elevated pad for the high tunnel to sit on helps ensure water drains away from the tunnel.

Wind

High tunnels can be significantly damaged by high winds. If possible, face tunnel end walls toward the prevailing wind to decrease the surface area the wind is hitting against and present the strongest side to the wind. If high winds are an issue in your area, windbreaks help protect a high tunnel. Keep in mind the shading potential of the windbreak when determining tunnel placement.

Figure 2. Lined drainage ditch to direct runoff.

Accessibility

High tunnels require daily monitoring and easy access is critical. If possible, build the high tunnel near the house or main farm buildings. Plan for year-round access. In areas that receive snow, special winter management is needed. Snow removal may require shoveling or plowing to keep levels low and avoid buildup around the tunnel (figure 3). It is important to have space to maneuver around all sides of the tunnel for these winter tasks. In addition, if power equipment (tractors, tillers, planters, etc.) are used in the tunnel, be sure there is sufficient room to maneuver these tools around the tunnel.

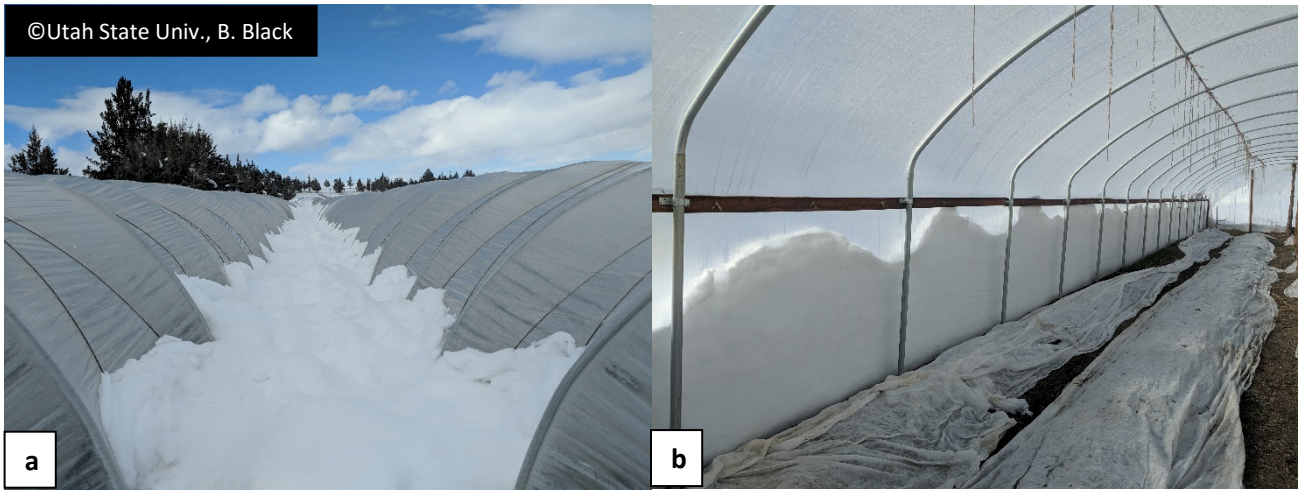

Figure 3. a) Snow build-up between high tunnels built too close together. b) Snow shading crops inside high tunnel.

Water

Select a high tunnel site where irrigation water is accessible. Secondary irrigation water can be used in a high tunnel but should be filtered before use with a drip system. High tunnel crops require irrigation during times of the year when secondary water may not be available. Building your tunnel next to a freeze-free, culinary water source will ensure year round irrigation is possible.

Figure 4. Freeze-free culinary water spout beside high tunnel.

Electricity

High tunnels are passively heated; however, there are situations where electricity may be needed at the tunnel. Consider running electricity out to your tunnel or build near a power source. Electricity may be needed during construction, if you plan on using automatic ventilation, electric heating (cables, heaters, light bulbs), or have other electricity needs. A solar panel connected to a deep-cycle battery with a voltage regulator (figure 5) is an alternative electricity option.

Building Code and City Ordinances

In 2015, Utah building codes were modified and now state that high tunnels are exempt from municipal regulation and do not require a building permit as long as they meet the following requirements:

- is not a permanent structure;
- is used for keeping, storing, sale or shelter of an agricultural commodity;
- has a metal, wood, or plastic frame;
- is covered with plastic, woven textile, or other flexible covering; and
- has a floor made of soil, crushed stone, matting, pavers, or a floating concrete slab.

Check with your city/county codes regarding edge of property and height regulations which may still apply.

Aesthetics

Finally, think of how the high tunnel will look on your property. Consider your (and your neighbor's) views.

Conclusion

It is likely that no one location will meet each of the site considerations discussed. As you select the best location for your high tunnel, decide which factors are most important for success and work to mitigate conflicting issues.

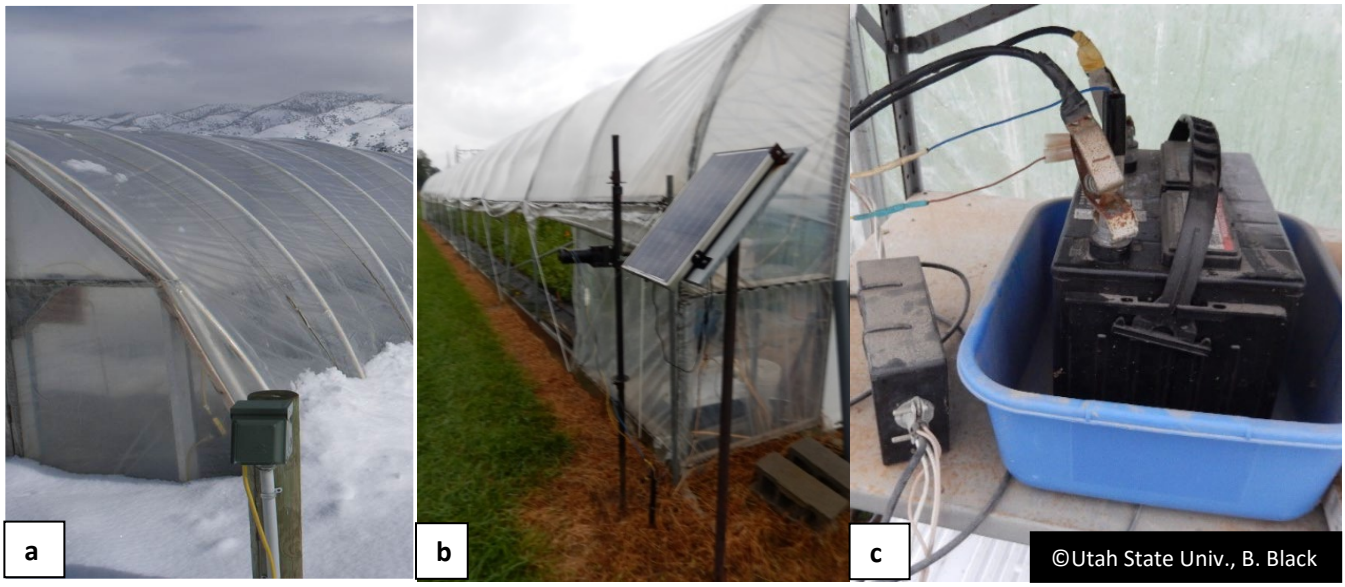

Figure 5. a) Power source near a high tunnel, b) solar panel connected to c) a battery with a voltage regulator.

Commercial High Tunnel Manufacturers

List is not all inclusive, listed alphabetically.

FarmTek
1440 Field of Dreams Way, Dyersville, IA 52040
https://www.farmtek.com/farm/supplies/homell

Haygrove
Redbank, Ledbury, Herefordshire, HR8 2JL, UK
https://www.haygrove.com/

Ledgewood Farm
132 Old Mountain RD, Moultonborough, NH 03254
http://www.ledgewoodfarm.com/

Poly-Tex
27725 Danville Ave, Northfield, MN 55057
https://www.poly-tex.com/high-tunnels/

Rimol
40 Londonderry Turnpike
Hooksett, NH 03106
https://www.rimolgreenhouses.com/greenhouse-series/high-tunnel

Tunnel Vision Hoops
3558 Lee Road
Shaker Heights, OK 44120
https://www.tunnelvisionhoops.com/greenhouses/

Additional Resources

Black, B., and D. Drost. 2010. Temperature Management in high tunnels. Utah State University Extension. Horticulture/HighTunnels/2010-04

Black, B., D. Drost, D. Rowley, and R. Heflebower. 2008. Constructing a low-cost high tunnel. Utah State University Extension. HG/HighTunnels/2008-01pr

Patterson, R. 2014. A high tunnel for strong winds and space utility. Utah State University Extension. Horticulture/HighTunnels/201-02pr

Maughan, T., D. Rowley, B. Black and D. Drost. 2014. Constructing a low-cost high tunnel for tall crops (14.5' wide by 10' tall). Utah State University Extension. Horticulture/HighTunnels/2014-05

This project is funded in part by USDA-Risk Management Agency and the Utah Department of Agriculture and Foods Specialty Crops Block Grant (SCBG 161039) under a cooperative agreement. The information reflects the views of the author(s) and not USDA-RMA or UDAF.