

High Tunnel Crop Production Tips

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What is a high tunnel?

High tunnels are low-cost season-extension technology used for producing a diversity of horticulture crops including vegetables, fruits, herbs and flowers. Specifically, high tunnels are passively vented, solar greenhouses covered with 1-2 layers of greenhouse plastic. Crops are grown directly in the soil beneath the high tunnel, and the only external connection is the drip irrigation system. In addition to accelerating crop growth and maturity, high tunnels protect the crop from an erratic environment where extremes in temperature, wind, rainfall, pests and light intensity can severely reduce marketable yield and quality.

What is the typical size for a commercial high tunnel?

High tunnels used for growing horticulture crops commercially are typically 20-30 ft wide and 100-200 ft in length with a height of 9-17 ft in center. Larger size high tunnels retain heat longer through the night and provide a more even growing environment.

What is the optimal orientation for a high tunnel?

High tunnels are passively vented structures. Therefore, in most regions they should be oriented perpendicular (at right angles) to the prevailing winds on your farm. Generally, this is a north-south direction, but many growers have oriented east-west with success. Good cross ventilation will remove humid air and moderate air temperatures during the day. Keeping humidity in the high tunnel from reaching a high level (>85%) is crucial for preventing many diseases.

How much do single bay, stationary high tunnels cost?

A commercial high tunnel will cost approximately \$1-2.00 per ft².

Should the high tunnel have a single or double layer of polyethylene plastic?

In general a high tunnel will provide about 12°F increase in average daily temperature. Adding a second layer of plastic will increase the temperature approximately 10°F while reducing light intensity by approximately 7%.

Which crops are typically grown within a high tunnel?

Any crop which you have a market for will benefit from high tunnel production. Specifically, crops which have a premium for earliness such as tomatoes, peppers, berries or salad greens are well-suited for high tunnel production. I recommend growers choose crops with a high yield potential and high value per unit. Tomatoes and salad greens are the top 2 vegetables grown in high tunnels.

How much does a high tunnel accelerate harvest?

Most crops grown within a high tunnel are harvested at least a month earlier (or later) than field-grown crops.

How many crops can be produced within a high tunnel per year?

At least 3 cropping cycles are realistic for high tunnels. Two warm season and one cool season crop within a 12 month period is feasible with the use of high tunnels. With intercropping (the growing of 2 or more crops simultaneously), the combination of crops is almost infinite.

Should high tunnels have supplemental heating systems?

High tunnels should be designed and managed as passively vented and solar heated structures. However, supplemental heat (propane space heaters, wood stoves, etc) can be used to protect the crops from lethal freezes. Most severe freeze events are limited. Using non-fossil fuel-based heating methods such as thermal blankets, row covers, water bags will protect crops from lethal freezes.

How can high temperature within a high tunnel be managed without damaging the crops?

High temperature can be as damaging to crops as low temperatures. Excessively high temperatures can cause flowers to fall off tomatoes and peppers and reduce pollination resulting in low, marketable yield.

Shade cloth, and roof vents are two of the most effective ways to moderate temperature within a high tunnel. A 50% white or black shade cloth is commonly used. Roof vents are placed about every 25 ft in the high tunnel.

Is compost used as a fertilizer source for high tunnel crops?

Compost is a very good organic fertilizer for use within the high tunnel. Since high tunnels are a relatively small planting area, compost is also economical for use in the high tunnel. ALWAYS have your compost source tested for nutrients, pH and soluble salts. If you are purchasing compost from a local farm, determine if any *phenoxy* herbicides had been applied to the meadows or pastures. *Phenoxy* herbicides are very damaging to many crops and can persist in the soil for years.

Compost application rates are based on the nutrient needs of the crops, but most growers apply 0.5-1lb per ft². Poultry-based compost releases nitrogen faster than a cattle manure-based compost.

How do crops which need cross pollination via insects perform within a high tunnel?

Crops which need cross pollination in order to set fruit include melons, some cucumbers, squash and berries. If the feral population of bees is not low, bees may enter the high tunnel naturally. However, many growers will either hand-pollinate or purchase bumblebees for pollination. There are some parthenocarpic (self-fruiting) summer squash varieties.

Table 1. Yield of selected high tunnel crops.

| Crop | Yield/Plant (lbs.) | Yield/High Tunnel (lbs.) |
|------------------------|-------------------------------|---------------------------------|
| Tomato | 15-20 | 5625 |
| Peppers | 8-10 | 10,640 |
| Eggplant | 3-4 | 3990 |
| Lettuce/Spinach | 1-2 lb/foot | 2400 |
| Strawberries | 5 lbs/foot (1.5 lbs/plant) | 1995 |
| Brambles | 2 lbs/foot | 950 |

