

## High Tunnel Systems – Q&A

**As a comment, I was surprised that producers in southern California (very hot) they used high tunnels with some shade screen to actually provide a cooler environment!**

Yes, shade cloth can be black, white or Aluminet (metallic), and can reduce the ambient temperature significantly. Shade cloth has a long useful life and is well-suited for temperature management of high tunnels. Growers must avoid overheating the tunnel.

**Some of the most popular crops require pollination. Do growers have challenges getting these crops pollinated?**

Crops which require cross-pollination include popular vegetable crops such as cucurbits (squash, cucumbers, melons). Many vegetables which are self-pollinated benefit from cross pollination. Purchasing bumblebee colonies is one option. Native pollinators will enter the tunnel as well. Planting flowering plants along the perimeter of the high tunnel will encourage entry of native pollinators.

**Any variety of tomatoes that is more profitable?**

Variety and type of tomato should depend on the market. For example, heirlooms would be a good choice if the price premium justified the lower yield. Hybrids are more uniform and have a high total marketable yield. Popular hybrids in the Mid-Atlantic region include 'BHN 589', 'Scarlet Red' 'Trust' and 'Big Beef'. Determinate varieties will produce over a shorter period of time and will be earlier than most indeterminates.

**Any thoughts on crop rotation in the high tunnels to help soil health?**

Crop rotation is very important for high tunnel production. I recommend rotating away from crops which are in the same botanical family for 2 years before returning to production of those crops. If a high tunnel is used for growing a diversity of crops, the grower could simply rotate the planting beds.

**Any thoughts on using high tunnels to extent the growing season for specific crops?**

In the Mid-Atlantic region of the U.S. high tunnels lengthen the growing season of warm season crops by 3 months.

**In Michigan the gothic would work best?**

Yes, in high snowfall areas, the gothic design would be recommended for high tunnels.

**Would we need the top doubled?**

Yes, the benefits of two layers (double poly) are significant, especially for winter crop production.

**Any use of rainwater catchment systems off of the high tunnels?**

Rainwater catchment by using an above-ground or in-ground tank can be used to irrigate the high tunnel. Seamless gutters, which don't have to be removed in the winter, can be mounted to the hipboard (or baseboard). This will also reduce backwash of rainwater into the high tunnel.

**Would the Quonset style tunnel be more appropriate for southern, hurricane prone states?**

For southern regions of the U.S., a Quonset-style high tunnel is fine. They are low profile. I would recommend growers get the extended sidewall ground posts so that the sidewalls open 4-6 feet for cross ventilation. I have never liked the ground-to-ground Quonsets with no roll-up sides.

**Regarding crop scouting. Should this be done on a daily basis?**

Crop scouting should be done daily or at least 3 times per week. Growers should pay close attention to the center of the tunnel (warmest part) and the edges of the tunnel for pest outbreaks.

**Any organic principles that can be applied to high tunnels?**

High tunnels are very well-suited to organic production. Cover cropping, beneficial insects, excluding pests with row cover or insect screens, are just a few of the organic production practices which can be used within high tunnels.

**With insect control netting - how does this effect pollinators and how do you deal with that issue?**

The nets exclude pollinators. Therefore the grower would have to buy bees if the crop needs or benefits from cross-pollination.

**On the 1/20th of an acre is the cost of the high tunnel typically offset by the increased return in dollars per square foot?**

Yes. The amount of marketable yield of high tunnel crops is >90% added to a higher yield per plant.

**What did he mean by 'plant families' regarding rotating crops?**

All plants are in specific botanical families. For example, peppers, eggplants, potatoes and tomatoes are in the same family and crops such as beet and chard are in another family. Plants which are botanically related can share pest problems, so rotating away from growing crops which are related back-to-back in high tunnels will avoid a lot of problems.

**Any thoughts on modifications of high tunnels to aquaponics?**

This is an excellent idea. One of my colleagues at West Virginia University used a recirculating trout effluent float bed system within a high tunnel to successfully produce leafy greens. The greens were more profitable than the fish.

**Side wall curtains: pros and cons of roll up or roll down types.**

Drop curtains are great. They keep wind off of the crop which could be damaging early in the growing season. They can hold water during the off-season. I have had good experiences with both roll-up and drop-down sidewalls.

**Does the summary of yield and revenue shown at the beginning of the webinar consider drip irrigation cost?**

Yes, we include microirrigation as an input cost for all crops within high tunnels.

**Comment on why drip irrigation should be buried vs surface laid**

This is optional, but with subsurface drip there will be less evaporation so there could be less salt buildup around the emitter than if the tape is on the surface. This would be more of an issue if the grower is irrigating with hard water or high salt-index fertilizers.

**What cover crops use and what date plant and how incorporate?**

We have had great success with triticale and crimson clover mixed with a winter pea. The cover crop can be cut with a sicklebar mower or rotary mower and incorporated with a tiller. Another option is no-till within the high tunnel. The cover crop can be mowed and replaced around the crop as a mulch or mechanically killed by rolling and crimping the stem. I would not use desiccant herbicides in high tunnels to terminate cover crops.

**Do you have any recommendations for growing herbs in the tunnel?**

Herbs are my next group of crops I want to investigate for high tunnel production. I have done annual herbs such as basil and cilantro within tunnels which has been successful, but I want to look at perennial culinary herbs.

**What are the options for cover crop termination in high tunnels?**

Primarily mowing and rolling/crimping. I would not recommend herbicide use within high tunnels.

**Are growers tilling the cover crops with walk behind or small tractor mounted tillers?**

Yes, a BCS tractor or a rear-mounted tiller can be used to incorporate the green manure cover crop.

**How about catching rainwater from the structure as a water conservation practice and use for irrigation?**

Recycling rainwater is a great idea for high tunnels. Gutters can be mounted to the hip board or the base board and channel water into a tank which could be pumped with a gasoline or solar pump back into the irrigation lines. An inch of rain off the roof of a commercial-sized high tunnel will yield over 1000 gallons of water for irrigation.

**How are you killing the cover crops?**

The cover crop is cut with a flail or rotary mower. A grower could use a string trimmer too. For no till, the cover crop can be rolled and crimped.

**Wind and hail damage have been a significant problem with high tunnels. Any suggestions?**

The shade cloth would protect against hail. For wind, the double poly and the cross-bracing on each bow would be recommended.

**How do you control squash bugs without other than netting?**

Rowcover (0.5 oz/yd<sup>2</sup>) could be put over the plants until the first female flower emerges. The Azera (need, pyrethrin) would be used organically. Synthetic insecticides can be used within high tunnels and are very effective. Consult your regional vegetable Production recommendations for specific recommendations.

**DR Jett are you going to pull for the Hokies or the Mountaineers when they play at FEDEX Labor Day. I know you attended both Universities!**

Both! That will be a great game.

**Any good resources RE cut flower production in high tunnels?**

[Hightunnels.org](http://Hightunnels.org) would be a great resource for high tunnel crop information

**What cover crop /cover crop mix do you recommend?**

We had significant biomass with October and November-seeded triticale, crimson clover and winter pea.

**What are the most common plants grown in high tunnels that require insect pollination?**

Some of the common plants grown within high tunnels which need cross pollination include cucumbers, summer squash, melons and to some extent strawberries. Tomatoes and peppers respond to cross-pollination as well.

**Thanks. I enjoyed giving the information to USDA-NRCS. Let me know if I can be of any further help.**

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Great job thank you!!

Thanks! Great presentation.

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