

Sattin Hill Farm Course

Module 8: Tunnels

Introduction

Module 8 is all about tunnels. How you choose the correct tunnel for your farm, how to build a tunnel, modify a tunnel, irrigation, and more. There are many reasons why you might want to add tunnels. Josh feels tunnels are instrumental for the operation of his farm and credits them with doubling his production.

Season Extension

Tunnels bring greater efficiencies, predictability, and higher yields to any farm. When most people think about adding caterpillar tunnels, high tunnels, or greenhouses to their farm, the primary reason is for season extension. While this is a good reason, Josh believes it to be just one of many reasons.

The term “season extension” simply means extending your growing season by planting earlier in the spring and later into the fall. Depending on where you are, you might even be able to grow through the wintertime. In North Carolina, where Josh’s farm is, he can grow through the winter without adding any supplemental heat to his caterpillar tunnels. In more northern climates, you still grow through the winter using high-tech heating and ventilation systems.

Controlling the Elements

For Josh, it comes down to being able to control the elements and create consistency. Contending with the unpredictability of the weather is a farmer’s most significant variable. While we’ll never have complete control over the elements, growing in tunnels is a giant leap to curb the risks.

Rain: Caterpillar tunnels help protect your crops and soil from heavy rain. They give you control over when and how much water your crops receive. North Carolina can receive extremely heavy rains, so this aspect was quite a game-changer for Sattin Hill Farm. Heavy thunderstorms bringing up to two inches of rain in just a couple of hours can create a lot of damage like crop failure and erosion, and even flooding. Excessive rains can also cause heavy clay soils to become waterlogged, leading to crop failure.

Temperature: Tunnels also give you some control over the temperature inside. You can close them up in the cold seasons to keep them warm and open them when needed for ventilation. This allows for a much more consistent environment for the plants to grow in.

Wind: Tunnels also protect the soil and plants from wind. The wind is one of the harshest elements on plants, especially when they are young and freshly transplanted. Transplants can even be stressed to the point of total crop failure. The wind-free microclimate created inside a caterpillar tunnel allows young crops to thrive and keeps leaves and other debris from being blown onto your crops.

Hurricanes: North Carolina is subject to the occasional hurricane. By the time they reach the Raleigh area (working their way inward from the coast), they typically grow milder, but the damage can still be extreme. In Josh's first season in 2018, they had two that came through, only about three weeks apart. He lost everything the first time and quickly replanted all of his beds. Then three weeks later, when the second one came, he lost it all again. Now when massive storms come through, Josh can just close up the tunnels and have no stress.

Other Benefits of Tunnels

Irrigation: Irrigation is very easy to install in a caterpillar tunnel. There are ready-made overhead irrigation kits that can be mounted from above, allowing for even and consistent overhead sprinkling or misting. You can also install drip irrigation. Either way, you have total control over the moisture your crops are receiving.

Trellising: Trellising is extremely convenient by mounting purlins above the beds, running the length of the tunnel. Strings can then be tied off to these purlin pipes for trellising crops like tomatoes and cucumbers. You no longer need trellising structures in the ground.

Shade Cloth: When the weather warms up, it is fairly simple to install shade cloth over a caterpillar tunnel to reduce the temperature. Shade cloth comes in different light blocking ratings (i.e., 20%, 30%, 40%, etc.), so a grower can select an option that best fits their specific growing region. Hotter climates would want higher percentage of light blocking to significantly reduce temperatures.

Different Kinds of Tunnels

While there are many different types of greenhouses on the market, there are two general categories you can put them into permanent and not permanent.

The caterpillar-style tunnels used by Josh are inexpensive, easy to set up, and can be moved if needed. The larger permanent tunnels are generally referred to as high tunnels. These will typically require you to have the ground leveled, as you would when preparing to build a permanent structure. The nursery greenhouse at Sattin Hill Farm is a permanent-style custom greenhouse made by Rimol. A future module will go over his nursery greenhouse in greater detail.

DIY Tunnels

Josh strongly discourages people from building their tunnels from scratch. This is what he did when first starting in 2018. It was extremely time-consuming, and when it came time to move it, he had to scrap it. He highly recommends purchasing a ready-made kit from Farmer's Friend LLC. It will most likely save you money and a lot of time. They're easy to set up, and they allow for flexibility.

Farmer's Friend Tunnels

At Sattin Hill Farm, Josh uses the "Gothic Pro" caterpillar tunnel from Farmer's Friend. Farmer's Friend sells various upgrades to their tunnel packages, allowing you to modify the tunnel to suit the needs and preferences of your farm.

Lift Kit: The Lift Kit is composed of 18" pipes that go under the hoops to raise the overall height of the tunnel. Josh has found this well worth it, creating a more comfortable work environment with more head space in the tunnel. The lift kit also makes the walls straighter by adding more vertical pipe before each hoop begins to bend inward. This allows for more flexibility when working the beds nearest to the sides of your tunnel.

Cross Braces: Cross braces add rigidity and allow you to hang pipes or wires for trellising.

Gothic vs. Classic Tunnels: Farmer's Friend offers two different shapes of tunnels: the Classic and the Gothic. The Classic tunnel has the rounded Quonset style peak, whereas the Gothic tunnel has the pointed peak. Though the Gothic is generally recommended for more northern growers concerned about their tunnels having the ability to shed a snow load, Josh prefers it for the added height.

50' vs. 100' Long: Farmer's Friend offers 50' or 100' long tunnels and either 14' or 16' wide. Josh opted for three 14' x 100' Gothic Pro tunnels. If you have the space for it, he recommends 100' tunnels instead of 50' tunnels. The rationale for this is the time it takes to open and close the tunnels. For example, if you have six 50' tunnels versus three 100' tunnels, you only have three tunnels to open and close versus six. It's also easier to regulate the temperature in a larger tunnel.

While some may think buying a 100' tunnel and splitting it up into two 50' tunnels, Josh has found it will cost you more due to the extra materials needed for end walls. If you need 50' tunnels, just buy the 50' kit.

14' vs. 16' Wide: If Josh could do it over, he would buy the 16' wide tunnels rather than the 14' wide. He has four 30-inch beds with 12-inch walkways and six inches on the sides. If he had a 16' wide tunnel, he could have wider walkways. The only reason he decided on the 14' width was due to the space constraints of his yard.

If he added two more feet of width to each tunnel, that would be another six feet, and the tunnels wouldn't have fit his space.

Wind Bracing: Adding wind bracing to the ends of your tunnel adds a lot of rigidity and strength when the storms are rolling through with high winds. Extreme gusts can mangle caterpillar tunnels if they aren't adequately reinforced.

4' vs. 5' Bow Spacing: The last thing you have to decide on is 4' versus 5' bow spacing. This is the space between each hoop or bow of your tunnel. Josh went with the 5' bow spacing since he doesn't have heavy snow loads in his location. However, if you live in a more northern climate with lots of snow, 4' bow spacing is recommended for its added strength.

Preparing for Installation

After selecting the tunnels for your farm, you need to prepare the ground where the tunnels are to be installed. Drainage is one of the most important considerations when preparing for your tunnel. Digging drainage ditches will ensure your crops don't flood and that the runoff from the tunnels is being directed away from the structure.

End Walls

While Farmer's Friend does sell end wall kits (with options for a dutch door or a zipper door), Josh decided to build his own scissor doors. After consulting with many other growers, this style seemed to be the most simple and effective. Josh has a video posted on his YouTube channel describing how he made his custom scissor door end walls for his tunnels.

Essentially, two lengths of galvanized top rail pipe hang from the center peak of the tunnel. With greenhouse plastic attached to them, they swing open like scissors to open or close the end wall. The original design for this style of end wall is on the [Johnny's Seeds website](#).

Some prefer more rigid end walls, but the scissor doors have worked wonderfully for Josh's context. For the majority of the year, they remain in the open position. He'll only close them on cold nights and during storms.

Baseboards

Josh built baseboards (also known as toe boards) for his tunnels. These have helped hold in the material from his deep compost mulch system, which can tend to spill out the sides. One of the other benefits of the baseboards is the rigidity it adds to the tunnel. It also creates a nice seal at the bottom when the plastic is pulled down on the sides.

Conclusion

Over the last few years, growing both at Sattin Hill Farm and Raleigh City Farm, Josh has found that the production out of a tunnel was exponentially better, with less crop failures. He highly recommends them!