

Sattin Hill Farm Course

Module 9: Winter Growing

Introduction

This module is all about winter growing and how to protect your crops using row cover, winter irrigation, moisture control, plumbing and freezing issues, and winter transplanting and direct seeding.

Where Josh grows in Raleigh, North Carolina (Zone 7b), it is relatively easy for him to grow through the wintertime in unheated caterpillar tunnels without a lot of inputs. If you are further north with heavier snow, you probably cannot grow as much in the winter without more high-tech infrastructure and heating inputs. However, if you're further south, where temperatures are higher, you can focus even more on winter growing and likely do some good business.

Most people think of farming as something that takes place from spring to fall. You get out there as soon as you can in the spring, wait for the fields to dry out, fight those late frosts, and then just push through the season to take the winter off. Many people who live in areas with extremely low temperatures and heavy snow, they don't think winter farming is even an option.

Benefits of Winter Growing

Josh has enjoyed winter farming in his region so much that he now takes summers off and only farms in the winter. One of the primary reasons for this choice is how hot summers get there in Raleigh. The intense heat brings multiple issues that Josh doesn't have to contend with in the winter.

Salad Crops Thrive: A lot of the quick-growing, high-turnover crops that Josh likes to grow don't do very well by nature in the summertime. Salad mix, for example, has to be coerced into growing through the summer by implementing some workarounds like shade netting and regular overhead irrigation. However, its natural inclination is to grow in cooler temperatures. When grown in the heat, salad crops will have lower yields, higher pest pressure, and less desirable flavor and appearance. For Josh, he found himself putting in a lot of effort in the summertime without a lot of output. This frustration led him to reconsider his approach.

Comfortable Work Environment: In addition to the crops struggling to thrive, Josh discovered he didn't physically enjoy working through the high heat and humidity either. Being in his 40's, he struggled after 11 a.m. working outside in temperatures over 90° and high humidity from May through October. Working outside in the winter season was far more comfortable.

Slower Pace: Another benefit of winter growing that Josh enjoys is the slower pace. Crops grow more slowly in the winter. When crops are ready to harvest in the summertime, you have to go and harvest them right away, or they're going to get too big or bolt and go to seed. However, if you miss the harvest by a few days or even a few weeks in the wintertime, it's usually not a big deal. As a grower, this gives you a lot more flexibility.

Less Competition: In terms of a business strategy, there is a lot less competition in the winter. Most likely, there are not a lot of growers in your area that will be growing through the wintertime. Whether it's farmers' markets or restaurants that you're selling to, you will likely be only one of a few farmers delivering at that time of year. This allows you to get higher prices due to less competition and higher demand for your crops (like lettuce, spinach, carrots, kale, and arugula).

Crop Protection

A big part of winter growing is about protecting your crops. There are two primary things you need protection from 1) cold, and 2) precipitation. Both can be extremely damaging to crops. As you've already learned from previous modules, one of Josh's favorite crop protection strategies is growing in tunnels. Tunnels will take care of both the cold and the winter precipitation.

Row Cover

There are also a few things you can use other than tunnels. The first way you can protect your crops from winter cold is by using a row cover. Using row cover is the most common approach for many farmers because it's the cheapest way to cover the most land. Josh has a love-hate relationship with row cover. One of the major drawbacks is that it doesn't last very long before replacing. It can tend to rip if not treated carefully. It's also extremely lightweight and will need to be weighted with sandbags or stones to prevent it from being blown away. It also doesn't protect from moisture very well (compared to a tunnel). It will, however, provide frost protection, and it's relatively inexpensive for covering large areas.

Row cover, also known as Agribon or Reemay, comes in different thicknesses or weights: Ag 15, 19, 30, and 50. Ag 15 advertises like insect netting. It's incredibly lightweight. However, it's very thin and not durable. When it comes to row cover, the higher in the weight you go, the more frost protection you gain, and the more degrees of temperature you gain. The increase in weight also means an increase in cost. Josh prefers the Ag 30 for his context. Ag 30 is considered a medium weight, and it gives a good balance between durability, protection, and cost.

Row Cover Support Hoops

You will need a way to support the row cover, so it doesn't rest directly on the crops. If it does lay on the crops when it freezes, you'll risk crop failure. Josh recommends a couple of ways to support the row cover: 1) wire hoops or 2) electrical conduit.

Wire Hoops: Pre-made wire supports are designed to bend into hoops when pushed into the ground on either side of the bed but return to a straight shape when removed for easy storage. Josh is a big fan of this style. You can also buy a spool of wire to cut your pieces. This may be a little more cost-effective, but more labor and harder to store.

Electrical Conduit Hoops: 10-foot segments of half-inch electrical conduits are another option. They will be stronger, less prone to tearing row cover, and longer-lasting. You can construct a simple jig to bend these into uniformly shaped hoops or purchase a hoop bender from Johnny's Seeds designed explicitly for the task.

Josh bends his conduit hoops to cover two beds (including the 12" path that separates them). This allows a 10' wide x 100' long row cover to cover half the tunnel. This spacing works well for growing in caterpillar tunnels with four beds. Josh purchased the 20' by 100' row cover from Farmer's Friend LLC and then cut it in half. Creating two pieces made it a lot less cumbersome to install and transport.

Standardizing Hoops & Row Cover

Regardless of your bed width and tunnel width in your context, do your best to keep them all the same. Standardizing your system like this will make it feasible for you to only have one size hoop and one size row cover. This eliminates you or your employees from wasting time digging through hoops and row covers to find the right size for a specific farm section. Having one size will simplify the process and eliminate one more potential bottleneck.

Storing Row Cover

Storing row cover after use can be tricky. You have to make sure it's dry before storing it away. There is a way to braid the row cover that makes moving from one place to another, prevents snagging, and makes storage easier. To braid it, make a loop at one end, then pull through another section to form another loop. Repeat the process for the length of the row cover. Refer to the video of this module for a demonstration by Josh.

Low Tunnels

In the past, Josh has also used low tunnels. While he doesn't recommend them for commercial growing, they can work for smaller-scale gardening contexts. These are built using 10-foot pieces of electrical conduit, just like the hoops made for supporting row cover. But instead of row cover, you would pull over greenhouse plastic, forming a "mini greenhouse." While it's much less expensive than building a larger caterpillar tunnel, Josh doesn't feel the labor required for setting them up, maintaining them, moving them, and getting around them to cultivate or harvest makes it worth it.

Being such a small space under the low tunnel, they heat up really fast in the sun and need to be quickly ventilated, so crops don't get scorched. In general, Josh doesn't feel they are worth the time you have to put into them when growing commercially.

Caterpillar Tunnels

As mentioned in the previous module, Josh grows in 14' x 100' Gothic Pro caterpillar tunnels from Farmer's Friend. They're relatively inexpensive to buy (compared to high tunnels, easy to set up and allow for a lot of flexibility. While you can get away with a lot of winter growing using row cover and low tunnels, caterpillar tunnels will get the job done faster with less input. They can be quickly opened up to ventilate, reducing the need to use row cover. In addition, when you do have to use a row cover, you have double the protection in a caterpillar tunnel!

When temperatures are getting down to 28-30° Fahrenheit, closing the caterpillar tunnel with no additional row cover will be fine. However, when temps drop below 26°, adding the row cover over the beds within the tunnel is suitable for added protection.

Well-known organic farmer Eliot Coleman spearheaded using row cover inside a tunnel. Elliott has written books about winter growing and helped educate many farmers on tips and tricks for winter production.

When it comes to determining the climate in your tunnel, Josh has a simple equation: when growing in a tunnel, the climate zone drops south one zone (it becomes warmer), and when adding row cover in that tunnel, it drops the climate down an additional zone. For example, Josh grows in zone 7, so crops in his tunnel will grow as if they're in zone 8, and when adding row cover, the crops will think they are even further south in zone 9.

When the tunnel is sealed during the cold season, there is no need to use sandbags or stones to weigh down the edges of the row cover, as there is no wind to risk blowing them off. This is an added convenience of using a row cover inside a tunnel versus the open field.

Climate Control

Maintaining the temperature in a caterpillar tunnel requires close attention as there is no automated climate control like you might see in a high tunnel. The only way to regulate the temperature in a caterpillar tunnel is by opening or closing the sidewalls, the end walls, or both.

Contending with Cold: If you know the temperature will drop below freezing that night, you have to close up the tunnel while the afternoon sun is still hitting the tunnels. This allows the heat to be trapped in the tunnel and heat the soil before the ambient temperature drops.

It's also important to consider how long the cold snap will last. Will it be 25° for just two hours or the entire night? Will it be 25° for one day or a whole week? These factors will determine how much crop protection you need in place. If it's a short frost and the sun will be coming out shortly

after, typically, most winter crops can rebound just fine. But an extended cold snap can be much more stressful to the crops.

Contending with Heat: There can be a high cost for infrastructure and fuel (whether gas or electric) when heating tunnels. In Josh's context, he doesn't feel investing in supplemental heat is worth it. Caterpillar tunnels aren't designed for heating. It would be very inefficient with just a single layer of plastic and loosely sealed perimeters. At Sattin Hill Farm in Raleigh, North Carolina, it works really in Josh's system using just the tunnel and the row cover.

Contending with Moisture: Excessive moisture can build up inside a tunnel from either too much moisture in the soil or too much moisture in or around the plants. With too much moisture and inadequate airflow, you will have fungal issues and disease pressure. This can happen very quickly when growing in the winter and must be closely monitored.

The best way to mitigate this is by minimal irrigation. If and when you need to irrigate, do not use overhead, but drip irrigation instead. Josh only irrigates with drip every few weeks when growing in the winter. Before irrigating, he will go around the beds and put his hand in the soil to ensure it's completely dry. If there is any moisture in the soil, he will forgo irrigation. If some beds need it but others don't, he'll just hand water the ones that do. Overwatering is the primary cause of disease in winter.

When watering crops with cold water in the winter, try to do it late morning, so the soil has a chance to warm back up before nightfall when temps drop.

Ventilation: When growing in the winter, it's essential to be ventilating your tunnels every day. Josh will wait until the point of the day when the temperature in the tunnel gets above freezing and then open the two end walls to allow airflow. If the temperatures allow it, he'll also periodically check the side walls to get even more air movement. If you have access to electricity, installing HAF (horizontal airflow) fans would benefit your crops' health.

Another aspect of maintaining good ventilation is crop spacing. When farming in the winter, it's best to plant crops with a little more distance between them to ensure good airflow. Closely spaced crops can build up excess moisture quickly when temperatures are low, and airflow is minimal.

For the most part, Josh plants his salad crops at four rows per bed. However, he's only been planting three rows in the winter to create more space between the plants. This has helped airflow dramatically and reduced the fungal and disease pressure.

Winter Planting

Most of the winter farming consists of maintaining and harvesting crops that were planted in late fall. But what about planting in the winter? It can be done, but it depends on where you are and

what you want to plant. In Josh's region of North Carolina, he has had success with direct-seeded crops in the middle of winter, but there are some strategies that must be used.

Crop Selection: Picking the right crops to plant in the winter is critical. Josh planted multiple beds of carrots in the middle of winter but had mixed results with germination and extremely slow growth. Carrots take a long time to germinate in warm weather and even longer in the winter. Josh has had good luck planting crops like baby kale, arugula, and spinach. These crops germinate at cooler temps, and they germinate quickly.

Temperature: If you are attempting direct seeding, check the soil temperature and watch the weather. If you notice a streak of warm days coming up, be prepared to seize that opportunity for planting. You want to give them the best chance to germinate in terms of the temperature. The same is true for transplanting. Look for those warmer days, and avoid the extreme cold for planting days.

Moisture: In addition to the temperature, closely monitor the moisture. Josh prefers hand watering newly planted beds when growing in the winter, especially direct seeded beds. Check on the moisture level once or twice a day, and hand water only as needed. This will bring the best results with direct seeding and transplanting.

Freezing Pipes

Having a strategy to prevent your water lines from freezing in the winter is crucial. Broken valves, lines, and timers can be a huge drain on your time and productivity. The best thing you can do is bury your water lines deep enough to avoid freezing. The depth will depend on where you are.

Install frost-free hydrants everywhere. Josh did not install these because he didn't want to invest the time and money when first building.

Though not ideal, he has figured out some go-arounds to make it work on his property. He has a main header line that runs through his farm. At either end of that line, he installed simple ball valves. On nights when he knows it's going to go below freezing, he'll close all of the tunnels in the afternoon and then shut off the water and open the ball valves at each end of the main irrigation header line.

He has another valve on a tee close to the house, allowing air to come in. When he shuts the water off from the house, opens up the valves at the ends of the header line, and opens up that valve to let the air come in, it drains the whole system.

It only takes a couple of minutes to open and close all valves. If you find yourself having to unscrew things and reconfigure lines, there's a greater margin of error. If you can figure out ways to install easy on/off valves, there will be less frustration, saved time, and less of a deterrent to taking the time you need to prepare for a freeze.

Protected Wash Station

The other aspect of winter water management is your wash station. Having a comfortable place to wash your vegetables in the wintertime is vital. Being wet and cold is hard on the body. Having areas out of the weather will be a huge advantage.

Conclusion

Overall, Josh loves winter growing and feels it has vastly improved his enjoyment of farming. He highly recommends putting your energy towards winter growing or extending your season to create more profit for you and your family.