



Cover Cropping for High Tunnels

Kaitlin Horst; Re-DiVined Grafted Vegetables and Cedar Meadow Farm

When you are growing any kind of crop on Cedar Meadow Farm, Steve Groff's 230 acre produce and row crop farm in Southern Lancaster county, there's not much of an excuse for not keeping living roots present across every square foot of ground, year-round. Steve's motto for over 20 years now has been, "soil is meant to be covered". Cover crop development here has been extensive, challenging, and rewarding. Now, I believe we could say that it has come out of its infancy and made it through its teenage years to arrive at a level of credible establishment. However, the one area on Steve's farm that has yet to have taken the overhaul transition to no-till and cover crops, has been the high tunnel tomato ground.



Photo: Kaitlin Horst

It has been our goal for years to sustainably incorporate cover crops in our tunnels. This is the challenge that we've had so far: The long season of tomato harvest and the nature of our 3-season Haygrove high tunnels. We are not able to think about removing the tomato vegetation, ground cover cloth, and stakes before a significant threat of cold

and/or snow. Our tunnels require that we remove the plastic before snow. This limits what we would be able to plant, and removing all the green vegetation from the tomatoes looks daunting in the fall. So, our history has been to wait till spring to pull out, burn the vines, and renovate the raised beds. That leaves us in the spring with decaying tomato roots that are still a host for verticillium wilt (which we deal with in our area), compacted soil, and higher levels of concentrated salts in row, and thus a less than ideal soil environment for beneficial microbes and roots.

Our need for utilizing cover crops in this soil is understandable. The soil is in a way "dying" under the weight of all that we ask of it and the woven ground cover cloth that prevents other vegetation from putting down roots that could help. This is what we would like to see happen by using cover crops: (1) Provide a source of root exudates to feed our beneficial microbes, keeping our soil "alive". (2) Through our selection of cover crops that are not hosts to verticillium, starve out these problem fungi. (Continued on page 2.)

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(3) Bring relief from compaction to keep our soil well drained and able to breath. (4) Recycle and re-distribute the nutrients left from the previous growing season, including adding nitrogen through legume cover crops. (5) And potentially utilizing the cover as a thatch in the spring to use as a weed barrier cloth (in conjunction with added straw when needed) instead of the woven version we've been using. Knowing our reasons and expectations for the cover crops, what has been done up to this point to put them into practice and test them?

This past spring of 2017, an acre of ground was selected to build another set of high tunnels that we had purchased. This ground had been planted with Sunn Hemp, Sorgham Sudan Grass, and Tillage Radish after wheat in July. In September, it was rolled down and planted with another set of cover crops of Crimson Clover, Triticale, Tillage Radish, and Hairy Vetch over the fall and winter for a re-flush in the spring.

To prepare this acre for the high tunnels and planting our tomato transplants, the only earth we moved was along the leg rows to dig a trench and build up a berm to divert the water coming off the plastic out the end of the tunnels. There is a 10-12 foot drop in slope from one side of the acre to the opposite side. This was desired in order to encourage the water to run out the ends and not across the planting rows. Next, drip tape was

laid, followed by black, woven ground cover cloth that smothered the cover crop across the entire high tunnel. The cover crop was rolled down by this ground cover a day or two before planting and when the Triticale and Crimson Clover were between 1-2 feet in height. Holes were burned in the ground cover and



Photo: Kaitlin Horst



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holes dug either by a hand-held drill and auger or a modified post-hole digger. Each transplant was planted by hand.

Throughout this growing season, we managed our crop as we have done before in regard to staking, pruning, and irrigating. Compared to the plants in the old tunnels and re-made raised beds, there was a small delay in the establishment of the transplants in the no-till/cover crop soil. That is to be expected considering the lower temperature

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of the soil, and initial compacted soil wall of the transplant hole at planting in the undisturbed soil. Once the new roots were established, however, these plants performed beautifully. Fertigation management was the number one area we noticed a difference in as the season progressed. The soil in the tunnels with the smothered cover crop held onto the water better and we did not need to irrigate as frequently. The plants seemed less affected by a swing in the amount of water irrigated, telling us that the soil did a better job managing how it held the water and also how it let the water drain from the soil.

We are just approaching the time now this fall, where we will pull out the plants and pull up the ground cover cloth in order to plant a new cover crop of Triticale and Hairy Vetch. We are curious to see how much biological life remains in the soil after this past growing season. We will continue to plant cover crops that are not hosts to Verticillium Wilt such as grasses and even non-encouraging hosts such as hairy vetch as cited in



Selecting Legume Cover Crops when Managing Verticillium Wilt by the University of California¹. With both of our feet not only wet but submerged into our commitment to improve our soil health through the use of cover crops and no-till, only time will tell how it will pay off by increasing the utility of our high tunnels in the same space of land and preserving it for future crop rotations in the future.

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¹ Lloyd, M. Selecting Legume Cover Crops when Managing Verticillium Wilt . Retrieved from <http://asi.ucdavis.edu/programs/sarep/publications/legumes-and-v-dahliae.pdf>



High tunnel network

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