

Extending the vegetable growing season with low cost quick hoops

Final Report for FNC10-811

Project Type: Farmer/Rancher

Funds awarded in 2010: \$6,000.00

Projected End Date: 12/31/2013

Region: North Central

State: Missouri

Project Coordinator:

[Curtis Millsap](#)

Millsap Farm

Project Information

Summary:

PROJECT BACKGROUND

Millsap Farms is a small family farm on 20 acres north of Springfield MO. We use organic practices to grow 2 acres of vegetable for our 100 member summer CSA, our 50 member winter CSA, along with our farmers market sales, and some restaurant sales. We cover crop, have some no-till beds, use organic practices, practice IPM, extend the season with high tunnels, add compost to our soils, pasture our poultry, and many other things. We've been farming for 7 years.

PROJECT DESCRIPTION

GOALS

Our goals were two-fold;

1. Experiment with different ways of building quick hoop tunnels, using different weights of row cover, and greenhouse poly, using EMT conduit for the hoops.
2. Determine the effectiveness of these quick hoops in protecting crops, both in the fall and winter, particularly as regards marketability of winter crops.

PROCESS

We constructed quick hoops using $\frac{3}{4}$ " EMT conduit. We devised a way of doing this which used a tubing bender from Harbor Freight Tools, with an added drill motor to power it. We've posted a video of the process at <https://www.youtube.com/watch?v=UFbgRHUakkE> The mechanization, including a drill, made the process much faster than with the hand wheel; my brother and I were able to bend several hundred hoops in an afternoon. These EMT hoops are very durable. We used two different weights of Row Cover; PRO19 and PRO50, and 6 mil greenhouse plastic. We used sandbags filled with compost as our weights. The hoops were placed about 8' apart with a sandbag at the base of each. The row cover was staked out at each end of the tunnels.

PEOPLE

My brother, Adam Millsap, from Urban Roots farm, helped bend all hoops, and Patrick Byers from the MU Extension helped publicize field days.

RESULTS

The quick hoops tunnels do a good job of protecting crops well below the temperatures which would have harmed them without protection. For example, we had two side-by-side beds of beets which were planted on the same day, and which grew equally well into the fall. One bed we covered with quick tunnels, and the other we left uncovered. The uncovered bed lost 90% of its foliage the first time the temps dropped below 30 degrees. We continued to harvest beets with beautiful greens out of the protected bed for another month and a half, until the beets were all gone. Carrots respond similarly. Spinach grows much better under covers, and seems to prefer the quick hoops to the flat row cover we have used in the past. The hoops keep the cover from touching the foliage, which seems to do a better job of protecting the plants from frost damage than row cover laying directly on the plants.

We failed to get good empirical temperature data. The data loggers we purchased were not reliable enough in the field, quitting every few days, until we finally gave up on them. The conditions under a row cover, on wet soil, exposed to rain, snow, frost, and ice, were just too much for the loggers we ordered. These loggers, part of the Accurite system, did work well in high tunnels and greenhouses, although they still tended to perform a little under their stated range, which meant there are lots of gaps in the data. On the other hand, through our experience with them we did discover that they work pretty well to monitor overnight temps in the greenhouses, and the system we used is able to send a low temp alarm to my cell phone, via text, and so I could wait to start a fire in our woodstoves until the temps warranted it. This probably saved us considerable wood and effort, as there were many nights when I would have started a fire earlier, but it turned out I only needed one after midnight. I also slept better, knowing if the temperature dropped lower than expected, the alarm would wake me it time to deal with it, which happened several times, probably saving several batches of seedlings, and crops of head lettuce.

As far as construction, we learned that keeping the row cover tight over the hoops, by staking tightly at each end, and by making sure there was no slack when we weigh down the edges, makes the biggest difference in longevity of the tunnels; wind is the ultimate enemy of these tunnels, and any loose material flapping will cause failure, either by turning into a hole, or by ripping the entire tunnel out of the ground. For the same reason, we learned it is important to have an even height on you hoops; if some are higher than others, it is very difficult to get all the slack out, and the tunnels fail much sooner than if the hoops are all about the same height above the soil.

The sandbags filled with compost do a nice job; they deteriorate after about two years in the sun; it helps a lot to store them under a tarp, or in the shade, when not in use. We purchase ours from Uline, and we were very pleased with the product and the service.

DISCUSSION

We found that quick hoops provide a month to two months of reliable protection, especially for fall crops. Ultimately, however, they always fail due to wear and tear, and wind. Some years they make it three months before getting too holey or shredded to do any good, but rarely more than that, regardless of material and construction technique. This is an important finding, because it lets us adapt our growing practices accordingly. We use our quick hoops to provided season extension of grown crops, but we don't expect them to carry crops through the winter. We occasionally had exceptions to that, like some spinach which made it through the winter of 2013-14, but generally, the quickhoop tunnels were useless by the end of January.

Similarly, we have found them very useful for early plantings of squash, cucumbers,

eggplant, and other heat lovers. They allow us to plant out at least a month earlier than usual. The frost protection is variable, so this is not a practice which we use for our main season plantings, as we can't afford to lose all of them, but we do plant out a bed or two of squash, cukes, eggplant, and peppers early, knowing that there is a chance we'll lose them. When it works, it gives us several weeks for earliness. Row cover without hoops will provide many of the same advantages, but it is more prone to damage the plants. On the flip side, we have largely stopped using hoops for the cold tolerant crops like head lettuce, cabbage, kale, carrots, etc. planted early. These crops seem to be fine with the row cover resting on them, and the quick tunnels tend to get blown apart by wind too frequently in the spring, when it is generally very windy at our farm.

All in all, quick tunnels fill a handy niche on our farm by providing a low cost, short term season extension option. They cost less than a tenth of what high tunnels cost, and while they don't provide nearly the same advantage as high tunnels in terms of weather protection, they do a decent job for the first two months, and they allow us to protect the crops which are doing best in the field. For example, if we have three beds of carrots, and one is a bit poor, we only cover the two good ones. If all three were in the high tunnel, one of them would be wasted space. So quickhoops are a very adaptable technology, with minimal up front investment, and fairly high potential returns. For example, if an uncovered bed of carrots froze the tops off, we sell those carrots for \$3/lb, where we sell bunching carrots with nice tops for \$4-5/lb. With the tops on they also weigh considerably more, so our premium for having nice tops on them is almost double the topped and stored carrots. The quickhoops allow us to keep the tops nice for at least an extra month or two.

OUTREACH

2011 We've hosted over 120 individuals for learning experiences on the farm this year. Last spring, as our season was just getting started, we hosted a tour of our farm for the Missouri Organic Association, which included a one-day seminar at a local conference center, followed by a tour of the farm in the afternoon. We had about 30 people in the morning class, and about 25 attended the farm tour in the afternoon. We also hosted two full time interns last summer, as we are this season, along with 4 part time interns. We also presented at the Nebraska Healthy Farms and Rural Advantage Conference in Nebraska City in February of 2012. At each of these venues we've highlighted our work with low tunnels, and have had good discussions with other growers who are trying these as well, or who will try them now, having seen our farm or pictures. We intend to attend the Small Farm Today Conference and speak in the Farmers Forum this year, in November. We also will be hosting a number of farm field days, both for the general public and other vegetable growers. I expect that we will again have a couple of hundred participants.

2012 We presented at the Small Farm Today tradeshow [National Small Farm Trade Show and Conference in Columbia, MO] this year, as part of the NCR-SARE Farmers Forum. I presented about extending the growing season at the Great Plains Vegetable Growers Conference this winter. We also hosted tours from the Missouri Organic Association, several Horticulture classes from Missouri State University, Ozarks Technical College, and an ecology class from Drury University. Along with that, we've hosted dozens of aspiring and current growers for one-on-one farm tours this year. Altogether, we've hosted over 300 visitors this year, and all of them have seen our low tunnels and hoops.

2013 We repeated many of the activities from previous years, including hosting tours as part of the Missouri Organic Association conference, The Missouri Vegetable Growers Association, an IPM course offered by Lincoln University, six university classes, 300 homeschoolers and their families, dozens of other farmers who just

dropped in to see what we are doing. Altogether we have shared our farm, and our quickhoop project, with over 1,000 people. As a result, I personally know of at least four farmers who have adopted our practices here in the local community, allowing them to harvest fall and spring crops at least a month longer on each end of the season, and they now sell at the farmers market a month longer on each end. I've also heard, through many phone calls and e-mails of at least twenty more farmers who have adopted our methods, and have benefitted from our experience in tunnel construction. We continue to host classes, tours, and individual farmers on our farm very regularly, and I speak about season extension at least three times a year at conferences and in classrooms.

A video from the 2012 NCR-SARE Farmers Forum can be viewed online through NCR-SARE's YouTube channel. Copy the following URL and paste it into your browser to view the presentation.

<https://youtu.be/AgHVhWZFKdI?list=PLQLK9r1ZBhhEGdL7uvTM8P0AzdBnksONr>

- [SARE Low Tunnel Project, Millsap PowerPoint, FNC10-811](#)

Research

Participation Summary

Information Products

- [Curtis Millsap Quick Hoops Farmers Forum Presentation 2012 \(Multimedia\)](#)

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