

No-till at Seeds of Solidarity in Orange, MA

At a Glance

Seeds of Solidarity is a 3-acre farm and non-profit organization in Orange, Massachusetts. Their philosophy is based in ecologically sound farming and food security, creating opportunities that allow community members to “grow food everywhere”. They are always changing, learning, growing, and innovating, and have been no-till since day one, making heavy use of cardboard and silage tarp. At Seeds of Solidarity, one will find some of the richest, most active soil on an unlikely plot nestled in the woods.

The Farm

Seeds of Solidarity began when owners Deb Habib and Ricky Baruc moved to the land in 1997. Ricky brought prior farming experience from New York and Deb brought her experience in education to initiate several programs in the community for women, teenagers, and incarcerated people. The land had been used long ago for pasture, but when they arrived, it was gravelly and wooded and less than ideal for farming. Ricky showed up with a BSC tractor and spader, fully planning to utilize them, but soon realized that this would be impossible because there was not any soil to till.

So, out of necessity, they ditched the equipment and started laying down cardboard. Ricky did not like the idea of tilling anyway, and he did not like the idea of using machinery because he found it unsustainable. On the New York farm, Ricky was tilling, claiming that was the trend in organic agriculture. Rotovators were the tools of the trade. At the time, some folks were switching to spaders, which Ricky says are better because they do not invert the soil as much. But in the end, it was all about getting a clean seed bed.

Today, much of the farm is growing garlic, but is also responsible for diverse vegetable and herb production, growing unique crops like ginger and turmeric. There are a few fields, mostly for garlic, and four 30x96 greenhouses, all of which are highly intensive. Most of their produce goes to their farm stand and the Quabbin Harvest co-op in Orange center, and the garlic is grown for their annual Garlic and Arts festival.

Cardboard

Ricky starts the cardboarding process in the Fall after the beds have been fully used. He covers the beds with cardboard to suppress plant growth and kill weeds, and adds a layer of compost or manure to weigh it down. This part of the process is necessary to keep the moisture in the soil; otherwise the organic matter beneath the cardboard will not break down. He uses either horse manure or a higher quality compost. This usually depends on the type of crop. Ricky prefers to use horse manure because it is cheaper and has a high content of woodchips. He has also found that after building up the soil for so long, it is of such good quality that they need less and less expensive compost.

By the time planting season rolls around, the organic matter beneath the cardboard becomes part of the bed, and the cardboard attracts a hearty population of

worms. Ricky describes his work as basically farming worms. Everything the worms eat comes out the other end five times richer in nitrogen, seven times richer in phosphorus, and eleven times richer in potassium. The worms are breaking down the cardboard and organic matter, increasing its nutritional value, and cleaning up pathogens in the process. Even when cardboard was being stored on the gravelly parts of the land, they accumulated a 1/8-1/4 inch layer of worm castings where one wouldn't expect to find worms at all.

The cardboard method is used mostly for transplants. When it comes time to plant, they will dibble straight through the cardboard and put the transplants into the soil beneath, usually accompanied by some compost.

Silage tarp

The other primary method by which Seeds of Solidarity grows their food is by using silage tarp. Ricky uses 80x100 foot pieces of black plastic silage tarp to cover the fields after they have been harvested, and then to terminate cover crops. This method is the key alternative to tilling. The black plastic conducts a lot of heat and retains moisture, allowing weed seeds to germinate and then die before planting. Additionally, the heat allows for more active soils in the spring. Typically, there is not a lot of microbial activity or available nutrients in cool spring soils, but the tarps keep the soil moving.

Ricky also uses 4-foot silage tarps for greenhouse beds. He will cover the beds, wait three weeks, and then rake out the excess plant material. This process has minimal disturbance on the soil and encourages worm activity. As opposed to tilling, using silage tarps not only encourages worm activity, but also maintains mycorrhizal networks and the energy and communication in the soil that tilling destroys.

Cover crops

Ricky likes to use classic cover crops such as rye and buckwheat, but has also begun experimenting with some less common crops. Recently, he has been making use of sunnhemp; sudangrass, which provides a lot of biomass; and bell beans, which are lush, completely cover the soil, and have a broad overstory that sunlight does not penetrate. Ricky has given positive reviews to each of these cover crops.

Why no-till?

Seeds of Solidarity is always growing and changing, searching for ways to grow food intensively but without harming the environment. For Ricky, not tilling is about creating a paradigm shift. The current paradigm, in his eyes, is male-driven, based upon tilling, and it's all about equipment. There is nothing in the forest that tills, and it is home to the most productive soils in the world. He says we shouldn't be doing anything that nature is not already doing, it's been here for a long time and that should be what we follow. When one manipulates the soil, they're taking the life energy right out of it. He compares it to any other ecosystem, including the one in our bodies. Many people nowadays are learning about the benefits of probiotics and taking them to keep the biome

in their intestines healthy and active. Ricky says, we must think of the soil in this way, something that should be nurtured and kept healthy and productive.

Currently, Seeds of Solidarity's philosophy is to grow food without using oil. Ricky was inspired by John Howe's book, *The End of Fossil Energy and Per Capita Oil*, which discusses what farming will look like in a post-oil era. The book predicts the era of oil will end in 2090. The whole system of agriculture is being kept alive by fossil fuels, from fuel to transportation to fertilizer. To combat this, John Howe created the Howe Engineering Company based in Waterford, Maine, and is working on converting fuel-based tractors to electric. Ricky is making change by focusing on building soil. Additionally, he sees the act of tilling as a concept based in colonizer mentality. The soil, home to a perfectly good system, is being wiped out and retrofitted to suit our needs. To Ricky, these ideas are dangerous and must be abandoned to ensure a food-secure future; he says, "everything has to change in our life for us to move forward."

Irrigation and Fertilization

Seeds of Solidarity is keeping themselves out of the peak phosphorus crisis by using innovative methods of fertilization. The Massachusetts Institute of Technology predicted that we will run out of known phosphorus reserves in just 80 years, and nearly 90% of extracted phosphorus is used in crop fertilizers. Going no-till can ensure that one's soil will be richer in essential elements, but Seeds of Solidarity is taking it a step further by recycling human urine.

Seeds of Solidarity has a microbe digester on site that they refer to as the "forest floor on steroids". It is essentially a tank with an outlet at the bottom. It is full of woodchips and animal manure, which, with the addition of urine, initiates microbial processes that create usable fertilizer. The microbes in the system eat the carbon in the woodchips, and the nitrogen in the urine helps to break it down. Woodchips are best to use because their porousness allows aeration. What comes out is a nutrient-rich, dark brownish-black liquid that is used on both seedlings and crops. The fertilizer has no ammonia smell due to the nitrifying bacteria. They use a water-to-fertilizer ratio of 20:1 on the seedlings, and 10:1 ratio for crops. They use the fertilizer once a week or once every two weeks on the garlic, while also adding fish emulsion.

When it comes to irrigation, no-till practices, particularly the cardboard method, have created huge benefits. The farm uses sprinklers in the greenhouses, which run regularly, but otherwise there is little irrigation. Even in droughts, like the one that occurred in the 2015 season, they consistently had plenty of moisture and worm activity an inch below the soil. Ricky cites the importance of this as we move towards more "global weirding" and climate change; using cardboard is revolutionary for moisture control.

Weeds and pests

On the farm, weed management comes primarily in the form of silage tarps. These take care of the occultation; the first flush of weeds will come up from the heat but then soon die off from lack of sunlight. Otherwise, weeds have not posed an issue, Ricky attributes this to no-till; he says every time you till, you bring up more weed seeds.

Bugs have been a minimal issue on the farm, although there are occasionally cases of cabbage looper in the brassicas and flea beetles in the arugula. Because Seeds of Solidarity is set in the woods, most of the disturbances come from small mammals like porcupines and raccoons. To avoid this, they use a floating row cover (Reemay), which allows sunlight through but keeps animals out. Ricky bends electrical metal tubing (EMT) into hoops and sets them at several points along the beds, he then lays a 14-foot cloth across three beds at a time and weighs it down with heavy objects like sandbags, this method also helps to keep flying insects out of the crops.

Advice and Important Information

For those interested in transitioning to no-till, Ricky highly recommends both the cardboard method and the use of silage tarps. One can acquire large amounts of cardboard by visiting stores that sell large items like bikes and furniture. These stores are often going through several boxes a week that end up being thrown out. Ricky also recommends experimenting with different cover crops. There are many options and each provides different benefits based on one's crops, soils, and growing methods.

Resources

Organic no-till – Rodale Institute

<https://rodaleinstitute.org/our-work/organic-no-till/>

Fighting Peak Phosphorus – Massachusetts Institute of Technology

<http://web.mit.edu/12.000/www/m2016/finalwebsite/solutions/phosphorus.html>

Growing for Market

www.growingformarket.com

The Market Gardener – Jean-Martin Fortier

<http://www.themarketgardener.com/>

The End of Fossil Energy and Per Capita Oil – Jonathon Howe, Howe Engineering Company

Howe, J. G. (2016). *The End of Fossil Energy and Per Capita Oil*. Waterford, ME: McIntire Publishing Services.

<http://www.solarcarandtractor.com/solarcarandtractor/index.html>