No-till at Lavoie Farm in Hollis, NH

"Initially it was just to save work, and once you start seeing the benefits of it, how it's working and how it's helping, it's a no-brainer to keep it going." – Adrien Lavoie

At a Glance

Adrien Lavoie is a farmer who takes advantage of every opportunity to keep things growing on his farm. Adrien puts out several plantings within a nearly nine-month season with much of the farm's corn, pumpkins, beans, and melons under no-till production. The farm has been in the family for over 100 years and now grows on 240 acres, combining conventional and organic methods and using both no-till and zone-tilling. The results of no-till on the farm are less time in the field, fuel savings, less spraying, less water use, and healthier crops.

Details of the Farm

In the early 20th century, Adrien Lavoie's great grandfather bought a house on the current farmland and converted it into a resort hotel. After his son (Adrien's grandfather) took over, he began growing veggies on 20 acres, and thus the farm grew to the 240 acres it is today.

Lavoie Farm grows sweet corn, pumpkins, apples, peaches, tomatoes, squash, zucchini, cucumbers, green and yellow beans, strawberries, blueberries, cherries, nectarines, and field corn. The rest of the land is dedicated to pollinator habitat and rotational land. The operation is not organic, but they use integrated pest management and a lot of the chemicals used are Omery-listed. Adrien says he plans to set aside a few acres to eventually get certified organic.

Adrien gets the first 26 acres of his corn down as early as possible, sometimes in March or April. This way, he gets the crop off by mid-July and can plant an early-germinating cover crop mix. These acres are tilled and planted under plastic, but the next 40 acres are no-till, and so are another 50 or so acres of string beans, pumpkins, cantaloupe, and watermelon. The transition to no-till did not happen over night. Adrien first began the no-till process by zone-tilling ten years ago.

Zone-tillage

Adrien started by zone-tilling to break up the compaction that had accumulated from plowing. The plow layer caused big pools of water after rain that would lead to waterborne diseases, like phytophthora, in the vegetables and consequently, more chemical spraying to keep them alive.

Adrien wanted to convert to no-till so that he could eliminate the work that comes with plowing and take less trips into the field so he could "go fishing every once in a while." In order to do this, zone-tilling was a crucial first step. The beds had a solid, cement-like layer 16 inches into the soil. The goal was to bust this up until the soil could drain properly. He used shanks set on 36-inch rows (two channels, three feet apart), then set the row over about 8 inches every year to ensure everything was broken up.

Cover crops

Adrien preps beds with heavy cover crops. He either rolls them to terminate them or uses an herbicide. He plants right through the crops, mow down the crop residue at the end of the season, and add a new cover right away. He is mostly using cereal rye, which will get up to six or seven feet, and roll the fully mature crop in the beginning of June. He has also been using radish as a cover crop, which helps to manage draining issues.

Fertilization

Adrien puts down a few pounds of nitrogen early on to help through the growing season. Through the planter, he uses 60-70 pounds of nitrogen because there is usually a decent amount already available in the soil. Otherwise, he uses 100% slow-release nitrogen that goes on granular in front of the furrow, but he is moving to using liquid behind the furrow.

Equipment

No-till planter: 4-row Monosem NG+4

Details:

- Wide linkages
- Monoshocks
- Pro wheels
- Yetter combo coulters in the front with residue managers
- Dawn curvetine closing wheels to close the furrow

Additional notes:

- Adrien uses pro wheels to firm the seeds instead of a Keaton seed firmer. The pro wheel is heavy, and rides in the trench to roll over the seeds.
- Adrien admits the press wheel is not ideal in every field, but it can be adapted so one does not have to switch equipment.

Roller: INJ, 8.5 foot

Details:

- Dawn ZRX roller crimpers
- Schaffert 2x2 liquid fertilizer injector (behind closing wheel)
- Residue managers

Challenges in No-till

Adrien has found challenges come up in the no-till process due to his soil type. He says his land is not perfectly suited to no-till, it consists of sand, sandy loam, and clay.

There are many rocks and hillsides, and plenty of small, flat, shale rocks. The shale rocks make it hard to get a consistent furrow, often the planters will lift up after hitting the rocks and will be unable to push a seed in. Because of this, Adrien has found difficulty in getting the planter properly set up.

Additionally, the farm had one challenging year when it was particularly dry. Adrien let his cover crop grow large and then it did not rain after that. The crop sucked up every bit of moisture 18 inches down and the seeds did not germinate. However, with no-till, Adrien finds that the farm only need a small amount of water and the root systems that have been established can hold it.

Results

As a result of no-till, Adrien finds that he is on the fields a lot less, cutting trips in half, and using a lot less fuel. Tilling requires a great deal of extra work as well as wear and tear on equipment. Adrien finds it a lot easier to pull a no-till planter than a 3-bottom plow. No-till planters do not take nearly as much power to complete their job as opposed to harrowing several times over.

The no-till process has inadvertently made crops more disease free, leading to less pesticide use. This has created a difference in crop quality. Often, Adrien would have issues with pumpkin rot, having to throw out 6-8 diseased pumpkins per bin, but since converting the pumpkins to no-till, there will now only be one bad pumpkin here or there, *maybe*. This is attributed to the fact that the pumpkins are no longer sitting directly in the soil, they now have a buffer of straw mulch. Keeping pumpkins off the ground makes it harder for them to catch diseases. This is also the case for the no-till string beans. Because the soil has better drainage, there is less standing water and less splashing that would normally transfer diseases to crops.

The healthier soil composition on Lavoie farm has helped Adrien retain fertilizers. The soil is more efficient at recycling its own nutrients as opposed to leeching through the soil. And, as aforementioned, the soil is draining excessive moisture during wet periods yet holding more moisture during dry periods, which was an immediate benefit after transitioning and has resulted in needing less irrigation during the growing season.

Finally, weed pressures on the farm have gone way down. It took a few years to get there, but there has been a noticeable difference. Adrien ensures low weed pressures by using weed killers early so they do not spread. He also mows the field after getting the crop off, then plants the cover crop right after so that it dominates the soil space.

Tomato trellising

Beyond no-till, Adrien is taking measures to ensure his crops are healthy and productive, particularly when it comes to tomatoes. Both the cherry and heirloom tomatoes at Lavoie Farm are trellised up about 10-13 feet, keeping them off of the ground. The tomatoes are grown on top of a 7-8 inch high raised bed, and are pruned about seven inches up the plant. This gives them a good airflow underneath and keeps standing water and surface soil from transmitting diseases. As a result, Adrien has reduced his fungicide use, and tomatoes are ready to harvest in late June and will be picked through the end of October.

Advice and Important Information

For those wanting to transition to no-till practices with a long history of tilling, Adrien highly recommends starting with zone-tilling as described above. It is not completely necessary to space out the work like Adrien did. You could get a zone-tiller with teeth closer together or with more shanks and do the job in one year. In that case, Adrien says one would need a 140-150 horsepower tractor. Alternatively, it can be done over a few years with a regular sized tractor.

It is also imperative that one understands their planter. One will need a planter specific to their needs, especially when it comes to setting up the coulters. It is important to know how deep you can put them to get good contact for even germination. A new planter can be expensive, but a lot of old planters can be adapted. For example, a John Deere 7000 or 7200 has plenty of attachments to make it no-till ready.

Before understanding one's planter, Adrien says it is necessary to understand the soil. If the soil is rocky or has bits of shale, one cannot run things too deep or the planter will not get good contact. Adrien poses the following questions to consider: what type of soil do you have? What kind of closing wheels do you want on the back of the planter? Do you have a drag chain? How are you going to get fertilizer in the furrow? If I move a wheel, what will it do to the rest of the planter? How do you make this all work in conjunction with getting a consistent furrow? A consistent bearing? A consistent cover?

Adrien admits that the process may be troubling in the first year, getting set up and making everything work properly. In the first year, it may be necessary to have someone walk behind the tractor and look into the furrow to make sure it is going smoothly. When it comes to cover crops, he cautions not to roll in the same direction you're planting but rather roll the opposite way of the plant. If there is a big rain event close to planting time and cover crops are big enough, terminate the crops then. This way, soil will be plenty moist and cover crops will not suck up all the excess moisture.

"I'd say don't get discourage too easily, pay close attention to what you're doing, specifically as it relates to the planter. If your seed is planted properly, you're going to have good results, if not, you're gonna be annoyed. Don't give up right away, tough it out a little bit. Learn, pay attention, and learn. Learn and learn and watch everything. Just go in your field and watch stuff, look at how the seeds are coming up. And if you got ones that aren't coming up as strong as others dig down in the soil and take a look at it, see what's going on. Learn from it. Try a small patch and learn from what happened and didn't happen. Once you figure it out, you'll never go back to plowing fields unless you absolutely need to for certain cultural practices. If you can no-till it, you're gonna no-till it."

- Adrien Lavoie