006 Lessons Learned in 2019

Starting something new, creating and establishing cover crop mixtures, and thoughts on regenerative and sustainable agriculture.

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My garden in late spring. Cats belong to my neighbours, but I keep them around. They're good mousers.

Getting Started

Getting started in something new can be a challenge. I'm a part of the Cover Crop Innovators Group by Steve Groff[1] and on our Apr 2, 2019 weekly webinar, he had Bob Recker on to speak about wide row corn.[2] He's not talking about going back the old days of 1m (40") spacing (the space required for a horse to fit between the rows for cultivation[3]). He's talking about 1.5m (60") spacing!

Crazy, right?

That was precisely his point. He's a retired engineer, and in the company he worked for 4% of sales went to Research & Development (R&D) and of that total 10% went to crazy ideas. On a farm, acres of land could be used to decide on how much to experiment. If you have a 1,000 acre farm, take 40 acres and try something new. Maybe try a new crop, maybe cover crops. But then also find 4 acres within the 40 acres and do something crazy – like very, very wide row corn. Instead of taking acres, you could take the money and invest in, or build, a new piece of equipment. Or perhaps you take that money and invest in yourself – go to conferences, take courses, or travel to different agricultural areas in the off-season.

In case you're wondering, the idea behind ultra-wide corn was to see whether the loss in yield could be made up in being able to have a cover crop growing season long between the rows. Preliminary results are promising, but this is only the second year of multi-location farm trials.

Move Quickly.

In design thinking, the main idea is to get to the point of trying something new as quickly as possible before spending too much time researching and honing it.[4] You don't want to be wasteful in resources, but on the other hand, you don't want to invest a lot in a new idea only to find that there's a flaw that requires a full re-design.

Again, in the Cover Crop Innovators Group, on our June 4, 2019 webinar, Steve showed a possible new piece of machinery that may help no-till organic agriculture work. Rick Clark from Indiana, USA, has created what he has called a "Row Mow." Instead of cultivator tines going between the crop rows, there are individual mowers that cut the cover crop and weeds down. Some plants may be killed, some will be just set back, but the crop should get the advantage and take over.

I'm not sure of the full design process, but the easiest way to start with something like this is a weed whip down some rows (which sounds like something I should try in my garden!). After testing on a small scale, the next logical step is to take what you've learned and put the money into prototyping a machine to test at a bigger scale. Once the machine runs for a season, you'll learn what you'd do for the next one.

Fail Often.

You may be tempted to give up on a new crop or cover crop after one year of trying. Remember, though, that each year is different, and trying it another year isn't doing the same thing. The weather will be different. Perhaps you can try a new variety. Maybe you'll plant it at a later time or with a new piece of equipment.

Soybeans and yellow peas in the irrigated areas of Southern Alberta give an excellent example to this. In 2018, had you tried yellow peas for the first time, you'd likely have been disappointed. The year started hot and stayed hot all summer. Peas are a cool-season crop and do most of their growth in the cool part of the spring and early summer. Soybeans, on the other hand, are a warm-season crop and don't grow much in the spring until the hot weather of the summer arrives. They thrived in 2018.

If 2018 was the first year trying both of these crops, you might be tempted to drop the peas and go with soybeans. This year, 2019, the season started cool, warmed to near normal temperatures, and then cooled off again later in the summer. The yellow peas had fantastic yields. The soybeans struggled to finish. Had we had a late August frost, (which we were close to – it dropped to +3C on Aug 27th), they would not have made a crop.

Cover Crop Establishment

Earlier this year I recorded an episode[5] chronicling the development of my garden over the past decade. When I started gardening I did it mostly the traditional way. I tilled the soil, planted

crops in rows, and rotated them around in a 4-year cycle. Over time I changed to minimum tillage with wood mulch spread throughout the garden. The wood mulch proved to be a problem in establishing tender vegetables, so I started to look at other ways.

Over the past five years, I've seen many projects attempting to make organic agriculture work with zero to minimum tillage. The basis of the system is to establish a winter-hardy cover crop in the fall, such as fall rye which is (also known as cereal rye), let it grow to their reproductive stage in the following spring, and then kill it and plant into the mulch.[6] I had some fall rye and winter wheat from a seed dealer, so I established them in my garden in the fall of 2018.

They grew well. Too well, unfortunately – by the time I was ready to plant my vegetables, the roots were so well developed I struggled to get them cleared to be able to plant. I still managed to get my vegetables planted, but they never took off the way I wanted, and it took a lot longer to plant than it should have.

Looking back, I see the problem: Soybeans are a large-seeded crop, and they are planted with heavy machinery and disk openers that can cut through the residue. I needed to work out a way for this to work with hand tools and small-seeded crops.

The way I've set up my garden is to have PVC pipe drip line every 60cm (24"). I plant my crops close up to both sides of the pipe, giving me a twin-row (20cm (8")) that straddles the pipe. Because the twin-row is much narrower than the PVC pipe spacing, it leaves ample space (40cm (16")) that the crop can expand into as it grows. I realized that this space could be the area where the cover crops grow.

Vegetable crops growing close to the PVC pipe and cover crop establishing between the vegetables.

Again, with tracking agricultural research, I've seen the development of establishing cover crops in corn after weed control and just before canopy closure.[7] The reason for trying this is that by the time corn is harvested, there's not much time left in the growing season to establish a cover crop. I've found this to a problem in my garden as well. By the time the vegetables are harvested there is not enough of the season left to establish cover crops.

I decided to try this in my garden by establishing something in between the twin rows in mid-June. I had found some cover crop seed at a local garden centre and had other stuff from a local agricultural seed dealer. I saw a week of cool, rainy weather (rare in our area) and so I tried it. I put in winter wheat, fall rye, hairy vetch, phacelia, tillage radish, crimson clover, and white dutch clover.

This worked very well. It established but it didn't grow much all summer. The water lines were close to the vegetables, so they had the first chance to get it. Any excess water and nutrients that went below the shallow-rooted vegetables would be picked up by the deep-rooted cover crops.

As expected, as I harvested crops, the cover crops took over. Now with more sunlight and access to all of the water, they flourished. This meant that there was always something growing in all parts of the garden.

This season proved to me that, at least in my area, I'm on the right track establishing the cover crop within the currently growing cash crop. For the third year in a row, we had snow in late September. This year was the worst by far. Not only was there 60cm (24") of snow, the temperature dropped to -14C (+7F) after the storm passed. The snow insulated the crops and cover crops, but a week later, after the snow had melted, the temperature dropped again; this time to -12C (+10F). With no snow to insulate, the frost killed most of the above-ground foliage. Potatoes on top of the hills and the crowns of the sugar beets froze as well.

However, winter hardy crops and cover crops survived. Winter wheat in the fields greened up. My fall rye, winter wheat, and hairy vetch in the garden all greened up.

I've ended up with a thick mulch that will protect the garden all winter. With the cover crops rooted between the twin rows, I should have a nice seedbed to plant in next spring. For any that do overwinter, I can mow them down, hoe them out, or let them go and crimp to kill when they go into their reproductive stage. If all goes well, I can then move the above-ground dead plant material around the vegetables in early June and then plant the next cover crop.

Cover Crop Mixtures

In my garden, I just tried a bunch of cover crops to see what would happen. I think this is an excellent way to start, but I don't think it's necessarily the best to keep going with this year after year or try to add more and more species to the mix. Starting with a mixture lets you see what grows best in your area and also enables you to see which species dominate in different parts of your fields. Over time, you can hone in on the species that do the most work for you.

I went to an organic field day that was put on jointly with researchers from our federal research branch, showing some of the new projects they are starting. While we were looking at a trial

My garden in mid-October. The perennials are on the left side, and the cover cropped annual area is on the right.

cycling enzymes and active carbon testing. There weren't many significant differences in the numbers, but he commented that compared to what he typically sees in conventionally managed systems, all the numbers were high.

One of the plots was a check plot where nothing was planted. It was supposed to be fallow, but there were no attempts to stop plant growth. Volunteer cover crops and weeds had filled it in to be as green as the rest of the plots. The active carbon and nutrient cycling enzymes were high as well, which prompted someone in the audience to ask: Why bother with a cocktail blend of cover crops when you can use what you have?

It was a good question that generated a robust discussion. Initially, when trying to rehabilitate the neglected soils, you may need to bring in specific plants to do the work. You'll also need to diminish the ones that don't do a good job which we call the weeds. However, it's possible that as a system matures, the plants that are there will take care of it the best. There's a book called *Weeds: Guardians of the Soil* that I have on my winter reading list, and I think it may provide some insight on this.

Sustainable and Regenerative Practices.

In my yard, I've been using wood chips around my trees for over a decade now. The town I live in lets residents pick them up for free from the local dump anytime. Not only that, they bring their bucket loader and dump a full load in the back of my truck. When I get home, all I need to do is rake it out into a wheelbarrow and spread where I need it. Every fall, I try to bring in one or two loads to replenish the areas that have thinned out due to decomposition.

I see this as mimicking nature. Trees don't naturally grow here, and so there hasn't been centuries of growth and decay to build the soil. Adding wood chips may look sustainable, or regenerative, but it really isn't – I'm importing organic matter.[8] The wood chips come from trees that have been growing for decades, and instead of all of the organic matter going back to the soil that they grew in, it is coming to my yard. If they grew without fertilizer, then all the nutrients that the trees mined from the earth have been transported to my yard. However, because they come mainly from parks and residences, fertilizer was likely applied (or they took up leached fertilizer from the surrounding lawn) and so the nutrients now in my soil are from the fertilizer source.

To be sustainable and regenerative, I'd need to be growing my mulch. I'd need to have a cover crop under the trees that was killed and left in place. However, this would come at the cost of water. Currently, I only need to water my trees in the fall and sometimes mid-summer. If I had a cover crop, I'd need to accept adding more water. Not watering is not an option as I live in a semi-arid area, and without water, the trees will die. Switching to cover crops would also mean a much slower improvement of the soil. Since I have the resource, the wood mulch, and the cost is low, why not use it?

Summary

In this episode, I've covered some of the key learnings I've had over this past year. I draw on observations from my garden, field days, and online study groups. Over the winter, I plan to go deeper as I work through a reading list that I've been compiling all summer. Look for new episodes in the late Winter of 2020.

This podcast was originally published at:
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It has since been moved to:
https://www.plantsdigsoil.com/podcast/006-lessons-learned-in-2019

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