

Reduced Tillage Techniques in Cucurbit Crops

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Background:

For about 10 years, we've been doing no-till and/or reduced-till growing on our farm. We started on popcorn and Indian corn. After confirming that we could establish a respectable stand, we moved on to sweet corn. We've now done no-till sweet corn with pretty good success for 8 or 9 years. Cucurbits have been more of a challenge, most likely due to the smaller number of effective herbicides available compared to corn. But we now have had 2 or 3 successful years of no or zone-till for cucurbits. We are really happy to say that the crop quality is so much better, cleaner and healthier that we won't be doing much bare ground again for pumpkins.

So...the impetus for trying this newish tillage technique was really straightforward...We needed to increase soil organic matter. We had seen, after years of vegetable production with conventional tillage, our soil organic matter levels fall down into the 2% range. We then started seeing all the problems that can go along with that:

- Little water holding capacity
- Increased disease pressure
- Poor nutrition
- A little soil erosion

Technique:

Our no-till technique is simple and inexpensive. I'd like to thank Nate Nourse for showing me some simple modifications to our Monosem Planter. The three additional parts that we put on and off our Monosem Planter are:

1. Fluted coulters mounted on front of the planting unit (3 bolts)
2. Down pressure springs, also simple
3. Heavier (cast iron) packing wheels for getting the trench to close

Most of the Potassium is broadcast in April on to a thick stand of Rye, which we allow to grow until near the end of May. We spray glyphosate to kill in May or early June. (Broadcasting can be tricky to see where you are going.)

The next is planting—The real leap of faith—achieving good seed to soil contact at the correct spacing is always your goal. These parts have made it very doable.

Achieving good weed control was the next challenge. Relatively easy with no-till corn, but not as many options in pumpkins. Sandea, Strategy (at the max labeled rate) and Gramoxone* to smoke any emerged weeds (before crop emergence) has been what's worked for us.

Cucumber beetle management is the same as bare ground.

Most of the Nitrogen requirements are broadcast just before running. This is a little less than ideal but we try to time it with a nice rain and have met the crops Nitrogen needs this way. We do get a little bit of leaf damage, but not too much.

Then, fungicides for disease control just like on bare ground.

The Zone-till technique entails all the same steps, minus the additional parts on the planter, but add the pass with the Zone Builder.

Results:

We knew that there would be great benefits to increasing soil organic matter and this is what we found:

- The big one is improved water holding capacity of the soil. We rarely need to irrigate our no-till fields, while at the same time we are running frantically to keep the bare ground parts of our sandy farm watered during hot spells.
- Improved drainage, which may not sound obvious but I quite dramatic. There is no puddling, no soil erosion and much better disease control.
- Better quality fruit from better disease control, specifically Phytophthora and little or no dirt on the fruit.
- We have reduced fuel/time in field preparation during a very busy planting season.
- More complex and active soil biology which I know would be difficult to put a finger on, but I know it is still important.

There are a few disadvantages.

- The soil is slow to warm in the spring, so no-till not zone-till may not be appropriate for early plantings.
- In the no-till, thick organic matter can sometimes ball up in planting, making good seed to soil contact difficult, reducing germination.
- The biggest disadvantage is that this method is reliant on chemical weed control; options for later cultivation are limited.
- Adding nutrients later can be more difficult.

Overall, we feel that we have turned a corner and have become fond of our no-till and zone-till planting techniques.