Zone Tillage – Twelve Years Later

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I have been growing crops with zone tillage since 1997. I started with corn and soybeans, and as I gained experience from success and many mistakes, I added other crops. Today, all the crops on my farm are grown with either zone tillage or no tillage.

A quick explanation of zone tillage is " till only enough in the row to plant the crop, and do not till the row middles to grow weeds". Start by probing the soil to find any density changes caused by previous tillage operations. Then use a vertical tillage tool with a narrow shank to till a slot just below the higher density layer in the soil. This vertical tillage should not lift or invert any soil, just cut a narrow slot through it to allow crop roots and water to move deeper into the soil. I use an Unverfurth Zone Builder with two rolling coulters behind the vertical shank to build a 6-inch wide ridge of soil 3-4 inches high. This operation should be performed far enough ahead of planting to allow the soil in the row to warm and dry a little and to settle enough for a good seedbed for the planter. I prefer to do this in the late fall to eliminate one job in the spring that is always too busy anyway.

In heavier clay soils, performing the zone-building in the fall lets the freezing and thawing of winter break down clods and leaves a perfect seedbed for planting. When I tried zone-building in the spring in heavy clay soils, I always got too many clods to plant through. I had to go over the field with a cultipacker to break down the clods. I tried adding rolling baskets behind each row of the Zone Builder, but they were not aggressive enough to break the clods. I finally added three cultipacker wheels behind each row of the Zone Builder to break down the clay clods just as they were formed and was able to plant satisfactorily. However, I always have a nicer seedbed in the row if the zone building is done in the fall, and I recommend that.

After many years of zone building, I tried planting into my heavy clay soils without using the Zone Builder, and had no success. My soils are too tight for good root penetration, they stay cool and wet too long in the spring, and water runs off instead of moving into the soil. I have always had a better crop where I operated the Zone Builder.

That is not the case with gravelly loam soils. I have stopped using the Zone Builder on them with no decrease in crop growth. After several years of zone building, density layers are gone, and if you don't do something stupid, like disking, to put one back in, they don't form. On those soils, I have gone to just a zone tillage planter pass, or a no-till drill. One trip over the field in the spring and that's it.

On sandy soils, I have never used the Zone builder. I don't want to do anything to dry them out. I just use a zone tillage planter for corn and pumpkins and a no-till drill for cover crops and hay crops. One pass planting, and that's it. My sandy soils have compacted enough

over the past 10 years to grow good crops, even in a dry summer, and I want to leave them that way.

My zone tillage planter consists of an Unverfurth Zone tillage cart with a fertilizer tank and a tool bar with three coulters per row. The outside two coulters for each row have fertilizer nozzles, and all the fertilizer for each crop is injected 2-3 inches deep on each side of the row. A John Deere planter is pulled behind the cart with each planter unit centered over the tilled row. I have made several modifications to the planter to make it work better, and I highly recommend each one. I replaced the original John Deere gauge wheel tires with reduced-inner-profile tires from a Case/IH planter to lessen sidewall compaction. The John Deere tires were developed for full width tillage systems where the soil near the surface had dried and light compaction was needed to firm soil around the seed. With zone tillage, the planter is working in moist soil that does not need compaction. I added Keeton seed fimers to each row to stop seed bounce in the bottom of the seed furrow for more uniform spacing. I replaced the original rubber closing wheels with Martin spading closing wheels and drag chains to eliminate compaction over the seed and leave the soil on top of the row loose to warm up quickly. I added flood-type spray nozzles over each row at the back of the planter to apply a pre-emergence herbicide at planting so when I leave the field, everything is done and I don't have to worry about getting back in after a rain. In all but my clay fields, this planter is the only field operation for the crop. Seed, fertilizer, and herbicide are applied in one pass.

I have been doing more and more no-till over the last few years with a no-till drill. I think this is a natural transition for zone tillers after their soils have healed sufficiently to not need a zone building operation. The no-till drill is really just a very narrow row zone tillage planter with almost no soil disturbance. I still prefer the zone tillage planter for sweet corn and pumpkins because I like the warming of the tilled row and I need to inject fertilizer. I also use the zone tillage planter for soybeans following wheat or rye because I have had very bad slug infestations where small grain straw remains on top of the ground. The zone tillage planter cleans off a 5-6 inch row, and the slugs won't crawl over the bare soil. I can find them under the straw between the rows, but they leave the beans in the row alone. When I use the no-till drill in the same field, slugs will cut off whole sections of row wherever there is straw.

Today, most zone tillage planters do not use a fertilizer cart like I do. They have row cleaners ahead of the opener to clean a narrow row, and one or two coulters ahead of and to the side of the row to inject fertilizer. Floating row cleaners should always be used to avoid operating too shallow or too deep. With these planters, a fertilizer tank is needed either on the planter if it is heavy enough, or on the tractor. I use three coulters/row to till a wider row because my planter is trailed separately and tends to drift sideways on side hills. With a planter equipped with row cleaners instead of a cart, two coulters, one on each side, are enough.

The final part of successful zone tillage and no tillage is to always keep the soil covered. Plant cover crops to protect the soil, add organic matter, and grow nutrients for the next crop. Cover crops are the heart of zone tillage and no tillage and the subject for another discussion.