



No-till Planting Set-up Considerations

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This fact sheet is written by Myron Sylling, a no-till farmer for 20+ years. He farms 1,300 acres near Spring Grove in southeastern Minnesota with his father and brother. When he began transitioning to no-till, Sylling originally saw no yield difference compared to his neighbors' conventional tillage programs, but now is seeing up to a 20-bushel yield advantage as a result of his no-till (and cover cropping) system. Statements made in this fact sheet are from Sylling's personal experience. You can read more about his experiences in blog posts on the Land Stewardship Project's Soil Builders' Network web page: www.landstewardshipproject.org/lpssoilbuilders.

This fact sheet provides some ideas to consider when developing the right planting set-up for you, your farm, and possibly, your budget.

There are many concerns floating around about yield loss when using a no-till system. Some of the reasons cited for this yield drag include: inadequate soil warm-up, too much soil moisture, poor spacing, poor emergence (depth control), poor stand, poor weed control, nutrient stratification—the list goes on and on. None of these concerns are wrong. These are all potential is-

suues that may arise with an improperly set-up planting system. Fortunately, many before you have worked to develop ways to overcome these potential issues.

First, let's discuss no-till planting soybeans, since starting with this crop can be a relatively easy way to get experience with this new system. Soybeans may be no-tilled with either a corn planter with the correct equipment switched out, or a grain drill. Each have their pluses and minuses, a few of which I've listed below.

Grain Drill

Pro:

- Cheaper cost than a planter
- No switch over, just hook up and go
- Simpler and cheaper maintenance

Con:

- May lack technology
- May lack penetration ability
- Less modifications available

Corn Planter or Split Row Planter

Pro:

- Don't need to own two pieces of equipment
- No need for second set of precision equipment
- Usually wider than a drill to cover more acres

Con:

- Weight, possible compaction issues
- Must spend time changing components
- May hold fewer bushels of seed

There are many other factors to consider, and each farmer needs to make their own decision on which piece of equipment will work best for their particular situation. On the following pages, I go into more detail about questions to consider when setting up a no-till planting system.

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◆ Drills

One major area of concern in planting soybeans with a drill is getting the seed in the ground. Most drills designed for no-till are heavy and are capable of putting a large amount of downforce on the row unit to penetrate corn stalks and compacted wheel tracks or headland areas. Some use a hydraulic system to transfer the force needed to penetrate the ground, while others use springs. A hydraulic system is simple and quick to adjust, but is also more costly. A spring system takes longer to adjust and costs less. Be aware that some drills are advertised as a no-till drill but are more of the small grains drill type, which have much lighter down pressure springs. These drills will require a coulter cart to break-up/loosen the soil so the seed can be placed at the correct depth.

Most drills meter seed with a controlled spill method. This means the seed flows through a slot that is adjustable in width into or onto a tooth type meter. Some seed can flow over the grooves in the metering wheel in certain situations, varying the amount of seed flowing to the ground. Most people feel soybean seed placement/spacing is not critical, so there is nothing wrong with this method of placement. However, some say that a more evenly spaced soybean seed may yield better. As of now, there is not a clear answer as to which one is the best economically.

Grain drills generally have less available after-market options available for them to work well in a true no-till environment—hence the need for a coulter cart or discing ahead of the drill. Things to look at with a true no-till drill are seed depth and furrow closing. Seed depth is a challenge with corn stalks. There will quite likely be some seed on top of the ground when a unit runs on an old corn row. Two things that help with this issue are running extra downforce to try and penetrate through the stalk and root ball and running a higher seed population to help make up for some of the ones not getting in the ground.

Currently, it is generally accepted that “normal” seeding rates are 180,000 to 200,000 with a “lite” grain drill, 165,000 with a true no-till drill, and 140,000 with a planter metering unit. On the closing side of things, it is necessary to check how much dirt is getting back over the seed. In many cases, an after-market closing wheel is beneficial. There are many types and it is important to know the conditions that you normally plant into to help you choose what is right for you. Many have found that some type of “notched” wheel provides the best closing in a wide variety of soil conditions. The advantage of the “notched” wheel is the crumbling of the undisturbed soil

into and onto the seed furrow. These wheels also tend to tear into the residue/stubble and can get dirt onto the seed that is in an old corn row much better than a smooth rubber or cast wheel.

◆ Planters

There are many more modifications available for planters than drills. One major consideration in using a planter for soybeans is what row spacing will make the most sense for you. There are many row widths available in a single rank planter (meaning only the corn rows plant the soybeans) and some feel that this is the simplest and cheapest way to plant soybeans.

There are also dual rank planters that are usually configured for twin row planting or 15-inch row width soybeans. Studies have shown a general soybean yield advantage of 3 bushels per acre in areas north of Interstate 80 for soybeans planted in rows narrower than 30 inches. The farther north you are, the greater the chance of seeing this yield gain. Of course, there are no guarantees: moisture and sunlight are major factors and no one knows what the new crop year will bring.

The following will pertain to both corn and soybeans as planter set-up concerns are similar.

Let's start at the front of the planter and work to the back. A major consideration is nitrogen fertilizer placement. Nitrogen does not have to be applied with the planter, although it is one of the most effective placement tools. Placing nitrogen with the planter gives you perfect placement indexed to each row. The drawback is the need to refill regularly, which reduces the number of acres planted in a day.

Planter placement is not as critical with straight no-till but can be very important if you choose to add cover crops to your farming practices in the future. If you use dry nitrogen (urea or other), your only real choice is fertilizer coulters on the front of your planter bar. If you choose to use liquid nitrogen, you may also use the leading coulters for placement or several other attachments that will place the nitrogen near your closing wheels. Some planter frames do not have clearance for additional coulters in the front, so the closing wheel placement is the only option. There are several other options for nitrogen placement that are currently being tested, but they have not yet been released for general purchase.

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As we move to the back of the planter, let's partially address one of the concerns raised at the beginning of this fact sheet—emergence. Important issues related to uniform emergence are temperature, moisture and depth. Row cleaners are tools that help with all of these. They help by clearing residue from the seeding area to leave a dark (heat), smooth (depth), and clean (no residue in the seed trench-moisture) area to place the seed. Depending on your exact needs, floating row cleaners are generally accepted as the best option in no-till conditions. If you want to go a step further, there are air and hydraulically adjustable models. These allow you to fine-tune how much pressure is applied to the row cleaner to penetrate the residue you are planting into. If you plant tilled ground as well as no-till ground, these are options you will want to consider for ease of adjustability.

Other row cleaners are of the screw or pin adjust type, meaning you set a pinhole or turn a screw/thread to adjust the depth and pressure they run at. These are cheaper than the floating style row cleaners. If your soil conditions do not vary much, or if you don't mind stopping the planter to adjust them properly, they can be a good fit. Another thing to consider when purchasing row cleaners is where they mount. Many row cleaners mount to the planting unit. This will transfer vibrations to the seeding unit and also remove downforce from the unit itself. There are row cleaners that mount to the planter frame as well. These do not affect the actual planting unit directly.

The next key component is downforce. No-till takes much more applied downforce to penetrate the ground. It is very important to ensure you have enough available downforce to penetrate the ground and have a consistent load on your gauge wheels. Without a consistent gauge wheel load, there will be an inconsistent seed depth. Consistent seed depth is one of the keys to uniform emergence (a key component of higher yields).

Today, the Cadillac system is hydraulic row-by-row downforce. This is by far the most expensive option out there. It is also the quickest reacting system and treats each row individually. You may choose to control sections or your whole planter as well with hydraulic downforce. The less control (sections) you have, the cheaper the system is. A step down from hydraulic is the air system. These too may be configured to adjust sections individually.

Most air controlled downforce systems adjust the

whole planter at once. Air is slower to react, but it does provide easy adjustment of downforce and consistent downforce for the full range of motion of the row unit. Heavy duty downforce springs are also an option. These are usually adjusted by selecting a set of notches on the parallel arms to set the stretch on the springs. In general, these will be able to apply enough downforce for most no-till conditions. One drawback from springs is an inconsistent pressure based on the position of the row unit. If the unit is in a low spot, too little downforce is applied. If the unit is running on a ridge, too much downforce is applied.

Standard springs will most likely not have enough downforce to maintain a consistent gauge wheel load. There are some options, however. Most planter manufacturers offer a second set of springs for this type of unit to increase applied downforce. Another option is to place weight in the insecticide boxes if you are not using them. With many farmers upgrading their downforce systems, if you do some Internet browsing you will find some good buys available on used heavy duty downforce spring and air systems.

◆ Meters

At this time, there is nothing that needs to be changed with your meters to plant no-till corn over conventional corn. There are many options available. Choose what works for you and is affordable.

◆ Openers (discs)

This is an item to watch. These will wear faster in no-till as they are applying all the force to undisturbed ground to create the seed trench. There are different thicknesses of opener discs. See your planter manual to verify they are within the diameter tolerance. You must also consider wear and tear on the disc bearings. Some planters have an increased failure rate of bearings due to the increased pressure placed on them from no-till soil. Most planters have a seed tube guard that sits between the opener discs. This will wear much faster in no-till and should be checked yearly. As these guards wear there is an increased chance of having more of a "w" at the bottom of your seed trench than the "v" needed for accurate seed depth placement.

◆ Pop-up/Starter

When no-tilling, it is generally considered a good idea to place some liquid starter in the furrow (more for

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corn than soybeans). This can help warm the soil slightly and, more importantly, provide early nutrition to the plant. This is more critical in a no-till application since the soil hasn't been disturbed and tends to be a little cooler and wetter than in tilled fields. The soil biology needs the warmer temperatures to become fully active and make nutrients available to the plants. Phosphorus is not very available until the soil warms up, so close placement is important.

◆ Closing Wheels

Closing the seed furrow is very important to seedling growth and emergence. In a full no-till system, the standard rubber closing wheels usually don't do a good job of crumbling in and closing the seed furrow

and you may need different springs for your closing system. There are many different types of closing wheels on the market. It is important to select one that works well on your planter and gets your seed furrow closed without packing it too much.

Cast wheels usually have the weight to get the furrow closed, but tend to pack too much. Most no-tillers use at least one closing wheel that has some type of dimple that penetrates the ground. This type of closing wheel helps break sidewall compaction, loosens dirt and provides a type of firming action to help remove air pockets in the furrow. The soil loosening service these wheels provide also helps create a darkened area (like the row cleaner) that helps the soil warm faster.

Planter Set-up Video

Check out this 12-minute no-till planter preparation video:
<http://bit.ly/2ETOUzv>.

LSP's Soil Builders' Network

The Land Stewardship Project invites crop and livestock farmers to join the southeastern Minnesota-based Soil Builders' Network to get regular updates on workshops, field days and on-farm demonstrations, as well as soil health and cover crop research. To sign-up and for more information, see www.landstewardshipproject.org/lspsoilbuilders.

On that page, you will also find links to fact sheets, blogs, podcasts and videos. More information is also available by contacting these LSP staffers:

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