

## Seeding in Hard, Dry, or Dusty Conditions

by Matt Hagny

### Planting conditions have become very dry across much of the USA & Canada, hence a few tips:

On planters and drills of all makes & models, we cannot emphasize enough the importance of having enough frame weight. This is the #1 problem this year wherever soils have become hard and dry (or even when moist, if there's a lot of mulch to be cut). Check along the length of row to see what the actual depth is—this is easy if you run Keetons or seed-lock wheels along with spoked closing wheels that don't pack the fill over the seed—just brush away the loose fill, and find the seed (usually) embedded in the bottom of the furrow (which might only be noticed at first as a bump as you run your finger or digging tool along the bottom of the trench) If you run closing or press wheels that do a lot of packing, it might be a little more difficult to find the seed and measure its depth.

As for **transferring down-force onto the planter row units**, remember that springs (for any given setting) will provide more down-pressure if the planter is truly running level, or even a wee bit 'nose up.'

Maxed out on air bag pressure? Try adding weight to the row unit itself (whatever you can dream up)—and remember, anything on the row unit that applies pressure to the soil is robbing pressure from the blades. I.e., lots of pressure on the closing wheels is subtracting from what the blades and gauge wheels have available for down-pressure. Same goes for row cleaners set aggressively, unit-mounted coulters, unit-mounted fertilizer attachments, etc.

As for planter toolbar weight, again realize that frame-mounted coulters or fertilizer openers are taking away from what can be transferred onto the row units.



*This field has actually been planted already, but with air-adjust row cleaners that were set to barely do anything. Despite the heavy mat of mulch, the planter blades cleaved it perfectly and the seeds were beautifully placed into the underlying soil. In Kansas and other southerly locations in the USA, we prefer to see this thatch remain intact for moisture preservation and better rooting.*



How much down-force do you really need? I'm incredibly thankful for **Precision Planting's 20/20 monitoring system** for the readouts on **% ground contact** for the gauge wheels (and 100% ground contact seems to correlate to uniform depth of furrow being cut). Over and over, I hear no-tillers who installed this on their planters exclaim, "I had no idea that it took that much down-pressure!" On planters that I've personally helped adjust over the past couple decades, lack of down-pressure (along with lack of frame weight) has been *the* most common error.

For newer JD planters, many are now running **SeedStar XP monitoring systems** for down-pressure, etc. *But don't always believe what the monitor is telling you*—if you're trying to run a minimal force on the gauge wheels to reduce sidewall compaction, say, 50 or 60, and you're in long-term no-till, your actual depth will be all over the map (much shallower than intended). It appears that this reading for gauge wheel pressure often needs to be above 300 for consistent depth (along with adequate air bag or spring pressure on the row units, and enough ballast on the toolbar), at least in tougher soils. *But please don't rely on our number either!* Again, verify with digging—that's the only way to really know what your seed placement and actual depth are. If you're too busy driving back & forth to check the seed placement carefully, you might want to rethink your priorities: You only get one chance at this (hopefully! —replant is always a disaster), and corn needs to be at a certain depth for robust roots to develop.

### **Too many seeds amongst the dust, rather than the bottom of the trench? Things to check (planters):**

- seed tubes cracked or frayed at the bottom?
- seed tube guards worn out?(less than 13/16" wide at lower end)  
—This lets the blades flex inward too much, creating a furrow that's too narrow at the bottom, plus allowing the sidewall to collapse prematurely. This occurs because the blade pulls away from the gauge wheel lip when engaged in the soil, which otherwise would help hold the sidewall together.
- gauge wheel lip not staying against blade? —Due to worn gauge-wheel pivot point, or inner lip worn off of gauge tire. (Hint: use hardened seed tube guards, and 3.5 mm opener blades—and there's also 4.0 mm blades for some planter models now.)
- RID gauge tires?
- planter nose-down? —This changes the trajectory of seed drop to be more rearward (worse placement); also causes the furrow to be narrower. Probably 75 – 80% of all planters are being ran nose-down, despite the operator insisting that it's level—be skeptical of your conclusions. :-) To evaluate planter levelness, while in the field, get back several hundred feet from it and off to the side—then compare the terrain, indicated by the tractor tires, to the row unit,



*Exact same spot as previous photos, but straw has been parted and loose soil in furrow gently brushed away to reveal the seed embedded in the bottom of the trench. Actual depth 1.75" below the soil line (not including the residue and duff). Almost all seeds in this field were a full 2" below the soil line. Emergence was 94% and with excellent uniformity of timing and plant size (no rain had occurred). 18-year no-till in north-central KS, previous season was wheat/double-crop corn. Seed firming with Keetons + Mojors, furrow closing with Thompson wheels + toe-out wedges.*



*Same spot after emergence. One of the main reasons this went so well is that it was planted later than normal (warmer seedbed).*

or the big square tube (toolbar).

- openers not maintaining their depth —Again, this has to do with holding the sidewall together under the gauge tire while the seed passes by.
- too much loosening of soil ahead of the openers? — i.e., cutting coulters, or fertilizer side-band openers being ran too close to the row.
- too much seed bounce (use Keetons, or seed-bounce flaps / Rebounders)

*Too often, the first reaction to seeing seeds in dust is to set the depth mechanism deeper. However, this will make the problem worse if there's not enough down-force being applied to the row unit.*

**Too many seeds amongst the dust, rather than the bottom of the trench? Things to check (drills):**

- seed boots worn? (see photo)
- gauge tire lip worn away?
- using RID gauge tires?
- openers not maintaining their depth

(again, this has to do with holding the sidewall together under the gauge tire while the seed passes by) (i.e., are you torquing the rockshaft enough—see below—while *not* lifting the frame?)

- too much air velocity? (air drills)
- seed bounce flaps worn away, broken, or bent?



**On Deere 50/60/90-series gauge-wheel drills (single disc openers),** if you're only using one rank (very common & desirable for seeding soybeans, milo, cover crops, etc) and struggling to get enough down-pressure, be sure to use the front rank. It's simply a matter of using the available ballast to the best advantage. When the down-pressure is cranked up, the drill frame will start to lift, but it always lifts the rear end first (due to the leverage of torquing the rockshaft against openers trailing behind the rockshaft)—so any extra weight is to the best mechanical advantage when it's as far rearward as possible and still attached to the main frame. So the rank that's locked up becomes ballast, and you want this to be the back rank that's carried, since all that weight is 4 ft behind the front rank.

Deere did provide for additional suitcase weights in an intelligent location—on the box drills anyway—since they go between/above the rear transport wheels. On the air drill frames, Deere was more haphazard in locating them—again, the very best location is above/behind the rear rank (ideally, the weights would be over the transport wheels, for even greater leverage, rather than hanging off the toolbar just above the rockshaft). They should also be centered on each section as much as possible—the weights hanging way out on the



*Side-band fertilizer openers rob frame weight that could otherwise be used to apply more down-force on the row unit. For dry conditions in long-term no-till in regions with low soil organic matter (OM), this planter is woefully unprepared—no added weight on the toolbar.*



*Unit-mounted fertilizer openers take a lot of down-force that would otherwise be available to hold the seed opener blades at the correct depth. In hard, dry conditions, you won't have enough spring or air-bag pressure. Obviously, seed placement that's shallower than intended (and inconsistent) is a disaster. It may be better to broadcast dry fertilizer than to compromise seed placement. Another problem with unit-mounted fertilizer openers is that they run too close to the seed row (often about 2" to the side, and can't easily be adjusted), which loosens soil and causes erratic seed placement, especially if it's getting dry and dusty on top. These unit-mounted openers also put a lot of unnecessary wear on the parallel links by side-loading it, and introduce more jiggle to the row unit and metering system. Frame-mounted side-band fertilizer openers should be 5" away from the seed row to let the seed openers function symmetrically and in undisturbed soil.*



*Demonstrating how the blades pull in and away from gauge tires when in the soil. No, those aren't Hercules' hands. Yes, these were 3.5 mm blades.*

ends of the wings cause the ends to dip unnecessarily. Weights at the front of the center section are poorly located to provide effective down-force transfer (although they might have purpose in loading the drawbar while pulling a tow-behind cart).

We've seen all manner of weights added, ranging from old tractor wheel weights, to concrete pillars and steel I-beams, and they all work just fine if they're at the back of the drill. (Another reason you want the weight at the back is keep the load off the dolly wheels at the front, which tend to sink all too easily when you do encounter a soft spot.)

Once you have enough weight, you can easily run the hydraulic down-pressure way up into the red zone on the gauge. As a reminder, don't use these gauges to compare with your neighbor—they're not all the same as to the color markings, etc. *All that's really important is how much you've compressed the big coil spring on each opener.* In really hard, dry conditions, you may need to compress that spring by 2.5 – 3 inches (which takes a lot of hydraulic pressure, and a lot of frame weight). This entails torquing the rockshaft so that it slopes downward in the back, by as much as 15 degrees or more (ignore the JD owner's manual that says this rockshaft should be level—that's not how the drill works at all: the only time it would be level is if you didn't need much down-pressure, i.e., tilled conditions). Also, don't fret too much about the Owner's Manual warning about bearing failure when running in the red—a great many people have seeded tens of thousands of acres (per drill) this way, with the bearings having good longevity. Obviously the high down-pressure puts more stress on everything (especially the torque tube itself), but the first task of a seeder is to get a good stand! Do what you need to do, or wait for a rain.

As for dusting in crops, beware that this creates a major hazard for wind erosion. It's also a relatively risky strategy for soybeans, since they lose their germ so easily—just from water vapor moving up thru the soil.



Gauge tire lip worn away.



Frayed seed tube. The edges curl inward, and cause seeds to bounce erratically. Of course, this was due to a worn-out seed tube guard, which is itself causing even more problems with seed placement (furrow too narrow, sidewalls caving in prematurely as blades flex and unflex).



Weights located for maximum mechanical advantage on Deere 1890 drill, on 10-inch spacing. This is in Alberta. More southerly soils with poorer structure and lower OM (organic matter) will require more.



The only meaningful indicator of down-pressure being applied is inches of compression on this spring.

*"After reading your articles and watching your planter and drill set-up DVD, we added old tractor wheel weights to our bar [Deere drill's toolbar]—I have never seen our 1890 sit so flat and stable when working."*  
—Tom Robinson, Hoyleton, South Australia