

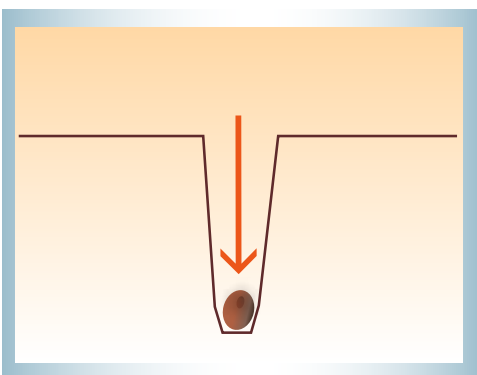
Seed Firming: Why, Where, and How



Small seed-lock wheels for planters were all the rage in the mid- and late-'90s, but quickly fell out of favor due to mud accumulation problems—most of which was due to the axle being down too close to the mud, and the arm too close to the wheel.



Deere 60/90-series. This is also a seed-lock wheel, but larger diameter— 9 or 10 inches, depending on manufacturer.



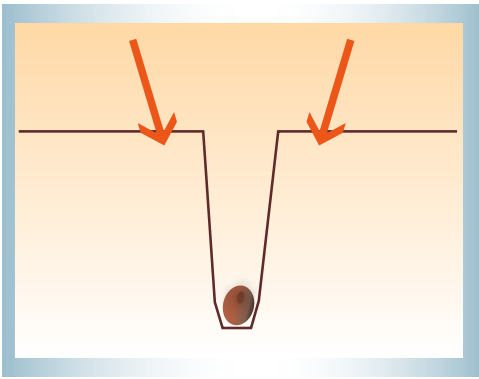
by Matt Hagny, consulting agronomist for no-till systems since '94.

We at Exapta have long emphasized the importance of adequate seed-to-soil contact. For instance, I saw enough evidence in '95 that I realized that Keetons—a brand of sliding seed firmer—were a major step forward for no-till when using JD, Kinze, White & similar planter openers. This was before I became a dealer for Keetons, and long before Exapta was founded—I became a dealer simply so that my crop-consulting clientele would have ready access at rock-bottom prices (my cost)—and I always kept a spare set in my pickup in case I found that someone's Keetons had gone flimsy and needed immediate replacement while planting was already underway.

And I'd observed how important the narrow, in-furrow 'seed-lock' wheels were on Deere 50/60/90-series grain drills—we also used miniature seed-lock wheels on planters in the mid-'90s, before Keetons came along. The choice of *which* in-furrow firming device is important—or do you need these at all in your conditions, or your particular seeder model?

Most seeders were designed for loose, tilled seedbeds, where the soil flowed back into the furrow easily as soon as the opener blade was past. Usually some sort of 'top-down' approach was used for seed-to-soil contact, in other words, pressing on the soil surface with a wide, smooth press wheel to compact all the soil above the seed and hopefully around the seed itself too. If the soil was damp and didn't readily fall back into the furrow, especially with no-till, more pressure (up to 150 lbs) was applied to squeeze it back together—although if the soil was clayey & wet, it might later crack open again. Unfortunately, the greatest compaction was near the soil surface, and this had unwelcome effects on seedling emergence, particularly for dicots (broadleaf species), and seedling growth due to making sidewall compaction much worse on gauge-wheel openers (very bad for causing tomahawk rooting problems in grass-type crops, [see our newsletter Plant Roots](#)). Plus, this method robbed a lot of down-pressure away from the opener & toolbar that was often needed to maintain the depth of the furrow being cut.

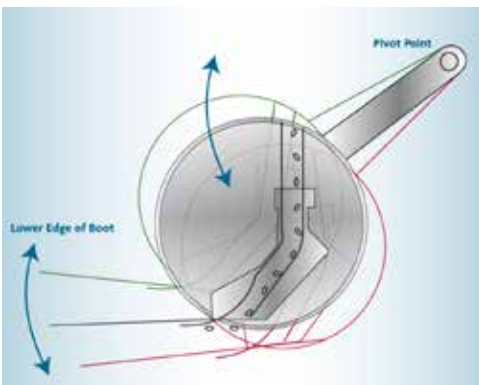
But all that's really needed is a small amount of pressure (2 - 10 lbs) applied directly onto the seed, simply pressing it into the furrow bottom. Instead of squashing from the top down, it's much more accurate and effective to do this only at the seed's location—and allow the soil above the seed to remain fairly loose, which is desirable for fast, uniform emergence of the highest % of seedlings. Hence, the Keeton's and seed-lock wheel's importance for no-till, as well as conferring value in many tilled seedbeds. But for no-till, in tough soils and moderately warm weather, the Keetons and seed-lock wheels were often the difference between a good crop stand and a marginal one, or even a complete wreck. *And yet we don't recommend them in some scenarios: What's up with that?*



'Top-down' seed firming and furrow closing can be hazardous to your crop—don't put the seeds in a coffin! Much better to firm the seed with a small but very consistent amount of pressure applied exactly where the seed is located—using narrow sliding firmers (Keetons, Flo-Rites) or narrow seed-lock wheels, which run along the bottom of the furrow before the soil caves in from the sidewalls.



Rebounders don't do any seed firming.



Deere 50/60/90-series openers move on a 'swing arm,' so everything on the opener changes angle as it skates out or moves upward to follow the terrain—and a Keeton attached directly to the opener therefore loses pressure very quickly with just a few degrees of rotation (unlike on a parallel-link). This may not be enough pressure for many conditions.

Case-IH Early Riser opener

One planter opener design, the Case-IH Early Riser, has some unique features that don't necessarily lend themselves to Keetons or standard seed-lock wheels. Primarily this is due to the gauge wheels being located farther forward in relation to the blades, which allows far more sidewall blowout—good for alleviating compaction, but with the effect that *the seeds are in a wide ribbon rather than a well-defined furrow*. (The RID gauge tires also contribute.) Since the seeds aren't lined up in a distinct furrow, the firming device (e.g., Keeton) only engages some of them, which will actually make emergence less uniform. This is why we generally don't recommend Keetons for Early Riser row units*. However, seed bounce flaps or Rebounders are worthwhile additions to the Early Riser openers, to help control seed bounce rearwardly. (There's a lot of confusion on this: Yes, Rebounders will sometimes drag a bit of sidewall into the furrow if the soil is mellow, but they rarely even touch the seed - at least not in their current form. *So it's a mistake to call a Rebounder a seed firmer*, or think it will do any seed firming. A very long time ago, when Rebounders were first introduced, they did do a bit of seed firming, but I think they ran into problems with the original Keeton patents, which recently expired. It'll be interesting to see if the Rebounders are changed in the future to once again provide some firming.)

I had devised a Keeton mounting system for Early Riser units back in the 1990s, but abandoned it when I saw what was happening with the ribbon of seed. The only way I could see to make it work would be to lengthen the gauge wheel arms and use non-RID gauge tires to eliminate most of the sidewall blowout causing the seed scatter or ribbon. I figured not many Early Riser owners would be any too keen on this due to the cost or sacrilege of major changes to OEM, not just of the gauge arms & Keeton bracket, but also to move or change the closing system to allow for the gauge wheels to be a couple inches farther rearward.

JD 50/60/90-series drills

Another instance where Keetons (in their current form) are a relatively poor choice is on the Deere 50/60/90-series gauge-wheel drill openers, because these openers are mounted on a 'swing arm' or radial linkage, such that the opener unit (the big casting, plus the boot and tube) changes angle significantly during field operation (unlike a parallel-link opener, which keeps everything at the same angle when moving up/down). With the Keeton attached directly to the JD 50/60/90 opener unit casting, the pressure on the Keeton varies wildly during field operation, and is often zero when the gauge wheel goes over a bump, or the entire opener skates out slightly, etc. While our Mojo Wire for drill Keetons helps a bit with this issue, Keetons on the Deere 50/60/90-series openers remain a poor choice—although if you farm really steep hills on the contour, such as in the Palouse, the entire drill may be drifting down-slope enough that the alignment of the seed-lock wheel to the furrow is hopelessly off-track. In this case, the Keeton + Mojo might actually have an advantage, since they will bend side-to-side a little to follow the furrow.

If you really think you want a sliding firmer for the Deere 50/60/90-series drills, there's one called the Fin (from J.D. Skiles or Surefire Ag) that moves independently of the opener unit, since it goes onto the arm for the OEM firming-wheel (the Fin replaces the seed-lock wheel). Thus, the Fin has a much



A Keeton seed firmer for grain drills, with Exapta's Mojo Wire. [See our shopping page](#) for which drill models these fit. Flo-Rites for grain drills will be available in early 2015.

more constant pressure throughout the full range of travel of the opener. The downside is that the Fin tends to gather & drag straw, especially in damp, heavy, stripper-harvested stubble.

For the majority of conditions, a correctly shaped, flexible seed-lock wheel is still the preferred method for the JD 50/60/90 drills (\$40 Needham V8; or \$82 Case SDX seed-lock). If you need to use liquid fertilizer, place it behind these in-furrow wheels (to help keep it from dripping onto the closing wheels: use in-line check valves, and weld a 5/8-inch-thick chunk of steel to the closing arm stop to hold them higher when the drill is lifted).

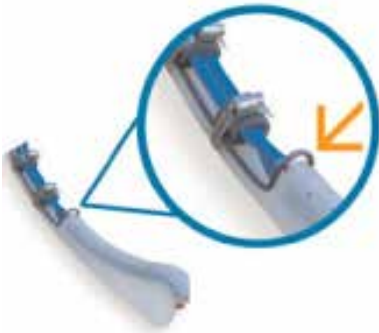
[Jan. 2016] Exapta's new DuraLok firming wheel is superior to the V8 and the SDX, and great value at \$51.50. (SDX seed-lock whls now \$105!)



The Fin moves independently of the opener, and has nearly continuous pressure.

Sticky Situations

Another scenario where Keetons may not work properly is in some extreme gumbo clay soils when wet—they may 'drumstick' so badly that they are just a big goober back there, dragging seed and so forth. *This is particularly true if the soil has been disturbed ahead of the Keeton*, whether it's full-tillage, strip-till, coulters, or whatever. RID (indented) gauge tires also make the mud accumulation worse, as does lack of pressure on the standard gauge tires, which help hold the sidewall together until the Keeton arrives. Ensuring the gauge wheel lip stays up tight against the blade during field operation is also key to cutting a clean furrow—most of you know enough to adjust & repair the gauge arm's pivot point (RK's kit is strongly recommended), and to replace the gauge tires when the lip has shredded itself. But the other aspect is preventing the double-disc blades from pinching together too much when they're pushing into the soil—[see our DVD](#) and [newsletters](#) on this topic, and [our Valion web page](#).



Keeton seed firmer for JD/Kinze/White planters, with Mojo Wire for added pressure.

If you're cutting a clean furrow in no-till, and truly have enough pressure on the Keeton to hold the tail down in the furrow to wipe itself clean, then—almost always—everything is okay. The problem is getting enough pressure on the Keeton (or the new Flo-Rite firmer), and this is where our Mojo Wire comes in—for a great many farmers, the Mojo Wire is what made the Keeton viable in their soils. And, don't worry about a little mud on the sides of the Keeton—as long as the bottom end is slick, that's all that matters.



The Flo-Rite seed firmer, introduced in 2014, with Beck's Hybrids being the exclusive distributor. These have about 60% more pressure than a Keeton when new, which is wonderful! However, they still need Mojo Wires for all except the mellowest of soil conditions. Limited farmer testing in 2013 indicates they wear only half as fast as Keetons, plus the lower end is replaceable on the Flo-Rites. What is unknown is how well they shed mud in sticky clays, a.k.a. gumbo.

Low-profile Keeton tails are often touted as the answer to mud adhesion, and they do help. But a full-height Keeton tail with a Mojo is generally better yet ([and you needn't take our word for it: Testimonials](#)). And why not a Mojo designed for the Low-Profile tails?—there just isn't much plastic there, it would wear away too quickly. Yes, Keetons do wear out faster with Mojo Wires, but that's a sign they're doing their (very important) job.

Placing liquid fertilizer into the furrow ('pop-up') somewhere ahead of the seed firmer (usually in front of, or thru, the seed-tube guard) often worsens soil adhesion on the firmer, whether they're the sliding type (Keetons, Flo-Rites) or seed-lock wheels. Some farmers have done this for 20 yrs without problems. Others have gumming up right away. A lot depends on soil texture, type of clay, type of fertilizer, etc. At Exapta, we contend that the most

The planter Flo-Rites were changed for 2015 to have considerably less pressure (now similar to a Keeton), thus increasing the need for Mojo Wires on them. The 2015 Flo-Rites also have a much deeper (taller) wear tip (the white part), which we are unsure of how it will affect mud collection on the lower surface.



Stand failure in long-term, low-disturbance no-till due to inadequate firming at the seeds' location. Pressure applied to the soil surface was ineffective here.

trouble-free setup is to place any sticky liquid fertilizers *behind* the firming device, not ahead of it. If you are using Keetons or Flo-Rites anyway, those are excellent tools for getting a judicious amount of pop-up fertilizer where it needs to go.

With these caveats, *all planters or drills should have a sliding firmer or large-diameter seed-lock wheel (the small ones clog with mud and straw) that is narrow enough to consistently go all the way into the furrow to directly contact and embed the seeds in the surrounding soil.* I arrived at this conclusion long before I sold any hardware for a profit, and this conclusion has been verified countless times over, by solid research, and tens of thousands of observations by farmers and agronomists.

**As I write this, in late March 2014, I've been told that Keetons for Early Risers are being discontinued, but Flo-Rites for these planters might soon be available.*