



Charles Martin equipped his older Deere 7000 conservation planter, with a crop roller made from heavy steel pipe.



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One-Pass Planter Turns Cover Crop Into Mulch

Planting into heavy cover crops is no problem for Charles Martin. He doesn't even have to spray a burndown first. His patent-pending planter attachment opens row spacings, crushes the cover crop and crimps the plant stems. Then it plants corn and applies liquid fertilizer. It does it all in a single pass that pays benefits throughout the summer.

"We definitely saw a difference last summer in side-by-side comparisons where the cover crop seeder had skipped some rows," says Martin. "It held the moisture. We also had very few weed or insect pest problems with the crushed cover crop."

Martin and his sons previously built an in-crop, high boy, cover crop seeder (Vol. 34, No. 5). They also use post harvest no-till drilling of cover crops. Recognizing that the longer a cover crop grows, the more benefits it provides, Martin wanted to be able to plant into standing material, not spray or crush it in advance.

"I wanted a way to clean the row so the sun could get to it, yet leave a heavy mat of plant material between the rows," explains Martin.

Martin modified an older Deere 7000 conservation planter. Each row cleaner is attached to the toolbar with parallel linkage ahead of the planter units. The 13-in., heavy-duty row cleaners are mounted on equally heavy-duty bushings used on Deere

7200 marker blades.

"The discs are mounted at a hard angle and beveled, so they scrape rather than dig, ripping the above-ground plant parts off and out of the way," says Martin. "I wanted the row cleaners out in front of the rollers. It's easier for them to push through standing cover crop than through matted plant material."

A combination of hydraulic pressure and springs allows the row cleaners to flex with the terrain. Front vertical links consist of lower square steel tubes sized to slide into upper steel tubes. Bolts mounted to the two tubes provide manual adjustment of maximum row cleaner depth.

Down pressure on individual row cleaners is maintained by 2-in. dia., 6-in. stroke, single action cylinders hooked in series. The series connection equalizes pressure across the cylinders as individual row units flex.

Two 2-in. springs are attached to each set of row cleaners and to a 3 by 3-in. steel tube that runs in front of and parallel to the planter toolbar and inside the parallel linkage of the row cleaners. When hydraulic pressure on the cylinders is released, the springs retract the row cleaners.

"The cylinder and springs let me adjust pressure on the go," says Martin. "With the added down pressure of the planter and the weight of the fertilizer tanks, I can apply enough down pressure to dig ditches with

the row cleaners and cut up the stems with the crimping plates on the rollers."

Crushing rollers between and just behind the row cleaners are connected to the lower horizontal links with bushings. The bushings let them flex as the row cleaner flexes. The exception is the end rollers, which are connected by a solid shaft running through a bearing to tie them to the adjacent between row rollers.

The rollers themselves are fabricated from 6-in., schedule 40 steel pipe. The crimpers are pieces of 2-in. by 10-in., 1/4-in. thick steel welded to the pipe in a pattern like a tractor tire tread.

"At first I had the crimper plates in a spiral direction, but that tended to flip the mat back across the row at one end," explains Martin.

The tread design tends to pull the mat of green material away from the rows, while the rollers act as depth controls for the row cleaners. The combination of row cleaners and rollers leaves a clean planting zone and a weed-smothering mat. Martin says the actively growing cover crop tends to pull moisture out of the soil in the spring, leaving a better planting bed.

While the rollers could be set to cut the stems, that's something Martin does not want. He notes cutting can result in regrowth.

Another advantage to the rollers is their effect on corn stubble. Martin says the rollers crush them flat along with any weeds that



Hydraulics apply down pressure to crop rollers.

grow in fields without cover crops. As a result, he says he no longer uses a preplant burndown.

"We will do a single pass with a burndown after planting if we see some goosenecking with small grain cover crops," he says. "Depending on how thick the mat is, we often don't need a second spray."

Martin and his sons are testing the planter again in 2012. One change he's making is to move the fertilizer application drops. In 2011, the drops were mounted ahead and just to the side of the row cleaners. This year they will be mounted behind the row closers.

At this point, Martin is unsure if they will produce the cover crop planter for sale or what the price would be.

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New Planter Technology Coming In 2013

"We're taking the fast reaction time of hydraulic power to a new level by mounting a hydraulic down force actuator on every row unit of a planter," says Roger Zielke of Ag Leader Technology. "This system will improve planting depth accuracy on every row of any size planter across all soil conditions."

The new system combines the monitoring and control technology of Ag Leader's INTEGRA™ display with the Rfx hydraulic down force actuator manufactured by Dawn Equipment.

Zielke says the system was developed because soil conditions encountered by a planter as it moves across fields can change quickly. In compacted soils, the planter may not be exerting enough down pressure for accurate planting depth while in soft soils it might be exerting too much. "With the air controlled systems already on the market the planter may be past the compacted area or the soft area by the time a down pressure adjustment is made," Zielke says. "With this system the hydraulic down force adjusts

instantly, on the go as soon as the planter enters new soil conditions. Another benefit is that hydraulic systems hold up better in dusty, rigorous field conditions than air compressor systems."

Zielke says the system is extremely effective because sensors detect down pressure exerted by the gauge wheels against the soil several times a second.

Ag Leader developed the ground force sensor that measures how much force the row unit gauge wheel is exerting against the ground. A control algorithm was developed to read the sensor, and a proprietary control module brings the data to the INTEGRA display screen in the tractor.

"This system allows the seed to always be planted at the intended depth, without compacting the side walls of the seed trench," Zielke says. "When seed is planted at a uniform depth, emergence and early growth is more uniform and that can lead to better yields."

Ag Leader is testing system components at several locations during the 2012 planting

season. The company intends to have equipment available for Kinze and Deere planters for 2013. All of the electronics are Ag Leader's design and Dawn builds the hydraulic actuator that mounts in place of a standard air bag on each row unit.

Zielke says the actuator, sensors, valves, hydraulic hoses, cabling and modules will cost \$650 to \$800 per row. The system will be less costly per row for larger planters because the cost of the control valve is divided across more row units. Pricing does not include the cost of the Ag Leader's INTEGRA display or the GPS system.

"This is a good fit for us because our expertise is in electronic control while Dawn has a lot of experience with the actuators," Zielke says. "Together we're providing a new level of planting accuracy."

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New-style actuator improves planting depth accuracy by adjusting hydraulic down force instantly on-the-go.