Precision Water Control

Tiling Speeds Up Planting On Wet Bottom Land

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When the Grogan's of Triple G Farms in Arlington, Ky., began precision agriculture in 1999, they branched out immediately to tiling the wettest fields.

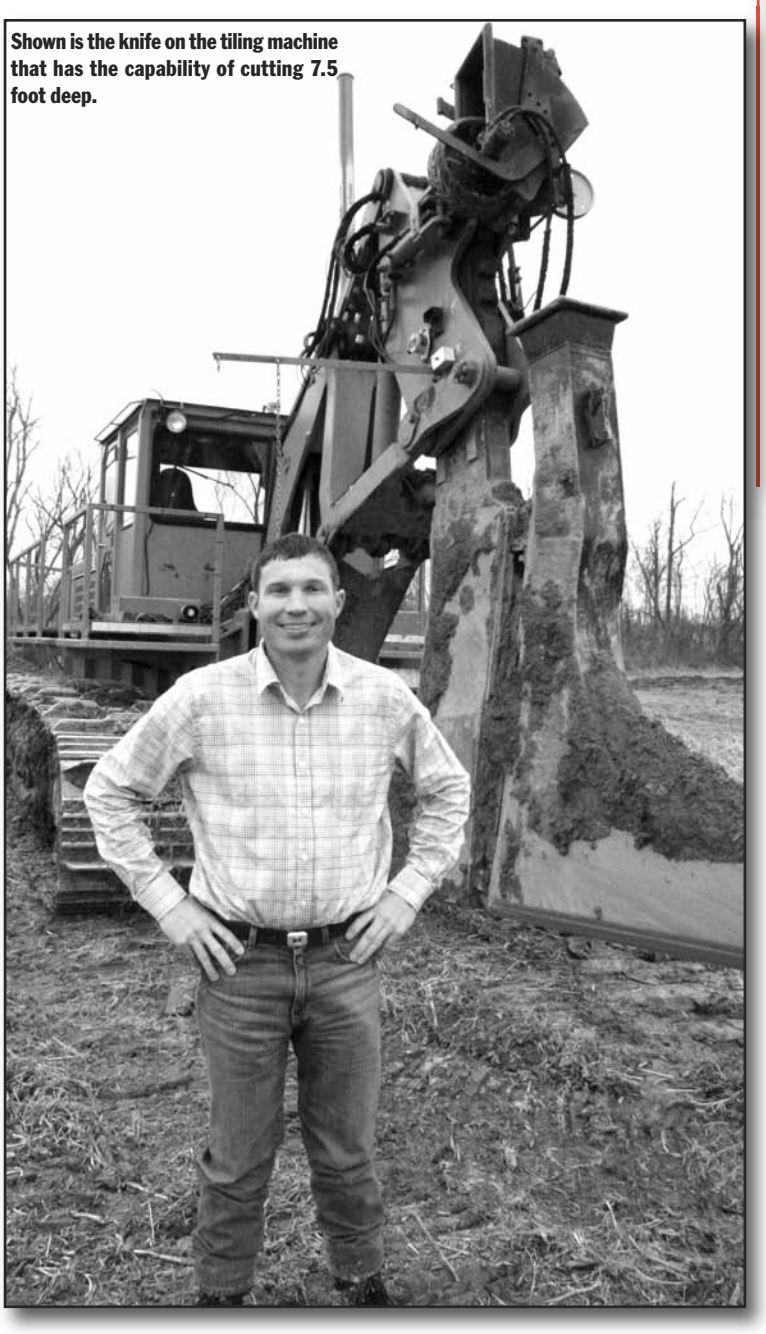
"We've been tiling now for 10 years," Darren said. "We started out with just a tractor and pull-type plow. We immediately tiled a farm that we bought that had been in CRP for 10 years."

Darren explained, "we used to use perforated pipe, but the pipe would silt in after a few years and the capacity would be limited. The knife cut pipe is exactly what it sounds like, it's just as if you took a razor blade and slit the pipe." Photos by John LaRose

The 300-acre farm was entirely too wet to farm. That's why it was put into CRP originally. With a pull-type plow, pulled by a John Deere four-wheel drive tractor, they inserted the tile in the ground just behind the plow. It was a very primitive way of installing tile.

"The tiling took that farm from a farm that would not produce to a farm that you could plant corn as early as you wanted to plant," Grogan said. That first experience taught them that tiling could restore productivity to land too wet to farm; but they also learned they needed better equipment if they wanted to continue to tile the land.

As time went on they made a sizeable investment in laser equipment to make the job easier. Four years ago they made a large capital investment in a Bron 450 self-propelled tile plow that can insert tile in any condition during winter months when they have the time to tile. The equipment uses a combination of laser for leveling and GPS for guidance and marking the position of the tile so it can be relocated. The machine has a 450 hp. Caterpillar engine, weighing 75,000 pounds, with the capability of plowing 12-inch down to 3-inch pipe, 7.5 foot deep.



Shown is the knife on the tiling machine that has the capability of cutting 7.5 foot deep.

"We use knife cut pipe," Darren explained. "We used to use perforated pipe, but the pipe would silt in after a few years and the capacity would be limited. The knife cut pipe is exactly what it sounds like, it's just as if you took a razor blade and slit the pipe. We don't get the silting in the knife cut pipe. There's just as much area for the water to get into the pipe, it just won't allow the soil and grit to get in there.

"With a five-man crew and this machine on the perfect kind of day, we have done 50,000 feet of pipe in a day," Darren explained. "That's almost 10 miles. This time of year we can plow in a line that's 1,500 feet long and there will be water running out of the pipe before we get back."

An examination of pipe that was laid the previous day showed the water running full pipe. Darren explained they do all the tiling in winter.

"We run so efficient on help, we don't have the help to tile year round," Darren said. "We're putting in a crop all spring, the crop is in the field all summer and we're harvesting until November, so that leaves November through February to tile. You know how deep the mud is out here. A tractor can hardly pull itself in those conditions, so we purchased this machine and now we're able to tile in any conditions whatsoever. As long as it's not pouring down rain and you have a foot of water in the field you can go out and tile. It will pull the tile in when the tractor will not string the pipe in beside it. It's an amazing piece of machinery."

Since they began tiling, the Grogan's have tiled 1,000 acres, and have 1,000 more acres that will benefit from tiling. As they purchase more acres, they're convinced that tiling forever will be in their future. Darren explained the benefits.

"Year before last it got considerably dry in this area," he said. "We bought an extremely wet farm and we began tiling it. We lacked 40 acres getting it tiled before spring broke and it was time to plant. The corn on the 40 acres that did not get tiled looked perfect all year, none was drowned out. It was one of those dry springs. I said in my mind this will be the year that tile will not pay. We had 105 degree heat and I don't know how long we went without rain, but it was a long time. When we shelled that corn, the tiled ground made 40 more bushel to the acre than the non-tiled."

That is the reverse of what one would expect. However, Darren thinks he understands the phenomenon. Corn is such a management sensitive crop that water stress can occur with no visual effects whatsoever, yet it will take the top end off the yield.

"I think you get two things," he explained. "You get the immediate effects of that excessive water stress in the plant, then with a wet spring I don't feel the corn roots get down to where they need to be. When you have tile in there and the pipe is 30-36 inches below, those roots are going after that moisture."

With deep roots, the plants can survive the July and August droughty period better. However, the plants with water just beneath the soil crust in early spring never develop roots to help them survive the dry summers.

Darren said tiling is becoming more commonplace in Kentucky and is spreading across the state with at least three very large custom operators doing the work.

"Actually there was a small scale tile done back in the 1970s, but only on a few of the wettest fields," he said. "It wasn't done properly, but it was done wonderfully for the time. We actually have some farms that we bought that were tiled back in the 1970s. They're low on the priority list because they're draining and doing well. Before we are finished, if there's such a thing for us to get done tiling, we will redo them."

Darren further explained the process that he uses to plan the tiling project.

"The first and most important thing when I lay out a field is the size of the main I need," he said. "I calculate the acres that are drained by the grade that I know I can get on the pipe. My main concern is the drainage co-efficient. That is how much water we can remove per acre per 24 hours. What we are striving to achieve is a minimum of three-eighths drainage co-efficient. We want to remove three-eighths of an inch of water per acre per 24 hour period. If we can achieve that, then we know we have a farm that's normally too wet but we can grow corn or wheat on it. Both are very water sensitive crops. You can take the wettest bottom and literally plant it when you plant the driest hill.

"Now, in light of that, the main, of course, is the heart of the whole drainage system," he added. "We're looking for the main that can remove that much water over the acres drained. Once we determine that, depending on the situation, we tile on 40-foot centers. When we began 10 years ago, we were tiling on 60-foot centers."

He explained the laterals in the pipe that attach to the main are 40 feet apart.

"Now we are down to a minimum of 40 feet, and if it's very wet we're at 30 feet," he said. "The fields tiled in the 1970s, were tiled on 75 feet."

When the tile is too far apart, the data from the combine shows a yield difference between those tile lines.

"That's why you want them close," Darren said. "It's another instance of precision agriculture helping to make those decisions." Δ

(See next week's paper for a report on irrigation on this farm.)

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