

Putting a plug into nitrogen runoff

Water-control system moving from research to field

By Tim Krohn

The Free Press, April 19, 2006

ST PETER —

Later this spring, after planting his crops, Don Wenner will be able to go to some small square tubes sticking up from his field and slide small blocks down that will back up some of the water flowing out of his field tile.

If they work as hoped, they will store more water in the soil, which could help plant growth during dry times, and they will keep nitrogen fertilizer from flowing out with the water and into ditches, streams and lakes.

"Farmers are concerned about the environment, about nutrients in water and what flows downstream," said Wenner about why he is taking part in the first of its kind test in Minnesota.

On Tuesday a couple of dozen area farmers came to Wenner's land, just west of St. Peter, to watch the installation of one of the water-control structures and to hear about the latest research into limiting nitrogen flow out of fields. Nitrogen causes excessive plant growth in streams and lakes, spurring algae blooms that can kill fish and aquatic life.

"This is the first opportunity for us to move off the research facility and onto a farm to see if we see the same benefits," said Gary Sands, a University of Minnesota researcher. He and many others have been studying different types of farm-drainage systems at the St. Paul campus and at the university's Waseca Research and Outreach Center.

Studies at Waseca have shown a reduction in nitrogen loss by as much as 80 percent using the control structures.

Farmers bury tile drainage lines in fields to get water out of the soil quickly.



A water-control device is hooked to a field drainage tile on Don Wenner's farm land near St. Peter. The control structure, which can hold back some water and nitrogen in fields, is the first in the state to be used in a field. It's effectiveness will be tested by researchers from several agencies and organizations. John Cross / The Free Press

“Farmers install tile because it increases yields by as much as 40 percent, said Tade Sullivan, executive director of the Ag Drainage Management Coalition. “But there is the problem of nitrogen flowing into water bodies.”

The black plastic drainage tile tubes are buried about 4 feet deep and have small holes in them that let water inside. The water inside then flows out the tile and into drainage ditches.

The water-control tubes installed on Wenner’s farm land are hooked into the tile lines at various spots. They allow a farmer to add or remove blocks that can hold water back in the tile or let it run through freely.

The idea, said Sands, is to let the tile flow freely in the early spring to get fields dried out so crops can be planted. Then the blocks are put in place inside the control structure to back up the water. That raises the water table in the field and holds the nitrogen in place.

Sullivan said raising the water table in the field can be good if there is a dry spell because there is more moisture available for plants. “There aren’t many environmental solutions in agriculture that are a win-win like this,” Sullivan said. “You keep some of the nitrogen from flowing out, and you can store some moisture.”

The cost of each control structure is between \$200 and \$1,000 depending on its size.

Besides the water-control project, researchers are working on something called shallow drainage systems to prevent nitrogen loss. Rather than putting tile 4 feet deep, they are put 3 feet deep to keep the water table in the field higher.

The drawback to that system is that tile need to be placed closer together to achieve the same drainage capacity, adding cost to tiling a field.

A third research area in nitrogen runoff reduction involves “woodchip bioreactors,” a kind of water filter built into drainage systems. Trenches are dug on the edge of fields and filled with woodchips and covered with soil. Tile lines send the water through the woodchips and then out another tile line. The woodchips capture the nitrogen.