

Agri Drain Corp. Partners to Install Bioreactors

Adair News, February 28, 2008

Agriculture's Clean Water Alliance (ACWA), a group of 16 ag retailers organized to reduce nutrient loss from farm fields in Raccoon River and Des Moines River watersheds, is supporting a tile line bioreactor pilot project in the Raccoon River watershed in 2008.

The project is being conducted in collaboration with ACWA's farming partners and an emerging partnership with USDA, Soil and Water Conservation Districts, the National Soil Tilth Laboratory, Agri Drain Corp. of Adair and the Ag Drainage Management Coalition.

Nitrogen is highly water-soluble, so as water moves off the farm landscape, it carries nitrogen with it. There are practices that capture and filter water at the surface (such as wetlands and retention ponds) but they can be costly and require land to be taken out of production. One alternative filtration practice is gaining interest in bioreactors.

Bioreactors are essentially underground trenches filled with a carbon source (commonly wood chips), through which tile water is allowed to flow. The carbon source provides material within which microorganisms can colonize. Using the wood chips as a food source, the microorganisms begin breaking down the nitrate through a denitrification process, and expel the nitrate as a gas.

The systems are easy to construct, relatively inexpensive, take little or no land out of production and are believed to require little maintenance. There are no adverse effects on crop production, and they can be designed to not restrict drainage. And early research has found nitrate removal efficiency averaging between 25 to 35 percent.

Dr. Richard Cooke, Associate Professor of Agriculture Engineering, University of Illinois, is a leading researcher of bioreactors. Dr. Cooke says the systems work, but we don't completely know how. "The bioreactor system, although effective, is not fully-understood. The identity and community dynamics of microorganisms participating in denitrification in tile drain bioreactors is unknown, apart from our findings that both bacterial and fungal species are important to the process. We surmise that the fungi break the cellulose in the wood into smaller organic molecules, which the bacteria then use in the metabolic processes."

The initial bioreactors to be installed by ACWA will be placed in the West Buttrick Creek/Hardin Creek areas of Greene county. The Greene County District Conservationist is interested in working with ACWA and there are several farmers who are willing to demonstrate the practice.

ACWA is looking at specific installation sites using GIS and aerial imagery. Once installed the units will be tested for effectiveness. ACWA will be observing nitrate levels in its water monitoring network above and below each site to evaluate the performance. If the bioreactors are proven as a practice in the Raccoon River watershed, they could become one of several integrated solutions for improved water quality.