ENVIRONMENT

New techniques help reduce nitrates in water

Saturated buffers, denitrification bioreactor see success on farms

By Orlan Love, The Gazette

Farmers, landowners and drainage contractors in the watershed of a Cedar River tributary learned Thursday about new approaches to removing nitrates from water flowing through drainage tile.

Annual nitrate load reductions exceeding 60 percent have been reported from test sites for a conservation practice known as saturated buffers, said Nathan Utt, an agricultural engineer speaking at a field day sponsored by the Black Hawk County Soil and Water Conservation District.

Other speakers reported on the effectiveness of a denitrification bioreactor installed last fall at Lanehaven Farms, the site of the field day. The bioreactor empties into Miller Creek, which drains parts of Black Hawk, Benton and Tama counties.

Utt, an employee of Ecosystem Services Exchange in Adair, said saturated buffers are simple, effective and inexpensive.

The practice entails installing a tile line beneath an established vegetation buffer and connecting it to a tile outlet from a farm field, he said.

"Nutrients in the water are removed naturally as the water moves underneath the buffer on its way to the creek," he said.

Tom Isenhart, a water resources specialist at Iowa State University, said he has been monitoring two saturated buffers in central Iowa that have recorded 40 percent to 60 percent nitrate load reductions.

"This is going to get a lot bigger in a very short time," said Bruce Gardner, a project coordinator for the Benton County Soil and Water Conservation District, which will demonstrate construction of a saturated buffer during an Oct. 2 field day on a farm near Dysart.

The Lanehaven Farms denitrification bioreactor has yielded mixed results in its first year of operation, said Chad Ingels, a watershed project coordinator with Iowa State University Outreach and Extension.

The bioreactor — a trench filled with wood chips that serve as a medium for bacteria that convert nitrates in tile water to harmless nitrogen gas — reduced nitrates by 30 percent to 40 percent during periods of normal rainfall, but its effectiveness declined following heavy rainfalls, Ingels said.

"We have gotten a 40 percent reduction in normal years," said Keegan Kult, who has been involved in installing about 20 bioreactors in his role as environmental projects manager for the Iowa Soybean Association.

Bioreactors and saturated buffers are eligible for cost share funds, speakers at the field day said.

The event, part of the Miller Creek Water Quality Improvement Project, was designed to showcase conservation practices aligned with the Iowa Nutrient Reduction Strategy and the Iowa Water Quality Initiative.

"Outreach and education are vital components for the Miller Creek Water Quality Improvement Project," said Miller Creek watershed coordinator Shane Wulf.

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Sy Bean photos/The Gazette

A crowd gathers between corn and soybeans on Thursday to see the denitrification bioreactor, a system that extracts nitrates from water runoff, during the Denitrification Bioreactor and Saturated Buffer Field Day at Miller Creek, south of Waterloo. The denitrification process still is being tested but has proved to be highly successful.

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Bruce Gardner, Benton County Soil and Water Conservation District

Lanny Schwartz, assistant commissioner of the Black Hawk Soil and Water Conservation District, looks at a demonstration model of the denitrification bioreactor on Thursday during the Denitrification Bioreactor and Saturated Buffer Field Day at Miller Creek, south of Waterloo.