

Bioreactors eligible for cost share

By JASON JOHNSON

DENITRIFYING bioreactors are now eligible for technical and financial assistance through USDA's Environmental Quality Incentives Program.

These underground structures are filled with a carbon source, such as wood chips, and intercept and treat tile water flow and reduce nitrate levels in water leaving agricultural land.

USDA's Natural Resources Conservation Service recently drafted an interim conservation practice standard in Iowa for bioreactors, which are designed to improve water quality in sites where there's a need to reduce the concentration of nitrate-nitrogen of subsurface drain flow or groundwater.

Administered by NRCS,

Key Points

- NRCS OKs EQIP cost sharing to install bioreactors in fields.
- The underground structures filter and treat tile water.
- Designs allow for no adverse effects on crop production.

EQIP offers farmers financial and technical assistance to install or implement structural and management practices on eligible agricultural land. In fiscal year 2009, NRCS provided more than \$20 million in financial assistance to Iowa farmers through EQIP.

The Iowa Soybean Association is providing technical assistance to groups and landowners in watersheds that need a reduction in nutrient loading. Roger Wolf, director of environmental programs for



ADD CHIPS: Wood chips are spread over geotextile fabric at a bioreactor installation demonstration in Webster County. Wood chips serve as a carbon source to metabolize nitrate into gas.

ISA, says the bioreactor is one practice to consider.

ISA partnered with the Clean Water Alliance, the Sand County Foundation, Iowa State University and others for a series of bioreactor installation demonstration projects for interested farmers.

Wolf says bioreactors are relatively inexpensive and easy to construct, take little or no land out of production, and require little maintenance. "There are no adverse effects on crop production, and they can be designed to not restrict drainage," he says.

Basics of bioreactors

The basic features and function of a bioreactor are fairly simple.

■ Bioreactors are generally located on the edge of a field to reduce compaction from traffic and interference with field operations.

■ The size and configuration of bioreactors is determined by desired flow rate, permeability of the carbon source (wood chips), and the desired hydraulic retention time (the time it takes for wood chips to metabolize nitrate into gas).

■ A water control struc-

FLOW CONTROL: Keegan Kult describes how the water control structure will work as part of a bioreactor system at the demonstration project on the Ann Smeltzer Trust Farm near Otho in Webster County.

ture will divert tile flow to the bioreactor. However, high flows bypass the bioreactor, thus maintaining normal field drainage.

■ A geotextile lining is used for the top of the bioreactor to prevent soil particles from blending with the wood chips.

Wolf says early research shows that a bioreactor can remove 25% to 35% of nitrate in tile line water, which is particularly important in north-central Iowa where nitrate levels in tile lines are among the highest in the country.

"Excess nitrogen and phosphorus cause havoc to our aquatic systems," says Wolf. "Nutrients in the water cause algae growth, and when algae dies off, it consumes oxygen in the water."

Cost of installation

Bioreactors will cost an estimated \$7,000 to \$10,000, which includes excavation, wood chips and a control structure. A major cost factor is size, which will depend on tile line size, slope and time needed to treat the nitrates. Bioreactors will be designed to work for at least 10 years, but Keegan Kult, watershed management specialist with ISA, says he expects bioreactors to function well for about 15 years.

Webster County farmer Gary Nelson is very encouraged by the potential benefits of bioreactors. "I see this as being proactive," he says, "instead of waiting until the government restricts the amount of nitrogen we can apply." There is a bioreactor demonstra-



tion site on the Ann Smeltzer Charitable Trust Farm near Otho, which Nelson rents.

Not designed for traffic

You may wonder if you can farm over a bioreactor. The answer is "no," says Allen Gehring, state conservation engineer for NRCS. The intention of a bioreactor generally is to be located on the edge of a field and to be seeded to grass.

Driving over it with farm machinery would risk compacting the wood chips buried below. The buried carbon source material is designed to remain permeable so water can filter through it. Traffic would create function problems. Plus, deep crop roots would likely cause complications.

The location, protection and cover on a bioreactor will likely be determined on a case-by-case basis, says Gehring. Each site will represent different limitations and obstacles.

Johnson is the public affairs specialist for USDA-NRCS, Des Moines.

Mississippi River Basin Initiative

THE federal government is taking action in a new 12-state NRCS initiative to reduce nutrient loading in the Mississippi River basin. Denitrifying bioreactors will be a core trapping practice for soil conservation and water quality improvement in the newly developed Mississippi River Basin Healthy Watersheds Initiative, or MRBI, which includes Iowa.

NRCS developed MRBI to help farmers in selected watersheds voluntarily implement conservation practices that avoid, control and trap nutrient runoff; improve wildlife habitat; and maintain agricultural productivity. NRCS will provide farmers assistance with a system of practices that will control erosion, improve soil quality and provide wildlife habitat, while managing runoff and drainage water for improved water quality.

NRCS will offer this initiative in fiscal years 2010 through 2013, dedicating at least \$80 million in financial assistance each fiscal year. This is in addition to regular NRCS program funding. Selected Iowa watersheds will be announced later this fall.

■ For more information about denitrifying bioreactors and EQIP, visit your local NRCS office. Details about MRBI are available at www.nrcs.usda.gov.

Chemicals in waterways down even with high crop yields

ARECENTLY published study by the U.S. Geological Service found steady or declining levels of pesticides in Corn Belt waterways from 1998 to 2006, despite record increases in per-acre yields.

Growth Energy CEO Tom Buis says the study shows that U.S. farmers can produce more corn using environmentally sustainable practices.

The USGS study ranked 11 herbicides and insecticides frequently used for

agricultural weed control in the Corn Belt including Illinois, Iowa, Nebraska and Ohio, and including parts of adjoining states. The study tracked those pesticides in 31 stream sites over two overlapping time periods: 1996 to 2002 and from 2000 to 2006.

According to Buis, with increasing frequency, farmers are using advanced farming practices to reduce runoff and protect water supplies. This report shows that each year those

practices can be advanced both to manage the environment and increase yields of corn for livestock feed and ethanol production.

The USGS scientists who ran the study linked the declining presence of pesticides to better agricultural management practices and scientific advancements.

Information on this study can be found at www.usgs.gov/newsroom/article.asp?ID=2345.