

Bioreactors, component of Iowa's Nutrient Reduction Strategy, help reduce fertilizer runoff

Trench filled with wood chips host bacteria that convert nitrates into nitrogen gas

Orlan Love
319-934-3172

- Tweet 13
- Recommend 8
- 98
- g+1 1

WATERLOO — A new woodchip bioreactor will reduce nitrates in tile water draining off an 80-acre Lanehaven Farms field about four miles south of here.



Blake Hollis, co-owner of Lanehaven Farms in Black Hawk County, uses a skid loader to distribute wood chips in a denitrification bioreactor on Nov. 14, 2013, on farm south of Waterloo. The wood chips serve as a medium for bacteria that will convert nitrates entering the bioreactor from drainage tile into nitrogen gas, which will escape harmlessly into the atmosphere. (Orlan Love/The Gazette)

SUBOXONE[®] Sublingual Film

www.suboxone.com

(buprenorphine and
naloxone) CIII. Find a
doctor.

The bioreactor – one of several components of the state's Nutrient Reduction Strategy – has the potential to substantially reduce the volume of nitrogen fertilizer polluting Iowa's surface water.

"It is one of many solutions we will implement to improve water quality," said Blake Hollis, a partner with his dad, Curtis Hollis, and other family members in Lanehaven Farms.

The Hollises consider themselves early adopters of technological advances that foster both productivity and sustainability. They employ many of the practices recommended in the state's Nutrient Reduction Strategy including conservation tillage, cover crops and spoon-feeding fertilizer to reduce costs and limit non-point pollution.

"I like that (the bioreactor) is an edge-of-field practice that won't take land out of production and that we can measure the results," Blake Hollis said.

Its effectiveness can be determined simply by monitoring the nitrate content of water entering and leaving the bioreactor – a trench filled with wood chips, which host bacteria that convert nitrates into harmless nitrogen gas.

"On average, we've reduced nitrates from 50 percent to 70 percent in water actually going through the bioreactor," said Chad Ingels, a watershed specialist with Iowa State University Extension who helped the Hollises install theirs in mid-November.

"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.

Effectiveness decreases in abnormal weather such as last year's drought, when tile lines quit running, and this year's record spring rainfalls, during which untreated water had to be diverted around bioreactors, he said.

"This year, with a lot of tile flow, nitrate reductions were in the 15 percent range," said Bruce Atherton, an agricultural engineer with the Natural Resources Conservation Service in Ankeny.

Both Kult and Atherton said the bioreactor's benefits carry to those living downstream – as far downstream as the Gulf of Mexico, where nutrients running off farm fields have created an anorexic dead zone incapable of supporting aquatic life.

Unlike cover crops, which improve the health of soil and protect it from erosion, bioreactors do nothing to improve farmers' bottom lines, they said.

"They have great societal benefits, and there certainly should be more cost-share funding available to support their implementation," said Bill Northey, secretary of the Iowa Department of Agriculture and Land Stewardship.

The state's Water Quality Initiative, developed to support the Nutrient Reduction Strategy, included no bioreactor funding this year, but that likely will change next year, Northey said.

To build the Hollises's bioreactor, an excavator dug a trench 100 feet long, 30 feet wide and 4 feet deep at the lowest edge of an 80-acre field that had just been pattern tiled. The trench was lined with plastic, filled with four semi loads of wood chips and covered with soil.

The wood chips serve as a medium for bacteria that convert nitrates in the tile drainage water to nitrogen gas, which escapes harmlessly into the atmosphere.

Ingels said the structure will cost between \$10,000 and \$15,000 and will have a life expectancy of 10 to 15 years. Half the cost of the demonstration bioreactor will be borne by the Heartland Water Quality Project, a collaboration by Iowa, Nebraska, Missouri and Kansas.

Though bioreactors are in their infancy – the number of operating bioreactors in Iowa is estimated to be no more than 30 – they can be especially beneficial in fields fertilized with high volumes of manure, Ingels said.

“We have one site in Dubuque County that has been reducing nitrates by more than 90 percent under normal flows,” he said.

Bioreactors are one option among several practices recommended for reducing non-point pollution under the state's Nutrient Reduction Strategy.

“It will take a lot of farmers adjusting their management to make it work,” he said.

- **Tweet** 13
- **Recommend** 8
- 98
- **g+1** 1



Have you found an error or omission in our reporting? Is there other feedback and/or ideas you want to share with us? Tell us [here](#).

FEATURED ARTICLES from TheGazette.com



University of Iowa's 'Vodka Samm' to be featured...



Cedar Rapids Police Department officers to go to...



By the numbers: Breaking down Iowa's non-con slate



Iowa's top 10 plays of 2013

You Might Also Like



PHOTOS: Hot Pictures of Sportscaster Kristen Ludlow
Rant Sports



You'll Never Need Another Deviled Egg Recipe After This
Food.com



Ever Wonder How Cruise Lines Fill Unsold Cabins? This...
Lifestyle Journal



You're Cooking it Wrong: Scrambled Eggs
uLive

From Around the Web

We Recommend

- [Heidi Klum's costume was a disturbing masterpiece of geriatric proportions](#) (Sports Illustrated)
- [Chemotherapy Linked to Cancer Spread](#) (Envita)
- [These 15 Women are the Most Beautiful In Sports](#) (Rant Sports)
- [Confessions of Hotel Housekeepers](#) (AARP.org)
- [The 15 Hottest Female Sports Broadcasters](#) (Rant Sports)
- [Chargers got away with an uncalled penalty on Chiefs' missed field goal](#) (Sports Illustrated)
- [Dubuque Hempstead Assistant Principal arrested](#) (The Gazette)
- [Photos: Christmas Eve service in Iowa City](#) (The Gazette)
- [Amid Obamacare late rush, government says 'don't worry'](#) (The Gazette)
- [Iowa recruit arrested in Des Moines](#) (The Gazette)
- [Car hits, kills Iowa City pedestrian](#) (The Gazette)
- [Wife of Iowa City manager candidate Susan Stanton files for divorce](#) (The Gazette)

Recommended by

Entertainment from hooplanow.com/music



• [Jason Aldean: The Night Train Tour](#)
[January 18, 7:30PM](#)
[@I Wireless Center](#)



• [Luke Bryan: That's My Kind Of Night Tour 2014](#)
[February 06, 7:00PM](#)
[@I Wireless Center](#)



• [Bret Michaels](#)
[February 14, 8:00PM](#)
[@Riverside Casino & Golf Resort](#)



• [The Band Perry with Easton Corbin](#)
[March 02, 7:30PM](#)
[@U.S. Cellular Center](#)

Featured Jobs from corridorcareers.com

**Account Support
Advisor**

IA-Cedar Rapids |
GreatAmerica
Financial Services
Corporation

**Programmer
Analyst**

IA-Cedar Rapids |
GreatAmerica

**Account
Representative
(Property and
Casualty) Insurance**

IA-Cedar Rapids |
Thomas L. Cardella &
Associates

**Operations Support
Specialist**

IA-Cedar Rapids |
GreatAmerica
Financial Services
Corporation