

regulatory agencies, and the scientific community will enhance these developments. Encouraging the mitigation of air emissions from agricultural sources is the responsibility of all stakeholders.

*Note: In addition to his professorial position in the Dept. of Biosystems and Agricultural Engineering, Dr. Bickert currently serves as Director of College of Agriculture and*

*Natural Resources Manure and Nutrient Management Programs.*

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### Environmental Management

# Stop Fertilizing, But Let the Cows Graze!

**Don Comis**

**Agricultural Research Service Information**

**F**armers who find excessive levels of nitrates in groundwater can keep on grazing their cattle without fear of further contamination from the nitrogen in cattle waste as long as they reduce or eliminate nitrogen fertilizer application for at least a few years.

That particular wisdom comes from a study at the Agriculture Research Service's North Appalachian Experimental Watershed Laboratory in Coshocton, Ohio. For several years, Dr. Lloyd Owens, a soil scientist at Coshocton, used a herd of 30 beef cows to rotationally graze four 8-acre fields on a hillside. Owens sampled nitrate concentrations in the groundwater below each field. U.S. Environmental Protection Agency guidelines for human drinking water stipulate 10 parts per million (ppm) as the maximum allowable safe level for nitrate-nitrogen. There is no danger to cattle from grazing on pastures with high nitrate levels.

#### Scientist's Findings on Nitrate Levels Helps Farmers

Scientists have gathered data on the watersheds in this rolling countryside for more than 60 years. The fields had been used as pasture for about 30 of those years. During the 11 years before the latest study began, Owens tested heavy nitrogen fertilization of 150 pounds per acre each year to see whether it would produce more and better grass for the cattle to graze without doing environmental harm. Unfortunately, it caused too much nitrogen to leach into the groundwater under these experimental conditions. Levels reached 13 to 26 ppm.

Some fields are more likely to have high nitrate levels in the groundwater beneath them, and annual fertilization can eventually turn them into problem fields. So Owens began a study to see whether he could lower nitrate levels by eliminating fertilizer for 7 years and either grazing cattle or harvesting hay from the fields.

He compared two pastures where cattle were allowed to graze with two pastures that were fenced to keep the animals out. In the "no cattle" pastures, the grass was cut and baled for hay twice a year.

"When you harvest the hay, you remove some nitrogen from the soil," Owens says. "And when cattle graze, they remove some of the nitrogen."

By the end of the 7-year study, Owens found that the nitrate-nitrogen in groundwater was brought down to about the same level (2 to 4 ppm) under both management practices, and the lack of fertilizer caused only a slight decrease in grass growth. But, most importantly, it did not make any difference whether cattle were on the land or not.

"It's a nice finding, because it doesn't force farmers to remove cattle from problem fields, as long as they stop fertilizing. And it saves the time and labor of baling hay for feed," Owens says.

*This research is part of Water Quality and Management, an ARS National Program (#201) described on the World Wide Web at [www.nps.ars.usda.gov](http://www.nps.ars.usda.gov).*

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"**High Nitrate in Groundwater? Stop Fertilizing But Let the Cows Graze!**" was published in the June 2004 issue of *Agricultural Research* magazine.

### Contents

Air Quality and Agriculture .....	1
Stop Fertilizing, But Let the Cows Graze! .....	3
Have Enough Land to Apply Your Manure? .....	4
Bulls Ranked by Conception Rates .....	5
Water Intake and Supply for Dairy Cattle .....	7
2004 Labor Update (Part 2) .....	9
Dairy Replacements: Where Are They? .....	11
I Said Grana Cheese, Not Granny's Cheese! .....	13
A Pathogen Linked to Powdered Infant Formula .....	14
North American Intercollegiate Dairy Challenge .....	16
New Composting Manure Turner on Campus .....	17
Alumni Profile - A Visit With Barbara Dartt .....	18
Calendar of Events .....	19