

# It's Still About Yields: Developments In Drainage In Illinois

URBANA, ILL.

**E**xcessive nitrates in surface waters from tile-drained areas have been associated with several health and environmental problems. The development of best management practices to reduce nitrate loads from drainage systems has driven much of drainage-related research over the past two decades. However, researchers have taken great care to concentrate on practices that will not adversely affect yields.

A panel of University of Illinois specialists, including Richard Cooke, associate professor of agricultural engineering and Drainage Extension Specialist, provided the most current information about crop production, pest management, and economics at the 2012 U of I Corn and Soybean Classic held on Jan. 12 at the I Hotel and Conference Center in Champaign, Ill.

"Excessive nitrates in surface waters have been associated with blue baby syndrome, bladder cancer, non-Hodgkin's lymphoma and hypoxia in the Gulf of Mexico," Cooke said. "Researchers agree that the optimal approach to reducing nitrate levels in those waters where it has become a problem is to use a combination of treatment options."

Suggested options include reducing nitrogen fertilizer application rates, changing the timing of fertilizer application, creating and restoring wetlands and implementing conservation drainage practices.

But the question remains – will these options be economical and not adversely affect yields?

Cooke said yes, conservation drainage practices should be convenient and cost effective. Researchers are encouraging producers to look into implementing bioreactors and drainage water management systems. These methods will have production and environmental benefits and maintain drainage efficiency.

"Bioreactors are essentially subsurface trenches filled with a carbon source, mainly wood chips, through which water is allowed to flow just before leaving the drain to enter a surface water body," he said. "The carbon source in the trench serves as a substrate for bacteria that break down the nitrate through denitrification or other biochemical processes."

Bioreactors provide many advantages, Cooke said. They use proven technology, they require no modification of current practices, land does not need to be taken out of production, drainage effectiveness is not affected, and they require little to no maintenance.

Drainage water management (DWM) is the practice of using a control structure to set the outlet of a drainage system, thereby adjusting the intensity of drainage, and only removing water that needs to be removed for optimum crop growth. This practice can be used to raise the outlet level after harvest, reducing nitrate loading from tile effluent at a time when there are no crops in the field.

"The normal mode of operation in the Illinois DWM Practice Standard is to set the water table control height to within six inches of the soil surface on Nov. 1, and to lower the control height to the level of the tile on Mar. 15. The practice can also be used to retain water in the soil during the growing season for a modest yield increase – 2 to 3 percent," Cooke said. "These systems are not much more expensive than conventional drainage systems, so even this modest yield increase may make them more economically viable."

For the producer, the decision to install or improve a drainage system is a practical one, based on principles of good economics and good husbandry. If the benefits outweigh the associated costs, drainage makes good sense and the case for these systems is strong, Cooke said. Δ

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