

SRBC Reports On Groundwater Nutrients

(Continued from Page A32) discharge from the wetland, we were dissatisfied with the results. Review of the data suggested that the concentration of phosphorus in the spring and field drain might be inadequate to promote root growth.

"In June of 1993, a phosphorus fertilizer was added to the wetland. Within three weeks, the nitrate concentration in the wetland discharge dropped from 24 milligrams per liter (mg/l) as N to 9.24 mg/l as N.

"Also the dissolved oxygen fell from 2 mg/l to essentially zero."

What that means is that the lack of phosphorus in the groundwater limited the ability of bacteria, microbes and plants to grow and thus use the nitrates as energy.

That has implications that more research is needed on the construction and maintenance of artificial wetlands, among other things.

However, the technique of recovery of groundwater for treatment is similar to the systems used at landfills to collect leachate.

This year, the SRBC plans to expand its study by developing a similar research plot on a Lancaster County farm, according to Larry Taylor, a hydrogeologist with the SRBC.

Taylor is one of three authors of the study sponsored by the SRBC, "Water Quality and Hydrogeology of Two Small Agricultural Basins

in Central Pennsylvania."

The other two authors are Robert Edwards, environmental specialist, and Charles Takita, sanitary engineer.

On Tuesday, Taylor and John Graham, an SRBC civil engineer, were at the site to explain its development, the design of the study, the findings and limitations of any information derived.

The SRBC is a single, federal-interstate agency that was formed by a compact between Maryland, New York, Pennsylvania and the federal government during the 1970s.

Its goal is to serve as the single water resources agency with authority throughout the entire Susquehanna River Basin to effect coordinated control of the use of water resources by governmental and private interests.

The continuation of the existing study areas, and the creation of a third hinges on adequate funding. The SRBC receives funds from the states involved and the federal government.

Under the Reagan-Bush administrations, according to researchers, funding for such projects was reduced and there is uncertainty about public policy to fund continued efforts to seek better knowledge in the flow of groundwater and nutrients.

This particular study was done

for the purpose of furthering more specific and reliable information on the nature of groundwater under two specific farm sites.

Study May Help Nutrient Management

But, according to researchers, the data suggests that it may be possible to use the information to better design a nutrient containment and/or treatment system for use on-farm.

According to Taylor, though it is too soon to advise the use of such a system, this research, particularly that done at the study site near Halifax, may one day serve as the basis of a Best Management Practice (BMP) for nutrient management in some farming situations.

Based on their conclusions, the authors state in their recommendations that, "Concepts developed from the existing projects should be utilized in a study of the entire Armstrong Creek basin. From this, estimates could be made of the potential nutrient reduction that could be obtained by collecting and treating localized groundwater discharges using field drains and constructed wetlands."

It should be understood that the goal of nutrient management is not to reduce the proper use of nutrients.

The goal of nutrient management is to prevent uncontrolled amounts of nutrients, primarily

nitrogen, from creating an overabundance of nutrients in aquatic systems.

The difficulty in doing so is that, while a visual inspection of a particular operation in a sub-basin may not appear to be significant in contaminating water sources, it may very well be a significant factor in local or distant nutrient pollution.

The goal of the law is to reduce excessive levels of nutrients from getting into surface and groundwaters, particularly by requiring high risk operations to develop and use plans for the containment and control of nutrients.

Manure is seen as a major sources of nutrients, although feed, carcasses, and other organic matter that could decompose into basic nutrients are also to be considered.

A definition of high risk operations, though still legally incomplete, would include high-density livestock operators.

Other high risk operations could be defined as those in which the level of competency or concern of its operator to implement reasonable nutrient controls is apparently low.

Study Isolates Flows

In general, the report showed that nutrients being applied to the land can be contained in "shallow groundwater" if the shallow groundwater can be captured through the use of drainage pipes

and directed to a single collection site.

According to the research, the field drain collected about 43 percent of the water, while about 47 percent was attributed to loss through evapotranspiration. About 4 percent of the rainfall actually was surface runoff and another 6 percent of the total was attributed to loss as getting past the collection system.

The study notes that while measures to control soil erosion have been successful in containing surface water, they also aid in directing water to filter through the ground, carrying nutrients.

A combination of drains and erosion control devices may eventually be prescribed as a technique for farming in certain situations.

Clugston said he raises primarily corn and alfalfa, and double-crops with rye. For the last six years he's also been trying to raise Sudex as an alternative ensiling crop, which he said is a "challenge" to use.

The farm soils are primarily second and third class, he said.

Clugston said he enjoys working with different types of research because he also learns. He said he didn't have the educational opportunities growing up, but he does have educational desire.

"Maybe that's why these types of projects fascinate me," he said.

USDA, PSU Collaborate On Pasture Research

UNIVERSITY PARK (Centre Co.) — A new Center for Pasture Research and Education has been established in Penn State's College of Agricultural Sciences.

A collaborative effort with the USDA Pasture Research Laboratory on the University Park Campus, the center brings together 18 agricultural scientists and several extension educators dedicated to improving the sustainability and profitability of animal agriculture through better use of grassland.

"Feed costs account for 50 to 60 percent of expenses in a dairy enterprise," said Steven Fales, professor of crop management and co-director of the center with Larry Muller, professor of dairy science.

"Pennsylvania farmers raise

more than 60 percent of their feed, but purchased forage and grain still make up a considerable amount of the operating costs," Muller said. "We hope to reduce these costs and increase profitability by helping farmers make better use of pasture."

Because efficient pasture use entails effective management of plants, animals, soils and other resources, most of the center's projects will cut across academic disciplines. The center includes experts in engineering, economics, animal science crops, soils, and ruminant nutrition.

"We're emphasizing a pasture's potential economic advantages," said Muller. "Producers won't adopt grazing technology unless pasture systems offer a higher pro-

fit at reasonable risk. Efficient pasture use could make the difference between some farmers surviving and remaining competitive or going out of business.

Penn State farm profitability studies have found that intensive rotational grazing can increase returns by an average of \$125 per year per cow, depending on commodity prices, production costs, and technology used on the farm.

Penn State studies also indicate that pasture use is rising. In a 1993 survey of 1,200 Pennsylvania dairy farmers, more than 29 percent said they use grazing as their primary forage source during the pasture season. About 16 percent use a rotational grazing system. The results also suggest pasture use is likely to rise — more than

18 percent of respondents said they intend to increase grazing in the next five years.

Not all farmers should rush into grazing though. "Large herds and pasture located long distances from the barn and milking facilities may make intensive grazing impractical," said Muller.

To exchange research findings and other information, the center has created an advisory council with representatives from production agriculture, financial institutions, the feed industry and other organizations and agencies. "Input from farmers and others will help us design research projects and educational programs that address their concerns," Fales said.

One project under way in the

center examines the possible impact of grazing practices on groundwater quality. "We're evaluating how various grazing systems, livestock densities, fertilization schemes and soil types affect nitrate contamination of groundwater," Fales said. Penn State researchers also are evaluating different plant mixes to see which provide the most nutrition and the longest growing season for the least money.

For more information about Penn State's Center for Pasture Research and Education, contact Steven Fales, 248 Agricultural Sciences and Industries Building, University Park, PA 16802, or Lawrence Muller, 316 Henning Building, University Park, PA 16802.

Penn State Pasture Researchers Test Concentrate Feeder

HUNTINGDON (Huntingdon Co.) — A computerized concentrate feeder developed and tested at Penn State may help farmers to feed well-timed supplements to cows on pasture. The mobile feeder is designed to help dairy farmers cut feed costs through more efficient use of pasture.

"To sustain high milk production when a herd is on pasture, farmers need to ensure that their cows get adequate nutrition through grains or concentrates," according to Dr. Dennis Buckmaster, assistant professor of agricultural engineering in the College of Agricultural Sciences. "But the timing of concentrate feeding is very important."

Grazing often forces farmers to feed cows concentrates at milking time, because grain feeders usually are kept inside the barn. "But feeding cows two or three large meals of grain each day upsets the cow's digestive system and keeps it from using nutrients efficiently," he said. "Offering grain or concentrates to cows while they're actually on pasture may help sta-

bilize digestion and maintain high milk production.

"Computer feeders allow farmers to control individual cow rations, monitor feed intake, and break up grain feeding into several small meals during the day," said Buckmaster. "But they're designed to stay in the barn. The Penn State prototype feeder can be wheeled into the pasture, allowing the cows to eat feed supplements when they feel like it."

The prototype was designed and built by Mark Gardner, who received a master's degree in agricultural engineering from Penn State in 1994. Gardner received the 1994 Young Scientist Award from the American Forage and Grassland Council for his work on the feeder.

The prototype feeder looks like a short grain bin attached to a trailer. The feeder's stalls have sensors that detect identification tags worn by each cow, telling the computer to dispense grain or concentrate according to the farmer's ration plan for that animal.

The device was tested last sum-

mer in a joint effort of the agricultural and biological engineering and dairy and animal science departments. "We know the feeder works and that cows on pasture will use it," said Buckmaster.

Dr. Larry Muller, professor of dairy science, and graduate assistant Douglas Hongerholt currently are gathering more detailed data on dairy cows' feed intake, milk production and general behavioral responses to the feeder.

DeFOREST, Wis. — American Breeders Service (ABS) has recently introduced a new look to the Alcide product lines. Designed to aid in accurate presentation of information, ABS and Alcide have recently introduced new labels for all lines of their udder care products currently marketed through the ABS sales network.

These new labels will be con-

Researcher also are looking at ways to make the feeder more energy-efficient. "Because it would be used in pasture, away from easily accessible electric outlets, the prototype was built with two power sources, a diesel generator and an experimental solar-powered battery," Buckmaster said. "The solar modules couldn't provide enough power to maintain an acceptable battery charge with the current design, but if we can make the electrical system more

efficient, solar power could be a very viable option."

Buckmaster is a member of Penn State's Center for Pasture Research and Education, a collaborative effort with the USDA Pasture Research Laboratory on the University Park Campus. The center brings together 18 agricultural scientists dedicated to lowering feed costs on Pennsylvania farms by improving the utilization of pasture.

ABS/Alcide Corp. Give New Look To Products

sistent in wording and layout, enabling dairy producers to find and understand directions, and precautions more easily. Additionally, the new labels are color coded to specifically identify the different products from one another.

With the redesign of the Alcide product labels, ABS will lead the industry by offering information

in both English and Spanish. "With the growing interest globally and the fact that much of the world speaks Spanish, we are excited to be able to provide this key product information to the users of the ABS/Alcide products in their native language, without having to segregate product packages," said Jim Winter, ABS director of animal care products.