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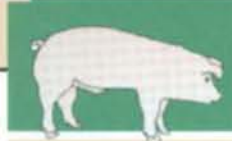


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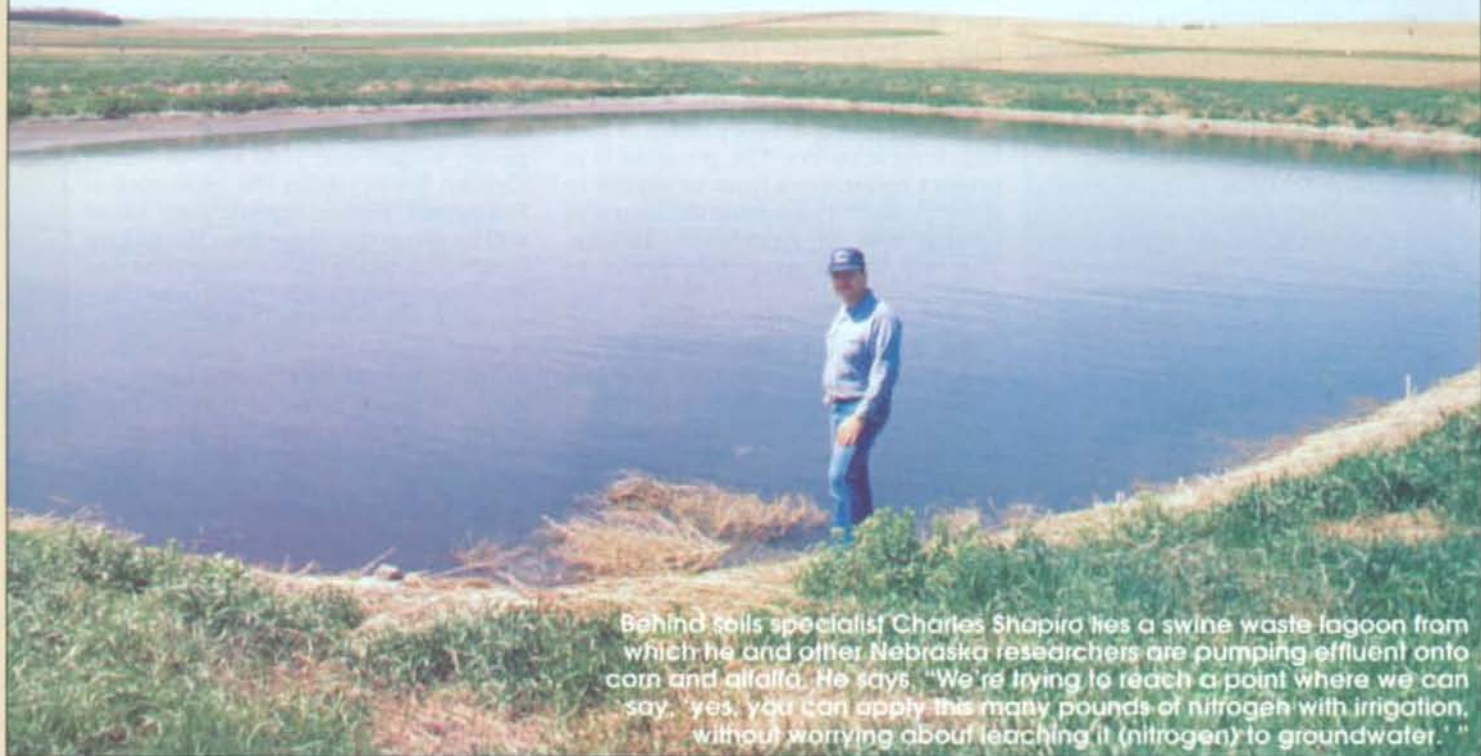
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Looking for the least land to handle swine wastes

BY DAVE HOWE



Behind soils specialist Charles Shapiro lies a swine waste lagoon from which he and other Nebraska researchers are pumping effluent onto corn and alfalfa. He says, "We're trying to reach a point where we can say, 'yes, you can apply this many pounds of nitrogen with irrigation, without worrying about leaching it (nitrogen) to groundwater.'"

This Nebraska study, in its second year, seeks answers on using lagoon effluent safely on least amount of land possible.

Is it a swine waste disposal problem? A swine waste utilization opportunity? Or is it a swine waste utilization situation?

Take your pick. You may find answers to whichever of the above three ways you view a lagoon system in your hog operation. They are coming from research at the University of Nebraska's Northeast Research and Extension Center, Concord, Neb. Researchers there are in their second year of a study on utilizing swine wastes from lagoon systems for crop production without surface and groundwater nitrate contamination.

"The problem we are running into (as hog numbers per operation rise) is land base available for disposal," says Mike Brumm, extension swine specialist at the Northeast Research Center.

Dr. Charles Shapiro, soils specialist at the center, and graduate assistant Jeff Mueller are studying

irrigation of alfalfa and corn with lagoon effluent. "What we're looking at is maximizing utilization of the nitrogen by corn and alfalfa," says Mueller. It's a system that fits best where water is available for flush systems and where crops are likely to need irrigation for maximum production. You don't want to irrigate when the crop doesn't need it in order to get rid of the effluent, the Nebraska researchers say.

A number of livestock waste studies have been done or are underway around the country. However, Nebraska researchers say a study in North Carolina is the only other they know of that is similar to the Nebraska work, where the focus is on maximum, environmentally safe utilization of swine lagoon effluent by crops through irrigation. Other researchers involved in the Nebraska study are Northeast Center irrigation specialist William Kranz and Univer-

sity of Nebraska-Lincoln forage specialist Bruce Anderson.

"Nitrogen is the main nutrient left in a lagoon," says Shapiro. "We're trying to work out a system of utilizing the nitrogen in the lagoon water on as few acres as possible, and reach a point where we can say, 'apply this much nitrogen with irrigation, without worrying about leaching it (nitrogen) to groundwater.'"

These researchers believe that corn might be able to utilize up to 200 pounds of nitrogen per acre annually, without adverse effect on yields or leaching to groundwater. Alfalfa might be able to handle twice that amount, 400 pounds, despite alfalfa's ability to fix its own nitrogen from the air.

"One way to increase the amount of nitrogen that can be applied per acre of crop ground is to use alfalfa as a sink crop to transfer effluent-N into plant protein that can be sold or fed to livestock," Shapiro has writ-



News & Notes

Two huge pork sales to the former Soviet Union were recently approved by USDA under the Export Enhancement Program (EEP). The first sale was for 45 metric tons of pork and the second was for 19 metric tons of boneless frozen shoulder meat.

According to Glen Keppy, president of the National Pork Producers Council, the Russian purchases lead the way for more EEP sales. "The fact that Russia is buying boneless shoulder meat instead of carcasses shows we are making headway in marketing U.S. pork," notes Keppy.

The Russian federation was the third largest importer of U.S. pork in 1993, in terms of volume of sales. The former Soviet Union ranked fourth largest in value of sales, as they purchased 16,189 metric tons of U.S. pork last year.

The balance of the 20,000 metric ton EEP allocation is still available for additional pork sales to the former Soviet Union this year.

Pork shoulder meat is showing increased potential in this country as well. A research study conducted by the National Live Stock and Meat Board with checkoff funds has found that pork shoulder cushions can be used to manufacture precooked frozen pork patties with the same characteristics as a product with higher levels of fat. The study evaluated different processing techniques that utilized lesser-valued pork cuts in the development of low-fat, precooked sausage patties.

A new essay contest sponsored by the FS Feed Division of GROWMARK allowed FFA members in Iowa, Illinois and Wisconsin to test their writing skills by showing creativity and understanding of the swine industry. Three winners were chosen from the 154 entries, one from each state. They are Marla Schemmel, Farley, Iowa; Tom Lowe, Carlock, Ill.; and Jason Keith, Sun Prairie, Wis.

The winning essays centered on challenges facing independent pork producers and ways in which they can cooperate. Each winner received a 35mm camera and an expense-paid trip to Chicago.

The Food Safety and Inspection Service has approved its final rule

mandating safe handling instruction labeling on all raw meat and poultry products. The label must address safe storage of raw products, prevention of cross-contamination, cooking of raw products and handling leftovers. The purpose is to protect consumers from exposure to possible bacterial contamination and reduce risk of food-borne illness. The regulation went into effect in July.

The American Berkshire Association, Farmland Foods, Inc., and one of the largest exporters of meat products to Japan have signed a multi-year agreement to provide high quality, Berkshire-influenced meat cuts to Japanese consumers.

The meat products provided to the Japanese markets will have very specific quality standards. They will be monitored for marbling, color and texture. Market animals that are highly influenced by American Berk-

shire genetics provide a more reliable carcass to meet quality standards for the Japanese consumer.

The pilot program leading to this first time partnership of a purebred breed association, packer and exporter began one year ago in Sioux Center, Iowa, under the guidance of Farmland Foods. Qualifying meat will be given the American Berkshire Gold trademark identifying it as the elite meat product for Japanese consumers.

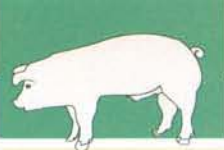
Market animals of Berkshire parentage, proven by transferred pedigree of one or more of the animals' parents, will receive \$2 per hundredweight live premium in addition to added carcass premiums for leanness. Any commercial operator who has purchased or will purchase purebred American Berkshire breeding stock, obtains a properly transferred pedigree and presents a copy at participating Farmland buying stations is eligible for premiums. □

Hog Profits

Breakeven Prices

Inputs	Producing Feeder Pigs (Sows bred mid-Aug.; pigs to be sold Feb., 1995)	Farrow to Finish (Sows bred mid-Aug.; pigs to be sold June, 1995)	Finishing Feeder Pigs (Pigs bought mid-Aug.; marketed Jan., 1995)
Interest rate	8.75%	8.75%	8.75%
Labor @ \$7.50/hr.	\$67.50/litter	\$90/litter	\$7.50/hd.
Vet. med. facilities operating cost	\$40/litter	\$85/litter	\$4/hd.
Marketing cost, including hauling	\$12/litter	\$15/litter	\$2/hd.
Depreciation, interest, tax & insurance on buildings and equipment	\$100/litter	\$150/litter	\$6/hd.
Cost of 40 lb. pig	—	—	\$31/hd.
Feeding period (days)	—	—	145
Number of pigs sold per litter	7.27	6.97	—
Market weight (lbs.)	40	230	230
Feed: Corn (lbs.)	1341/litter	5314/litter	570/hd.
Price/bu.	\$2.45	\$2.45	\$2.45
40% supplement (lbs.)	225/litter	1131/litter	130/hd.
Price/ton	\$273	\$273	\$273
18% pig starter (lbs.)	78/litter	78/litter	—
Price/cwt.	\$20.45	\$20.45	—
16% pig grower (lbs.)	273/litter	273/litter	—
Price/cwt.	\$10.25	\$10.25	—
Price you'll need to:	(per head)	(cwt.)	(cwt.)
A. Cover feed & variable costs	\$27.00	\$35.50	\$38.50
B. Cover total costs (breakeven)	\$41.75	\$45.50	\$41.00

Only major inputs used in above calculations are listed. Final figures are rounded off to the nearest \$.25. Each 10 cents per bu. change in corn price from \$2.45 moves total breakeven cost 50 cents in the same direction. Interest rate for finishing feeders based on special rate for purchasing animals.



ten in a research report.

Last year, he and Mueller irrigated with effluent at rates which provided amounts of nitrogen ranging from zero to 600 pounds per acre, 150 percent of alfalfa's expected 400-pound uptake. Alfalfa yields, measured on a 100 percent dry matter basis and averaged for three-, four- and five-cutting regimes, showed 11 percent lower yield at the maximum nitrogen rate than at the zero rate: 3.29 tons per acre versus 2.94 tons at the 600-pound nitrogen rate.

Corn also received effluent at several rates, comparing zero, 200, 400 and 600 pounds of N per acre, with yields of 96.9, 107.1, 107.9 and 112.5 bushels per acre, respectively.

Shapiro and Mueller tried a fall rye seeding as a nitrogen "sponge" crop to take up some of the N in the soil and hold it between growing seasons. The ½-ton of rye dry matter per acre from last fall's seeding held about 20 pounds of N.

In all plots, tubes with vacuum lines have been installed in plot root zones to pull water (leachate) out of the soil profile to measure nitrates in water moving through the zone.

Nebraska researchers say it will take at least two more years of data to get the answers hog producers need, especially since last year's above-average rainfall provided limited opportunities to apply effluent

when the crops needed irrigation.

Where amount of land for swine waste utilization isn't a limiting factor, these researchers hope to answer how to get the most value from the nutrients in the wastes for crop production.

Further, they hope to learn more about managing for odor control. Make the lagoon large, says Brumm. "Dilution is the solution to odor pollution," he quips.

Also, a large lagoon allows more leeway for an operator to choose when to spread effluent (which is 90 to 95 percent water) on land — when it best favors operator labor schedules and environmental considerations, Brumm says. "We recommend producers have multi-year storage for lagoons."

Lagoons are anaerobic, where digestion of organic material is done by bacteria that do not require oxygen. These bacteria include what Brumm calls "purple sulfur-fixing bacteria." They fix sulfur, keeping it from becoming part of compounds that are associated with offensive odors, he explains. As the general name for the bacteria implies, this class of micro-organism is purple. Hence, a properly functioning anaerobic lagoon will have a purple cast. □



This is one of a number of sites within the corn and alfalfa plots where a vacuum line runs into a tube extended into the root zone for pulling samples of water moving through the root zone for determining nutrient leaching under different rates of effluent application.

Swine waste math

A little bit of swine waste lagoon math can provide a rough idea of quantities involved in handling effluent from swine confinement lagoon systems.

Based on some general estimates by Brumm, a pig in a grow/finish unit with fresh-water gutter flush would produce a daily average of about 1.5 gallons of effluent (not counting flush water) over a 100-to 120-day finishing period. That's about 2 acre-inches of effluent, plus flush water annually for every 100 head of capacity in this type of system.

In a confinement farrowing unit, figure about 5 gallons of effluent per crate daily. Composition of effluent from a farrowing unit might be a little more dilute than that from a grow-finish unit.

Based on analyses of the lagoon system in the Nebraska

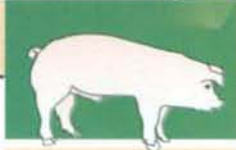
study so far, there are about 80 pounds of nitrogen per acre-inch of effluent pumped from the lagoon, or about 150 to 160 pounds of nitrogen a year in the effluent pumped from the lagoon to cropland for every 100 head of grow-finish capacity. "What we're finding is that it (nutrient content of the effluent from the lagoon) is pretty stable," Shapiro says. Each acre-inch also contains about 2 to 3 pounds of phosphorus, 1 pound of sulfur and 70 pounds of potassium.

An important distinction is that a significant amount of nitrogen has been lost to the atmosphere from the anaerobic lagoon during microbial digestion — before the effluent is pumped from the lagoon onto crops, explains Brumm.

Further, soils specialist Shapiro notes that about 65 percent of the nitrogen in the lagoon effluent is in

the volatile ammonia form. Thus, even more of the nitrogen may be lost to the atmosphere as it is applied through the sprinkler irrigation system to the crop. Still more nitrogen may be lost through volatilization from the soil surface after the effluent is on the soil surface. In other words, a portion of the 80 pounds of nitrogen per acre-inch of effluent coming out of the lagoon may be lost to the atmosphere before it enters the soil.

If you're interested in minimizing the amount of land needed for safe utilization of swine wastes, nitrogen losses to the atmosphere may actually be desired. But if you are trying to save as much nitrogen as possible for crop production or are in an area where nitrogen losses to the atmosphere are a pollution concern, it's a different situation. □



Hog Health

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Q: What can I do during times of sudden boar power shortages

without sacrificing new entry quarantine policies?

A: You could hand mate with a breeding management technique called "intentional single service." It involves breeding all weaned sows that come in heat on days 4, 5 and 6 after weaning with just one service. If a sow comes in heat after day 6 or has a service lasting less than 4 minutes, then she is mated twice. Although results can be variable, the majority of farms we work with on this system have farrowing rates and liveborn numbers comparable to multiple service. It is thought that the sows coming in heat on days 4, 5 and 6 are the higher fertility sows and for them, once is enough. Another solution is to use artificial insemination (AI) during the peak demand time periods using purchased semen or collecting your own boars. Get some experienced guidance if AI is a new technique for you.—**Clark Huinker**

Q: The FDA published a report to control producer use of drugs in an extra-label manner. What does extra-label mean, and which products are involved?

A: Extra-label drug use involves any animal drug product used in a manner outside the label instructions, where a veterinarian and client meet the requirements of Compliance Policy Guide 7125.06. Uses outside the label are common in animal production, such as higher or lower than labeled dosages, other disease conditions, other species, unapproved routes and mixtures with vaccines or other antibiotics.

According to FDA directives, producers may use drugs outside the label only under the direction of a veterinarian. Proper animal identification and treatment records are required by the FDA directives. These practices, coupled with an extended withdrawal period, are required to assure no violative residues when extra-label drug usage is contemplated.—**Jim McKean** □