Producers adjust manure spreading rates

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Producers are finding new ways to capture nutrients while reducing manure rates and the potential for manure to contaminate surface waters. Land application of manure is the oldest and most sustainable method of livestock and crop farming. But land application comes with positive and negative consequences, sometimes within the same practice. Crop rotations, soil types, weather and manure systems provide unique challenges and opportunities for each producer.

Bob Dykhuis puts the manure management system together from feeding strategies, to manure testing, to improved tillage and application methods. *photo courtesy MPPA*

The main goal of applying manure is simple from a regulatory standpoint: keep it out of surface and ground waters. The logistics of achieving this require farmer ingenuity and a desire to create a successful system on each farm.

In pursuing a comprehensive nutrient management plan, Paul and Ralph Swartzendruber of Bay Port realized they needed to reduce manure application rates related to both phosphorus and nitrogen. The manure coming out of their swine finishing facility was high enough in nutrients that they needed a new system to achieve acceptable levels of nitrogen ahead of edible bean crops.

Paul's can-do attitude is to "capture everything the manure has to offer." They have improved nitrogen retention and are saving money while being environmental stewards.

The amazing part is they are seeing increased nitrogen credits with this system, even though they are using less manure per acre.

Their traditional system of pulling a 5-knife applicator behind the manure tank did a great job of reducing odor, but to reduce the rate per acre they had to drive faster through the field. This threw up more soil, exposing the manure, creating more odors, leaving the field in rough condition for planting.

Paul went into the shop and came out with an inverted splash plate that distributes the manure in a low, wide pattern. With two manifolds, one on each side, they now spread evenly in an 18-foot swath. He pulls a field cultivator directly behind the manure tank for odor control. According to Paul, it has achieved "good results with excellent crop response." He credits the success to distributing the manure evenly and incorporating it shallow, in the top 3-4 inches of soil rather than deeper via knives. Paul says that most any equipment dealer would have an old field cultivator they would love to sell, so this retrofit should not be expensive.

By applying over a wider swath and driving faster (6 mph) the Swartzendruber's now apply 2,500 gallons per acre. The amazing part is they are seeing increased nitrogen credits with this system, even though they are using less manure per acre. "We used to try to achieve the entire nitrogen credit with knifed-in manure, but it just wasn't working," Paul comments. With this system, they can achieve lower phosphorus rates, maintain 100 lbs. of nitrogen credit (a $40/acre savings), and still use a starter shot of nitrogen with the planter. They take a pre-sidedress nitrate test to determine the final sidedress rates. Paul thinks they may be recovering twice the nitrogen over previous methods and gaining some nitrogen credit even in the second year.

While one farmer is trying to dial down manure due to nutrients, another hog producer is dealing with low nutrient manure from gestation and farrowing swine facilities.

Bob Dykhuis, of Allegan, states, "We test our manure frequently and have a good history of the nutrient content." The manure consistently tests low enough in nitrogen and phosphorus that it can be applied at higher rates. But since he has many tile-drained fields, he has been working with application rates and tillage to protect water quality. Dykhuis previously used a subsoiler that went deeper and placed the manure directly behind the knives. He has switched to a chisel plow with 3-inch twisted shanks on 12-inch spacing, going only 8 inches deep. He places the manure just **ahead** of the tillage in a one-pass system. This combination of immediate shallow tillage on closer spacing has proven successful.

Dykhuis has considered many other aspects of manure management to improve application practices. Phytase is utilized in the feed to reduce total phosphorus in the manure. Flow meters are installed to insure application rates at varying speeds. Cover crops are being considered because

injection leaves soils rough with less residue. He is considering separating manure streams and irrigating alfalfa to deal with the most dilute systems. Soil conditions are monitored to ensure the soil is fit to be applying manure.

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No one system works for all producers. Remember, the main goals are all working in the same direction: Keeping manure nutrients in the root zone reduces odors, retains nitrogen, saves money and decreases the risks of manure reaching surface waters.

Actions to reduce the risk of manure reaching surface waters:

- Evaluate your farm on a field-by-field basis and rank fields based on the potential for manure loss. Ask yourself: "If it rains tomorrow, will runoff leave the field?" Then ask yourself what could be done to minimize this risk.
- Excessive application rates increase the chance of runoff and nutrient loss. Calibrate manure spreaders, and verify that the calibrated rate is the rate that is actually applied to the field.
- With some dilute manures, the right rate may be considerably less than the allowable agronomic rate based on manure nutrient content.
- Inject the manure, use rapid incorporation whenever possible, or loosen the soil with tillage before spreading to create a rough, permeable surface.
- Use soil and water conservation practices such as crop residue management, grassed waterways, buffer strips, strip crops, or planting on the contour.
- Use spreading setbacks of 150 feet to separate manure from streams, and from ditches that flow to streams.

Swartzendrubers mounted an inverted splash plate on each side off the back of the manure applicator and extended the hitch to a field cultivator providing immediate, shallow incorporation of manure. More photos and description available at www.rootzone.msu.edu.

- Establish a cover crop that will be growing during manure applications.
- Decrease the manure application rate and avoid spreading in the rain or when rain is in the forecast. Do not spread when tile lines are flowing.
- Records should be kept of manure analysis, soil test reports, weather conditions and rates of manure application for individual fields.
- Read, understand and adopt the *Generally Accepted Agricultural and Management Practices for Manure Management and Utilization.* These will form the foundation of your site-specific manure land-application plan.
- In the event of a manure release to surface waters, call the Pollution Emergency Alerting System, 1-800-292-4706.
- For more information, visit www.rootzone.msu.edu