Management Considerations for Late Summer Manure Application

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Are you getting ready to spread manure? Whether from a field stack or a liquid manure pit, many livestock producers have been waiting for the growing season to come to a close to spread manure. The home-stretch for our Wisconsin cropping year often begins with small grain or corn silage harvest. This early harvest opens fields for spreading manure, planting fall established alfalfa or winter cover crops, and other field activities in preparation for next year. Soil and field conditions are very important to consider as you spread manure through the next months to meet crop nutrient needs for next year.

Macropores. Farmers in portions of the state without adequate rainfall are seeing drier soil conditions of late summer which can create macropores, which connect the surface, where cropping activities are occurring, to lower depths of the soil. These openings in the soil surface, such as cracks, earthworm burrows, or root channels, should become a consideration as producers prepare to spread manure. Macropores seem to be most prevalent in no-till fields and are very common where tile drainage lines are present. The last thing you want is for liquid manure to quickly travel directly to drain tiles or into shallow bedrock via macropores.

What should be done? Go, deliberately look at fields that you plan to spread late summer manure on. Recognize the water quality risk if you see that large soil cracks exist and you know individual fields sit on top of drain tiles, shallow bedrock, or shallow groundwater. If such a field is still a candidate to receive manure, consider a shallow tillage pass prior to spreading manure to break up macropores enough to prevent liquid manure from taking one of these paths of preferential flow.

Added Water. Another important consideration when applying liquid manure, especially to wet soil or when rain is in the forecast, is the amount of water added to the soil by the manure. The chart below shows acre inches of water equated to approximate gallons of liquid manure applied. Values shown should be scaled back depending on manure solids content, i.e. a 2% solids liquid manure contains more water than a material with 4 % solids.

Acre-Inches of Water	Gallons of Manure per Acre (Approx)
0.10	2,700
0.25	6,700
0.50	13,500
0.75	20,300
1.0	27,000

Data from one Discovery Farm in Southwestern Wisconsin demonstrated that when soils were already wet, it took approximately 0.7 inches of rainfall, on average, to produce a runoff event. However, the smallest amount of rainfall that resulted in a runoff event was about 0.25 inches. If you use the chart above, a 0.25 inch rainfall event can be equated to around 7,000 gal/acre of liquid applied to the soil.

What should be done? Recognize the water quality risk if soils are already wet, and you plan to add more water equivalent as liquid manure. Also, recognize the additive effect that even a small rain event may have on generating surface water runoff immediately after applying liquid manure. Watch the weather, recognize how much cumulative water will be involved and consider how your field will respond.

Big Storm Events. UW-Discovery Farms data also show that a significant amount of any given years' total nitrogen, phosphorus, and sediment losses can occur from one or two big storm events. Big storms account for a large portion of the annual water runoff from a field, and can contribute more than half of all annual nutrient and sediment losses.

The field conditions that exist when big storm events occur influence nutrient and sediment losses. The largest losses occurred under three circumstances: (1) when the ground has little cover to protect it from runoff, either before vegetative canopy in the spring or in the fall after crop harvest, (2) when snow melted and the soil was still frozen, minimizing water infiltration into the ground, and (3) when storms exceed the design criteria for best management practices.

What should be done? Recognize the water quality risk on your operation if big storm events happen in September or October, after you have harvested corn silage. Do you have soil and water conservation practices in place to slow the speed of water and keep it as clean as possible as it moves off your farm fields? Keeping grassed waterways in good shape, contour field operations, leaving residue on the field or planting cover crops can help minimize your risks during large storm events.

Late Summer Soil Temperature. To make the best use of manure nitrogen for the following year, late summer applications should be approached with caution. Soil temperatures through September are still warm enough for soil microbes to be very active. Microbial activity only slows once soil temperatures drop below 50 degrees F.

Manure applied late in the summer can have significant amounts of organic nitrogen converted quickly to ammonium, and quickly again to nitrate by soil microbial activity. Nitrate nitrogen is not bound to soil particles, but rather exists within soil water. It is very available to plants, yet also vulnerable to leaching deeper into the soil, out of the root zone and lost from crop utilization.

Under warm moist soil conditions, ammonium nitrogen can be changed to nitrate within 2 weeks after application. Once soil temperatures cool to 50 degrees F, the transformation process to nitrate slows to 6 or more weeks.

What should be done? As much as possible, delay manure applications until soil temperatures are less than 50 degrees F. Adjust the application timing of any late summer manure so that the nitrogen contribution stays as ammonium as long as possible. Each year is different, but in Wisconsin, mid-October is usually a safe bet for soil temperatures to be below 50 degrees. Another option is to plant a winter cover crop that can take up any available nitrogen and hold onto it until it is useful in the spring.

Summary

The considerations and suggestions listed here are meant to be used as tools for making the best management decisions possible. Land and manure management for crop production and water quality is a delicate balance. Rising input costs and highly valuable commodity prices are even another driver for keeping nutrients where they are most useful-in the field. Here's to a safe and successful harvest season.

For more information please visit our website at www.uwdiscoveryfarms.org or call our office at 715-983-5668.

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