



ADVANCED AG SYSTEMS'

# Crop Soil News

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"It is the crops  
that feed the  
cows that make  
the milk  
which creates  
the money."

## Money In Manure

The dairy farm recession is into its fourth year. Farms are struggling to find places to tighten or worse, cut corners. There is one place that dairy (and confinement livestock) have that is often overlooked – maximizing the use of the manure that is produced. Yes, it is a waste that must be disposed of – but it has more value than many realize or make use of.

Manure is all cost unless you adjust your fertilizer to what you have applied even under daily spread. Daily spread of 8000 gallons/acre is still going to release 42 lbs. of organic nitrogen and all the phosphorous (102 lbs./a = 196 lbs./a of 11-52-0) and potassium (194 lbs./A = 313 lbs./A of 0-0-62) is still there (unless the manure washed off the field) for the crop to use. The phosphorous is worth \$68.61/acre while the potassium is worth \$95.26/acre. Added to the organic nitrogen and you are spreading \$193.27/acre (more than what you paid for the corn seed.) If you ignore this and simply use your regular N-P-K fertilizer, you are spending double for your corn crop and that is not how you make money.

As you keep spreading, especially in daily spread, you are applying many times over the phosphorous and potassium than the crop needs. As we showed in the October 2017 newsletter, once a soil test for phosphorous or potassium reaches the high or very high level, the odds of you getting an economic return by adding more fertilizer goes to near zero even with early planting. We also showed research fields where manure was applied and the soil test P & K in one year went to very high levels. Dr. Ketterings, Cornell University (<http://nmsp.cals.cornell.edu/publications/factsheets/factsheet8.pdf>) research clearly documents that when the phosphorous levels were high to very high, there was NO response to starter phosphorous. The same holds true with potassium. A number of farms I worked with, especially those daily spreading evenly across the field, switched to simply putting 30 lbs. nitrogen/acre in the band for a starter and got crops as good as ever off of regularly manured fields. This not only reduced cost but allowed more acres to be planting without refill.

Ammonia in livestock manure results primarily from the breakdown of urea by the enzyme urease. Urea is present in the urine while urease is present in the solids. Work in Canada found ammonia losses following land application of manure could reach up to 95 per cent of the total manure nitrogen-ammonium(N-NH<sub>4</sub>) content. Lower the dry matter the less loss as the added water carries it into the porous soil – if your soil is porous. Canadian research found as temperature increases, ammonia volatilization increases, especially within the first few hours after manure is applied to the soil (50%). A wind removes it even faster.

If you are spreading 8,000 gal/acre, immediate incorporation is worth \$84/acre (120 lbs. N/a = 261 lbs./A urea fertilizer). 100 acres of corn is \$8,400 in fertilizer you would not have to buy this year yet you have more than enough nitrogen on yearly spread to sustain a 24 ton/a corn silage crop. This is added to the organic nitrogen, phosphorous, and potassium we calculated before of \$193 for a total of \$277/acre of fertilizer applied as manure. This is worthless if you don't adjust the starter fertilizer to account for this.

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A number of units are sold that allow immediate incorporation. The September newsletter <http://advancedagsys.com/wp-content/uploads/2018/09/Sept-2018-manure-winter-forage-2.pdf> featured one such unit mounted on the back of a manure spreader. I would go with the narrowest row spacing for more uniform application and to allow greater application rates without runoff issues. In the photo at the right is a different system developed by Mark Anderson. It drops the manure in front of an Aerway aerator set at a shallow angle. The unit throws enough soil that in our research it captured ammonia equivalent to immediately chisel plowing after spreading.



Mark Anderson attached an Aerway directly behind his manure tank for one pass incorporation. He since switch the drop tubes to the front of the unit as you can see in the picture below, it covered the manure and held the nitrogen more efficiently

OK, we don't have one of those and the milk check says no new machinery. In early 1980's I worked with a farmer to modify an old disk. We changed the gang angle so the leading edge of the disk was nearly straight. The disk cut in about 1 – 2 inches and threw a thin layer of soil across to cover any manure. It pulled very easy – to easy. We had to add weight to keep it in the ground as we flew over the field. There are older used disks out there. It can be rigged to either pull directly behind the spreader (drop the spread plate low to the ground to spread in front of the disk); or run as a separate trip (tough to get traction immediately after spreading). Yes, you can use a regular disk but avoid the temptation to set it all the way down. You don't need a big honking offset disk. There is no need to waste all that fuel and horsepower to capture the nitrogen. The goal is to simply throw a thin layer of soil over the manure. A smaller unit will allow you to make a one pass while pulled behind the manure spreader. Canadian study found losses can be reduced 85-90% by disking. A perfect system? No. But it will save \$84/acre with an 8,000 gallon/acre manure application.



What do we do with the savings? The old adage, “if you have one dollar to spend, spend it on lime” still holds true today. Lime needs are creeping up on nearly all the farms. Once the pH drops below 6.0, the efficiency of phosphorus is cut in half. If that wasn't bad enough, the efficiencies of your nitrogen and potassium are also reduced by 25%. “Lime costs money!” It doesn't cost as much as fertilizer that does not work.

Top dressing hay fields: Potassium is critical to maintaining alfalfa stands along with **sulfur** to produce crude protein. For most farms the fertilizer budget is drained before you get to June. Many farms say they will skip it until next year. What they haven't realized is that they have said that for several years just as with the lime above. The upshot is that seedings are running out quicker than they planned and the forage is testing low in protein from sulfur deficiency.

The bottom line: Test – don't guess. We have said this for years, maybe this is the year to do it? I worked with a group of farmers and the only one who had ever soil tested had done it on one field five years ago. University soil test recommendations are based on years of research on your state's soils in your neighborhood. It will give maximum yield at minimum cost. In my work in Extension, **a farm that had been consistently using University soil tests**, had higher than average yields (over multiple years) yet their fertilizer and lime costs were **35% lower without skimping on any fertilizer**.

Sincerely,

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to Better  
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