



ADVANCED AG SYSTEMS'

Crop Soil News

<http://www.advancedagsys.com/>

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

Advanced Ag Systems
Research, Education, Consulting

Note: **Change of Address. 2150 Cherry Street, Rutledge, TN 37861**

My address is changing as we have bought a house and are moving home and business to Rutledge Tennessee. We are fed up with NY socialism and taxes and would like to live the rest of our lives in freedom.

The email and phone number will stay the same. The web site <http://www.advancedagsys.com/> will also remain the same. I will be working to move all the video presentations to the site. My research on forage crops will continue in New York (and possibly Tennessee). The newsletter will still be published as I develop information that farmers and agribusiness can use. Seminars are still available as either Zoom/Skype on line meetings or in person. On-farm consultations are still available. Now I have to learn to type and speak with a southern drawl as I sound funny to the locals.

Maximizing Manure Fertilizer

The [November](#) (click to open) newsletter addressed the first steps you need to take to deal with, and relieve some of the pressure from the high fertilizer prices. This letter will key in on a change that livestock farms, especially those that produce a lot of manure, can make to reduce or completely offset the fertilizer while supporting high crop yields.

The first step is to recognize that manure is your major source of nutrients. Calculations I made several years ago showed that for many farms, more fertilizer arrives on the grain truck than arrives on the fertilizer truck. This is especially true for those with low forage diets (less than 60%) that import a lot of feed. Even with a daily spread, there are steps you can take to maximize the reuse of those nutrients.

Manure has 20 – 30 lbs. of nitrogen/1,000 gal. (with ½ as volatile ammonia and ½ as organic nitrogen). About 35% of the organic is available by decay the next year. Thus, you potentially have 10 -15 lbs. of ammonia N plus 3.5 to 5.25 lbs. of organic matter N/1000 gal. If you daily spread or surface spread without immediate incorporation, you lose the 10-15 lbs. of ammonia but keep the organic unless it physically washes off the field to the nearby waterways. This is especially true if you spread on snow covered ground. On an 8,000 gal/acre manure application that means you are throwing away



On sloping ground, this manure and most of the fertilizer it contains, moves off the field or to low spots in the field during the spring melt.

\$80 to \$120/acre of ammonia nitrogen by not incorporating or injecting. Instead of having 108 to 162 lbs. of nitrogen, (80+28=108 to 120+42=162) you only have 26 – 42 lbs. of N: the organic fraction released. In other words, **you threw away 75% of the nitrogen and now have to buy expensive fertilizer to make up for it.** You paid twice, once to spread the manure and again to buy the fertilizer you lost. Spreading without immediate incorporation means you have to put much more manure on to meet your nitrogen needs. This greatly overfertilizes the phosphorous and potassium, wasting this valuable fertilizer.

Phosphorous is 8 to 10 lbs./ 1000 gal and is not lost by volatilization. Leaving manure on the surface over winter (daily spread) allows a significant amount to move off to streams during spring runoff (money running off of your field). Leaving a field bare, without a living cover allows more highly available dissolved phosphorous to also move off the field to water sources. Research has found this to occur especially with manure spread on bare ground in the fall and winter (winter forage absorbs dissolved phosphorous). All this accelerates the non-uniform phosphorous level on your farm. Unless you grid sample and then have a variable rate fertilizer applicator on your planter, you are stuck with fertilizing for the lowest testing part of the field to not have yield loss. The result is that you have considerable money loss as medium and high testing areas get fertilizer that has **NO economic response to pay for it.**

Potassium is also 20 – 30 lbs./1000 gal. At 8,000 gal/A of manure it is equal to 240-400 lbs./A of 0-0-60 fertilizer applied. Potassium will attach to soil particles on the soil exchange so is less likely to leave. Spreading on frozen or snow-covered ground can let the money of this valuable fertilizer leave in the spring runoff water.

Manure has a huge range of fertilizer content and makeup as you go from farm to farm. It also can range depending on the effectiveness of the agitation. There is NO substitute for **manure samples** taken at the beginning, middle, and end of emptying the storage. The first step of management is knowing the data you are working with.

If manure has equivalent 30-10-30/1000 gal that is equal to \$59.20/1000 gal. in purchased fertilizer Looking at spreading 8,000 gal/acre you are applying \$473/acre. This is a huge number due to the price of fertilizer increasing tremendously this past year. Even if your analysis is only 2/3 the nutrient level above, that is still \$312/A. You could easily lose 1/2 to 3/4 of that by applying to the surface with volatilization of nitrogen and losses for frozen ground when manure or its nutrients go off in spring runoff. This point is not that you are losing 1/2 to 3/4 but that **you have NO clue what was lost** and what was left. In addition, part of the field may have lost all of it and part may have gained and had too much as it washed from the higher areas. If your commercial fertilizer applicator just went out and randomly drove around the field spreading fertilizer wherever, you would rightly have a fit. Yet you just did that yourself by not spreading manure uniformly as a fertilizer, letting it wash to lower areas for non-uniform fertilization or off the field completely.

The biggest opportunity to offset fertilizer is the use of manure injectors. The number and types are increasing each year as more farmers realize the economic and environmental benefits. By simply putting the manure into the soil instead of on top you dramatically reduce or even eliminate the loss over the winter from runoff. The manure stays where it is put. The hills aren't shortchanged and the swales are not over-fertilized and your money is not running into the nearby creek. More importantly, and a critical factor in this era of expensive fertilizer and short supply, the amount of nitrogen (presently at \$1/pound) is not volatilizing with your money evaporating into the air. The ammonia put into the soil reacts with the soil



Injected manure stays where it is put without running off the field or leaving some spots short on fertilizer while overloading others. If the field is slated for corn, a nitrification inhibitor to keep the nitrogen in ammonia form as long as possible is strongly suggested. These fields can be no-tilled or strip tilled for one pass planting as the first corn in, in early spring.



Early winter injected manure into winter forage or cool season grass can completely replace the need for those field's purchased fertilizer spring application. A rolling 24 hours after application will assure a smooth field for mowing.

exchange and stays there until the soil is warm in the spring. With the use of an ammonia inhibitor compound, it can be held 6 to 8 weeks after the soil warms before converting to nitrate.

A key our research and that in the Delaware NY watershed found, was that injecting manure into winter forage or cool-season grasses in November through freeze-up can meet all the needs of that crop the next spring. As soon as it turns warm the ammonia converts to nitrate and is quickly taken up by the roots of the rapidly growing grasses or winter triticale. With enough manure injected, you can **meet all the fertilizer needs of the crop** without any of it running off into the streams or the air. This environmentally sound late application leaves more room in your storage in case spring application is delayed. With these high fertilizer prices, it doesn't take long to pay for an injector system. The only complaint I have heard is that the farmer runs out of manure too soon.



Keeping heavy equipment (trucks) off the field and minimizing axle load and tire pressure on the field allows manure to be injected without permanent yield robbing compaction.

For grass fields and winter forage you can still inject if you do not have manure storage. Simply take your daily spread tanker with rolling injectors on the back, out to the field and start injecting. When the tank is empty stop, lift the injectors, and start there the next day with the next load until you have the field covered. You are fertilizing, not just spreading manure. Each trip is saving money by making greater use of a product you have to dispose of anyway. An occasional stone will pop up but you have time to pick them. We do not suggest knife injectors due to the higher horsepower and the tendency to bring up more stones. We do suggest running a roller over after the field is manure fertilized to assuredly push down any sod/stone that was left lifted. The suggestion is to go with the narrower setting. My research found that even at 17-inch spacing, the winter forage showed no streaking the next spring as the roots reached across and tapped the manure fertilizer. The downside for the daily spread are days where the soil is too wet for traffic. Injecting or surface spreading can do long-term damage to your yields. By keeping axle load under 8 tons/A you avoid permanent yield-robbing deep compaction. By keeping tire pressure at 15 psi, the tire spreads the weight over more area and avoids yield-robbing surface compaction. By injecting into grass sods or well-established winter forage, the roots cushion the impact and spread the weight out more. As the roots grow, they exert tremendous side pressure to push the compaction out (think of tree roots lifting a concrete sidewalk).

For spring application, Dr. Ketterings at Cornell has taken injection a step further by injecting on 30-inch rows and then planting the corn no-till or strip-till directly over those rows. As soon as the corn seed puts its roots out they are immediately into the NPK of the manure. The farmer she worked with was able to get maximum yield on just manure as the fertilizer source. Dr. Ketterings has found no root burn.

Another clear advantage is that you can inject right next to non-farm neighbors and there is no residual smell. The bonus is that doing it from November on, with the colder weather the neighbors all have their windows closed.

Click on [Injecting Manure](#) is more information on injector types.

Click on [Fact sheet 61](#) for more information on the fertilizer manure contains.

Sincerely,

A handwritten signature in black ink that reads "Thomas F. Kilcer". The signature is written in a cursive style.

Thomas Kilcer,
Certified Crop Advisor

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Hand
to Better
Agriculture**

