

THE LEADING EDGE

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A PUBLICATION DEDICATED TO MAXIMIZING YIELD POTENTIAL

Mother Nature's Original Fertilizer: An Effective Alternative

The value of manure is on the rise. As input costs continue to increase, manure is becoming less of a "dirty" word to producers looking for ways to effectively manage their nutrient application process. While once disposed of by the ton, a host of variables have made manure as a fertilizer an attractive option for many producers.

Manure has always been recognized as an option for feeding crops, but older storage methods caused manure to lose much of its nutrient value.

The application process for manure also made it cost prohibitive, and most producers instead chose more traditional forms of fertilizer, such as nitrogen, potash, and urea. These traditional forms offered simpler application methods and overall, a lower input cost and higher return on investment.



Manure is now a much more viable choice for widespread fertilizer usage.

But in the last 20 to 25 years, especially in the hog confinements prominent in the Midwest, manure has been stored in pits or lagoons.

The conditions in these deep, under-slat pits or manure containment structures reduce nitrogen loss by volatilization, and they collect much of the excreted phosphorous and potassium.

The retained nutrient value of manure increases its potential to make money for producers who use it for fertilizer. And, due to the sheer number and size of these confinement operations, there are more and more livestock producers looking for ways to effectively put their "waste" to use. Manure is readily available as a fertilizer.

Questions about whether or not crops receive the needed nutrients from manure are being answered in the affirmative by several studies. Crops that are fed in the spring with manure instead of traditional fertilizers like nitrogen and urea do not typically suffer a loss of yield.

A study in Ohio found that wheat yields in manure-fed fields were comparable, and even sometimes slightly better than, traditionally fertilized fields.¹ A study completed by the University of Minnesota revealed that yields

can increase if manure is applied to fields that do not have a recent manure history or that have a lower organic-matter composition.²

1 "Livestock manure a winner as alternative spring crop fertilizer," AG Answers, January 5, 2007, <<http://www.agriculture.purdue.edu/aganswers/story.asp?storyID=4380>> (November 3, 2008).

2 Bob Koehler & Bill Lazarus, "How to Maximize Manure Value," n.d., <<http://swroc.cfans.umn.edu/Bob/docs/maxmanure.pdf>> (November 3, 2008).

The costs associated with traditional fertilizers will continue to rise into the next growing season. According to Purdue University projections, total fertilizer costs per acre for corn could top out around \$200 per acre, and for soybeans, \$100 per acre.

Adding manure increases the organic matter in soil, something traditional fertilizers cannot do. Organic matter increases the life span of soil by increasing its ability to stand up to erosive forces such as wind and water.

The activity of decomposing organisms present in organic matter results in increased porosity and better water and air movement through the soil. Healthy soil is better able to retain nutrients.

These facts, combined with the rising costs of nitrogen, potash, and urea, mean exploring the cost of manure application may be well worth the effort for producers. While following the comfortable, familiar fertilizer application plan may seem to be advantageous, it may no longer be the most cost-effective option.

In order to get that critical return-on-investment when using manure as a fertilizer, several factors must be balanced. The costs associated with applying manure vary by region depending on availability, application equipment, and distance the manure needs to be hauled. Tools are available to help producers analyze the cost-to-benefit ratio of manure application. One, called Manurwkst, is available from the University of Minnesota.

The key to getting the most out of the investment in manure as a fertilizer rests in two factors: accurate knowledge of the nutrient content of the manure and the nutrient needs of the fields; and effective and efficient application methods.

Over-application of manure means its value per gallon is reduced and also opens the door to adverse environmental consequences. Operators of hog confinements should test manure from each pit to create accurate indexes of the nitrogen and phosphorus values of the product. Farmers should rely on fall soil tests to determine the optimal amount of manure to apply per acre of crop.

It is most beneficial to apply manure in the spring to a growing crop, allowing the crop to capture and use more of the manure's nutrients. Manure applied in the fall may lose up to 55 percent of its nitrogen value, depending on the application method.

More than half the nitrogen in liquid livestock manure is typically ammonium nitrogen. The ammonium nitrogen and approximately one-third of the organic nitrogen in livestock manure is available to growing crops during the season of

application.

However, manure applied in the spring and incorporated on the first day retains as much as 70 percent of its value.

Incorporation of manure is key—leaving manure on the surface of the soil for just a week in the spring results in 80 percent nitrogen loss. Manure injection is a very effective method of providing nutrients to plants. While broadcasting manure may lead to volatilization of ammonia in manure where a significant percentage of the nitrogen is in the form of ammonia, injecting manure means nutrients are stored until needed by growing plants. Studies have shown that the injection of swine manure can lead to increased levels of nitrogen, potassium, and phosphorus in the leaves of corn plants. Crops receiving injected manure also produced higher yields than those grown in soil that received a broadcast manure application.

New tools make manure incorporation a sound method of fertilization, even for no-till farmers. Producers looking to maintain a no-till environment should look for injection tools that perform well in tough residue conditions and leave a surface smooth and ready for planting.



Angled blades with sealing discs provide no-till farmers a manure application option not available in the past.

Several no-till compatible tools for manure incorporation and injection are available, including shanks and discs. Studies have shown that shallow disc injectors produce the least amount of soil disturbance of these two options, and they still incorporate enough manure to minimize most environmental concerns.

Angled discs take disturbance down another level. Angled discs are therefore a good fit for no-till systems and direct seeding applications. Angled discs with a sealing disc provide effective injection and odor control.

In a three-year study conducted in Minnesota, disc injectors also seemed to pull more easily than knife or sweep application systems. Discs require less power to operate effectively, which could result in fuel savings.

Manure is a valuable resource for producers in areas where livestock production is prevalent. When properly applied in the right amounts, it has the ability to increase soil health. It also has the potential to result in a significant cost savings over more traditional fertilizer choices.

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