

# THE LEADING EDGE

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## A PUBLICATION DEDICATED TO MAXIMIZING YIELD POTENTIAL

### Reconciling the Differences between Manure and No-till

The current media focus on "going green" has thrown more public attention on environmental issues than ever before. Turning waste into something with value is now a common goal for households, corporations, builders, and industries in general.

The agriculture industry has long seen the value of reusing livestock manure, a "waste," as fertilizer. Using manure, which may be a natural by-product of a farming operation, as fertilizer saves money. As commercial fertilizer costs rise, it is logical to take advantage of an existing, less expensive source of nutrients. However, this practice, while sound in principle, brings challenges.

Manure applied to fields is made available to crops for its nutritional value, but it is also made susceptible to erosion. Runoff of manure into water supplies can lead to contamination, and therefore manure application is carefully regulated. For example, in Iowa, liquid manure from a hog operation with an average animal weight capacity of more than 200,000 pounds must be injected or incorporated within 24 hours.



Avenger® coulters with Sharktooth™ closing wheels

Each state or region has its own regulations for manure application. If producers adhere to these regulations, water contamination is minimized. All producers should carefully research regulations in their area or hire certified manure application professionals to do the job.

Regulations aside, the process of manure application still presents a slew of factors that need to be considered before a workable system is devised for each operation. Producers should consider soil's natural composition and propensity for erosion. They should also search for the right balance between making nutrients available, protecting the environment, and maintaining a

conservation-tillage level of residue coverage.

**Research has shown that 40% of the total nitrogen in incorporated beef feedlot manure is made available to the plant in the first year of application. Studies in Canada showed the release of N from pre-plant injected hog manure coincides well with the demand for N in the growing corn crop.**

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 N 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 level of N, K, and P 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.

Manure injection also has another, neighbor-friendly benefit — lower odor. While some manure may still pool on top of the soil, incorporation of this fertilizer will lead to lower odor than broadcast application. According to a study done in Canada, the amount of pooling decreases when the soil disturbance increases.

While manure injection has clear benefits, it has not always been compatible with soil conservation. Tools and methods of incorporating manure often resulted in what was essentially a tillage pass through the field. As indicated above, increased disturbance does have the benefit of lowering odor. But more soil disturbance also means less residue on the soil surface, leaving the soil more susceptible to eroding winds and rain.

Producers using strip-till and minimum-till systems can adapt their processes and consider manure application in place of a tillage pass that provides a similar amount of soil disturbance.

But for producers dedicated to no-till, injection of manure may require a change in thinking. In fact, researchers from Iowa State University suggest that even in no-till, the soil disturbance that undoubtedly occurs with manure injection should lead it to be considered a tillage pass.

Several tools for manure incorporation and injection are available, including shanks and discs. Studies have shown that disc injectors produce the least amount of soil disturbance of these two options, and angled discs take disturbance down another level. Angled discs are therefore a good fit for no-till

**To take advantage of the benefits of manure without applying in excess, producers must know the nutrient content of the manure they are applying, which depends on species and storage method, among other factors. It is also critical to know the existing composition of the soil to**

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.

**which the manure will be applied. It is not uncommon for states to require producers to create and file a manure management plan to ensure practices are safe and effective. Chemical analyses are available to determine both manure and soil makeup.**

**[Click here to access a manure management guide published by Iowa State University.](#)**

Aerators, another injection option, have the lowest disturbance of all tools, but they also typically result in the more surface pooling of manure and higher odor concentrations.

Since studies have shown that most injection tools control odor well enough that high odor readings occur only immediately following injection, low-disturbance injectors are an excellent option for producers hoping to stay true to no-till residue coverage. In fact, the previously referenced Minnesota study found that one year, residue coverage was reduced only 17 percent by the working injection discs.



Avenger® coulters running in corn stalks with smooth sealing discs

Residue coverage prior to application was 86 percent, and soil disturbance led that number to drop, but still maintain a coverage level acceptable for conservation tillage plans.

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.

While there is no one-size-fits-all solution for injecting manure in a no-till environment, tools do exist that maintain significant residue coverage. Coupling the right tools with manure of a composition suitable for the soil to which it is applied will result in a satisfactory fertilizer solution for both the environment and the producer's pocketbook.

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