

S-02-05

September, 2005

### When Poultry Litter Doesn't Seem to Work

Many Alabama crop producers tried poultry litter as an alternative source of crop nutrients this year for the first time. Nitrogen prices are at an all-time high and poultry litter is abundant if you can get it delivered and spread. Some tried stockpiling it in temporary stacks in the field. Most producers were satisfied with the results. Some were not. There have been reports from crop insurance adjusters that there may be a higher percentage of claims filed by folks who use broiler litter to fertilize their crops than by farmers who use commercial fertilizer. If this is true, then we need to find out why because it could jeopardize poultry litter use in the future. What are we to do with Alabama's 1.8 million tons per year if we don't land apply it? Not only will excess nutrients continue to be a problem in poultry-producing areas, but it could jeopardize the sustainability of Alabama's poultry industry. *Field crop research has consistently demonstrated that poultry litter could replace some or all of the nutrient needs of a crop.*



Following are some possible reasons poultry litter may not perform as well in row crops as research has shown.

Variable nutrient concentration. Often we speak of fresh broiler litter as about a 3-3-2 fertilizer (60-60-40 pounds N-P<sub>2</sub>O<sub>5</sub>-K<sub>2</sub>O per ton). The concentration of nutrients can be highly variable depending upon the litter source, the number of flocks on the litter, types of birds, the age of the litter, how it was stored, moisture content, etc. A manure analysis is always good to have even if it is run after the litter is spread. If you are buying litter from a Certified Animal Waste Vendor, ask for an analysis. You wouldn't buy fertilizer without some type of guarantee of what's in it so don't purchase litter without some reasonable idea of its value.

Litter applied before crop can use it. Best management practices for fertilizers *and manures* clearly state that they must be applied within 30 days of planting a crop or when the crop is actively growing (Alabama NRCS Nutrient Management Code 590). On research plots, most litter is applied within a day or two of planting. Nitrogen in litter is quite water soluble and just like fertilizer N, it could be leached or denitrified if excessively wet weather follows application. In on-farm cotton tests, we have lost all

of the preplant N as poultry litter when the ground stayed excessively wet for several weeks. Under these conditions, we also lost all fertilizer-applied N. Some growers still believe that since poultry litter is an “organic” N source, they can put it out anytime between November and March and expect the nutrients to still be around in June when a crop of corn or cotton is growing. Most of the P and K will remain unless runoff occurs, but most of the N will definitely be lost in winter and spring rains. Ideally, litter could be top dressed or side dressed like fertilizer, but most vendors and producers don’t have a convenient way to do this

Not enough applied. Assuming that a litter analysis was run and the litter turned out to be a 3-3-2 fertilizer grade equivalent. Not all of the litter N will be available to the crop. Surprisingly, our research with cotton and corn demonstrates that between 70 and 95% will be available to the crop during the season when it is applied (unless, of course, it is washed off, leached out or denitrified). To be safe, we generally suggest using an availability factor of 2/3 or 67%. For example, if a ton of litter is 3% N, it will contain a total of 60 pounds N of which 2/3 or 40 pounds N per ton will be available to this crop. If you intend to apply a total of 120 pounds of fertilizer N, then you’d have to apply 3 tons of this litter to get all the N the crop will need. If you apply less, then you need to be prepared to sidedress with fertilizer N. If excessive rainfall resulted in suspected losses early in the season, you may need to sidedress anyway. The phosphorus (P) and the potassium (K) component of the litter won’t be lost. Generally, if litter is applied as a N source, more than adequate P and K will be applied to the crop.

Improper litter storage. Best management practices clearly specify that dry poultry litter should be protected from moisture if it is stored. A study during the winter of 2005 clearly demonstrated that unprotected, stacked poultry litter WILL NOT SHED MOISTURE. In fact, exposed litter absorbs all the rain that falls on it. When moist litter begins to compost and generate heat, it loses N and ties up plant available



N as organic N. It becomes heavy with moisture and difficult to spread. It rapidly loses value as a fertilizer. Litter stored under a tarp could lose some N as moisture condenses under the tarp or seeps in from the sides. Litter stored under tarps for six months last winter (December to May) went from 3.22% N (64 pounds N per ton) to 2.60% N (52 pounds per ton) – a loss of 19%. Near the surface of the covered piles where moisture condensed, the N loss was 29%.

Spreading problems. Poultry litter is not easy to spread uniformly. A vendor must take extra care to calibrate his spreader truck to assure uniform application. We’ve seen many situations where a vendor intended to apply about 2 tons per acre. In reality, he

was applying 6 tons per acre directly behind the truck and ½ ton per acre 10 feet away while driving a 40-foot pattern. This would result in definite patterns in a hay field or wheat field but may go unnoticed in a cotton field where some crop variability is common. Lumpy litter and litter that has wet spots in it presents another problem with spreading. No one has studied the effect of litter lumps in a field but common sense suggests that they would not be as effective as a dry, uniform application. Interestingly, when dry litter is uniformly spread at planting on cotton and corn, we've seen no difference in performance of conventionally tilled and no-tilled crops. This observation is consistent with other studies that show less than 10% N loss from surface application versus incorporation.

Look for other problems, too. Traditionally, poultry litter has been popular as a pasture and hay crop fertilizer. Rarely were soil tests necessary because in addition to supplying the three primary plant nutrients, N, P, and K, poultry litter contains micronutrients and a little lime. With intensively managed row crops, nutrient applications need to be more precise. Soil acidity, parasitic nematodes, diseases, insects, weeds, tillage systems, soil traffic pans and weather can have dramatic effects on crop responses to nutrients. Look for other possible causes for crop failures. Rarely is crop fertilization a sole cause of crop failures. Sometimes it is easy to blame a new practice when the real cause may be less obvious.



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