

STRESSING ENVIRONMENTAL RESPONSIBILITY

RESIDUAL VALUE OF BROILER LITTER—IT AIN'T THAT MUCH!

T 5 years ago. Therefore, broiler litter must build up soil nitrogen. Right? Not necessarily so!

he grass is not only greener on the other side of the fence, but it's also greener where you accidentally dumped that load of broiler litter

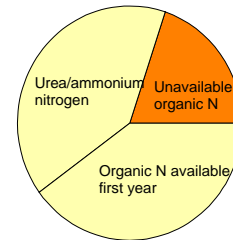
When broiler litter is applied at recommended, agronomic rates in Alabama (usually less than 4 tons per acre), very little of the total nitrogen is carried over in the soil. Ideally, most is taken up by the crop. But, some is lost to the air (volatilization), some is leached below the rooting zone by rainfall, and some is tied up by soil microorganisms as soil organic matter. Any carryover nitrogen (residual nitrogen) comes from this organic matter.

North Alabama fescue pastures with a long history of heavy broiler litter application (up to 10 tons/acre/year) had a total residual nitrogen in the upper 8 inches of soil of only 550 pounds per acre more than unfertilized pastures. This seems like a lot, but it's not readily available. Assuming that only 5% of this total N is available to crops each year (Illinois uses 2%), then available nitrogen would be only 28 pounds per acre per year above that receiving no broiler litter. This can make a difference in the color of the grass, but it's not a lot of nitrogen compared to that recommended for maximum forage production (60 to 120 lb. N/acre). This same study showed that most of the broiler litter nitrogen leached down to the water table.

Experiments with cotton and corn in North and Central Alabama showed that when 120 to 240 pounds N per acre as broiler litter (2 to 4 tons/acre) was applied at or near planting, no additional fertilizer nitrogen was needed for maximum yield. On the other hand, if broiler litter was applied more than one month ahead of planting, most of the nitrogen was lost, primarily by leaching. This can contribute to nitrate contamination of groundwater and inadequate nitrogen for high yields.

These tests have demonstrated that a pound of total nitrogen in broiler is almost as good as a

Nitrogen in Broiler Litter



pound of fertilizer nitrogen. However, to assure adequate N fertilization and to account for some being tied up in soil organic matter, we recommend that growers assume about 2/3 of the total nitrogen in broiler litter will be available to the crop this year. Therefore, if broiler litter is a 3-3-2 fertilizer, then it contains an average of 60 pounds total N, 60 pounds phosphate (P₂O₅) and 40 pounds potash (K₂O). About 2/3 of the N or 40-60-40 will be plant available. Most of the phosphate and potash is held by the soil. If litter is applied to the crop on this basis and treated like any other fertilizer, Alabama growers can achieve maximum crop yield, maximum fertilizer (broiler litter) efficiency, and minimum environmental impact. Excess N has to go somewhere. Unfortunately, over-applied N may find its way to our groundwater.

So, if the grass is greener on the other side of the fence and no broiler litter or fertilizer has been applied in a year or two, don't drink the water!

—Charles Mitchell, Extension Agronomist-Soils

Is Soil Phosphorus Getting Too High?

EPA and some Congressmen think so. That's why Senator Harkins (IA) has proposed legislation to regulate the land application of animal wastes based on crops' phosphorus needs as well as the nitrogen needs. Most crops need a lot of nitrogen but not that much phosphorus. (*over*)

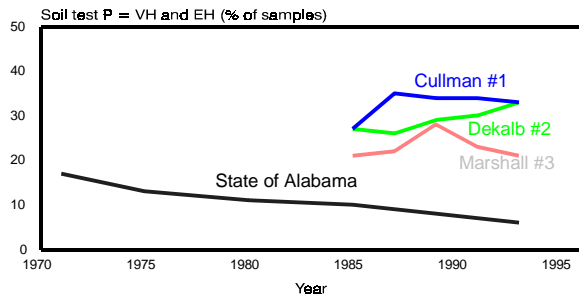
" the scoop on litter"

(Continued from front)

Hay and forage crops take up about 4 times more N than P₂O₅. Nitrogen doesn't build up in the soil. Phosphorus does. Since many animal manures contain almost as much phosphorus as nitrogen (broiler litter is a 3-3-2 fertilizer), use of manures will inevitably build up soil phosphorus.

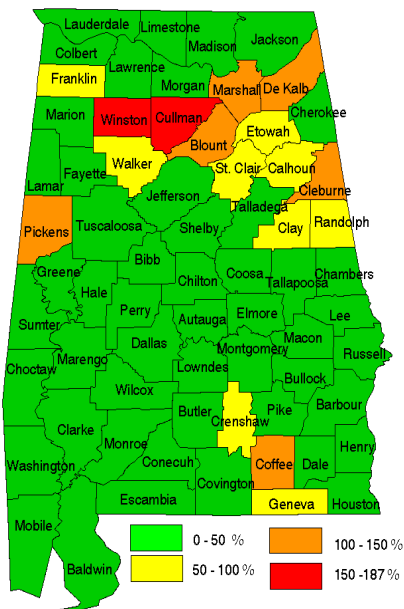
We have some Alabama soils with extremely high phosphorus levels. Many are back yard gardens and lawns, but some are on poultry farms. High soil phosphorus seems to be associated with poultry producing counties:

Trends in Soil Test P Alabama



In addition, some of these same counties produce a lot more phosphorus in broiler litter than the total crop needs (see map).

unless we can find a way to export the litter to those counties where the phosphorus is needed. Therefore, phosphorus will continue to increase in these soils



Phosphorus produced in broiler litter in Alabama. Percentages represent the percentage of the total crop phosphorus needs met by poultry broiler litter (Figure developed by J. Beck and W. Wood, Auburn University)

-Charles Mitchell, Extension Agronomist-Soils

DRystack/COMPOSTERS: Why Build Them So Well?

Frequently the question is raised "Why build such a nice barn just to store chicken litter?" The simple answer is that Engineering Standards exist which provide guidance for the design of such structures. Any responsible engineer who would stand behind his design would be foolish not to comply with accepted design practices. Aside from this, there are practical reasons for structural features such as knee braces, deep post embedments and higher levels of wood preservative treatment for structural posts. Knee bracing is used to increase rigidity in post-to-truss or post-to-girder connections. The use of knee braces provides added stiffness to the entire structure and often decreases the required post size and embedment depth. The required embedment depth for posts is determined based on the wind speed, size and shape of the building, soil type and compaction, whether or not knee braces are used, post hole width and a few other factors. Strong winds create tremendous forces, which tend to lift the posts out of the ground and push the building over. Shallow embedments are not adequate to resist these forces. Even an additional one-foot of depth can make a big difference in preventing or reducing damage to the structure from strong winds.

The Natural Resources Conservation Service (NRCS) recommends a minimum wood preservative treatment of 0.6 pcf of chromated copper arsenate for structural posts in contact with the ground. This is consistent with recommendations found in industry standards, federal specifications, wood product organization publications, textbooks and other published literature. Studies done by the Forest Products Laboratory, U. S. Forest Service, have shown that test stakes treated at lesser levels and placed in the ground have shown significant damage after 18 years. Stakes treated at the 0.6-pcf level have lasted much longer. The damp conditions and presence of manure in waste storage structures make this a severe environment for wood. You would therefore expect the posts in waste storage structures to have a shorter life than the stakes used in the studies. Having the assurance that the posts will last for the required life of the structure is worth the small extra expense for the higher treatment.

The larger drystack/composters cost several thousands of dollars to construct, regardless of how well they are built. The extra cost associated with many of the features that some would consider as excessive is generally only a small percentage of the total cost. In return you're getting a safer structure that will last longer and require less maintenance. So it actually makes good economic sense to build it well.

-Perry Oakes, State Conservation Engineer



For additional information or assistance, please call your local county agent or soil conservationist.

Kevan Tucker,
County Extension Agent