



Welcome to Ground Work

*Over the past few weeks we've been focusing on wise residue management, and on AgriEnergy Resources **Residue™** program. The live microbes in **Residue™** break down mature crop residues which, in turn, build organic matter/humus/"real fertility" into your soil. As we've discussed, building organic matter has countless benefits for your soil, and countless benefits for your wallet. This week we'll share some studies and some numbers that show how you can **save money by reducing added nitrogen and phosphate.***

Study #1 – Background information from USDA

Back in 1938, USDA studied prairie soils and calculated that the organic matter in the root zone contained 16,000# of nitrogen. That would have been soil with about 8% organic matter. Timber soils (about 2% organic matter) had about 4,000# of nitrogen. Conclusion: every 1% organic matter = 2,000# of nitrogen in the root zone.

Study #2 – Nitrogen Rates on Corn at AgriEnergy Resources Research Farm

On our soils, we've found in many field trials over several years that **we need only 0.6# of added nitrogen to produce a bushel of corn following corn.** The University of Illinois for years has said it takes 1.2# N on corn-after-corn. In other words, **we grow a 200 bushel corn crop with 120# N** rather than the university's recommended 240# N.

Following soybeans, we need only 0.37# of added nitrogen to grow a bushel of corn. Adding more nitrogen beyond this rate isn't economic. The University of Illinois recommends 0.95# N per bushel on corn-after-soybeans. In this case, **we grow a 200 bushel corn crop with 74# N** rather than the university's recommended 190#.

Our most economic rate of added nitrogen was in corn-on-soybean stubble:
0.17#/bushel – or 35#/acre – of added N produced 203 bushels per acre!

Whether it's corn after corn, or corn after soybeans, we can raise a bushel of corn with dramatically less purchased nitrogen than conventional recommendations. Our data shows that we're saving about 115# of purchased nitrogen to consistently raise 200 bushel corn. At today's prices, that is **\$70 per acre saved!**

Study #3 – Nitrogen Rates on Corn on Iowa Research Farms

Dr. Jerry Hatfield, who heads the National Laboratory for Agriculture and the Environment (formerly the National Soil Tilth Lab) at Iowa State University, reports the same experience on research farms where they have active soil biology: They don't need as much purchased nitrogen to raise high-yielding corn. He cites a farm where they've **raised 308-bushel corn with only 80 pounds of added nitrogen.**

Study #4 – Phosphate Use at AgriEnergy Resources Research Farm

It is accepted that the maintenance rate for phosphate in corn production is 0.43# phosphate per bushel harvested. So, for a 200 bushel corn crop, we would need to add back 86# of phosphate per acre per year.

During a 28-year period (1981-2009) at our research farm we maintained 200 bushel corn yields while adding only 15# of phosphate per acre per year.

Let's do some math:

Accepted Maintenance Rate	86# x 28 years =	2,408#
Actually used @ AgriEnergy	15# x 28 years =	<u>420#</u>
Amount "saved" (not used)		1,988#

Convert 1,988# phosphate to DAP and that is 4,300#/acre of DAP that was never purchased!

So, surely the soil tests dropped. Well ...

1981	P-1: 146
2009	P-1: 190

At today's prices, **this is another \$55 per acre saved!**

What do these studies tell us?

We are NOT mining the soil! On the contrary; because of wise residue management we are adding new humus every year by aggressively recycling leaf, stalk, and root residue.

Some of that humus is immediately available crop nutrients; and some of the more stable humus components remain to build up total soil organic matter, long-term. 1% organic matter contains 650# phosphate along with the 2,000# nitrogen. As we manage residue to build organic matter, we are storing tremendous fertility.

The Bottom Line

The first step in a good residue management program is: inoculate the crop residue with **Residue™**. Why? **Residue™** contains bacteria, actinomycetes and fungi. Fungi dominate the product because fungi produce organic acids and enzymes to attack mature, waxy, lignacious residues. Leaf material recycles easily, but we want to get after the stalks and roots. Breaking down the stalks and roots gains access to more of the nitrogen, phosphate, and other nutrients.

Talk to us about using **Residue™** to reduce your added nitrogen and phosphate.