Patent to Destroy Monsanto:
Organic "Weed and Feed"—Putting an End to Monsanto in Agriculture

Excerpted from *Alcohol Can Be a Gas! Fueling an Ethanol Revolution for the 21st Century,* by David Blume.

Monsanto is the industry leader in genetically modified seed and is the supplier of Roundup. It is in the vanguard of companies that wish to shackle farmers to patented herbicide-resistant seed—which allows farmers to use lots of Roundup herbicide to kill the weeds growing between the GMO crop. Monsanto prohibits farmers from saving the seed and forces them to buy new seed each year. I have a remedy for this strong-arm tactic.

In permaculture, we always think back to what happens in Nature for an explanation. So, let's observe corn in Nature to figure out how best to grow it without chemicals. When a cornstalk falls over at the end of its life, the husk-wrapped starchy ears of corn plop onto the ground. Over the winter, a little decomposition happens to the husk. Birds might get to the kernels on the top half of the cob, pecking some open, scattering bits of corn, but leaving some of the grain on the cob, where rain washes it onto the ground. Come spring, three, four, maybe a dozen intact seeds sprout and come rocketing out of the ground. Very few or no weeds seem to be near the corn when it sprouts. So, in Nature, the corn seems to have an herbicidal effect that gives the clump of corn a big head start. To this day, indigenous people plant corn in clumps imitating Nature.

An experiment I performed shows how easy it is to take herbicides out of the picture. For a long time, organic farmers had known that corn gluten meal (CGM) was a very good pre-emergent herbicide. This means that it kills plants when they are just sprouting, as opposed to post-emergent herbicides, which kill plants beyond the seedling stage. (The high price of CGM has limited its use to organic gardeners; it is too expensive for most organic farming.) No one knew how CGM worked, however. USDA scientists said that the prevailing theory was that weeds were nitrogen-poisoned by the high-protein gluten. It seemed a ridiculous theory, as most weeds I know suck up nitrogen better than most crops.

Based on my observation of corn in Nature, I conducted an experiment to see if the distiller's dried grains with solubles (DDGS), the byproduct of dry-milling corn, would have an herbicidal quality similar to CGM's. Remember, everything that came from the soil is in the DDGS. The only thing taken out of a crop to make alcohol is the solar energy. The plant carbohydrates contain only carbon dioxide, water, and sunlight. Nothing from the soil is used up in burning alcohol in cars. All the protein, fat, and soil minerals are still in the spent byproduct of the alcohol process.

I set up four flats with potting mix, and I put ten rows of weed seeds in each one. The seeds were for the ten worst weeds reported in cornfields. I reasoned that if anything would be resistant to the herbicidal effect of corn, it would be weeds growing in cornfields. I added nothing to the control flat, sprinkled whole organic corn meal (OCM) over the second flat, sprinkled CGM over the third, and sprinkled DDGS over the fourth. (I included OCM in the experiment to make sure that any herbicidal effect was not from the residue of chemical herbicides; organic corn is never treated with chemicals. Later testing of the DDGS showed that it, too, contained zero residual biocides.)

Fig. 3-8 Control group, plantings without DDGS. These rows are planted with the ten worst weeds found in cornfields. They are used for testing any new herbicide. In this flat, there was just plain fertilized soil, and in just a few days the weeds have come up rather nicely.

Fig. 3-9 Plantings with DDGS. This photo was taken on the same day as the control photo. You can see most of the weeds did not survive germination, and the rest are severely stunted. Within days, all the weeds were finished off. You can just see the remains of the bacterial gel that formed on the surface of the soil as a result of the DDGS addition.

So did DDGS act like an herbicide? Yes, it did. In fact, all three materials had significant herbicidal effects, but the DDGS results were the most pronounced. About half the weeds were killed, and the rest were stunted. Stunting was enough, though, since the corn grew right up and buried the puny weeds in darkness, where they withered.

I did another trial at the same time to see if herbicidal qualities would inhibit the germination of corn. I seeded four flats with corn instead of weeds, and then treated them with nothing, OCM, CGM, and DDGS. The various additives delayed germination one day.

The granules of OCM, CGM, or DDGS were attacked by bacterial and fibrous fungal mycelia right away, which grew into the grains from the soil. The bacteria frequently formed water-holding gels, which adhered to both the grains and the soil particles. The filamentous fungi

knitted the grains to soil particles in mats of webbing. This prevented soil erosion and seed washout by falling drops of water. It also created a breathable "seal" on the surface of the soil, limiting evaporation.

Next, there was an explosion of soil microlife eating the pioneering fungi, bacterial gels, and the DDGS. Within weeks, the mycelia, the bacterial gels, and the granules of DDGS disappeared. The fermented, ground seed in the form of DDGS had allowed things that like to eat germinating or broken seed coats to go through a powerful population explosion in the soil. These microbes really savaged the roots of sprouting weed seeds. Once this fungus and microbe explosion happens, it takes many weeks before any other seed trying to germinate in the bed has a chance to grow. Corn, however, was immune to the effect. The herbicidal control effect was biological, not chemical.

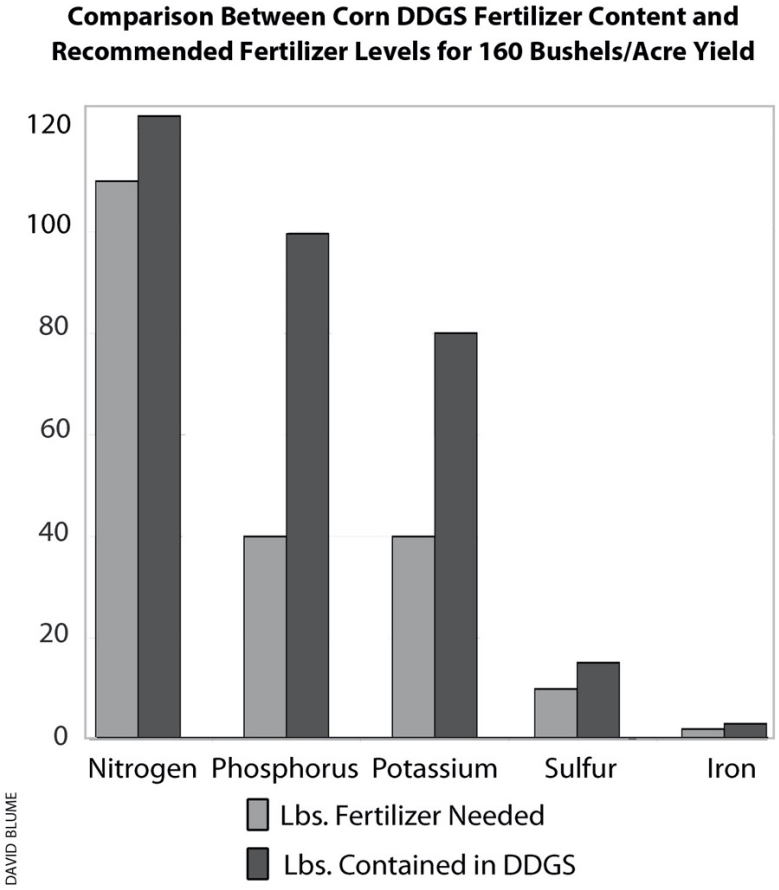

Fig. 3-10 Corn DDGS fertilizer value. You'll note that the DDGS supplies considerably more nutrients than are needed to grow the next crop of corn, especially when it comes to phosphorus and potassium.

So how does this translate into a revolution in farming and an end to Monsanto's formula of selling patented seed and herbicides to match, and still dramatically cut production costs?

According to USDA records, the median corn yield in the very average state of Nebraska was almost 160 bushels per acre (Nebraska Agricultural Statistics Service, Nebraska Agri-Facts 17/2002). I had the DDGS in my experiment analyzed for its composition of soil nutrients, and

then calculated how much DDGS would come from 160 bushels, and what would be the soil nutrient value of that amount of DDGS. It was then a simple matter of comparing these figures to what the USDA says it takes to grow the 160 bushels of corn in that average field.

I found that there was enough fertilizer value in the DDGS "left over" from growing 160 bushels of corn to raise more than the next 160 bushels, since there was actually 10% more nitrogen and an even greater surplus of other critical nutrients, such as phosphorus, potassium, iron, and sulfur, than was required to grow the next corn crop. Everything that came out of the soil to make that corn was still there in the DDGS. So, from the soil's point of view, it was like returning last year's crop nutrients for use by this year's crop.

I found that this ratio of increased percentages of certain nutrients with repeated DDGS applications to corn held true even at yields of more than 200 bushels per acre. So, over a period of years, 160-bushel land would be producing 200 bushels. Plus, the soil organic matter would rise year after year after year. Combined with the soil-protecting effects of DDGS, the higher organic matter would mean more retained nutrients, increasing humus levels.

It would also mean relative drought-proofing of the crop, due to the mycelial sealing-in of moisture in the early phases of crop growth, and the sponge-like water-retention effect of organic matter.

What I had literally discovered in the experiment with DDGS was organic, drought-proofing, "weed and feed."

Now, how would this affect a farmer's bottom line and even free him from corporate dependence? Using very general numbers, you'll find that a corn farmer historically grosses something like $250 per acre on his crop. For that acre, he spends more than $50 on toxic Roundup herbicide and Roundup Ready genetically modified herbicide-resistant seed. He spends about $80–$100 in fertilizer per acre and a smaller amount on insecticides. With all his expenses totaled, a farmer will generally net, in a decent year, about $50 on an acre of corn.

But if the farmer produces alcohol instead of selling his grain into agribusiness—and takes the DDGS that results from his grain-growing, and applies it to his field during soil prep and planting—his costs to produce that acre of corn will drop from $150 to about $50, tripling the net profit.

And remember, the farmer is now making alcohol from his grain, instead of selling it cheap for animal feed. If the farmer sells his alcohol to a community-supported energy alcohol distribution station, he can bring in, after deducting the cost of making the alcohol, $1.50 per gallon, or $588 per acre, instead of getting $250 selling corn for animal feed.

The net profit from his crop would be over $500 instead of $50. He wouldn't have to borrow money for fertilizer or GMO seed (since he could now save his own), and he would have, of course, no herbicide costs. This could be big news in Farm Country. Instead of corn being a soil-draining crop in rotation, it could be soil-building. Never again would a single year's crop failure bankrupt a farm.

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Fig. 3-11 Improved growth of corn using DDGS. On the left is corn in fertilized potting soil, and on the right is corn in the same soil with DDGS added to the surface. Neither patch is nutrient-deficient, but clearly the addition of the DDGS has improved the growth of the crop on the right. In the original color photo, the difference is even more marked.

Once a farmer starts to farm with DDGS, even if he only does it every other year or one in every three years while rotating through other energy crops, he is within an inch of being organic—which is better for the environment, his family's health, and his bottom line. The Oilygarchy—which sells more than one billion pounds of insecticides per year, as much as four billion pounds of herbicides per year, and an ungodly amount of highly energy-intensive nitrogen fertilizer, made from natural gas—would be deprived of a high-value market for its products. Monsanto would have no one to sell its proprietary GMO seed or chemicals to. Now, this would really be a farmers' revolution.

So here is my contribution to the revolution. I was granted a patent in 2007 on the process to use DDGS as a combination fertilizer and herbicide. Now an agribusiness corporation cannot patent it and then prevent others from using it. I am going to handle use of my patent in a completely different manner than a large agribusiness corporation would. A program will be set up to let individual farmers and small collectives with small capacity license this patent for a nominal fee, perhaps only requiring registration (details are still being worked out as of the publication date of this book).

I ask the following three things of these small-volume users of my patent: 1) that they not use chemical herbicides and not use genetically modified seeds; 2) that they learn how to breed and save their seed from season to season; over time, you will end up with a variety tailored to your climate and soil (write me if you need help with this); and 3) in lieu of the patent royalty, donate what you think is fair to the International Institute for Ecological Agriculture so that I can keep doing this kind of work. Make sure that you take care of your family and workers first. I trust my fellow small farmers to do right by me if their profit increases. So take that, Monsanto!

Alcohol fuel production can result in more concentrated corporate farming of monocrops processed in giant plants, or it can save the family farm and provide farmers with markets for a wide variety of crops. The preferable route to a sustainable agriculture system looks to me like farmers cooperatively producing fuel and multiple co-products in small plants, using a wide range of feedstocks, from roots to grains to cellulose.

That sort of mosaic would go a long way toward eliminating the pest and soil problems that monoculture has created, as well as eliminating the use of toxic chemicals and fertilizers in an attempt to mitigate those problems. Such diversity would make for a more resilient farm economy with less chance of failure than the high-risk gambling involved in growing only corn and soybeans. Ideally, a sustainable agricultural system would be three-dimensional, harvesting three times as much sunlight as biomass. It would have mixed canopies of trees, and ground crops whose environmental needs closely match the local climate and solar income.

As you will see in Book 2, Chapter 11, farms can become producers of many value-added human foods and products, rather than just the suppliers of low-cost raw materials to corporations. Alcohol fuel production sets us on the road to a permanently productive and fossil-fuel-free agriculture.