LAND STEWARDSHIP PROJECT

LSP *Myth Buster* #38

An ongoing Land Stewardship Project series on ag myths and ways of deflating them.

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➔ *Myth*: Genetic Engineering Can Replace Diversity

➔ *Fact*:

One argument in favor of genetically engineered crops is that they can replace "old fashioned" agronomic practices that rely on planting a diversity of crops in rotation. That claim is quickly going south these days as the basic rules of evolutionary biology begin to take charge out in farm fields. A simplified version of this rule is that if you use huge amounts of one single chemical or technology to kill pests, it's inevitable that some of those pests will survive, reproducing offspring that resist being killed by subsequent sprayings.

In the 1990s, soon after Monsanto started marketing seeds that produced crops genetically engineered to tolerate the herbicide glyphosate (marketed under the brand name Roundup), farmers adapted the technology in droves. The advantages for farmers were evident early on: they could plant their crop and then spray it once it had started growing, reducing the expensive, and erosive, mechanical weed control methods of the past. And since they were spraying the crop rather than saturating the soil at planting, less of it was required. Finally, glyphosate is known as a less toxic chemical than older herbicides, and supposedly does not hang around as long in the environment to cause problems.

Today herbicide tolerant crops account for 93 percent of the soybeans and 85 percent of the corn grown in the U.S., according to the USDA. This technology is ubiquitous in Farm Country, and it's made many, many fortunes for its creator, Monsanto.

But time is running out for this cash cow. Acreage with weeds that resist being killed by glyphosate almost doubled from 32.6 million in 2010 to 61.2 million in 2012, according to a 31-state survey conducted by Stratus Agri-Marketing. Nearly half of all U.S. farmers Stratus surveyed said they had glyphosate resistant weeds on their farm in 2012, up from 34 percent of farmers in 2011.

And now another high-flying genetically engineered agricultural product—corn plants modified to resist being killed by insects—is succumbing to the cold hard facts of basic biology. In late August there were reports out of Illinois that the western corn rootworm, a devastating pest, was showing serious signs of being resistant to "Bt corn"—corn genetically engineered to fend off these insects (76 percent of U.S. corn is of the Bt variety). More reports emerged over the summer from across the Midwest, prompting Environmental Protection Agency officials to visit problem fields themselves.

"Instead of making things easier, we've just made corn rootworm management harder and a heck of a lot more expensive," said University of Minnesota entomologist and pest management specialist Bruce Potter on *Minnesota Public Radio*.

By mid-September farmers were reporting that the stalks of genetically engineered corn were being pushed over by winds — a sign that ravenous rootworms were taking their toll in areas they weren't supposed to. To make things worse, the insect damages the plant's ability to absorb water — a particularly thorny problem as parts of the Corn Belt suffered through another year of major drought.

Bugs and weeds that are finding ways to fool Bt and Roundup technology are bad news for a lot of reasons, not the least of which is that it means farmers are being forced to return to using the same nasty chemicals GMOs were supposed to make irrelevant. The irony is that one way Monsanto, the USDA and other backers of GMOs sold the public on the safety of this technology in the early days was to argue that it would mean fewer pesticides would be used, and the ones that were used would be less of an environmental and human health threat.

There are now entire field days dedicated to how to deal with superweeds. Agronomists, many of whom work for seed and chemical companies, are recommending "diversifying" the chemical toolbox by returning to some old favorites like atrazine.

In a 2009 analysis of USDA statistics, researcher Charles Benbrook found that genetically modified crops have actually increased pesticide use by 318 million pounds since 1996, compared to what would have probably been used in the absence of GMO varieties. Herbicide use on crops genetically engineered to resist weed killers rose over 31 percent from 2007 to 2008 alone. That makes the overall chemical footprint of GMO crops "decidedly negative," concluded Benbrook.

In an extensive 2010 report on GMO crop technology, the National Research Council warned that although products like Roundup Ready seeds provide some benefits to farmers, superpests threaten to make such advantages moot.

One positive development has emerged from all this talk of superweeds and superbugs: university crop experts are getting desperate enough to recommend that farmers utilize diverse crop rotations and cover crops to disrupt pest cycles. Researchers in South Dakota found that planting a cover crop in the autumn significantly reduced rootworm damage in a corn crop planted the following spring. Such sustainable methods are not only good for the environment, but Monsanto hasn't figured out how to patent them yet.

➔ More Information

- A University of Illinois report on Bt corn-resistant rootworms is at http://bulletin.ipm.illinois.edu/?p=1629.
- Stratus Agri-Marketing's report on herbicide-resistant weeds is at www.stratusresearch.com/blog07.htm.
- The effects of cover cropping on western corn rootworm is described in a 2010 paper published in the journal *Environmental Entomology* (December, pages 1816 to 1828): www.entsoc.org/Pubs/Periodicals/EE.
- More *Myth Busters* are at www.landstewardshipproject.org/about/libraryresources/mythbusters.

This **Myth Buster** *is brought to you by the members and staff of the Land Stewardship Project, a private, nonprofit organization devoted to fostering an ethic of stewardship for farmland and to seeing more successful farmers on the land raising crops and livestock. For more information, call 612-722-6377 or visit www.landstewardshipproject.org.*