

June 30, 2014

Docket ID No. EPA-HQ-OPP-2014-0195
Environmental Protection Agency
Office of Pesticide Programs
1200 Pennsylvania Ave., NW
Washington, DC 20460-0001

To the Administrator, the Director of the Office of Pesticide Programs, and EPA Staff Responsible for Forthcoming Decisions Regarding the Next Generation of Herbicide-Tolerant Crops:

I submit these comments as a private citizen. I currently serve a Research Professor at Washington State University. I have conducted independent analyses of the benefits, risks, costs, and impacts of herbicide-tolerant crops, and other agricultural biotechnologies for 30 years. Some of the first National Academy of Science (NAS) reports assessing the future of agricultural biotechnology were done during my tenure as the ED of the NAS Board on Agriculture (1984-1990). I have reviewed dozens of regulatory packages for past and present transgenic crops, published peer-reviewed papers on these technologies, and have tracked for over 10 years the impact of genetically engineered corn, soybeans and cotton on pest management systems and overall pesticide use. I currently serve on the USDA's AC 21 Agricultural Biotechnology Advisory Committee.

In 1996 with colleagues at Consumers Union, I co-authored a book published by CU entitled *Pest Management at the Crossroads*. In that book's discussion of herbicide-tolerant crops – the first commercial plantings occurred the year the book came out – we explained why the prospect of herbicide-tolerant crops was attractive to farmers, who were then struggling to deal with several challenges in using the low-dose, persistent herbicide chemistry then on the market. These challenges ranged from resistance, to carryover damage to crops, to drift and damage to non-target plants, trees, vines, and shrubs, poor control of weeds, and high and rising per acre costs. We then wrote:

“The recent discovery of the first-ever (“not possible”) glyphosate-resistant weed species in Australia should prompt farmers to reconsider the wisdom and sustainability of these technologies.” (page 169)

Explaining why herbicide-tolerant technology would almost certainly accelerate the emergence of resistant weeds, *Pest Management at the Crossroads* states that:

“Gaining the ability to apply herbicides more frequently or possibly at higher rates per acre is the major reason farmers are willing to pay the higher cost of transgenic seed. Such changes in the pattern of herbicide use, though, are almost custom-made for accelerating resistance.” (page 220)

Regrettably, many farmers, regulators, most academic weed scientists, and the pesticide-biotech industry largely ignored the warnings issued around the time herbicide-tolerant crops started their meteoric climb in market share. And regrettably, Roundup Ready (RR) technology has proven uniquely proficient in accomplishing what Monsanto had claimed would be almost impossible – generating glyphosate-resistant weeds.

It took only five years for RR technology to trigger emergence of a newly glyphosate-resistant weed (marestail in Delaware). But this record pace in creating a newly resistant weed did not deter the industry or farmers, and by that time, both the EPA and USDA had fully endorsed herbicide-tolerant technology via multiple approvals. Reliance on the technology continued to rapidly expand in three major crops, and by 2005 RR varieties were planted on close to one-half of the cultivated cropland in the nation.

Excessive reliance triggered resistance, resistant weeds spread and triggered the need for farmers to spray more heavily. As a result, herbicide use on GE crops has risen steadily since around 2000. There are now more than two-dozen glyphosate-resistant weeds covering perhaps 70+ million acres. Weed management costs are on a trajectory to double compared to just a few years ago, and may quickly double again if the next generation of herbicide-tolerant crops is approved.

The decision now before the EPA, whether to register Dow AgroSciences' new choline salt formulation of 2,4-D herbicide, is only a small piece of a large, complex puzzle. It is none the less a critical decision point, and perhaps *the last chance* for the government to take actions hopefully sufficient to prevent a series of regrettable, and even possibly tragic, outcomes from occurring over the next several years.

For reasons well known to EPA and USDA policy officials, and to experts in this field, neither the EPA or USDA has the legislative mandate or tools to mitigate herbicide resistance and what it inevitable causes – heavier use of herbicides. The registrants, in this case Dow AgroSciences, are responsible legally for requesting label provisions designed to prevent economic damage to other peoples' property, such as drift-induced, off-target crop damage. The EPA is charged with assuring that label directions prevent adverse impacts on human health and the environment.

If USDA deregulates (approves) 2,4-D herbicide-tolerant corn, there are two good reasons for EPA to approve the Dow AgroSciences' new formulation of 2,4-D. First, the choline salt formulation of 2,4-D significantly reduces volatilization and off-target movement, and will surely help reduce economic damage to nearby crops, as well as human exposures. Second, Dow has invested millions over the years in reducing the levels of highly toxic, dioxin-like impurities in 2,4-D herbicides. So, any acre sprayed with Dow AgroSciences' new formulation will pose lower risks than an acre sprayed with other, registered 2,4-D products, especially compared to imported 2,4-D products with much higher levels of toxic impurities.

If the EPA approves the choline salt formulation and various tank-mix products containing it, these risk-reduction benefits will be cited among the reasons why. But the

EPA is well aware that there is no plausible basis to project that the choline salt formulation of 2,4-D will be sprayed on all herbicide-tolerant crop acres, even if a requirement to do so is among the provisions farmers agree to when they sign the technology agreements required upon purchase of 2,4-D tolerant corn seed. The older, cheaper formulations will remain on the market, an ongoing temptation to farmers facing rising input costs and tighter profit margins.

EPA also no doubt realizes that no one really knows the degree to which the choline salt formulation will reduce 2,4-D volatilization that can lead to drift and off-target damage. Dow AgroSciences-funded research and regulatory documents claim reductions over 90%, but many experts are skeptical that the reductions will be that great over the diversity of climatic conditions and application methods that will be used to treat 2,4-D tolerant corn. Plus, the new formulation will still be subject to spray drift at the time of application, the route of off-target movement responsible for a significant share, if not the majority, of 2,4-D-associated drift and damage episodes.

The EPA and USDA are also well aware, and will be reminded hundreds of times in other comments submitted to this docket, that there are already at least eight weeds resistant to 2,4-D; that this technology will likely prove efficacious for only five to perhaps seven years; and, that once farmers attempt to spray their way out of the corner they have been backed into by the spread of glyphosate-resistant weeds, they will have exhausted most of the available herbicide chemistry available to them. Surely, the EPA and USDA owe it to farmers and the public to reflect on “what comes next?”

The pending decisions by EPA and USDA over whether to allow unlimited planting of 2,4-D and dicamba herbicide-tolerant crops will, in all likelihood, be the most consequential to occur over my 30+ year career working on the evaluation of agricultural pest management systems and technology.

The decisions will have a profound impact in determining the contents of the farmer’s weed control toolbox in the decade ahead, and whether farmers increase or begin to reduce reliance on a single tactic (herbicides) by adopting proven, multi-tactic weed management systems that virtually all academic weed management experts are now recommending. I strongly urge both agencies to step back and consider the implications of responding to today’s herbicide-resistant crisis by doubling down on what caused it in the first place – excessive reliance on one, or even a few herbicides.

If the long-list of 2,4-D and dicamba resistant traits and crops is approved in the next couple of years without restrictions, the almost inevitable collateral damage could reach historic proportions:

- Human Health -- EPA-funded research in the 1980s and 1990s documented clear linkages between spring spraying of 2,4-D and dicamba and a host of reproductive problems including spontaneous abortions and several types of birth defects, and some studies also identified these herbicides as risk factors for several cancers.

- Drift and Crop Damage -- Off-target drift at the time of spraying, and after volatilization over the next several days, will trigger tens of thousands of crop damage episodes. It will place fruit and vegetable farmers in jeopardy in areas with substantial acreage of corn (not to mention the backyard gardens of rural neighbors).
- More Resistance – 2,4-D and dicamba remain effective and important herbicides for control of certain broadleaf weeds, and they are among the lowest-cost options for farmers. Approval of major field crops resistant to them will dramatically accelerate the spread of weeds already resistant to these herbicides, and will trigger several new ones to emerge. Not only will vastly expanded use trigger resistance and possibly a host of human health problems, it will also eliminate, or sharply curtail, the efficacy of these herbicides for those farmers using them today.
- Risks to the General Population – Most Americans are already exposed multiple times per year, if not on a near-daily basis to 2,4-D via drinking water, beverages, and food. The likely quantum leap in use will surely increase exposure levels, as well as the percentage of the public impacted. Health risks will expand proportional to exposure.
- Public Attitudes About Genetically Engineered Crops – It is obvious from the number of people submitting comments to this docket that 2,4-D herbicide-tolerant corn, and related technologies, is going to receive intense scrutiny. Many people will likely first learn about agricultural biotechnology through stories triggered by the impacts and controversy surrounding these crops. First impressions matter and are not likely to always be positive, setting up further barriers to future biotechnologies that offer possibly significant consumer benefits and few, if any, serious risks.

Despite the above concerns, policy makers in both EPA and USDA are likely to conclude that they have no legal basis for denying approval to 2,4-D herbicide-tolerant corn, nor the herbicide products custom-formulated to go along with them. But the leaders in both agencies do have control over the conditions applied to approvals, if and when they are granted.

I want to state clearly, before offering my concluding comments and suggestions, that I conclude that the risks inevitably associated with unlimited use of these technologies are so great that they should not be approved. EPA decision-makers are responsible, at the end of the day, for finding an acceptable balance in the risks and benefits associated with pest management technology. In the case of 2,4-D and dicamba herbicide-tolerant crops, the benefits are modest at best (other than to Dow AgroSciences and Monsanto, the patent holders for the transgenic traits), given the high price farmers will pay for new GE seed. And the downside risks are significant, even if everything works as well as hoped, and could be much worse if current concerns prove warranted.

If the technologies are approved, EPA and USDA should take several actions to:

- Reduce the risk of collateral damage,
- Rapidly detect it, if and as it occurs, and
- Quickly take actions to prevent the damage from spreading, as it surely would if 2,4-D and dicamba-resistant crops come to dominate corn, soybean, and cotton production to the degree Roundup Ready technology has been embraced by farmers.

Some 25 year ago, the EPA provided funding to several birth centers through the Midwest and Great Plains to study the impacts of routine herbicide exposure on birth outcomes and reproductive health. A new round of similar grants is surely warranted if these technologies move forward. The grants should support the centers in putting in place routine monitoring of 2,4-D levels in the blood of pregnant woman, in umbilical cord blood at birth, and in newborns. Semen quality should also be monitored. The centers should also be given the resources needed to monitor the development of the infants for several years, with special attention to the birth defects and health problems previously linked to spring-time herbicide exposures in the research funded by the EPA.

EPA should not allow up to three applications of 2,4-D at a rate up to 1.0 pound of active ingredient per application, as requested by Dow AgroSciences. Today, corn farmers apply, on average, about 0.4 pounds of 2,4-D per acre early in the crop season; approval of the requested Dow AgroSciences label would allow a 7.5-fold increase in the rate of application per crop year. Many corn farmers feel they can gain most of the benefits of the technology with one, well-timed application after the crop has emerged. With so many questions begging answers, allowing such heavy use right out of the gate is reckless.

EPA and USDA should insist that the technology providers provide funding to USDA to put in place a system to monitor the spread of 2,4-D resistant weeds. Both agencies should build triggers into their approvals, linked to the emergence and spread of 2,4-D resistant weeds. When the first credible evidence of newly resistant weeds emerges, binding and enforceable restrictions should be placed quickly on the future use of the technology, such as any acre of cropland can be planted to a 2,4-D or dicamba herbicide-tolerant crop only once every three years. Imagine how much better off corn, soybean, and cotton farmers would be today if that sort of common sense, preventive policy had been adhered to after the initial approval of Roundup Ready crops and the emergence of glyphosate-resistant marestalk in Delaware in 2001.

Both agencies should collaborate in designing and funding a drift and off-target damage monitoring system to test in real time whether, and to what degree the new choline salt formulation has mitigated this area of risk. The technology developers should agree to provide whatever funding is needed for the USDA to administer a compensation program to reimburse farmers and rural neighbors who suffer losses of crops, trees, vines, or other plants as a result of drift from herbicide-tolerant crop fields. Relying on lawsuits to sort out who must pay such damages would clog rural courts, and is bound to sow the seeds of rural discord.

The National Institute of Environmental Health Sciences should be placed in charge of assuring that regular, government-controlled biomonitoring is undertaken in areas with substantial acreage planted to next-generation herbicide-tolerant crops. The biomonitoring should track trends in herbicide levels in urine, blood, and selected tissues. Again, the industry and government should ideally agree upfront over the threshold levels of herbicides in blood and urine that will trigger steps to cut back on their use, or end it entirely.

In closing, please recall the time when the EPA faced considerable public concern in the mid-1990s over the possible emergence of resistance to the *Bt* endotoxins engineered into *Bt*-transgenic corn and cotton. Resistance genes triggered by widespread planting of *Bt* corn and cotton could, many experts warned, erode the efficacy of *Bt* foliar insecticides that were, and remain, so crucial to conventional and organic fruit and vegetable growers. In response to such concerns, the EPA carried out an open, deliberate scientific and public review of the technology, the factors increasing the risk of resistance, options to prevent resistance, and possible consequences of various policy options. After weighing the facts known at the time, the EPA mandated that several significant steps be taken to reduce the risk of resistance, steps that worked very well for over a decade, until the technology providers convinced the agency that some of the most important preventive measures were no longer needed or justified.

In the next several months, the EPA and USDA face another set of decisions that could lead to consequences no one will find acceptable. This time around, the warnings are not just coming from a few independent-minded, academic weed scientists and NGOs, and the stakes are far higher in terms of the possible impacts on farmers, public health, the environment, and the biotechnology industry.

If the USDA and EPA conclude they must approve this second-generation of herbicide-tolerant crops, I urge the agencies to take the proactive steps outlined above, which will hopefully minimize the chances of serious collateral damage occurring, and quickly curtail it if it indeed materializes.

Sincerely,



Charles Benbrook