

February 4, 2013

The Honorable Jim Jones
Acting Assistant Administrator
Office of Chemical Safety and Pollution Prevention
US Environmental Protection Agency
Ariel Rios Building
1200 Pennsylvania Avenue, NW
Washington, DC 20004

Re: Letter Asking EPA to Establish Mandatory Use Restrictions for Glyphosate and Other Herbicides in Order to Prevent the Development of Herbicide-resistant Weeds_____

Dear Acting Assistant Administrator Jones,

American farmers began planting genetically engineered (GE) crops in 1996 and this past year, they were grown on over 170 million acres of farmland. Those engineered varieties have provided significant benefits, such as increased yields, reduced insecticide use, reduced pest populations, and less erosion of top soil. However, poor management practices by the biotechnology developers and farmers are jeopardizing the sustainable use of some of those safe and environmentally beneficial products.

The Environmental Protection Agency (EPA) has played a crucial role in the commercialization of GE crops, regulating engineered varieties that produce pesticides, as well as the different herbicides that can be sprayed safely on engineered herbicide-tolerant crop varieties. Recent scientific evidence has documented the development of herbicide-resistant weeds due to the overuse and misuse of glyphosate with glyphosate-tolerant crops. It is critical that EPA establish enforceable standards that protect the benefits of those engineered crops and their corresponding herbicides for future generations. Therefore, the Center for Science in the Public Interest (CSPI)¹ requests in this letter that EPA review its current policies and establish stronger risk-management obligations for the different herbicides that are used in conjunction with engineered herbicide-tolerant crops as set forth below.

¹ CSPI is a nonprofit education and advocacy organization that focuses on improving the safety and nutritional quality of our food supply. CSPI seeks to promote health through educating the public about nutrition; it represents citizens' interests before legislative, regulatory, and judicial bodies; and it works to ensure advances in science are used for the public good. CSPI is supported by the 850,000 member-subscribers to its Nutrition Action Healthletter and by foundation grants. CSPI receives no funding from industry or the federal government.

I. <u>EPA Should Establish Enforceable Use Restrictions to Ensure the Judicious</u> and Sustainable Use of Glyphosate with Engineered Herbicide-Tolerant Crops

Of the 170 million acres of GE crops planted in the US last year, approximately 154 million were engineered corn, soybeans, canola, cotton, sugar beets, and alfalfa that were tolerant to the application of an herbicide, and in almost all cases the herbicide was glyphosate. This has resulted in a tremendous increased use in the last 10 years of glyphosate -- an inexpensive and relatively environmentally benign herbicide compared to alternatives that were previously used by farmers. Farmers planting glyphosate-resistant varieties have clearly benefited by lowering costs and simplifying their farm management, but it has also caused a significant problem -- the evolution and spread of glyphosate-resistant weeds. This problem has been compounded because today glyphosate is the primary weed-management tool used across multiple crops.

In 2010, The National Research Council published a report entitled "The Impact of Genetically Engineered Crops on Farm Sustainability in the United States," which identified 10 weed species that had become resistant to glyphosate since the planting of glyphosate-tolerant crops in 1996. It stated that this trend is "now reducing the effectiveness of this weed-management tool." (NRC Report 2010, p. 4). More recently, the International Survey of Herbicide Resistant Weeds identifies 11 glyphosate-resistant weed species thriving in 22 states. Experts have estimated that those resistant weeds impact no fewer than 7 million to 10 million acres of farmland and that number will continue to grow.

The development and spread of glyphosate-resistant weeds has been well known for some time, yet the trend has not been arrested by farmers or the biotech industry. Dow AgroSciences tells its customers on its website that there were no glyphosateresistant weeds in the Corn Belt in 2000, but today there are four confirmed resistant weeds causing problems in more than half of the Corn Belt states. With funds from the biotech developers, academics, such as Chris Boerboom at the University of Wisconsin and Michael Owen at Iowa State University, have produced pamphlets and written materials, such as "Facts about Glyphosate-Resistant Weeds," for farmers.3 Those materials document the problem and propose using other herbicides and farm-level risk management practices. In 2012, the National Academy of Sciences held a National Summit on Strategies to Manage Herbicide Resistant Weeds, where interested industry, academic, and government representatives came together to discuss the problem and identify different solutions. A recent paper by the Council for Agricultural Science and Technology found that "herbicide-resistant weeds pose one of the most significant threats to soil conservation since the inception of the USDA Natural Resources Conservation Service," because farmers may be required to go back to tillage practices to combat resistant weeds. (CAST Issue Paper #49, Feb. 2012, p. 13).

² Heap, I. The International Survey of Herbicide Resistant Weeds. Online. Internet. January 31, 2013. Available at www.weedscience.com.

³ Boerboom, C and Owen, M. Facts about Glyphosate-Resistant Weeds. Online. Internet. January 31, 2013. Available at http://www.extension.purdue.edu/extmedia/GWC/GWC-1.pdf.

The outcome of the discussion and analysis among industry and academic experts has been to suggest "integrated weed management" (IWM)4 or "best management practices" (BMP) that farmers should take to prevent the spread and evolution of herbicide-resistant (HR) weeds. Some farm actions that qualify as IWM and BMP include, but are not limited to, crop rotation, cover crops, judicious use of tillage, rotation of herbicides with different modes of action (MOA), applying herbicides at the label rates, and nutrient and water management. It is unclear, however, whether farmers are carrying out those voluntary actions and whether those actions are arresting the problem. According to an extensive three-year study by the Weed Science Society of America on reducing the risk of herbicide resistance, which was published in Weed Science in 2012,5 there is little good data on farmers' use of best-management practices. With the limited data they found, however, they concluded that for most of the US acres of herbicidetolerant corn, soybeans, and cotton, those farms did not practice "diversified weed management practice programs that integrates multiple herbicide MOAs," two key resistance-management recommendations that should be more widely implemented. They also concluded that while most corn, cotton, and soybean growers use

... some herbicide resistance best management practices ... a significant fraction of growers are not practicing adequate, proactive herbicide resistance management. The fields of those growers are likely to be the places where HR weeds are evolving, and that lack of stewardship may discourage other growers from being more diligent about resistance management. (*Weed Science*, 60:53, 2012).

Thus, without EPA involvement, farmers are not likely to carry out integrated weed management.

Three other important facts support the need for greater EPA involvement. First, farmers continue to grow more glyphosate-tolerant crops every year, increasing the likelihood of HR weeds. Second, farmers are using other herbicides and greater quantities of total herbicides to address the resistance problem that currently exists, which reduces the environmental benefits of herbicide-tolerant crops and increases the environmental impacts of those other harmful herbicides. Third, there have been no new

⁴ According to David Morgensen, et. al., "Integrated weed management is characterized by reliance on multiple weed management approaches that are firmly underpinned by ecological principles. As its name implies, IWM integrates tactics, such as crop rotation, cover crops, competitive crop cultivars, judicious use of tillage, and targeted herbicide application, to reduce weed populations and selection pressures that drive the evolution of resistant weeds." (Morgensen et. al., *BioScience* 2012 62: 75-84).

⁵ In 2008, USDA approached the Weed Science Society of America and asked that they develop comprehensive information on herbicide resistance and GE crops. The first part was to "outline the state of knowledge on the evolution, management, and impact of herbicide-resistant weeds and weed population shifts in both conventional and GE crops." The second part "focused on documenting the current use and success of herbicide-resistance management programs in various agroecosystems, focusing on single-season row crops and orchards." The result of this three-year study was published in a special issue of Weed Science in late 2012 (Weed Science 2012 60: 1-62). This source should be extremely valuable to EPA as it provides information not just on resistant weeds and different weed management practices, but recommendations to arrest the current situation, some of which are incorporated into CSPI's recommendations later in this letter.

herbicides with novel modes of action introduced in the last 20 years, and none are currently in development trials. As some academic scientists recently wrote, "herbicides are a non-renewable resource." (Harker, et. al., Weed Science 2012 60: 143). Yet, the Weed Science Society report found that farmers do not understand this fact and believe new chemistry will come along to address any problems that might arise from current practices. (Weed Science 2012 60: 53).

EPA should establish mandatory risk management obligations that preserve the continued effective use of glyphosate by American farmers. Michael Owens stated at the recent National Summit that herbicide-resistant weeds are not an herbicide problem nor a GE crop problem, but "a behavioral problem with the application and management of herbicides." (Proceedings of the National Summit 2012, p. 3). EPA is responsible for the safe and effective use of herbicides, including how those herbicides are applied in the field. Therefore, just as EPA established refuge requirements for farmers growing Bt corn and cotton in order to protect those relatively benign pesticides so they would not lose their effectiveness for future generations of farmers, EPA needs to establish requirements for the proper and judicious use of glyphosate on herbicide-tolerant crops.

EPA's mandatory involvement in this area is critical for several reasons. First, many young farmers who adopted glyphosate-tolerant crops don't have knowledge about diversified production practices that would prevent resistant weeds and won't likely adopt them unless forced by the government. Second, using alternative herbicides and non-chemical weed control practices are often ignored by farmers for economic reasons as weed control using glyphosate is both cheap and relatively quick. Third, if some farmers are "freeloading" and not using integrated weed management practices, this discourages neighboring farmers from carrying out those actions themselves as they are expensive and may have no impact if HR weeds migrate from their neighbor's farm.

While CSPI acknowledges that preventing or delaying weed resistance is complex and farmers will need flexibility to address site specific conditions, EPA should not let those issues lead to a failure to act. Without EPA action, it will only be a matter of time before glyphosate-tolerant weeds make using glyphosate obsolete. Therefore, at a minimum, EPA should implement the following recommendations:

1. EPA should limit the use of glyphosate to prevent development and spread of HR weeds. It is clear that the extensive planting of glyphosate-tolerant crops and the spraying of glyphosate leads to HR weeds. Some farmers will continue overusing glyphosate unless doing so is illegal. In geographic areas of concern (areas with high adoption of glyphosate-tolerant varieties or where glyphosate-resistant weeds are known), EPA should restrict glyphosate use so farmers cannot continually plant engineered seeds and use glyphosate year after year in the same field. Such a limitation on the use of glyphosate (e.g., "This product may not be used two years in a row in the same field") would force farmers to either rotate herbicides (hopefully with different MOAs), rotate crops, or rotate seed varieties (glyphosate-tolerant varieties with a non-glyphosate variety). Any of these "forced" rotations would reduce the

- development and spread of HR weeds. By limiting glyphosate use, EPA would accomplish what one group of academic weed scientists recommended, which was to "avoid making more than two glyphosate applications to a field over a two year period." (Boerboom and Owen, p. 7).
- 2. EPA should require farmers to establish and implement resistant-weed management plans. To safeguard Bt as a plant-incorporated protectant for future generations, EPA requires farmers to carry out insect-resistance management (IRM) through the planting of refugia. Similar requirements are needed to manage weed resistance either through individual farm plans or area-wide management plans. Individual plans could require farmers to pick from a variety of chemical and non-chemical activities to conduct annually on their farm, allowing farmers to conduct actions most relevant to their location and weed issues. Area-wide management plans might, as stated by Morgensen et.al., "mandate carefully defined patterns of herbicide rotation or could set upper limits on the total sales of a specific herbicide active ingredient or of a resistant seed variety within an agricultural county." (Morgensen et. al., BioScience 2012 62: 82).
- 3. EPA should require mandatory disclosure of each herbicide's mode of action on the label of the herbicide products purchased by farmers. All discussions of IWM or BMP to prevent HR weeds stress the need for farmers to rotate between herbicides with different MOAs. Extension specialists, academic scientists and the biotech industry repeat this message to farmers, yet farmers don't always know or have access to information on the MOA of the herbicides they use. Currently, only some manufacturers voluntarily provide MOA labeling on their products. With a mandatory MOA label requirement, farmers who understand the importance of rotating herbicides will have the information they need to carry out that weed-management practice. The Weed Science Society recommends this same action and stated such a requirement, "whether by agreement among the companies or through a regulatory agency, is essential to the implementation of herbicide-resistance management in the United States." (Weed Science 2012 60: 53).
- 4. EPA should provide incentives to encourage farmers to implement integrated weed management. It is clear that IWM and reduced use of glyphosate may not be in the short-term economic interest of individual farmers. EPA should consider incentives that will encourage IWM and disincentives to cropping systems using just glyphosate. Fees could be charged to make glyphosate more expensive. Some of the revenue generated by such fees might be made available to defray the cost to farmers who carry out non-chemical weed management practices, such as crop rotations, destruction of weed seeds, and special cleaning of farm equipment. EPA could work with USDA to establish and administer incentive programs.

If EPA mandated use restrictions consistent with the aforementioned four recommendations, farmers and the biotech industry would understand that preventing HR weeds is a priority of EPA. EPA's actions would help ensure that the development of glyphosate-resistant weeds was arrested and that future farmers could judiciously use glyphosate with glyphosate-resistant seeds.

II. If EPA Allows the Use of Existing Herbicides Such as 2,4-D and dicamba on Engineered Herbicide-Tolerant Crop Varieties, It Should Establish Enforceable Restrictions that Reduce the Likelihood of the Development of New Resistant Weeds

Biotechnology developers currently have petitions for deregulation pending at USDA for engineered soybean varieties tolerant to 2,4-D and dicamba and corn varieties tolerant to 2,4-D. If those petitions are granted by USDA in 2013, farmers would begin using those engineered seeds in 2014, as long as EPA allowed the use of those herbicides on those crop varieties. EPA should not allow those new uses of 2,4-D or dicamba without first establishing use restrictions to prevent resistant weed populations and protect those products for use by future generations of farmers.

The biotech-seed industry will undoubtingly market engineered varieties of corn and/or soybeans tolerant to 2,4-D and dicamba as solutions to fields with glyphosate-resistant weeds. As "stacked" herbicide-tolerant varieties, there may be a short-term benefit, making it relatively easy for farmers to fight current glyphosate tolerant weeds and delay the establishment of other glyphosate-resistant weed species. Thus, it is reasonable to assume that those two engineered seed and herbicide combinations will be an effective weed management tool for glyphosate-resistant weeds and have significant adoption, especially in geographic areas where HR weeds already exist.

However, if farmers embrace them, as the use of those herbicides increases, so will the pressure for the development of resistant weed populations to 2,4-D and dicamba. As stated by David Morgensen, et. al.,

Historically, the use of the synthetic auxin herbicides has been limited to cereals or as preplant applications in broadleaf crops. The new transgenes will allow 2,4-D and dicamba to be applied at higher rates, in new crops, in the same fields in successive years, and across dramatically expanded areas, creating intense and consistent selection pressure for the evolution of resistance. (*BioScience 2012 62:79*).

Multiple cases of weed resistance to 2,4-D, dicamba, or both have been documented over the course of those herbicides' long histories of use. Globally, 16 different weed species are resistant to 2,4-D and six to dicamba. (Morgensen et. al., *BioScience* 2012 62: 79). Two weed species are resistant to both. As stated by a number of academic scientists in a recent letter to the Proceedings of the National Academy of Sciences,

Taken together, the facts on the current distribution of synthetic auxin resistance suggest that the potential for the evolution of 2,4-D resistant weeds in transgenic cropping systems is not negligible but is actually quite high. (Egan, et. al., *PNAS* March 15, 2011, Vol. 108, no. 11, p. E37)

So, with increased use of herbicides and herbicide-tolerant crops, additional resistant weeds will develop – the only question is how long it will take and whether EPA can prolong the herbicides' effectiveness through mandatory use restrictions.

Based on the significant negative impact caused by the unsustainable use of glyphosate and glyphosate-tolerant crops, EPA needs to be proactive in its regulation of the use of 2,4-D and dicamba used with new herbicide-tolerant seed varieties. EPA should put in place similar mandatory risk management restrictions as discussed above for glyphosate, including limiting the use of those herbicides in the same field in successive years and requiring farmers to establish IWM plans with both chemical and non-chemical weed-control measures. By establishing mandatory risk-mitigation measures, when farmers first adopt combinations of herbicides and engineered seeds, they would be encouraged to consider those measures and their cost implications in their planting decisions. That would encourage good weed-management practices from initial adoption and, one would hope, significantly retard the problems that have rapidly developed with glyphosate.

In conclusion, EPA has a mandate to protect our country's environment and that includes ensuring that relatively "safer" agricultural production systems that combine herbicides and engineered seeds are used in a sustainable manner. The evidence is overwhelming that glyphosate and glyphosate-tolerant crops have not been used sustainably to date, and without EPA imposing mandatory obligations, those technologies will become less and less effective. Therefore, EPA should use its legal authority to inform farmers and the biotech-seed industry that overuse of a single chemical-based weed-management system is unacceptable and impose a more integrated weed-management system with restrictions on the overuse of glyphosate, 2,4-D, and dicamba.

I would welcome the an opportunity to meet with you and your staff to discuss the issues addressed in this letter and learn what EPA is doing to address them. In the interim, if you or your staff have any questions about the content of this letter, please let me know and I would be happy to answer them.

Sincerely,

Gregory affe

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