

Nos. 20-3663, 20-3665

UNITED STATES COURT OF APPEALS  
FOR THE EIGHTH CIRCUIT

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JOHN S. HAHN,  
*Special Master,*

BADER FARMS, INC.,  
*Plaintiff-Appellee,*

v.

MONSANTO COMPANY AND BASF CORPORATION,  
*Defendant-Appellants,*

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On Appeal from the United States District Court for the  
Eastern District of Missouri, No. 16-cv-00299-SNLJ

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**AMICI CURIAE NATIONAL FAMILY FARMS COALITION,  
CENTER FOR BIOLOGICAL DIVERSITY, PESTICIDE ACTION  
NETWORK, CENTER FOR FOOD SAFETY, AND SAVE OUR  
CROPS COALITION IN SUPPORT OF APPELLEE BADER  
FARMS**

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## **CORPORATE DISCLOSURE STATEMENT**

*Amici curiae* National Family Farm Coalition, Center for Biological Diversity, Pesticide Action Network, Center for Food Safety, and Save Our Crops Coalition are nonprofit corporations, have no parent corporations, and do not issue stock.

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## STATEMENT OF IDENTITY AND INTEREST OF *AMICI CURIAE*<sup>1</sup>

*Amici* are public interest nonprofits whose mission includes protecting farmers and the environment from the damaging impacts of pesticides generally and dicamba specifically. To that end, several *Amici* successfully challenged the Environmental Protection Agency's (EPA) pesticide new use registration of dicamba over-the-top uses in 2020. *See Nat'l Family Farm Coalition et al. v. EPA*, 960 F.3d 1120 (9th Cir. 2020) (*NFFC*).

Center for Food Safety is a nonprofit whose mission is to empower people, support farmers, and protect the earth from the harmful impacts of industrial agriculture. It has nearly one million members nationwide, including thousands of farmers. Since its inception, the organization has had a flagship program to improve the regulation of

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<sup>1</sup> No party's counsel authored the brief in whole or part; no party or party's counsel contributed money that was intended to fund the preparation or submission of this brief; and no person—other than *Amici*, their members, or their counsel—contributed money that was intended to fund preparing or submitting the brief. *See* Fed. R. App. P. 29(a)(4)(E). All parties have consented to the filing of this brief. *See* Fed. R. App. P. 29(a)(2).

pesticides generally and genetically engineered, pesticide-resistant crop systems specifically. It has numerous staff—scientific, policy, and legal—whose work encompasses the topic, and has worked on the dicamba issue specifically since at least 2011.

National Family Farm Coalition (NFFC) is a nationwide nonprofit addressing challenges facing family farms and rural communities. For years, NFFC has devoted significant resources to addressing the harms to farmers stemming from pesticides sprayed on pesticide-resistant crops, in particular here, dicamba-resistant crop systems.

Center for Biological Diversity is a nonprofit whose mission is to ensure the preservation, protection, and restoration of biodiversity, native species, ecosystems, public lands and water, and public health through science, policy, and law. Its environmental health program focuses on pesticides' adverse impacts, including those of dicamba.

Pesticide Action Network is a nonprofit founded to combat the proliferation of pesticide-intensive, monocrop agriculture. Its mission is to advance a vision of agriculture that replaces the use of hazardous pesticides with healthier, ecologically-sound pest management. In addition to having thousands of members who are conservationists,

many of its members are also farmers, who live, farm, and recreate in many locations where the approved dicamba use has been sprayed or will be sprayed. Since the outset of the dicamba controversy, the organization has worked to reduce the negative health and livelihood impacts of pesticide drift in the states where over-the-top dicamba has been approved for use.

Save Our Crops Coalition (SOCC) is a grassroots coalition of farm interests organized for the specific purpose of preventing injury to non-target plants from exposure to herbicides such as dicamba. Dicamba has been used far more extensively with the introduction of new genetically engineered crops tolerant to it. SOCC is not opposed to plant technology advances, particularly genetic modification. However, SOCC does oppose regulatory actions that would result in herbicide use that causes substantial injury to non-target crops and to the habitats necessary for their pollinators.

## INTRODUCTION

This appeal is about whether Appellants BASF and Monsanto are liable for damaging Bader Farms' peach orchards as a result of commercializing their dicamba-resistant crop system, which the Appellants knew for over a decade poses a grave threat of drift damage to crops and trees.

Appellee Bader Farms ably explains how the Appellants' system damaged their peach farm. In this filing, Amici provide the Court further context regarding how these crop systems function. Section I places this litigation in the broader context of the recent dicamba drift crisis, which has caused unprecedented damage to trees and crops, over millions of acres, unlike anything ever before seen in U.S. agriculture, by any pesticide. Section II explains that federal regulators have failed to address and guard against the adverse agronomic, social, economic, and environmental impacts of these crop systems. Section III explains the unsustainable nature of dicamba-resistant crop systems and refutes Appellants' (and their *Amici's*) claims about the benefits of their products.

## ARGUMENT

### I. THE DICAMBA-RESISTANT CROP SYSTEM CAUSED UNPRECEDENTED DAMAGE.

#### A. Monsanto's Roundup Ready Crop System Created an Herbicide-Resistance Epidemic.

This litigation is about the dicamba-resistant crop system, developed in response to its predecessor, the “Roundup Ready” crop system. Beginning in the mid-1990s, Monsanto sold Roundup and seeds genetically engineered to resist Roundup’s active ingredient, glyphosate. The resistance enabled glyphosate—previously little used with these crops—to be sprayed directly on them (over-the-top) to kill weeds without killing the crop. This “Roundup Ready” crop system dramatically increased the overall pesticide output into our environment. *Ctr. for Food Safety v. Vilsack*, 718 F.3d 829, 841 (9th Cir. 2013). It also caused a related problem, anticipated by many scientists: weed resistance.<sup>2</sup> Like the overuse of antibiotics, Roundup overuse

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<sup>2</sup> J. Gressel, *Fewer constraints than proclaimed to the evolution of glyphosate-resistant weeds*, 8 Resistant Pest Management Newsletter (1996); Stephen B. Powles, *Gene amplification delivers glyphosate-resistant weed evolution*, Proceedings of the National Academy of Sciences 107 (2010).

generated an epidemic of glyphosate-resistant “superweeds” infesting over 120 million acres of U.S. cropland since 2001.<sup>3</sup>

In response, Monsanto denied that its products caused glyphosate-resistant weeds and instead blamed farmers and weather.<sup>4</sup> At the same time, it licensed the dicamba-resistance gene in 2005<sup>5</sup> and touted the new dicamba-resistant system as an “effective treatment of glyphosate-resistant weeds,” *NFFC*, 960 F.3d at 1126, a system that has no utility beyond that function. Now, Monsanto tries to absolve its dicamba-resistant system of drift damage, claiming farmers’ misuse, just as it

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<sup>3</sup> Jackie Pucci, *The war against weeds evolves in 2018*, CropLife (Mar. 20, 2018), <https://www.croplife.com/crop-inputs/the-war-against-weeds-evolves-in-2018/>.

<sup>4</sup> Greg D. Horstmeier, *Dicamba’s PTFE Problem*, DTN Progressive Farmer (Aug. 29, 2017), <https://www.dtnpf.com/agriculture/web/ag/blogs/editors-notebook/blog-post/2017/08/29/dicambas-ptfe-problem>; Bob Hartzler et al., *Preserving the value of glyphosate*, Iowa State University (February 20, 2004), <http://extension.agron.iastate.edu/weeds/mgmt/2004/preserving.shtml>.

<sup>5</sup> University of Nebraska-Lincoln, Institute of Agriculture and Natural Resources, *Monsanto, UNL to develop dicamba-tolerant crops* (Mar. 25, 2005), <https://digitalcommons.unl.edu/cgi/viewcontent.cgi?article=1288&context=cropwatch>.

disclaimed responsibility for weed resistance with the Roundup Ready system.<sup>6</sup>

### **B. Dicamba's Volatility Limited Its Uses.**

First registered in 1962, dicamba is a synthetic auxin herbicide, a type of pesticide. Several properties render dicamba much more likely than other herbicides to cause widespread plant damage. First, it is highly toxic to broadleaf (flowering) plants, including vegetables, fruit trees, grapes, melons, tobacco, cotton, and legumes like soybeans.<sup>7</sup> Second, small amounts cause considerable damage; for instance, just one teaspoon applied over an acre stunts tomato plants.<sup>8</sup> Third, dicamba is a volatile compound that is known to volatilize (evaporate)

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<sup>6</sup> Horstemeier, *supra* n. 4.

<sup>7</sup> Kevin Bradley, *Dicamba Injury Forum*, Missouri Dep't of Agric. (July 6, 2017), <https://weedscience.missouri.edu/2017%20Dicamba%20Injury%20Forum.pdf>.

<sup>8</sup> O. Adewale Osipitan & Stevan Knezevic, *Sensitivity of grape and tomato to micro-rates of dicamba-based herbicides*, University of Nebraska-Lincoln (May 3, 2018), <https://cropwatch.unl.edu/2018/sensitivity-grape-and-tomato-micro-rates-dicamba-based-herbicides>.

from soil and plant surfaces days after the application,<sup>9</sup> forming vapor clouds that drift and cause damage “on a massive scale.”<sup>10</sup>

As a result, regulators have always limited dicamba uses with soybeans and cotton to pre-plant and pre-harvest applications. Despite such limited use, dicamba has historically caused significant crop damage, ranking among the top herbicides in crop injury episodes,<sup>11</sup> and even led weed scientists to discourage farmers from applying it at all.<sup>12</sup> Consequently, dicamba usage declined dramatically from the 1990s to the 2000s, before spiking sharply with Appellants’ commercialization of the dicamba-resistant crop system.<sup>13</sup>

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<sup>9</sup> Richard Behrens & William E. Lueschen, *Dicamba Volatility*, 27 *Weed Science* (1979).

<sup>10</sup> Bader Exhibit 1371.

<sup>11</sup> Ass’n of Am. Pesticide Control Officials (AAPCO), *1999 Pesticide Drift Enforcement Survey: 1996 to 1998*, AAPCO (1999); Association of American Pesticide Control Officials (AAPCO), *2005 Pesticide Drift Enforcement Survey: 2002 to 2004*, AAPCO (2005).

<sup>12</sup> Bob Hartzler, *A Historical Perspective on Dicamba*, Iowa St. Univ. Extension & Outreach (Dec. 19, 2017), <https://crops.extension.iastate.edu/blog/bob-hartzler/historical-perspective-dicamba>.

<sup>13</sup> U.S. Geological Survey, *Pesticide Use Maps – Dicamba*, [https://water.usgs.gov/nawqa/pnsp/usage/maps/show\\_map.php?year=2017&map=DICAMBA&hilo=L&disp=Dicamba](https://water.usgs.gov/nawqa/pnsp/usage/maps/show_map.php?year=2017&map=DICAMBA&hilo=L&disp=Dicamba).



### C. “Low-Volatility” Dicamba is a Myth.

Aware that the new dicamba-resistant crop system would generate thousands of drift damage episodes,<sup>14</sup> Appellants sought to allay concerns with heavily promoted claims that their new dicamba products were “low volatility.” Yet Monsanto prohibited independent testing to vet these claims,<sup>15</sup> and even shut down its own field trials, to forestall troublesome findings that might derail EPA approval.<sup>16</sup>

Independent tests conducted since EPA’s registration have shown that new dicamba is as volatile as, or only slightly less volatile than, older versions long available to farmers.<sup>17</sup> Because dicamba can volatilize up to 96 hours after application, farmers are unable to foresee or prevent vapor drift, contrary to Appellant BASF’s contention that

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<sup>14</sup> Johnathan Hettinger, *‘Buy it or else’: Inside Monsanto and BASF’s moves to force dicamba on farmers*, Midwest Center for Investigative Reporting (Dec. 4, 2020), <https://investigatamidwest.org/2020/12/04/buy-it-or-else-inside-monsanto-and-basfs-moves-to-force-dicamba-on-farmers/>.

<sup>15</sup> *Id.*

<sup>16</sup> *Id.*

<sup>17</sup> Jason K. Norsworthy et al., *Dicamba: What do we know?*, Report of the 2017 State of Arkansas Dicamba Task Force Meetings, Winthrop Rockefeller Institute app. B at 32-50 (2017), [https://www.centerforfoodsafety.org/files/arkansas-dicamba-task-force-report--9-21-17\\_39181.pdf](https://www.centerforfoodsafety.org/files/arkansas-dicamba-task-force-report--9-21-17_39181.pdf).

regulating use can control dicamba volatilization. *See* BASF Br. 5-6.

Weed scientists agree that volatility is a major cause of dicamba drift damage,<sup>18</sup> and as the Ninth Circuit highlighted, “Dicamba has a chemistry problem that likely cannot be fixed.” *NFFC*, 960 F.3d at 1143.

Nonetheless, Monsanto speculates that it was not the dicamba-resistant crop system that caused injury to the Baders’ peach trees, nor to millions of acres of crops across the country. Monsanto Br. 43-44. Its denial, however, is belied by the data.

**D. As the District Court Found, the Dicamba-Resistant System Is to Blame for the Historic Drift Damage.**

Contrary to Appellants’ allegations, *see* BASF Br. 22, 24; Monsanto Br. 3, the district court’s decision that the dicamba-resistant system is responsible for damage to Bader Farms’ peach orchard is fully supported by science, and this Court should affirm. *See Bader Farms Inc. v. Monsanto*, No. No. 1:16cv299-SNLJ 1, 20 (E.D. Mo. Nov. 25, 2020). Appellants’ focus on illegal use of dicamba formulations not registered for use on dicamba-resistant crops in 2015 and 2016 is

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<sup>18</sup> Kevin Bradley, *Off-target movement of dicamba in Missouri, Where do we go from here?*, University of Missouri (Aug. 21, 2017), [https://ipm.missouri.edu/IPCM/2017/8/Off-target\\_movement/](https://ipm.missouri.edu/IPCM/2017/8/Off-target_movement/).

misplaced. *See* Monsanto Br. 30-37; BASF Br. 11-16. Moreover, the great majority of damage in 2017 and later years *is* due to use of dicamba products registered for dicamba-resistant crops.<sup>19</sup>

Dicamba drift injured up to 15.66 million acres of soybeans in 2018,<sup>20</sup> costing farmers millions of dollars in reduced yields. To give just a few examples, 200 Minnesota soybean farmers suffered a collective \$7 million worth of yield losses,<sup>21</sup> while weed scientist Jason Norsworthy estimated Arkansas soybeans hit multiple times by dicamba drift would yield five rather than a typical 50 bushels per

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<sup>19</sup> Indiana Pesticide Review Board, *Dicamba Discussion 2017-2019*, Office of Indiana State Chemist (Sept. 26, 2018), <https://usrtk.org/wp-content/uploads/2020/03/Office-of-the-Indiana-State-Chemist-dicamba-discussion-2017-9.pdf>.

<sup>20</sup> *See* EPA, *Dicamba Use on Genetically Modified Dicamba-Tolerant (DT) Cotton and Soybean: Incidents and Impacts to Users and Non-Users from Proposed Registrations*, at 31 (Oct. 26, 2020), <https://www.regulations.gov/document/EPA-HQ-OPP-2020-0492-0003>.

<sup>21</sup> Mark Steil, *Minn. Farmers' harvest hit hard by drifting weed killer*, Minnesota Public Radio (Nov. 17, 2017), <https://www.mprnews.org/story/2017/11/13/minn-farmers-harvest-hit-hard-by-drifting-weed-killer>.

acre.<sup>22</sup> John Seward’s vegetable farm was destroyed in two successive years by dicamba drift, with over \$11,000 in losses.<sup>23</sup>

Four factors explain why the dicamba-resistant system is responsible for “enormous and unprecedented damage,” *NFFC*, 960 F.3d at 1144, which according to pesticide expert Andrew Thostenson of North Dakota State University is unlike anything that “has ever happened in the history of pesticide use in this country.”<sup>24</sup>

First, in contrast to traditional early season use, dicamba-resistant crop systems allow spraying over-the-top in the growing season, when surrounding crops are incredibly vulnerable to injury from dicamba.<sup>25</sup>

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<sup>22</sup> Winthrop Rockefeller Institute, *Report of the 2017 State of Arkansas Dicamba Task Force Meetings* 142 (Sept. 2017), [https://www.centerforfoodsafety.org/files/arkansas-dicamba-task-force-report--9-21-17\\_39181.pdf](https://www.centerforfoodsafety.org/files/arkansas-dicamba-task-force-report--9-21-17_39181.pdf).

<sup>23</sup> Emily Unglesbee, *When drift hits home: dicamba moves beyond bean fields and into the public eye*, DTN Progressive Farmer (July 20, 2018), <https://www.dtnpf.com/agriculture/web/ag/crops/article/2018/07/20/dicamba-moves-beyond-bean-fields-eye>.

<sup>24</sup> Robin Booker, *Dicamba volatility causes anxiety as new season nears*, The Western Producer (May 3, 2018), <https://www.producer.com/crops/dicamba-volatility-causes-anxiety-as-new-season-nears/>.

<sup>25</sup> Brief for Dr. David Mortensen as Amicus Curiae Supporting Petitioners, *Nat’l Family Farm Coalition v. EPA*, No. 17-70196 (9th Cir.

Second, the high summer temperatures dramatically increase dicamba's volatility, and hence its vapor drift. *NFFC*, 960 F.3d at 1125. Farmers can make two over-the-top applications per season, causing multiple drift damage episodes through the hottest summer days;<sup>26</sup> many fields are drifted on "multiple times in the same year."<sup>27</sup> This is why, after the massive 2017 dicamba drift crisis, agronomists informed Appellants they would recommend farmers cease spraying dicamba over-the-top,<sup>28</sup> a recommendation echoed by the Association of American Pesticide Control Officials.<sup>29</sup>

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Feb. 16, 2018), [https://www.centerforfoodsafety.org/files/amicus--dave-mortensen--2-16-18\\_86344.pdf](https://www.centerforfoodsafety.org/files/amicus--dave-mortensen--2-16-18_86344.pdf).

<sup>26</sup> EPA reduced the limit to two over-the-top applications to dicamba-resistant cotton when the new dicamba registrations were extended on October 31, 2018.

<sup>27</sup> Larry Steckel, *Dicamba drift problems not an aberration*, Farm Progress (Aug. 8, 2018), <https://www.farmprogress.com/weeds/dicamba-drift-problems-not-aberration>.

<sup>28</sup> Email from Michael Owen, Iowa State University, to Appellants (Oct. 19, 2017), Bader Exhibit 1094; *see also* Kevin Bradley, *Off-target movement of dicamba in Missouri. Where do we go from here?*, *supra* n. 18.

<sup>29</sup> Letter from Leo Reed, President of AAPCO, to EPA Administrator Andrew Wheeler (April 28, 2020), <https://aapco.files.wordpress.com/2020/04/aapco-dicamba-letter-2020.pdf>.

Third, dicamba spraying has risen substantially because of the dicamba-resistant system. Planted on 27 million acres in 2017, dicamba-resistant crops drove up dicamba use to nearly 10 million pounds in that year, 13 times the average amount used with these two crops from 2012-2016, at new times of the year and in novel ways. *NFFC*, 960 F.3d at at 1127.

Fourth, in addition to volatility-enhancing heat, temperature inversions also create extensive dicamba damage. *Id.* at 1125. Temperature inversions occur when a layer of cool air is trapped beneath a layer of warmer air. Inversions permit small dicamba droplets and vapor to accumulate close to the ground in a concentrated cloud, which can then move in unpredictable directions in light winds to cause often extensive drift damage. *Id.* According to University of Tennessee weed scientist Larry Steckel, “Dicamba drift for the past three years has often travelled a half mile to three-quarters of a mile and, all too frequently, well beyond that.” *Id.* at 1139. Moreover, in areas of intensive use and temperature inversions, it is often impossible to identify a single farmer’s use as responsible for drift damage due to a

phenomenon known as atmospheric loading:<sup>30</sup> dicamba spray from multiple users in the same location forms huge clouds suspended in the air that then drift, causing extensive damage.<sup>31</sup>

### **E. Dicamba Drift Also Damages Trees Broadly, Not Just Bader Farms.**

As this litigation tragically illustrates, dicamba drift harms not just soybeans; trees, shrubs, and virtually all broadleaf plants are vulnerable. Numerous states have reported trees with dicamba damage since the adoption of dicamba-resistant crop systems: Missouri, Arkansas, Tennessee, Mississippi, Nebraska, and Virginia among them.<sup>32</sup> In controlled experiments, the University of Missouri found that drift-level doses as little as 1/200th of the typical dicamba application concentration injures trees, with peach and several others being

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<sup>30</sup> D.T. Waite et al., *Atmospheric concentrations and dry and wet deposits of some herbicides currently used on the Canadian Prairies*, 58 *Chemosphere* (2005).

<sup>31</sup> Brief for Dr. David Mortensen as Amicus Curiae Supporting Petitioners, *Nat'l Family Farm Coalition v. EPA*, No. 17-70196 (9th Cir. Feb. 16, 2018), [https://www.centerforfoodsafety.org/files/amicus--dave-mortensen--2-16-18\\_86344.pdf](https://www.centerforfoodsafety.org/files/amicus--dave-mortensen--2-16-18_86344.pdf).

<sup>32</sup> Kevin Bradley, *Dicamba Injury Mostly Confined to Specialty Crops, Ornamentals and Trees so Far* (June 6, 2018), <https://ipm.missouri.edu/IPCM/2018/6/dicambaInjuryConfined/>).

“extremely sensitive.”<sup>33</sup> Cypress, sycamore, and many other trees in natural areas and towns have been damaged by dicamba in western Tennessee and throughout northeastern Arkansas,<sup>34</sup> and in Illinois.<sup>35</sup> Experts reported dicamba damage in some areas is so severe that tree mortality is higher than from the Emerald Ash Borer, an insect that has killed tens of millions of trees across 25 states.<sup>36</sup> Laurie Stepanek, a Nebraska Forest Service specialist, reported herbicide damage as

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<sup>33</sup> Brian Dintlemann et al., *Evaluations of dicamba and 2,4-D injury on fruiting trees and various other woody species*, University of Missouri (2018),

[https://www.greatplainsgrowersconference.org/uploads/2/9/1/4/29140369/2018\\_gpgc\\_trees\\_evaluations\\_of\\_dicamba\\_and\\_24-d\\_injury.pdf](https://www.greatplainsgrowersconference.org/uploads/2/9/1/4/29140369/2018_gpgc_trees_evaluations_of_dicamba_and_24-d_injury.pdf).

<sup>34</sup> Dan Charles, *A drifting weedkiller puts prized trees at risk*, National Public Radio (Sept. 27, 2018),

<https://www.npr.org/sections/thesalt/2018/09/27/651262491/a-drifting-weedkiller-puts-prized-trees-at-risk>; see also Dan Scheiman, *Dicamba Symptomology Community Science Monitoring Report*, Audubon Arkansas (Nov. 9, 2020),

[https://ar.audubon.org/sites/default/files/static\\_pages/attachments/community\\_science\\_monitoring\\_report\\_1920.pdf](https://ar.audubon.org/sites/default/files/static_pages/attachments/community_science_monitoring_report_1920.pdf).

<sup>35</sup> Johnathan Hettinger, *‘We’ve got it everywhere’: Dicamba damaging trees across Midwest and South*, Midwest Center for Investigative Reporting (June 16, 2020),

<https://investigatamidwest.org/2020/06/16/weve-got-it-everywhere-dicamba-damaging-trees-across-midwest-and-south/>.

<sup>36</sup> *Id.*



their “No. 1 problem . . . It’s so widespread and affecting so many trees.”<sup>37</sup>

As the court in *NFFC* noted, EPA was told of, but failed to quantify or estimate, damage to trees—one of the many deficiencies of its approval. *NFFC*, 960 F.3d at 1138-40. Damage suffered by Mike Hayes, a Tennessee resort owner, was one of many examples: “He estimates [dicamba] killed 20% of the young trees he planted . . . This year, he estimates he has been hit eight separate times by dicamba. He expects five cypress trees to die this year.” *Id.* at 1139. The court also noted a letter from Dr. Ford Baldwin to EPA’s head of Pesticide Programs stating that “most trees in the countryside and towns are cupping and even dying following multiple years of exposure.” *Id.* at 1138-39; *see also id.* at 143 (recounting record evidence of harm to trees and the social costs to communities, *e.g.*, “These are 100-year old oaks. We’re senior citizens and we don’t have time to plant new trees and watch them get even halfway to maturity.”).

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<sup>37</sup> *Id.*

## **F. Bader Farms Is Particularly Susceptible to Dicamba Damage.**

Bader Farms' location in the Missouri Bootheel made it particularly likely to incur massive dicamba drift damage. First, dicamba-resistant crops sprayed over-the-top represent 80% of cotton and 65% of soybean acreage grown there in 2017.<sup>38</sup> Second, the long growing season means dicamba is applied over an extended period of time, resulting in “many fields [] exposed to dicamba drift two or three times, greatly increasing the severity of injury.”<sup>39</sup> Third, the region experiences high temperatures and frequent temperature inversions, which occur on one-half to two-thirds of days in June and July there,<sup>40</sup> and the flat landscape allows for greater off-field dicamba movement.<sup>41</sup> Consequently, dicamba injured an astounding 64% of the conventional (non-dicamba-resistant) soybeans in the Bootheel by early July 2017.<sup>42</sup>

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<sup>38</sup> Kevin Bradley, *Dicamba Injury Forum*, *supra* n. 7.

<sup>39</sup> Bob Hartzler, *Thoughts on the dicamba dilemma*, Iowa State University Extension and Outreach (July 13, 2017), <https://crops.extension.iastate.edu/blog/bob-hartzler/thoughts-dicamba-dilemma>.

<sup>40</sup> Kevin Bradley, *Off-target movement of dicamba in Missouri. Where do we go from here?*, *supra* n. 18.

<sup>41</sup> B. Hartzler, *Thoughts on the dicamba dilemma*, *supra* n. 39.

<sup>42</sup> Kevin Bradley, *Dicamba Injury Forum*, *supra* n. 7.

So much dicamba accumulates in the Bootheel atmosphere that University of Missouri researchers found that even the rainfall is toxic: “the dicamba amounts in the rain were high enough to injure sensitive crops, especially with multiple exposures.”<sup>43</sup>

## II. APPELLANTS’ REPRESENTATIONS OF ADEQUATE FEDERAL REGULATION ARE FALSE.

While Appellants market their herbicide-resistant seeds and herbicides as a “crop system,”<sup>44</sup> sold and used together, regulators have missed the key threat posed by the crop system—massive drift injury—by assessing their components in *isolation*. Two separate agencies regulate Appellants’ products, the United States Department of Agriculture (USDA) and EPA, and between them, numerous adverse impacts, including their intertwined herbicide impacts, are overlooked. *Cf. Geertson Seed Farms v. Johanns*, No. C 06-01075 CRB, 2007 WL 518624, at \*11 (N.D. Cal. Feb. 13, 2007) (“The Court notes, however,

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<sup>43</sup> Emily Unglesbee, *New 2,4-D and dicamba data*, DTN Progressive Farmer (Dec. 7, 2020), <https://www.dtnpf.com/agriculture/web/ag/crops/article/2020/12/07/four-things-missouri-scientists-2-4>.

<sup>44</sup> A Google search of “Roundup Ready Xtend Crop System” yields 4,400 hits (5/10/21).

that it is unclear from the record whether *any* federal agency is considering the cumulative impact of the introduction of so many glyphosate resistant crops; one would expect that *some* federal agency is considering whether there is some risk to engineering all of America’s crops to include the gene that confers resistance to glyphosate.”) (emphases added). USDA and EPA ignored informed comments urging an “integrated review” of Xtend crops and dicamba,<sup>45</sup> and for “coordinated analysis of the dicamba-resistant soybean system”<sup>46</sup> at the very outset. The consequences of the government’s disjointed, inadequate regulatory process – for Bader Farms and many others— have been nothing short of devastating.

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<sup>45</sup> Dr. David A. Mortensen, Comment Letter on Application to Register New Uses Regarding Dicamba Resistant Soybean (Sept. 20, 2012), <https://www.centerforfoodsafety.org/files/cfs-science-comments-on-dicamba-use-registration-for-dicamba-resistant-soybeans.pdf>.

<sup>46</sup> Center for Food Safety, Comment Letter to EPA on Monsanto’s Petition to Register Use of Dicamba on dicamba-Resistant Soybeans, (Sept. 17, 2010), <https://www.regulations.gov/document/EPA-HQ-OPP-2010-0496-0018>.

## A. USDA's Regulation of Genetically Engineered Plants Overlooks Key Impacts.

Dicamba-resistant seeds are regulated by USDA under the Plant Protection Act of 2000 (PPA), 7 U.S.C. § 7701 *et seq.*, pursuant to which USDA “deregulated” them, in 2015.<sup>47</sup> USDA has plenary authority under the PPA to regulate broadly defined “plant pest” and “noxious weed” harms caused by GE crops, *see id.* 7 U.S.C. § 7702 (10), (14), yet USDA claims its regulation does *not* encompass the indirect pesticide impacts of herbicide-resistant seeds, either in the form of herbicide drift harms, or in the creation of herbicide-resistant superweeds. *Ctr. for Food Safety v. Vilsack*, 718 F.3d 829, 841 (9th Cir. 2013) (affirming USDA’s argument that it did not err in failing to regulate the indirect glyphosate effects when it deregulated glyphosate-resistant alfalfa seeds).<sup>48</sup>

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<sup>47</sup> Monsanto Co., Determination of Nonregulated Status of Herbicide Resistant Soybean and Cotton, 80 Fed. Reg. 2675-76 (Jan. 20, 2015).

<sup>48</sup> More recently, USDA has attempted to exit the regulatory business *completely* when it comes to GE seeds, replacing premarket approval with a mostly voluntary, self-certification system. *See SECURE Rule Amends USDA Regulation of Genetically Engineered Organisms*, National Law Review (May 19, 2020), <https://www.natlawreview.com/article/secure-rule-amends-usda-regulation-genetically-engineered-organisms>.

Thus in its 2015 dicamba-resistant crop deregulation, USDA passed the buck entirely to EPA to handle any dicamba drift problems.<sup>49</sup> USDA also erroneously assumed that no grower would spray dicamba over-the-top of the dicamba-resistant crops unless or until EPA approved a dicamba pesticide product for over-the-top spraying.<sup>50</sup>

USDA presumed wrongly. EPA rejected the initial dicamba product, Clarity, that Monsanto then sought to register due to drift injury concerns. Appellees' Answering Br. 7. The dire consequences of USDA's reckless deregulation were soon apparent. Deluged with dicamba injury complaints, EPA issued a Compliance Advisory in August 2016. *Id.* With dicamba damage episodes skyrocketing, under

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<sup>49</sup> USDA, *Plant Pest Risk Assessment: Monsanto Petition for Determination of Nonregulated Status of Dicamba-Resistant MON 87708 Soybean*, at 32 (Jan. 2015), <https://www.regulations.gov/document/APHIS-2013-0043-4810> (“Although dicamba spray drift and volatilization can potentially injure susceptible crops in proximity to MON 87708 soybean, such impacts are not considered plant pest risks, and such impacts are assessed by the U.S. EPA.”).

<sup>50</sup> USDA, *Record of Decision: Determination of Nonregulated Status for Dicamba-Resistant Soybean and Cotton Varieties*, at 19-20 (Jan. 14, 2015), [https://www.aphis.usda.gov/brs/aphisdocs/dicamba\\_feis\\_rod.pdf](https://www.aphis.usda.gov/brs/aphisdocs/dicamba_feis_rod.pdf).

tremendous pressure to act, EPA rushed to approve Appellees' putatively "low-volatility" dicamba products—XtendiMax and Engenia—just three months later, despite seriously deficient data and grave misgivings, *see infra*.

**B. EPA's "New Use" Approval of the Dicamba Over-the-Top Products Resulted in Violations of FIFRA.**

EPA's rush to approve dicamba resulted in numerous Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) violations. *See NFFC*, 960 F.3d at 1144. FIFRA is the federal scheme under which EPA regulates pesticides (including herbicides like dicamba). 7 U.S.C. §§ 136 *et seq.* Before any pesticide can be sold or used, EPA must register it, *e.g.*, grant a license establishing the terms and conditions of its sale and use. *Id.* § 136a(c). Generally speaking, EPA is supposed to only register a pesticide for use if it will not "cause unreasonable adverse effects on the environment." 7 U.S.C. § 136a(c)(5)(C); 40 C.F.R. § 152.112(e).

EPA registered the product new over-the-top uses despite early warnings of significant dicamba drift problems. As early as 2010, scientists advised EPA that the crop system would lead to volatile drift

injury to non-target plants.<sup>51</sup> Steve Smith, Director of Red Gold, an Indiana tomato producer, testified in 2010 Congressional hearings that “the widespread use of dicamba herbicide poses the single most serious threat to the future of the specialty crop industry in the Midwest.”<sup>52</sup>

EPA conducted a screening assessment in 2013 that predicted dicamba vapor could injure plants up to 1,500 meters from a sprayed field,<sup>53</sup> but later dismissed it in light of data provided by Monsanto.

EPA first rejected the product Clarity (a.k.a. M1691) for use on dicamba-resistant crops, based in part on over 73 reports of drift injury

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<sup>51</sup> EPA, *Ecological risk assessment for dicamba and its degradate, 3,6-dichlorosalicylic acid (DCSA), for the proposed new use on dicamba-tolerant soybean (MON 87708)*, at 20 (Mar. 8, 2011), <https://www.regulations.gov/document?D=EPA-HQ-OPP-2016-0187-0008>.

<sup>52</sup> *Testimony of Steve Smith, Director of Agriculture for Red Gold, Before the H. Comm. on Oversight and Government Reform*, 111th Cong. (Sept. 30, 2010), <https://hygeia-analytics.com/wp-content/uploads/2018/10/Steve-Smith-2010-testimony.pdf>; see also Save Our Crops Coalition, Comment Letter to EPA on Dicamba New Use on Herbicide Tolerant Cotton and Soybeans (May 31, 2016), <https://www.regulations.gov/document?D=EPA-HQ-OPP-2016-0187-0792>.

<sup>53</sup> EPA, *Addendum to the Environmental Fate and Ecological Risk Assessment for the Section 3 New Use of on Dicamba-Tolerant Soybean*, at 11 (May 20, 2013), <https://www.regulations.gov/document?D=EPA-HQ-OPP-2016-0187-0006>.



from field trials of Xtend crops conducted with it from 2012 to 2014 and incidents reported by Missouri and Arkansas agricultural officials.<sup>54</sup> In two particularly alarming cases, Clarity volatilized and drifted 2,800 feet and 2.2 miles to damage soybeans and cotton, respectively.<sup>55</sup>

Then, very late in the registration process, EPA turned its attention from Clarity to XtendiMax. In a critical volatility assessment of XtendiMax, EPA scientists noted major deficiencies in the available data, and numerous “uncertainties” that “could result in underestimates of vapor drift,” leading them to hedge their conclusions: “volatilization could be greater under conditions outside the scope of the

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<sup>54</sup> EPA, *Dicamba DGA: Second Addendum to the Environmental Fate and Ecological Risk Assessment for Dicamba DGA salt and its Degradate, 3,6-dichlorosalicylic acid (DCSA) for the Section 3 New Use on Dicamba-Tolerant Soybean*, at 6-10 (Mar. 24, 2016), <https://www.regulations.gov/document/EPA-HQ-OPP-2016-0187-0007>.

<sup>55</sup> *Id.* at 7-8.

submitted studies.”<sup>56</sup> Their calls for additional data were in vain.

XtendiMax was registered just six days later.<sup>57</sup>

### **C. The Ninth Circuit Vacated the Registrations in *National Family Farm Coalition v. EPA*.**

These dicamba registrations were vacated and set aside in June 2020, when the Ninth Circuit held that EPA had violated FIFRA six different ways, broken into two subsets of three. *NFFC*, 960 F.3d at 1124, 1144 (summarizing holdings in each place). First, EPA had “substantially understated” three risks the agency acknowledged. *Id.* Second, EPA had also “entirely failed to acknowledge three other risks.” *Id.* Namely, EPA had substantially underestimated the drift threat by understanding dicamba-resistant crop acreage and the amount of

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<sup>56</sup> EPA, *M-1691 Herbicide, EPA Reg. No. 524-582 (Active Ingredient: Dicamba Diglycolamine Salt) and M-1768 herbicide, EPA Reg. No. 524-617 (AI: Diglycolamine Salt with VaporGrip™) – Review of EFED Actions and Recent Data Submissions Associated with Spray and Vapor Drift of the Proposed Section 3 New Uses on Dicamba-Tolerant Soybean and Cotton* (Nov. 3, 2016), <https://www.regulations.gov/search?filter=EPA-HQ-OPP-2016-0187-0955>.

<sup>57</sup> EPA, *Final Registration of Dicamba on Dicamba-Tolerant Cotton and Soybean* (Nov. 9, 2016), <https://aglaw.psu.edu/wp-content/uploads/2021/03/Dicamba-XtendiMax-Conditional-Registration-11.9.16.pdf>.

dicamba sprayed; the number of farmer drift injury reports; and by failing to quantify the amount and costs of dicamba-caused crop damage, including EPA's failure to quantify that drift damage despite having record evidence. *Id.* at 1136-39.

The registration decision also violated FIFRA because EPA completely failed to consider and account for several other important costs, including economic losses ensuing from anti-competitive effects of the registrations as well as the social costs of strife and dissension in farming communities triggered by rampant off-target dicamba damage to neighbors' crops. *Id.* at 1142-44.

Finally, EPA violated FIFRA by predicating its conclusion that its approval would have no adverse economic and environmental effects on label mitigation—in the form of weather-related label use restrictions—that substantial record evidence demonstrated were so extreme that farmers could not both follow them and have any hope of controlling weeds. EPA failed to consider and analyze whether following those directions was possible in real world farming conditions. *Id.* at 1139-42. For all these reasons, and considering the record as a whole, the Court concluded that EPA had “failed to perform a proper analysis of the risks

and resulting costs of the uses,” and thus substantial evidence did not support the EPA registration. *Id.* at 1144. In light of the “substantial” flaws in EPA’s decision, the Court fully vacated the registrations. *Id.* at 1145.

In short, the Court’s lengthy treatment eviscerated EPA for its shoddy, rushed, and legally and scientifically flawed decision to approve Appellants’ products. It rejected EPA’s and Defendant-Intervenor Monsanto’s arguments attempting to place the blame of drift harm on other pesticides or farmer misuse. Accordingly, any reliance on that process here is sorely misplaced. Finally, as a post-script, in March 2021 EPA itself went out of its way to issue a “scientific integrity” memo specifically calling out the agency’s prior dicamba approval as a decision tainted by “political interference” and ignoring important scientific risks.<sup>58</sup>

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<sup>58</sup> Memorandum from Michal Freedhoff to the Office of Chemical Safety and Pollution Prevention (Mar. 10, 2021), <https://www.dtn.com/ag/assets/EPA-Memorandum-Scientific-Integrity.pdf>; see also Emily Unglesbee, *EPA: Politics Tainted Dicamba Decision*, *Progressive Farmer* (Mar. 15, 2021), <https://www.dtnpf.com/agriculture/web/ag/crops/article/2021/03/12/epa-ignored-science-past-dicamba-new>.

#### **D. *NFFC v. EPA* Confirms that Defensive Adoption Took Place.**

Of all the court's holdings, the one perhaps most relevant applies to the issue of whether Monsanto and BASF engaged in a conspiracy to create an ecological disaster in order to increase its sales of dicamba-resistant seeds. *See* Bader Br. 48-49. The court cited ample evidence of farmers planting dicamba-resistant soybeans defensively, which the Court deemed "anti-competitive economic effects in the soybean and cotton industries," resulting in economic costs that "EPA entirely failed to acknowledge." *NFFC*, 960 F.3d at 1142-43.

For instance, small seed companies informed EPA that they lost sales of non-dicamba-resistant soybean seeds as their farmer-customers moved *en masse* to dicamba-resistant varieties to forestall dicamba injury. *Id.* University of Tennessee's Larry Steckel likewise reported: "Many growers have told me they simply gave up trying to grow non-Xtend soybeans because they had repeatedly seen dicamba injury in past years – often multiple times in the same year." *Id.* at 1143. North Dakota State University agricultural economist David Ripplinger similarly stated that "almost all" [the farmers he spoke to] are "going to

grow dicamba soybeans this year [2018] because they don't want to be exposed to the risk," *id.* at 1142-43, and accurately surmised that Monsanto knowingly profited from this scheme.<sup>59</sup>

Not only did the registrations "create[ ] a substantial risk that DT soybeans, and possibly DT cotton, will achieve a monopoly or near-monopoly," they left those who could not defensively plant such as Bader vulnerable to drift damage. Bader, along with others left vulnerable, suffered significant direct costs of dicamba drift damage in terms of reduced yields and crop destruction. *See supra.*

### **III. APPELLANTS' (AND THEIR AMICIS') PRODUCT HYPE IS FALSE.**

#### **A. Dicamba-Resistant Seeds Are Neither Beneficial nor Necessary.**

Appellant Monsanto claims it introduced dicamba-resistant seeds because they had exceptional traits—beyond dicamba resistance—desired by farmers: high yield, disease resistance, and other herbicide

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<sup>59</sup> Mikkil Pates, *Ubiquitous: Will dicamba beans take off in 2018?*, Agweek (Feb. 9, 2018), <https://www.agweek.com/business/agriculture/4401381-ubiquitous-will-dicamba-beans-take-2018>.

resistance, with utility on their own. *See* Monsanto Br. 7, 10, 44.<sup>60</sup>

Monsanto and their Amici further claim that Monsanto and BASF do not sell a “system”; they only sell seed or herbicide components. *See* Washington Legal Foundation Br. 8; Monsanto Br. 44. Yet Monsanto’s dicamba-resistant seeds were overwhelmingly purchased for their dicamba resistance, and are not otherwise exceptional.

First, contrary to Monsanto’s claims of higher yield, *see* Monsanto Br. 10, 44; *see also* Washington Legal Foundation Br. 6, trials carried out by University of Wisconsin agronomists found that glyphosate-resistant soybean varieties (Roundup Ready 2 Yield® = RR2Y) outyielded those resistant to dicamba and glyphosate (Roundup Ready 2 Xtend® = RR2X) “by a significant 1.8 BPA [bushels per acre].” They added: “RR2X soybeans are a stack of herbicide traits and not yield traits.”<sup>61</sup> If anything, then, growers purchasing dicamba-resistant soybeans take a yield *hit* for the sake of the dicamba-resistance.

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<sup>60</sup> *See* BASF Br. 10; *see also* Am. Seed Trade Ass’n and CropLife Br. 3, 23, lobbying organizations of which both Appellants are members.

<sup>61</sup> Shawn P. Conley, *New traits don’t automatically translate to highest yield!*, University of Wisconsin (Dec. 1, 2016), <https://www.ilsoyadvisor.com/on-farm/ilsoyadvisor/new-traits-don%E2%80%99t-automatically-translate-highest-yield>.

Second, Monsanto also touts dicamba-resistant seeds as having an “exceptional disease package,” Monsanto Br. 44, yet nearly all modern soybean varieties incorporate resistance to various diseases.<sup>62</sup> These are traits often developed through breeding of conventional (non-genetically engineered) soybeans at university research stations, which have been devastated by dicamba drift, among them University of Missouri’s Fisher Delta Research Center, located two dozen miles from Bader Farms.<sup>63</sup>

Third, neither is resistance to additional herbicides a feature unique to dicamba-resistant crops. *See* Monsanto Br. 44. Dicamba-resistant soybean’s additional glyphosate-resistance is widely available in the majority of competitors’ seeds, though it is useless for glyphosate-resistant weeds. Dicamba-resistant cotton’s additional resistance to

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<sup>62</sup> Loren Giesler, *Select resistant soybean varieties to manage disease threat*, University of Nebraska-Lincoln (Sept. 26, 2013), <https://cropwatch.unl.edu/select-resistant-soybean-varieties-manage-disease-threat-unl-cropwatch-sept-26-2013>.

<sup>63</sup> Dan Charles, *Rogue weedkiller vapors are threatening soybean science*, National Public Radio (July 19, 2019), <https://www.npr.org/sections/thesalt/2019/07/19/742836972/rogue-weedkiller-vapors-are-threatening-soybean-science>.



glyphosate and glufosinate (Liberty) is found in Appellant BASF's cotton seeds.<sup>64</sup>

Finally, according to a USDA study of soybean farmers surveyed in 2018, “more acres were planted with dicamba-tolerant seed than were actually sprayed with dicamba.”<sup>65</sup> For those who did not spray, it was either because glyphosate-resistant weeds did not appear, or “to prevent yield loss from unintended exposure to dicamba.”<sup>66</sup> Nowhere does USDA cite any other benefits of dicamba-resistant seeds.

### **B. Herbicide-Resistant Crop Systems Are Unsustainable.**

In fact, far from *beneficial*, herbicide-resistant crop systems have emerged over the past quarter-century as perhaps the biggest obstacle to progress in making American agriculture more sustainable by

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<sup>64</sup> BASF, *Stoneville Cotton*, <https://agriculture.basf.us/crop-protection/products/stoneville.html>; BASF, *FiberMax Cotton*, <https://agriculture.basf.us/crop-protection/products/fibermax.html>.

<sup>65</sup> Seth J. Wechsler et al., *The use of genetically engineered dicamba-tolerant soybean seeds has increased quickly, benefiting adopters but damaging crops in some fields*, USDA (Oct. 1, 2019), <https://www.ers.usda.gov/amber-waves/2019/october/the-use-of-genetically-engineered-dicamba-tolerant-soybean-seeds-has-increased-quickly-benefiting-adopters-but-damaging-crops-in-some-fields/>.

<sup>66</sup> *Id.*

threatening all crops without a dicamba-resistant trait, including those developed by public sector breeders.

First, herbicide-resistant crops systems have resulted in widespread environmental damage by dramatically increasing overall herbicide use in American farming.<sup>67</sup> Glyphosate has practically eliminated milkweed from Midwest farmers' fields,<sup>68</sup> causing the dramatic decline of the Monarch butterfly, so grave that in 2020 the Fish and Wildlife Service concluded Endangered Species Act protection was warranted for the once-ubiquitous Monarchs.<sup>69</sup> Dicamba drift has killed off many flowering plants that honey bees feed on, causing huge

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<sup>67</sup> Charles Benbrook, *Impacts of genetically engineered crops on pesticide use in the U.S. – the first sixteen years*, 24 Environmental Sciences Europe (2012), <https://enveurope.springeropen.com/articles/10.1186/2190-4715-24-24>.

<sup>68</sup> John Pleasants, *Monarch Butterflies under Threat from Rising Herbicide Use*, Scientific American (June 6, 2014), <https://www.scientificamerican.com/article/monarch-butterflies-under-threat-from-rising-herbicide-use/>.

<sup>69</sup> Endangered and Threatened Wildlife and Plants; 12-Month Finding for the Monarch Butterfly , 85 Fed. Reg. 81,813-81,822 (Dec. 12, 2020).

drops in honey production for beekeepers in Arkansas and other states,<sup>70</sup> with untold harm to wild bees and other animals.<sup>71</sup>

Second, agricultural diversity has also suffered; conventional soybean producers have switched to dicamba-resistant seeds for protection,<sup>72</sup> while vegetable, vineyard, and organic producers<sup>73</sup> struggle to survive the dicamba onslaught. *See supra* II.D.

Third, just as glyphosate-resistant weeds became the rationale for the dicamba system, *see supra*, so the ongoing rapid emergence of dicamba-resistant weeds<sup>74</sup> will be used as a pretext to justify

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<sup>70</sup> Liza Gross, *Bees face yet another lethal threat in dicamba, a drift-prone pesticide*, *Reveal* (Jan. 23, 2019), <https://revealnews.org/article/bees-face-yet-another-lethal-threat-in-dicamba-a-drift-prone-pesticide/>.

<sup>71</sup> L. Knuffman et al., *Drifting Toward Disaster: How dicamba herbicides are harming cultivated and wild landscapes*, National Wildlife Federation, Prairie Rivers Network, Xerces Society for Invertebrate Conservation (2020), <https://www.nwf.org/-/media/Documents/PDFs/NWF-Reports/2020/Drifting-Toward-Disaster.ashx?la=en&hash=0827D8DEB85721D687E7387C8812E0B36752464E>.

<sup>72</sup> David Bennett, *Dicamba task force member: 'Figure out' new formulations*, *Delta Farm Press* (Sept. 18, 2017), <https://www.farmprogress.com/weeds/dicamba-task-force-member-figure-out-new-formulations>.

<sup>73</sup> Johnathan Hettinger, 'We've got it everywhere'; *supra* n. 35.

<sup>74</sup> Emily Unglesbee, *Dicamba-resistant pigweed*, *DTN Progressive Farmer* (July 28, 2020),

introduction of new crops that withstand up to *five* weed-killers<sup>75</sup>—a spiral of rising resistance and toxic herbicide use with no end in sight.<sup>76</sup> Nor do herbicide-resistant crop systems promote soil conservation, as often claimed, since farmers often resort to soil-eroding tillage to control weeds immune to ever more herbicides.<sup>77</sup>

Finally, as a result, agronomists increasingly see the herbicide-centric approach to weed control as counterproductive, and are championing exciting new Integrated Weed Management techniques that drastically reduce or eliminate herbicides use.<sup>78</sup> Iowa agronomists

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<https://www.dtnpf.com/agriculture/web/ag/crops/article/2020/07/27/dica-mba-resistant-palmer-amaranth>.

<sup>75</sup> Emily Unglesbee, *Five-herbicide corn tech*, DTN Progressive Farmer (April 28, 2021),

<https://www.dtnpf.com/agriculture/web/ag/crops/article/2021/04/28/bayer-future-five-way-herbicide>.

<sup>76</sup> Brandon Keim, *The next generation of GM crops has arrived – and so has the controversy*, Wired (June 24, 2014),

<https://www.wired.com/2014/06/the-future-of-biotech-crops/>.

<sup>77</sup> William Neuman & Andrew Pollack, *U.S. farmers cope with Roundup-resistant weeds*, New York Times (May 4, 2010),

<https://www.nytimes.com/2010/05/04/business/energy-environment/04weed.html>; see also Tari Gunstone et al., *Pesticides and Soil Invertebrates: A Hazard Assessment*, Frontier Environmental Science (May 4, 2021),

<https://www.frontiersin.org/articles/10.3389/fenvs.2021.643847/full>.

<sup>78</sup> David A. Mortensen et al., *Navigating a critical juncture for sustainable weed management*, 62 BioScience (2012),

have shown that farmers can reduce herbicide use by 82% using cultural techniques to manage weeds, while maintaining yields and profits.<sup>79</sup> Organic farmers (who operate without synthetic pesticides altogether) have pioneered these weed management tactics, such as diverse crop rotations, cover crops, and prudent use of tillage. Even industry heavyweights are taking notice: for example, Cargill is teaming up with the Rodale Institute to help farmers convert 50,000 acres to organic corn and soy production.<sup>80</sup>

Farmers not ready for such transformative change also have better alternatives. There are 29 and 35 non-dicamba herbicides

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<https://academic.oup.com/bioscience/article/62/1/75/295845>; K.N. Harker et al., *Our View*, 60 *Weed Science* (2012).

<sup>79</sup> Matt Liebman et al., *Agronomic and economic performance characteristics of conventional and low-external-input cropping systems in the central Corn Belt*, 100 *Agronomy Journal* (2008),

<https://core.ac.uk/download/pdf/38939595.pdf>.

<sup>80</sup> Lisa Held, *Rodale enlists Cargill in unlikely alliance to increase organic farmland*, *Civil Eats* (Feb. 9, 2021),

<https://civileats.com/2021/02/09/rodale-enlists-cargill-in-unlikely-alliance-to-increase-organic-farmland/>.

available for use on cotton and soybeans, respectively, with at least 9 and 14 suitable for over-the-top spraying.<sup>81</sup>

## CONCLUSION

Appellants' assertion that the dicamba-resistant system did not cause the substantial damage to Bader Farms is belied by the facts and science. Worse, the Baders' story is unfortunately a microcosm of a much broader story, the unprecedented drift damage caused by Appellants' defective system, not only to Bader Farms, but to millions of acres of crops and trees across the country. This damaging system offers no real public benefit, only externalized costs borne by other farmers and the environment. The manufacturers and regulators have both utterly failed to protect farmers from these foreseeable, indeed, known dangers. As the district court here found, Appellants must be held responsible for their actions.

*Amici* respectfully request the Court affirm the district court.

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<sup>81</sup> EPA, *Over-the-top dicamba products for genetically modified cotton and soybeans: benefits and impacts* (Nov. 1, 2018), <https://www.regulations.gov/document/EPA-HQ-OPP-2016-0187-0966>.

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May 12, 2021

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