Case No. 17-70196

IN THE UNITED STATES COURT OF APPEALS
FOR THE NINTH CIRCUIT

NATIONAL FAMILY FARM COALITION, *et al.*,
Petitioners,

vs.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY, *et al.*
Respondents

MONSANTO COMPANY,
Intervenor

ON PETITION FOR REVIEW FROM THE UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

BRIEF OF *AMICI CURIAE* FAMILY FARM DEFENDERS, ET AL. IN SUPPORT OF PETITIONERS

SHAUN A. GOHO
Emmett Environmental Law &
Policy Clinic
Harvard Law School
6 Everett Street, Suite 4119
Cambridge, MA 02138
(617) 496-3368 (office)
(617) 384-7633 (fax)
sgoho@law.harvard.edu

Counsel for Amici Family Farm Defenders, et al.

CORPORATE DISCLOSURE STATEMENT

Pursuant to Federal Rules of Appellate Procedure 26.1 and 29(a)(4)(A), *amici* state that they do not have any parent companies and no publicly-held company has a 10% or greater ownership interest in any of them.

TABLE OF CONTENTS

Page(s)

TABLE OF CONTENTS i

TABLE OF AUTHORITIES iii

INTERESTS OF THE *AMICI CURIAE* 1

SUMMARY OF ARGUMENT 4

ARGUMENT 6

I. XTENDIMAX IS A RESPONSE TO A HERBICIDE-RESISTANCE PROBLEM THAT MONSANTO'S ROUNDUP-READY SYSTEM CREATED 6

II. DICAMBA IS A HIGHLY VOLATILE HERBICIDE PREVIOUSLY USED IN ONLY LIMITED CIRCUMSTANCES 8

A. Herbicide Damage Can Be Caused by Either Spray Drift or Vapor Drift . 8

B. Dicamba Use on Broadleaf Crops Has Been Limited Because of its Toxicity and Volatility 9

III. COMMENTERS WARNED EPA THAT APPROVING XTENDIMAX WOULD LEAD TO SIGNIFICANT DAMAGE FROM DICAMBA DRIFT 11

IV. DICAMBA USE IN THE 2017 GROWING SEASON CAUSED SIGNIFICANT HARM TO DICAMBA-SENSITIVE CROPS AND NATURAL VEGETATION 13

A. Dicamba Caused Unprecedented Damage to Soybeans during the 2017 Growing Season 13

B. The Scale of the Damage Shocked the Agricultural Science Community 17

C. State Governments Were Overwhelmed by Complaints and Imposed their own Limits on the New Dicamba Formulations 18

D. Dicamba Drift Damaged Other Broadleaf Crops, Apiaries, and Natural Vegetation 21

V. DICAMBA IS INHERENTLY VOLATILE AND EPA ERRED IN APPROVING THE NEW DICAMBA FORMULATIONS 22

A. Significant Dicamba Drift Damage Appears to Have Been the Result of Vapor Drift from Label-Compliant Use of the New Formulations 23

B. Both the New and Original Labels Impose Unwieldy Restrictions on Farmers 25

1. *The Limited Allowable Wind Speed is Unworkable* 26

2. *Temperature Inversions Further Limit the Number of Allowable Spraying Hours* 27

3. *Mandating that Farmers do not Apply XtendiMax to Weeds Taller than Four Inches is Unrealistic* 28

4. *It is Almost Impossible to Remove the New Dicamba Formulations from Applicator Tanks* 28

C. The October 2017 Label Changes do not Address Vapor Drift and Will not Improve Matters in 2018 29

VI. EPA'S REGISTRATION OF THE NEW DICAMBA FORMULATIONS EMOTIONALLY AND FINANCIALLY HARMS FARMERS ACROSS THE COUNTRY 30

CONCLUSION 32

TABLE OF AUTHORITIES

Page(s)

REGULATIONS

40 C.F.R. § 156.10(i)(2)(ii) 26

OTHER AUTHORITIES

A Day in the Life with Dicamba Damage, Corn & Soybean Digest, July 18, 2017 ..... 28, 29

Associated Press, *Arkansas Panel Backs Ban of Controversial Herbicide Dicamba*, NBC News, Nov. 9, 2017 19

Ass'n of Am. Pesticide Control Officials, *2005 Pesticide Drift Enforcement Survey* (2005) 10

Chris Bennett, *Dicamba Drift Blowing Farm Trouble Again in 2017*, AgWeb, June 19, 2017 ..... 10, 25

Chris Bennett, *Dicamba Lawsuits Mounting*, AgWeb, Sept. 17, 2017 16

Kevin Bradley, *A Final Report on Dicamba-injured Soybean Acres*, Univ. of Mo. Integrated Pest Mgmt., Oct. 30, 2017 15

Kevin Bradley, *Dicamba Update*, Dicamba Injury Forum (July 6, 2017) 23

Kevin Bradley, *Off-target Movement of Dicamba in Missouri. Where Do We Go from Here?*, Univ. of Mo. Integrated Pest Mgmt., Aug. 21, 2017 27

Christopher Brown, *Dicamba Lawsuits Brought Together in Federal Trial Court*, Bloomberg BNA, Feb. 2, 2018 32

Christopher Brown, *North Dakota Farmers to Face Restrictions on Monsanto's Dicamba*, Bloomberg BNA, Nov. 30, 2017 20

Dan Charles, *A Wayward Weedkiller Divides Farm Communities, Harms Wildlife*, NPR, Oct. 7, 2017 ..... 16, 21, 22, 30

Dan Charles, *Monsanto Attacks Scientists After Studies Show Trouble For Weedkiller Dicamba*, NPR, Oct. 26, 2017 ..... 13, 25

Eli Chen, *Missouri Department of Agriculture Places Restrictions on Monsanto and DuPont's Dicamba Products*, St. Louis Pub. Radio, Dec. 11, 2017 20

Comments on Proposed FIFRA Registration Dicamba: New Use on Herbicide-Tolerant Cotton and Soybean, https://www.regulations.gov/docket?D=EPA-HQ-OPP-2016-0187 11

David Wildy Named 2016 Arkansas Farmer of the Year, Swisher Sweets/Sunbelt Expo, July 22, 2016.....16

Andrew DeMillo, *Monsanto asks Arkansas Judge to Halt State's Herbicide Ban*, Associated Press, Nov. 17, 2017.....20

Dicamba, Extension Toxicology Network (Sept. 1993) 9

Caitlin Dewey, *This Miracle Weed Killer was Supposed to Save Farms. Instead, it's Devastating Them*, Wash. Post (Aug. 29, 2017) 12, 13, 25

Farmer of the Year, Swisher Sweets/Sunbelt Expo, http://sunbeltexpo.com/foty/ .15

Frequently Asked Questions, Dicamba Drift, USDA Risk Mgmt. Agency, https://www.rma.usda.gov/help/faq/dicamba.html 17

Steven A. Gower et al., *Effect of Postemergence Glyphosate Application Timing on Weed Control and Grain Yield in Glyphosate-Resistant Corn: Results of a 2-Yr Multistate Study*, 17 Weed Tech. 821 (2003) 6

Bryce Gray, *Dicamba Damage is Back—and Possibly Worse than Before*, St. Louis Post-Dispatch, June 25, 2017.....25

Arthur Grube, et. al., EPA, *Pesticide Industry Sales and Usage: 2006 and 2007 Market Estimates* (2011).....10

Klaus Grossman, *Auxin Herbicides: Current Status of Mechanism and Mode of Action*, 66 Pest Mgmt. Sci. 113 (2010).....8

Gil Gullickson, *All Systems Go for 2016 Roundup Ready 2 Xtend Soybeans Launch*, Successful Farming, Feb. 3, 2016.....7

Gil Gullickson, *Why Dicamba-Tolerant Technology is in Trouble*, Agriculture.com, July 11, 2017 24

Danny Hakim, *Monsanto's Weed Killer, Dicamba, Divides Farmers*, N.Y. Times, Sept. 21, 2017 31

Bob Hartzler, *A Historical Perspective on Dicamba*, Iowa St. Univ. Extension & Outreach, Dec. 19, 2017 8

Bob Hartzler, *Thoughts on the Dicamba Dilemma*, Iowa St. Univ. Extension & Outreach, July 13, 2017 14

Mary Hightower, *Division of Ag Researchers Find Volatility in all Dicamba Formulations They Tested*, Univ. of Ark., Sys. Div. of Agric., Aug. 10, 2017 ..24

Greg D. Horstmeier, *Dicamba's PTFE Problem*, Progressive Farmer, Aug. 29, 2017 ..... 24, 25

Joe Ikley & Bill Johnson, *How Many Hours Could We Spray Dicamba Postemergence in 2017?*, Purdue Univ. Pest & Crop Newsletter, Sept. 1, 2017 27

Ill. Fertilizer & Chemical Ass'n, Dicamba Management Survey (Aug. 28, 2017).24

Tom Jordan et al., *Reducing Spray Drift from Glyphosate and Growth Regulator Herbicide Drift Caution*, Purdue University Weed Science (2009) 8, 9

Greg R. Kruger et al., *Spray Drift of Pesticides*, Univ. of Neb.-Lincoln Extension (2013) 9

Eric Lipton, *Crops in 25 States Damaged by Unintended Drift of Weed Killer*, N.Y. Times, Nov. 1, 2017 ..... 8, 10, 15, 21

Mark Loux & Bill Johnson, *Ohio Soybeans: Dicamba Drift Injury Becoming More Evident*, Agfax, July 12, 2017 ..... 23, 24

Mark Loux & Bill Johnson, *12 Considerations to Make when it Comes to the XtendiMax Label*, Corn & Soybean Digest, Nov. 23, 2016 28

Marianne McCune, *A Pesticide, a Pigweed and a Farmer's Murder*, NPR Planet Money, June 14, 2017 ..... 14, 30

Press Release, Monsanto, EPA Supports Monsanto's Product Label Updates to Help Farmers Use Dicamba Even More Successfully in 2018 (Oct. 13, 2017)..29

David A. Mortensen et al., *Navigating a Critical Juncture in Sustainable Weed Management*, 62 BioScience 75 (2012).....12

Brian Naber, *Dicamba Field Investigations: What Monsanto Has Learned So Far*, Monsanto (July 21, 2017).....22

William Neuman & Andrew Pollack, *Farmers Cope With Roundup-Resistant Weeds*, N.Y. Times, May 3, 2010.....6, 7

New Dicamba Rules Proposed for Tennessee Cotton, Soybeans, Se. FarmPress, Dec. 11, 2017.....20

Mario Parker, *Pesticide 'Drifting' Wreaks Havoc across U.S. Crops*, Bloomberg, Aug. 1, 2017.....14

Pesticide Action Network N. Am., Comment Letter on Proposed FIFRA Registration Dicamba: New Use on Herbicide-Tolerant Cotton and Soybean (May 31, 2016).....11

Tom Philpott, *This Weed Killer is Wreaking Havoc on America's Crops*, Mother Jones, Jan./Feb. 2018.....23, 31

Karl Plume, *Arkansas to Ban Dicamba Weed Killer after Drift Complaints*, Reuters, July 7, 2017.....19

Tom Polansek, *Minnesota Joins U.S. States Limiting Controversial Farm Chemical*, Reuters, Dec. 12, 2017.....20

Tom Polansek, *Missouri Limits Use of Weed killer Linked to Crop Damage*, Reuters, Nov. 17, 2017.....20

Tom Polansek & Karl Plume, *U.S. Farmers Confused by Monsanto Weed Killer's Complex Instructions*, Reuters, Aug. 21, 2017.....26, 27

Save Our Crops Coal., Comment Letter on Proposed FIFRA Registration Dicamba: New Use on Herbicide-Tolerant Cotton and Soybean (May 31, 2016).....11

Save Our Crops Coal., *SOCC Pens Open Letter to Chairman of Monsanto* (Aug. 9, 2016) 21

Robert F. Service, *A Growing Threat Down on the Farm*, 316 Science 1114 (2007) 7

Dale Shaner, *The Impact of Glyphosate-tolerant Crops on the Use of other Herbicides and on Resistance Management*, 56 Pest Mgmt. Sci. 320 (2000) 7

Pam Smith, *Dicamba Debate Continues*, Progressive Farmer, July 12, 2017 31

Testimony of Steve Smith, Domestic Policy Subcommittee of Committee on Oversight and Government Reform (Sept. 30, 2010) 6, 12

Larry Steckel, *Revised Engenia, Xtendimax and FeXapan Herbicide Labels*, UTcrops News Blog (Oct. 19, 2017) 29

Tiffany Stecker, *Dicamba Woes Drain State Agencies, Vex Companies*, Bloomberg, Dec. 5, 2017 ..... 18, 29

Tom Steever, *Weed Scientist: Dicamba Needs More Research*, Brownfield Ag News for Am., Sept. 1, 2016.....13

Mark Steil, *Minn. Farmers' Harvest Hit Hard by Drifting Weed Killer*, Minn. Pub. Radio News, Nov. 13, 2017 16

Emily Unglesbee, *States Grapple with Dicamba: State Pesticide Regulators Face Hundreds of Dicamba Investigations and 2018 Decisions*, Progressive Farmer, Sept. 20, 2017..... 15, 17, 18

Union of Concerned Scientists, *The Rise of Superweeds—and What to Do About It* (2013) 6

USDA Reports Record High Soybean Acreage, Corn Acres Down, U.S. Dep't of Agric. (June 30, 2017) 14

INTERESTS OF THE *AMICI CURIAE*[1]

Amici are farmer support organizations whose members are deeply concerned about the effects of dicamba drift on their farms and on the future of American agriculture more generally.

Amicus Family Farm Defenders ("FFD") is a national grassroots organization with over 3000 members, based in Madison, Wisconsin, and founded in 1994. Its mission is to create a farmer-controlled and consumer-oriented food and fiber system, based upon democratically controlled institutions that empower farmers to speak for and respect themselves in their quest for social and economic justice. To this end, FFD supports sustainable agriculture, farm worker rights, animal welfare, consumer safety, fair trade, and food sovereignty. FFD's members include many conventional and organic farmers who are concerned that their economic livelihood will be jeopardized by dicamba drift. Some—including both soybean growers and vegetable farmers—have already seen their crops suffer serious dicamba damage.

[1] Pursuant to Federal Rule of Appellate Procedure Rule 29(a)(2), *amici* state that all parties have consented to or stated that they do not object to the filing of this brief. Pursuant to Federal Rule of Appellate Procedure 29(A)(4)(e), *amici* certify that no person or entity, other than *amici* or their counsel, made a monetary contribution to the preparation or submission of this brief or authored this brief in whole or in part.

Amicus Farm and Ranch Freedom Alliance ("FARFA") is a nonprofit organization that supports independent family farmers and protects a healthy and productive food supply for American consumers. FARFA's mission is to promote common sense policies for local, diversified agricultural systems. Many of FARFA's members raise crops that are vulnerable to damage from herbicide drift, and FARFA supports their right to raise the crops of their choice without suffering uncompensated damages.

Amicus the Iowa Organic Association ("IOA") is a non-profit 501(c)(3) organization dedicated to the advancement of Iowa's organic food and farming system. IOA was founded in 2006 and represents over 1,000 certified organic operations in the state of Iowa. IOA's members are concerned about the impact of dicamba drift on non-dicamba-ready soybeans and other broadleaf crops.

Amicus the Kansas Rural Center ("KRC") is a private non-profit research, education, and advocacy organization that was founded in 1979 to address the loss of family farms, concentration of land and natural resources into fewer hands, and the rise of a capital intensive agricultural system that often leaves people out of the equation. KRC is committed to economically viable, environmentally sound, and socially sustainable rural culture. Many of KRC's members—particularly specialty crop growers who do not have the option of purchasing resistant seeds—are concerned that dicamba drift will harm their crops.

Amicus the Organic Farmers' Agency for Relationship Marketing, Inc. ("OFARM") is a farmer cooperative of organic grain and livestock farmers, with members in 19 states, incorporated in the State of Minnesota as a marketing-agency-in-common. Dicamba drift has the potential to harm OFARM's organic producers by causing them to lose their organic certification and also resulting in their fields being disallowed for organic production for 3 years.

Amicus the Organic Farmers Association ("OFA") provides a strong and unified national voice for domestic certified organic producers. OFA serves over 18,000 U.S. certified organic farmers and farmer-handlers across the United States as well as over 90 nonprofit farmer-based organizations serving organic farmers locally. OFA's national surveys of certified organic U.S. farmers indicate that contamination, including pesticide drift, is one of their top concerns.

Amicus 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 is likely to be used far more extensively upon the introduction of new genetically modified 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.

SUMMARY OF ARGUMENT

In response to increasing glyphosate-resistance in weeds and the resulting threat to its Roundup Ready crop system, the Monsanto Company genetically engineered soybeans and cotton to be resistant to dicamba—which would otherwise be fatal to these broadleaf crops—and sought the United States Environmental Protection Agency's ("EPA") approval of a new formulation of dicamba marketed under the name XtendiMax. Before and during the review process, multiple commenters warned EPA that granting Monsanto's application would cause serious harm to other farmers because of dicamba's propensity to drift away from its application site. EPA relied, however, on Monsanto's internal testing, which purported to show that XtendiMax was less volatile than older dicamba formulations. Independent scientists were not allowed to conduct field tests to study the degree to which the new formulation would drift in real-world conditions.

Events on the ground in 2017 more than confirmed the warnings. Farmers flooded state departments of agriculture with complaints about harm to their crops from dicamba drift. By the end of the growing season, more than 2,700 farmers in twenty-four states had filed complaints and over 3.6 million acres of soybeans had been damaged. Some state agencies responded by imposing limitations on dicamba use or even banning it altogether during the summer months.

Monsanto has tried to blame this disaster on farmers' alleged illegal use of older dicamba formulations or their failure to follow the EPA-approved label instructions for XtendiMax. The evidence, however, shows that much of the damage can be traced to farmers who followed the label instructions for XtendiMax and other new dicamba formulations. For one thing, many damage reports exhibit the characteristics of vapor drift—which is largely a result of the chemical characteristics of the herbicide formulation—rather than spray drift, over which farmers have more control. Moreover, the dramatic increase in drift damage between 2016 and 2017 is inconsistent with older formulations' being to blame. To the extent that some farmers have had trouble complying with the label, that phenomenon is a result of the label's extreme complexity and the limited hours per month when spraying can be done consistent with the label's requirements.

EPA's approval of XtendiMax has financially harmed farmers and has torn at the fabric of farming communities, pitting neighbor against neighbor. Many farmers feel that they are faced with an impossible choice: pay Monsanto a premium for dicamba-resistant seeds that they do not want or watch their crops be damaged by dicamba drift from their neighbors' farms. EPA should not put farmers in this position. The consequences of the 2017 growing season confirmed

the prediction that "[t]he widespread use of dicamba is incompatible with Midwestern agriculture."[2]

ARGUMENT

I. XTENDIMAX IS A RESPONSE TO A HERBICIDE-RESISTANCE PROBLEM THAT MONSANTO'S ROUNDUP-READY SYSTEM CREATED

In the 1990s, Monsanto developed the Roundup Ready crop system. This system included its herbicide glyphosate, sold under the brand name Roundup, combined with crops that were genetically engineered to be glyphosate-resistant.[3] This genetic resistance was essential to the success of the system, because it allowed farmers to apply glyphosate to growing crops.[4] Roundup Ready crops became enormously popular; by 2010, 90% of soybeans and 70% of corn and cotton grown in the United States came from glyphosate-resistant seeds.[5]

---

[2] Testimony of Steve Smith, Domestic Policy Subcommittee of Committee on Oversight and Government Reform (Sept. 30, 2010), https://oversight.house.gov/wp-content/uploads/2012/01/20100930Smith.pdf.

[3] Union of Concerned Scientists, *The Rise of Superweeds—and What to Do About It* 2 (2013), *available at* http://www.ucsusa.org/sites/default/files/legacy/assets/documents/food_and_agriculture/rise-of-superweeds.pdf.

[4] Steven A. Gower et al., *Effect of Postemergence Glyphosate Application Timing on Weed Control and Grain Yield in Glyphosate-Resistant Corn: Results of a 2-Yr Multistate Study*, 17 Weed Tech. 821 (2003).

[5] William Neuman & Andrew Pollack, *Farmers Cope With Roundup-Resistant Weeds*, N.Y. Times, May 3, 2010, http://www.nytimes.com/2010/05/04/business/energy-environment/04weed.html.

Weed scientists worried that the widespread adoption of Monsanto's system would quickly produce weeds resistant to glyphosate.[6] The United States Department of Agriculture nonetheless approved the Roundup Ready crops. Just as the weed scientists predicted, the planting of broad areas of Roundup Ready monocultures spurred the evolution of glyphosate-resistant weeds. By the mid-2000s, resistant weeds were already beginning to be a problem[7] and by the early 2010s, many farmers were plagued by the rise of "superweeds" impervious to the effects of glyphosate.[8]

Monsanto's approach to the superweed problem was to engineer crop resistance to an older, more toxic herbicide: dicamba. In 2016, Monsanto unveiled the Roundup Ready Xtend crop system, including XtendiMax, a dicamba-based herbicide, and seeds genetically engineered to be resistant to dicamba.[9]

---

[6] *See, e.g.*, Dale Shaner, *The Impact of Glyphosate-tolerant Crops on the Use of other Herbicides and on Resistance Management*, 56 Pest Mgmt. Sci. 320 (2000).

[7] Robert F. Service, *A Growing Threat Down on the Farm*, 316 Science 1114 (2007).

[8] Neuman & Pollack, *supra* note 5.

[9] Gil Gullickson, *All Systems Go for 2016 Roundup Ready 2 Xtend Soybeans Launch*, Successful Farming, Feb. 3, 2016, https://www.agriculture.com/news/business/all-systems-go-f-2016-roundup-ready-2_5-ar52147.

II. DICAMBA IS A HIGHLY VOLATILE HERBICIDE PREVIOUSLY USED IN ONLY LIMITED CIRCUMSTANCES

Dicamba was first described in 1958 and was first approved for use in the United States in 1962.[10] It belongs to a category of pesticides known as growth regulators or synthetic auxins, which kill weeds by disrupting growth and damaging plant tissues.[11] Dicamba use has traditionally been limited to the time before crops emerge because of its propensity to volatilize and drift from the target field and harm broadleaf crops on nearby fields.[12]

A. Herbicide Damage Can Be Caused by Either Spray Drift or Vapor Drift

There are two major mechanisms by which herbicides can drift from one field to another. The first is spray drift (also known as particle drift, droplet drift, or physical drift), which occurs when small liquid particles of an herbicide float through the air during the application process.[13] Spray drift is most often caused

---

[10] 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.

[11] Klaus Grossman, *Auxin Herbicides: Current Status of Mechanism and Mode of Action*, 66 Pest Mgmt. Sci. 113, 113 (2010).

[12] Eric Lipton, *Crops in 25 States Damaged by Unintended Drift of Weed Killer*, N.Y. Times, Nov. 1, 2017, https://www.nytimes.com/2017/11/01/business/soybeans-pesticide.html.

[13] Tom Jordan et al., *Reducing Spray Drift from Glyphosate and Growth Regulator Herbicide Drift Caution*, Purdue University Weed Science (2009), *available at* https://ag.purdue.edu/btny/weedscience/documents/reducingdrift09.pdf.

by application errors (such as spraying overly small droplets and/or spraying from too great a height) and weather conditions (such as wind direction and high wind speeds).[14]

A second type of drift is called vapor drift, which occurs when herbicide droplets evaporate and the chemical then moves through the air.[15] Vapor drift can occur during application, but can also occur hours or days later. The likelihood and magnitude of vapor drift is largely a function of the volatility of an herbicide and to a lesser extent the weather conditions, especially temperature and humidity.[16] Volatility refers to a substance's propensity to change from a liquid or solid to a gaseous state. The more volatile an herbicide, the more likely it is to spread by vapor drift. Vapor drift and spray drift result in different patterns of damage, discussed in Section V.A, *infra*.

B. Dicamba Use on Broadleaf Crops Has Been Limited Because of its Toxicity and Volatility

Dicamba is an extremely volatile herbicide and is thus prone to vapor drift.[17]

---

[14] Greg R. Kruger et al., *Spray Drift of Pesticides*, Univ. of Neb.-Lincoln Extension (2013), *available at* http://extensionpublications.unl.edu/assets/pdf/g1773.pdf.

[15] Jordan et al., *supra* note 13.

[16] *Id.*

[17] *Dicamba*, Extension Toxicology Network (Sept. 1993), http://pmep.cce.cornell.edu/profiles/extoxnet/carbaryl-dicrotophos/dicamba-ext.html.

When dicamba drifts off-target it is easy to spot. The hallmark of dicamba damage in broadleaf plants is the dicamba cobra head—cupped leaves, collapsing in on themselves.[18] Because dicamba is so toxic to virtually all broadleaf plants, old dicamba formulations can be used for broadleaf crops only on fields in which the plants have not yet emerged.[19]

Even so, dicamba has historically caused significant crop damage. For example, the Association of American Pesticide Control Officials identified dicamba as the pesticide that was third-most-commonly at fault in drift incidents,[20] at a time when it was not among the twenty-five most-commonly-used pesticide active ingredients in the United States.[21]

---

[18] Chris Bennett, *Dicamba Drift Blowing Farm Trouble Again in 2017*, AgWeb, June 19, 2017, https://www.agweb.com/article/dicamba-drift-blowing-farm-trouble-again-in-2017-naa-chris-bennett/.

[19] Lipton, *supra* note 12.

[20] Ass'n of Am. Pesticide Control Officials, *2005 Pesticide Drift Enforcement Survey* (2005), https://web.archive.org/web/20100712202329/http://aapco.ceris.purdue.edu/doc/surveys/DriftEnforce05Rpt.html.

[21] Arthur Grube, et. al., EPA, *Pesticide Industry Sales and Usage: 2006 and 2007 Market Estimates* 14 (2011), *available at* https://www.epa.gov/sites/production/files/2015-10/documents/market_estimates2007.pdf.

III. COMMENTERS WARNED EPA THAT APPROVING XTENDIMAX WOULD LEAD TO SIGNIFICANT DAMAGE FROM DICAMBA DRIFT

During the comment period on Monsanto's application to register XtendiMax, EPA received thousands of comments expressing concern over the dangers of dicamba, including its extreme volatility and drift risk.[22] In particular, commenters warned that, in combination with dicamba-resistant crops, "the window for dicamba spraying will be significantly widened,"[23] allowing application farther into the growing season. This extension would be problematic because "[v]olatilization leading to drift occurs more readily at higher temperatures."[24] Additionally, "[a]pplications at this time of year occur when other crops are 'leafed out,' further increasing the risk of non-target damage."[25] Moreover, because dicamba residues are "difficult to remove from pesticide

---

[22] *See generally* Comments on Proposed FIFRA Registration Dicamba: New Use on Herbicide-Tolerant Cotton and Soybean, https://www.regulations.gov/docket?D=EPA-HQ-OPP-2016-0187 (last visited Feb. 5, 2018).

[23] Pesticide Action Network N. Am., Comment Letter on Proposed FIFRA Registration Dicamba: New Use on Herbicide-Tolerant Cotton and Soybean 2 (May 31, 2016), https://www.regulations.gov/document?D=EPA-HQ-OPP-2016-0187-0859.

[24] *Id.* at 1.

[25] Save Our Crops Coal., Comment Letter on Proposed FIFRA Registration Dicamba: New Use on Herbicide-Tolerant Cotton and Soybean 3 (May 31, 2016), https://www.regulations.gov/document?D=EPA-HQ-OPP-2016-0187-0792.

applicators' equipment," "the likelihood that vulnerable crops treated by an applicator's dicamba-contaminated equipment will be harmed increases."[26]

These comments echoed even earlier warnings. For example, in 2010, Steve Smith, the Director of Agriculture for Red Gold, the largest privately held canned tomato processor in the United States, warned Congress that "[t]he widespread use of dicamba herbicide [poses] the single most serious threat to the future of the specialty crop industry in the Midwest."[27] Similarly, a group of weed scientists warned in 2012 that "[t]he new resistant cultivars will enable growers to apply [dicamba] several weeks later into the growing season, when higher temperatures may increase volatility and when more varieties of susceptible crops and nontarget vegetation are leafed out, further increasing the potential for nontarget drift damage."[28]

In response to these concerns, Monsanto took the position that drift would not be a problem because it had formulated XtendiMax to reduce volatility.[29] Yet

---

[26] Pesticide Action Network N. Am., *supra* note 23, at 1.

[27] Testimony of Steve Smith, *supra* note 2, at 2.

[28] David A. Mortensen et al., *Navigating a Critical Juncture in Sustainable Weed Management*, 62 BioScience 75, 80 (2012).

[29] Caitlin Dewey, *This Miracle Weed Killer was Supposed to Save Farms. Instead, it's Devastating Them*, Wash. Post (Aug. 29, 2017), https://www.washingtonpost.com/business/economy/this-miracle-weed-killer-was-supposed-to-save-farms-instead-its-devastating-them/2017/08/29/33a21a56-88e3-11e7-961d-2f373b3977ee_story.html.

the internal studies that it submitted to EPA included only a handful that addressed volatility in field settings, as opposed to greenhouses or labs.[30]

In addition, Monsanto refused to make Xtendimax available to independent scientists so that they could verify Monsanto's claims of reduced volatility.[31] As explained by University of Arkansas weed scientist Bob Scott, "I wish we could have done more testing. We've been asking to do more testing for several years, but the product was not made available to us."[32] Similarly, Kevin Bradley of the University of Missouri stated in 2016 that "[w]e really can't tell you anything about the volatility [of the new dicamba formulations] . . ., because we have not been able to do that research, and that's really unfortunate."[33]

IV. DICAMBA USE IN THE 2017 GROWING SEASON CAUSED SIGNIFICANT HARM TO DICAMBA-SENSITIVE CROPS AND NATURAL VEGETATION

A. Dicamba Caused Unprecedented Damage to Soybeans during the 2017 Growing Season

---

[30] *Id.*

[31] *Id.*

[32] Dan Charles, *Monsanto Attacks Scientists After Studies Show Trouble For Weedkiller Dicamba*, NPR, Oct. 26, 2017, https://www.npr.org/sections/thesalt/2017/10/26/559733837/monsanto-and-the-weed-scientists-not-a-love-story.

[33] Tom Steever, *Weed Scientist: Dicamba Needs More Research*, Brownfield Ag News for Am., Sept. 1, 2016, https://brownfieldagnews.com/news/weed-scientist-dicamba-needs-research/.

XtendFlex cotton was introduced on a small scale in 2015, followed by Xtend soybeans in 2016.[34] Farmers only began to use them on a large scale, however, following EPA's conditional registration of Xtendimax in November 2016. For the 2017 season, about half of all cotton (five million acres) and nearly a quarter of all soybeans (twenty million acres) grown in the United States came from dicamba-resistant seeds.[35]

Still, three-quarters of soybeans planted in 2017 were *not* dicamba-resistant. This fact is particularly problematic, given that no other crop is as sensitive to dicamba injury.[36] Farmers had a variety of reasons for choosing not to switch to Xtend soybeans. For example, some still had success with other seeds and did not feel the need to add dicamba resistance to their fields. Some chose to raise organic or non-GMO crops, thus receiving a premium in the marketplace. What these farmers had in common, however, is that they could not have anticipated the

---

[34] Marianne McCune, *A Pesticide, a Pigweed and a Farmer's Murder*, NPR Planet Money, June 14, 2017, https://www.npr.org/2017/06/14/532879755/a-pesticide-a-pigweed-and-a-farmers-murder.

[35] Mario Parker, *Pesticide 'Drifting' Wreaks Havoc across U.S. Crops*, Bloomberg, Aug. 1, 2017, https://www.bloomberg.com/news/articles/2017-08-01/farmers-cry-foul-as-pesticide-wreaks-havoc-across-u-s-crops; *USDA Reports Record High Soybean Acreage, Corn Acres Down*, U.S. Dep't of Agric. (June 30, 2017), https://www.nass.usda.gov/Newsroom/archive/2017/06_30_2017.php.

[36] Bob Hartzler, *Thoughts on the Dicamba Dilemma*, Iowa St. Univ. Extension & Outreach, July 13, 2017, https://crops.extension.iastate.edu/blog/bob-hartzler/thoughts-dicamba-dilemma.

damage they would suffer from their neighbors' choices to use the new dicamba formulations.

As the season progressed, state departments of agriculture began receiving unprecedented numbers of complaints.[37] By October, over 2,700 farmers in twenty-four states had filed complaints and over 3.6 million acres of soybeans had been damaged.[38]

These figures almost certainly represent significant underestimations of the actual harm. Reuben Baris, acting chief of the herbicides branch of the Registration Division in EPA's Office of Pesticide Programs, stated that the actual number of damage incidents could be five times higher.[39]

The stories of some individual farmers can put these raw numbers into perspective. For example, David Wildy runs a fifth-generation farm in Manila,

---

[37] Emily Unglesbee, *States Grapple with Dicamba: State Pesticide Regulators Face Hundreds of Dicamba Investigations and 2018 Decisions*, Progressive Farmer, Sept. 20, 2017, https://www.dtnpf.com/agriculture/web/ag/news/crops/article/2017/09/20/state-pesticide-regulators-face-2018.

[38] Kevin Bradley, *A Final Report on Dicamba-injured Soybean Acres*, Univ. of Mo. Integrated Pest Mgmt., Oct. 30, 2017, https://ipm.missouri.edu/IPCM/2017/10/final_report_dicamba_injured_soybean/.

[39] Lipton, *supra* note 12.

Arkansas.[40] He was named the Southeastern Farmer of the Year in 2016 by the Swisher Sweets/Sunbelt Expo.[41] In 2017, he planted the same soybeans as he had in previous summers. Every soybean field on his farm suffered dicamba damage; Wildy estimated that he would lose hundreds of thousands of dollars because of decreased yield.[42] Similarly, Tom Peterson in Minnesota lost two to four bushels per acre of his soybean crop.[43] Across the state of Minnesota, some farmers lost as much as twelve bushels per acre, resulting in an estimated $7 million in lost revenue.[44]

Farmers suffering yield losses from dicamba damage are left with few options for compensation. The United States Department of Agriculture has stated that dicamba drift, along with other kinds of chemical drift, will not be covered by

---

[40] *David Wildy Named 2016 Arkansas Farmer of the Year*, Swisher Sweets/Sunbelt Expo, July 22, 2016, http://sunbeltexpo.com/david-wildy-named-2016-arkansas-farmer-of-the-year/.

[41] *Farmer of the Year*, Swisher Sweets/Sunbelt Expo, http://sunbeltexpo.com/foty/ (last visited Feb. 5, 2018).

[42] Dan Charles, *A Wayward Weedkiller Divides Farm Communities, Harms Wildlife*, NPR, Oct. 7, 2017, https://www.npr.org/sections/thesalt/2017/10/07/555872494/a-wayward-weed-killer-divides-farm-communities-harms-wildlife.

[43] Mark Steil, *Minn. Farmers' Harvest Hit Hard by Drifting Weed Killer*, Minn. Pub. Radio News, Nov. 13, 2017, https://www.mprnews.org/story/2017/11/13/minn-farmers-harvest-hit-hard-by-drifting-weed-killer.

[44] *Id.*

federal crop insurance.[45] Since last summer, several class actions have been filed on behalf of affected farmers against the manufacturers.[46]

B. The Scale of the Damage Shocked the Agricultural Science Community

As the scale of the damage from dicamba drift became clear over the summer, weed scientists were stunned. For example, North Dakota State University Extension pesticide specialist Andrew Thostenson stated "[w]e've never observed anything on this scale in this country since we've been using pesticides in the modern era."[47] University of Tennessee weed scientist Larry Steckel described the dicamba damage as "so widespread it's kind of overwhelming. . . . [I]n two weeks we have as many complaints in 2017 as we had in all of 2016."[48] These scientists, along with other university weed scientists across the South and Midwest, struggled to study and explain the phenomenon in real time because they had not been given the opportunity to study the new

---

[45] *Frequently Asked Questions, Dicamba Drift*, USDA Risk Mgmt. Agency, https://www.rma.usda.gov/help/faq/dicamba.html (last visited Feb. 5, 2018).

[46] Chris Bennett, *Dicamba Lawsuits Mounting*, AgWeb, Sept. 17, 2017, https://www.agweb.com/article/dicamba-lawsuits-mounting--naa-chris-bennett/.

[47] Emily Unglesbee, *States Grapple with Dicamba: State Pesticide Regulators Face Hundreds of Dicamba Investigations and 2018 Decisions*, Progressive Farmer, Sept. 20, 2017, https://www.dtnpf.com/agriculture/web/ag/news/crops/article/2017/09/20/state-pesticide-regulators-face-2018.

[48] *Id.*

dicamba formulations before EPA approved them for real-world use.

C. State Governments Were Overwhelmed by Complaints and Imposed their own Limits on the New Dicamba Formulations

State agencies were overwhelmed by the unprecedented number of complaints they received.[49] David Scott, Office of the Indiana State Chemist pesticide program administrator, explained that "[y]ou basically stop doing anything [else] and hope that you can respond to" the dicamba complaints.[50] Even then, the agency will not be able to finish processing the complaints until well into 2018.[51] Kansas official Judy Glass, who spoke on behalf of pesticide regulators from Iowa, Kansas, Missouri, and Nebraska at an EPA-convened meeting, explained that the beleaguered state agencies are struggling to clear the backlog of dicamba complaints while simultaneously facing budget issues and expected staff shortages.[52]

In response, some state governments, without waiting for EPA to act, have started imposing limits on dicamba use. For example, Arkansas implemented an emergency 120-day ban on dicamba use in July 2017 after the number of

---

[49] *Id.*

[50] Tiffany Stecker, *Dicamba Woes Drain State Agencies, Vex Companies*, Bloomberg, Dec. 5, 2017, https://bnanews.bna.com/environment-and-energy/dicamba-woes-drain-state-agencies-vex-companies.

[51] *Id.*

[52] *Id.*

complaints filed with the state agriculture department surged beyond 600 cases, as well as increasing the fine for illegal dicamba use to from $1,000 to $25,000.[53] Missouri implemented a temporary ban on dicamba use and lifted the ban only after approving additional label restrictions to try to limit damage to farmers.[54] Tennessee also imposed similar local restrictions on dicamba use in reaction to the record number of complaints.[55]

In anticipation of the 2018 growing season, a number of states have placed new restrictions on the use of XtendiMax and others are considering taking action. In particular, four states have either partially or totally banned the use of dicamba during the growing season. First, in early November, the Arkansas Plant Board banned the use of any form of dicamba between April 16th and October 31st, 2018.[56] The Missouri Department of Agriculture similarly banned the use of the

---

[53] Karl Plume, *Arkansas to Ban Dicamba Weed Killer after Drift Complaints*, Reuters, July 7, 2017, https://www.reuters.com/article/usa-arkansas-dicamba/arkansas-to-ban-dicamba-weed-killer-after-drift-complaints-idUSL1N1JY1XD.

[54] Sonja Begemann, *Missouri Lifts Dicamba Ban, Provides New Application Restrictions*, AgWeb, July 13, 2017, https://www.agweb.com/article/missouri-lifts-dicamba-ban-provides-new-application-restrictions-naa-sonja-begemann/.

[55] Karl Plume, *Tennessee Restricts Use of Monsanto Pesticide as Problems Spread*, Reuters, July 13, 2017, https://www.reuters.com/article/us-tennessee-grains-monsanto/tennessee-restricts-use-of-monsanto-pesticide-as-problems-spread-idUSKBN19Y2KE.

[56] Associated Press, *Arkansas Panel Backs Ban of Controversial Herbicide Dicamba*, NBC News, Nov. 9, 2017, https://www.nbcnews.com/news/us-

new dicamba formulations state-wide from July 15th to October 31st, 2018, and from June 1st to October 31st, 2018, in ten counties that suffered particularly heavy dicamba drift damage.[57] North Dakota banned the use of dicamba after June 30th or when the temperature is above 85 degrees,[58] while Minnesota's ban applies after June 20th or when the temperature is above 85 degrees.[59] Tennessee, while stopping short of a ban, requested EPA's approval for greater restrictions on the use of the new formulations through a Special Local Needs label.[60] The state agencies' need to resort to these measures highlights the flaws in EPA's approval

---

news/arkansas-panel-backs-ban-controversial-herbicide-dicamba-n819311. Monsanto has filed suit to challenge the Arkansas ban. Andrew DeMillo, *Monsanto asks Arkansas Judge to Halt State's Herbicide Ban*, Associated Press, Nov. 17, 2017, https://apnews.com/4eba03072335459d90ae32af82f4bd76.

[57] Tom Polansek, *Missouri Limits Use of Weed killer Linked to Crop Damage*, Reuters, Nov. 17, 2017, https://www.reuters.com/article/us-usa-pesticides-missouri/missouri-limits-use-of-weed-killer-linked-to-crop-damage-idUSKBN1DH2TD; Eli Chen, *Missouri Department of Agriculture Places Restrictions on Monsanto and DuPont's Dicamba Products*, St. Louis Pub. Radio, Dec. 11, 2017, http://news.stlpublicradio.org/post/missouri-department-agriculture-places-restrictions-monsanto-and-duponts-dicamba-products.

[58] Christopher Brown, *North Dakota Farmers to Face Restrictions on Monsanto's Dicamba*, Bloomberg BNA, Nov. 30, 2017, https://bnanews.bna.com/environment-and-energy/north-dakota-farmers-to-face-restrictions-on-monsantos-dicamba.

[59] Tom Polansek, *Minnesota Joins U.S. States Limiting Controversial Farm Chemical*, Reuters, Dec. 12, 2017, https://www.reuters.com/article/us-usa-pesticides-minnesota/minnesota-joins-u-s-states-limiting-controversial-farm-chemical-idUSKBN1E702G.

[60] *New Dicamba Rules Proposed for Tennessee Cotton, Soybeans*, Se. FarmPress, Dec. 11, 2017, http://www.southeastfarmpress.com/regulatory/new-dicamba-rules-proposed-tennessee-cotton-soybeans.

of XtendiMax and the inadequacy of the measures it put in place to reduce drift damage.

D. Dicamba Drift Damaged Other Broadleaf Crops, Apiaries, and Natural Vegetation

The damage caused by dicamba drift has not been limited to soybean fields. Dicamba is undiscerning in its targets: it harms all broadleaf plants, including virtually all non-cereal crops as well as naturally occurring vegetation. Across the Midwest, a variety of plants are showing signs of dicamba damage.[61]

For example, dicamba has harmed many non-soybean broadleaf crops. University of Missouri weed scientist Kevin Bradley found that tomatoes, watermelon, cantaloupe, vineyards, and pumpkins have been harmed by drifting dicamba.[62] Because EPA has not established tolerances (maximum allowable levels) of dicamba pursuant to the Food Quality Protection Act for crops such as tomatoes, grapes, cucumbers, pumpkins, and squash, if these crops have *any* amount of dicamba on them, they must be destroyed.[63]

Non-crop broadleaf plants have also been affected. That damage not only harms the environment in general, but also affects the pollinators that feed on the

---

[61] Charles, *supra* note 42.

[62] Lipton, *supra* note 12.

[63] Save Our Crops Coal., *SOCC Pens Open Letter to Chairman of Monsanto* (Aug. 9, 2016), http://saveourcrops.org/2016/08/09/open-letter-to-hugh-grant-chairman-and-ceo-of-monsanto/.

flowering plants. Beekeepers in dicamba-affected areas are reporting that their bees are unable to find as many flowering plants because of dicamba damage, which is leading to decreased honey yields.[64] One beekeeper noted that his bees have yielded forty to fifty percent less honey in the 2017 season, and honey production is down by about thirty-three percent on average in dicamba-affected areas.[65]

V. DICAMBA IS INHERENTLY VOLATILE AND EPA ERRED IN APPROVING THE NEW DICAMBA FORMULATIONS

Monsanto and the other manufacturers have argued that EPA's approval of the new dicamba formulations is not responsible for these widespread harms. Instead, they allege, the drift damage has been caused by farmers' failure to adhere to the label instructions or to illegal use of older dicamba formulations.[66]

These claims are contradicted by the ample evidence that much of the damage observed last year was caused by label-compliant use of the new dicamba formulations. Moreover, to the extent that some farmers may have violated the terms of the label, this occurrence reflects the extreme complexity of the label and limited circumstances in which it is possible to apply XtendiMax consistently with

---

[64] Charles, *supra* note 42.

[65] *Id.*

[66] Brian Naber, *Dicamba Field Investigations: What Monsanto Has Learned So Far*, Monsanto (July 21, 2017), https://monsanto.com/products/articles/dicamba-field-investigations-monsanto-learned-far/.

the label's instructions.

A. Significant Dicamba Drift Damage Appears to Have Been the Result of Vapor Drift from Label-Compliant Use of the New Formulations

Several lines of evidence suggest that much of the dicamba drift damage in 2017 arose from vapor drift following farmers' label-compliant use of the new dicamba formulations such as XtendiMax. First, weed scientists who tracked dicamba damage found that in most cases it exhibited characteristics consistent with vapor drift rather than spray drift. For example, most fields showed uniform damage from one end to the other; spray drift damage is typically greatest near an application site and then steadily decreases over a short distance in a downwind direction.[67] Moreover, damage often occurred upwind from where the herbicide was applied; an Illinois survey of professional pesticide applicators found that 85% of them had observed damage in fields that were not downwind of the application

[67] Mark Loux & Bill Johnson, *Ohio Soybeans: Dicamba Drift Injury Becoming More Evident*, Agfax, July 12, 2017, http://agfax.com/2017/07/12/ohio-soybeans-dicamba-drift-injury-becoming-more-evident/; Kevin Bradley, *Dicamba Update*, Dicamba Injury Forum (July 6, 2017), *available at* https://weedscience.missouri.edu/2017%20Dicamba%20Injury%20Forum.pdf; Tom Philpott, *This Weed Killer is Wreaking Havoc on America's Crops*, Mother Jones, Jan./Feb. 2018 (quoting University of Illinois weed scientist Aaron Hager as saying that the damage was "too uniform to be explained by anything else" but vapor drift), https://www.motherjones.com/environment/2018/01/dicamba-monsanto-herbicide-neighbor-farms-soybeans/.

site.[68] In addition, drift damage was observed at distances up to five miles away from application sites.[69] Because spray drift is too heavy to float that far from the application site, vapor drift is the only explanation for such distant dicamba damage.[70]

This conclusion was bolstered by the field studies that independent scientists were finally able to perform in 2017. University of Arkansas weed scientists concluded that in the field there was little difference in volatility between the older dicamba formulations and the new ones.[71] The scientists also found that the new formulations were causing damage across more than twice the buffer distance required by EPA.[72] Furthermore, field experiments showed volatilization up to

---

[68] Ill. Fertilizer & Chemical Ass'n, Dicamba Management Survey, at 7 (Aug. 28, 2017), *available at* https://www.ifca.com/media/web/1505403758_IFCA%20Ag%20Retail%20Dicamba%20Survey%20Report%208%2028%202017.pdf.

[69] Greg D. Horstmeier, *Dicamba's PTFE Problem*, Progressive Farmer, Aug. 29, 2017, https://www.dtnpf.com/agriculture/web/ag/perspectives/blogs/editors-notebook/blog-post/2017/08/29/dicambas-ptfe-problem; Gil Gullickson, *Why Dicamba-Tolerant Technology is in Trouble*, Agriculture.com, July 11, 2017, https://www.agriculture.com/crops/soybeans/why-dicamba-tolerant-soybean-technology-is-in-trouble.

[70] Loux & Johnson, *supra* note 67.

[71] Mary Hightower, *Division of Ag Researchers Find Volatility in all Dicamba Formulations They Tested*, Univ. of Ark., Sys. Div. of Agric., Aug. 10, 2017, https://www.uaex.edu/media-resources/news/august2017/08-10-2017-Ark-NEREC-Field-Day.aspx.

[72] *Id.*

three days after application.[73] As a result of these multiple lines of evidence, "during a July 29 call with EPA officials, a dozen state weed scientists expressed unanimous concern that [the new dicamba formulations are] more volatile than manufacturers have indicated."[74]

In addition, there has been no evidence of widespread illegal use of older dicamba formulations. Instead, there have been many cases of dicamba drift being specifically traced to farmers who used the new formulations and followed the label instructions.[75] Moreover, the dramatic increase in dicamba drift complaints between 2016 (when only older formulations were available) and 2017 (when the new formulations went on sale) suggests that use of the new formulations is primarily to blame.

B. Both the New and Original Labels[76] Impose Unwieldy Restrictions on Farmers

When EPA approves an herbicide for use, it also approves a label that

---

[73] Charles, supra note 32; Dewey, *supra* note 29.

[74] Dewey, *supra* note 29.

[75] Horstmeier, *supra* note 69; Bennett, *supra* note 18; Bryce Gray, *Dicamba Damage is Back—and Possibly Worse than Before*, St. Louis Post-Dispatch, June 25, 2017, http://www.stltoday.com/business/local/dicamba-damage-is-back-and-possibly-worse-than-before/article_2e33ec05-ae98-5468-92f8-bccf6bcd7698.html.

[76] EPA approved an updated label in October 2017 following the controversy over dicamba use during the summer. The updated label is discussed in greater detail in section V.C, *infra*.

provides instructions on its safe handling and use. "It is a violation of Federal law to use [an herbicide product] in a manner inconsistent with its labeling." 40 C.F.R. § 156.10(i)(2)(ii). The label that EPA approved for XtendiMax creates a patchwork of complicated restrictions that Iowa agronomist Bob Hartzler described as "unlike anything that [had] ever been seen before."[77] The conditions the label requires for the "safe" application of XtendiMax are virtually impossible for many farmers to follow.

1. The Limited Allowable Wind Speed is Unworkable

According to the EPA-approved labels, farmers can apply XtendiMax only when the wind speed is between three and fifteen miles per hour (the old label) or between three and ten miles per hour (the new label).[78] There are several problems with this requirement. First, this narrow range of allowable wind speeds significantly limits the times when farmers can apply the herbicide. An analysis by Purdue agronomists of Missouri's 2017 emergency rules, which are similar to the new label, found that in northeastern Indiana there would have been only forty-nine hours in June (seven percent of the month), and 101 hours in July (fourteen

---

[77] Tom Polansek & Karl Plume, *U.S. Farmers Confused by Monsanto Weed Killer's Complex Instructions*, Reuters, Aug. 21, 2017, https://www.reuters.com/article/us-usa-pesticides-labels/u-s-farmers-confused-by-monsanto-weed-killers-complex-instructions-idUSKCN1B110K.

[78] *Id.*

percent of the month) in which farmers could apply the herbicide.[79]

Second, the wind speed limit requires that farmers constantly monitor the wind while applying the product. In 2017, some farmers resorted to checking weather websites on their smartphones to try to get sufficient wind information.[80] They needed to rely on this real-time tracking of wind conditions because wind speed can change from hour to hour in the field, and unforeseeable gusts of wind can quickly turn a legal, on-label application into an illegal, off-label application.

2. *Temperature Inversions Further Limit the Number of Allowable Spraying Hours*

Both the old and new XtendiMax labels also prohibit to different degrees the application of the herbicide during temperature inversions—weather phenomena that create a pocket of cooled air below a layer of warmer air higher above the ground. Inversions allow dicamba droplets to remain suspended close to the ground and make it easier for dicamba to drift off-target. This situation is not uncommon: for example, inversions happen in one-half to two-thirds of days in June and July in Missouri.[81]

---

[79] Joe Ikley & Bill Johnson, *How Many Hours Could We Spray Dicamba Postemergence in 2017?*, Purdue Univ. Pest & Crop Newsletter, Sept. 1, 2017, https://extension.entm.purdue.edu/pestcrop/2017/Issue23/#4.

[80] Polansek & Plume, *supra* note 77.

[81] Kevin Bradley, *Off-target Movement of Dicamba in Missouri. Where Do We Go from Here?*, Univ. of Mo. Integrated Pest Mgmt., Aug. 21, 2017, https://ipm.missouri.edu/IPCM/2017/8/Off-target_movement/.

3. *Mandating that Farmers do not Apply XtendiMax to Weeds Taller than Four Inches is Unrealistic*

Both versions of the label provide that farmers can apply XtendiMax only to weeds that are under four inches tall.[82] This requirement further limits farmers' ability to apply the herbicide consistent with the label. If, for example, a farmer is not able to apply XtendiMax for two weeks in June due to unfavorable weather, by the end of that time many weeds will be more than four inches tall. Moreover, it is unreasonable to expect farmers to be able to take stock of every weed in the target field. Some weeds also grow so quickly that there is only a tiny window of time in which farmers can use the herbicide.[83]

4. *It is Almost Impossible to Remove the New Dicamba Formulations from Applicator Tanks*

The label also describes extensive application system clean-out procedures. However, even these extensive procedures are falling short in the field because dicamba contamination is so pernicious. Applicators report that dicamba is "almost impossible" to clean out of the application systems.[84] In some cases,

---

[82] Mark Loux & Bill Johnson, *12 Considerations to Make when it Comes to the XtendiMax Label*, Corn & Soybean Digest, Nov. 23, 2016, http://www.cornandsoybeandigest.com/soybeans/12-considerations-make-when-it-comes-xtendimax-label.

[83] *Id.*

[84] *A Day in the Life with Dicamba Damage*, Corn & Soybean Digest, July 18, 2017, http://www.cornandsoybeandigest.com/crop-protection/day-life-dicamba-damage.

farmers have documented damage to fields inconsistent with normal dicamba drift, and weed scientists have concluded that the patterns of damage are more consistent with tank contamination.[85]

C. The October 2017 Label Changes do not Address Vapor Drift and Will not Improve Matters in 2018

As mentioned above, in October 2017, the manufacturers agreed to voluntarily add additional use restrictions to their labels in response to the crisis in the Midwest over the summer.[86] However, these label changes do not address volatility and serve only to further limit the permissible application conditions, which were *already* unrealistically restrictive.[87] Even if applicators could follow all of the restrictions (which David Scott, pesticide program administrator of the Indiana State Chemist, thinks would be "a miracle"[88]), the label changes miss the point and are only effective for mitigating *spray* drift instead of *vapor* drift.

---

[85] *Id.*

[86] Press Release, Monsanto, EPA Supports Monsanto's Product Label Updates to Help Farmers Use Dicamba Even More Successfully in 2018 (Oct. 13, 2017), https://monsanto.com/news-releases/epa-supports-monsantos-product-label-updates-to-help-farmers-use-dicamba-even-more-successfully-in-2018/.

[87] Larry Steckel, *Revised Engenia, Xtendimax and FeXapan Herbicide Labels*, UTcrops News Blog (Oct. 19, 2017), http://news.utcrops.com/2017/10/revised-engenia-xtendimax-fexapan-herbicide-labels/.

[88] Stecker, *supra* note 50.

VI. EPA'S REGISTRATION OF THE NEW DICAMBA FORMULATIONS EMOTIONALLY AND FINANCIALLY HARMS FARMERS ACROSS THE COUNTRY

Farmers are paying the price for dicamba damage through fractured relationships with neighbors. Dicamba is splitting once friendly farming communities apart: Wildy described seeing "farmers taking sides, and enemies being made . . . [i]t's a situation that is so catastrophic and appalling, I never would have thought that I would see something like this."[89] In 2016, the dicamba conflict grew so toxic that one farmer allegedly shot and killed his neighbor during an argument.[90]

Farmers find themselves in one of two camps now: those who believe that dicamba poses too great a risk of damage to neighboring farms, and those who feel that they have no choice but to use the new dicamba formulations. Wildy falls solidly in the first camp, stating "[r]egardless of how good it is, and how much I need it, if I can't keep it from damaging my neighbor, we can't use it," while his neighbor Michael Sullivan, who chose to plant Xtend seeds and use dicamba in 2017, believes "[t]he technology is too good to just trash it."[91]

Those in the latter group argue that the dicamba damage will be a non-issue

---

[89] Charles, *supra* note 42.

[90] McCune, *supra* note 34.

[91] Charles, *supra* note 42.

once all farmers start planting the dicamba-resistant Xtend seeds. However, this "solution" ignores three critical issues: (1) the damage from dicamba extends beyond soybeans, with watermelons, vineyards, tomatoes, peas, and trees showing dicamba damage in 2017;[92] (2) farmers have a right to choose which seeds they plant and how to raise their crops; and (3) farmers should not be forced to pay a premium for Monsanto's Xtend seeds merely to protect themselves from the toxic environment EPA has created by registering the new dicamba formulations.

Farmers are already warning that they feel they have lost their freedom of choice: Missouri Farmer Michael Kemp explained that "[y]ou're going to have to buy [Monsanto's Xtend soybeans] because their chemical is drifting around."[93] Missouri soybean farmer Darvin Bentlage says that a seed dealer has explicitly pitched it to him in these terms: "You might as well buy some dicamba seeds. You know your neighbor's gonna spray it—you might as well buy it too, to keep from getting damaged."[94] As a result, some farmers have filed an antitrust lawsuit against Monsanto, arguing that they "are in effect being forced to make use of the

---

[92] Pam Smith, *Dicamba Debate Continues*, Progressive Farmer, July 12, 2017, https://www.dtnpf.com/agriculture/web/ag/news/crops/article/2017/07/12/states-contemplate-herbicide-2.

[93] Danny Hakim, *Monsanto's Weed Killer, Dicamba, Divides Farmers*, N.Y. Times, Sept. 21, 2017, https://www.nytimes.com/2017/09/21/business/monsanto-dicamba-weed-killer.html.

[94] Philpott, *supra* note 67.

new dicamba-resistant seeds."[95]

That loss of freedom will have an impact on the bottom lines of non-GMO and organic farmers. Transitioning to the genetically modified Xtend soybeans will mean that they will lose the premium for which they could have sold their crops. Those farmers will instead have to pay Monsanto a premium for the Xtend soybeans.

American farmers should not be faced with an impossible choice between risking their livelihoods or adopting an expensive technology they do not want. Yet EPA's approval of XtendiMax has put them in precisely this position. The evidence before EPA was clear that XtendiMax presented an unreasonable risk to the environment and the events of 2017 only confirm that this was the case.

CONCLUSION

For the foregoing reasons, *amici* respectfully request that the Court vacate EPA's conditional registration decision.

DATED: February 16, 2018

SHAUN A. GOHO
Emmett Environmental Law &
Policy Clinic
Harvard Law School
6 Everett Street, Suite 4119
Cambridge, MA 02138
(617) 496-3368 (office)

[95] Christopher Brown, *Dicamba Lawsuits Brought Together in Federal Trial Court*, Bloomberg BNA, Feb. 2, 2018, https://bnanews.bna.com/environment-and-energy/dicamba-lawsuits-brought-together-in-federal-trial-court.

(617) 384-7633 (fax)
sgoho@law.harvard.edu

Counsel for Amici Curiae
Family Farm Defenders, et al.[96]

[96] The Emmett Environmental Law & Policy Clinic would like to acknowledge the contributions to this brief of Heather Romero, a student in the Clinic.

CERTIFICATE OF COMPLIANCE

Pursuant to Federal Rule of Appellate Procedure 29(a)(4)(G), I hereby certify that the foregoing brief complies with the type-volume limitations in Federal Rules of Appellate Procedure 29(a)(5) and 32(a)(7)(b). It was prepared using Microsoft Word 2013 in Times New Roman 14-point font, a proportionally spaced typeface, and contains 6485 words.

/s/ Shaun A. Goho
Shaun A. Goho

CERTIFICATE OF SERVICE

I hereby certify that I electronically filed the foregoing brief with the Clerk of the Court for the United States Court of Appeals for the Ninth Circuit by using the appellate CM/EF system on February 16, 2018. I certify that all participants in the case are registered CM/ECF users and that service will be accomplished by the appellate CM/ECF system.

/s/ Shaun A. Goho
Shaun A. Goho

Form 8. Certificate of Compliance Pursuant to 9th Circuit Rules 28.1-1(f), 29-2(c)(2) and (3), 32-1, 32-2 or 32-4 for Case Number 17-70196

Note: This form must be signed by the attorney or unrepresented litigant *and attached to the end of the brief.*

I certify that (*check appropriate option*):

☐ This brief complies with the length limits permitted by Ninth Circuit Rule 28.1-1.
The brief is [ ] words or [ ] pages, excluding the portions exempted by Fed. R. App. P. 32(f), if applicable. The brief's type size and type face comply with Fed. R. App. P. 32(a)(5) and (6).

☒ This brief complies with the length limits permitted by Ninth Circuit Rule 32-1.
The brief is [6,485] words or [ ] pages, excluding the portions exempted by Fed. R. App. P. 32(f), if applicable. The brief's type size and type face comply with Fed. R. App. P. 32(a)(5) and (6).

☐ This brief complies with the length limits permitted by Ninth Circuit Rule 32-2(b).
The brief is [ ] words or [ ] pages, excluding the portions exempted by Fed. R. App. P. 32(f), if applicable, and is filed by (1) ☐ separately represented parties; (2) ☐ a party or parties filing a single brief in response to multiple briefs; or (3) ☐ a party or parties filing a single brief in response to a longer joint brief filed under Rule 32-2(b). The brief's type size and type face comply with Fed. R. App. P. 32(a)(5) and (6).

☐ This brief complies with the longer length limit authorized by court order dated [ ]
The brief's type size and type face comply with Fed. R. App. P. 32(a)(5) and (6). The brief is [ ] words or [ ] pages, excluding the portions exempted by Fed. R. App. P. 32(f), if applicable.

☐ This brief is accompanied by a motion for leave to file a longer brief pursuant to Ninth Circuit Rule 32-2 (a) and is [ ] words or [ ] pages, excluding the portions exempted by Fed. R. App. P. 32 (f), if applicable. The brief's type size and type face comply with Fed. R .App. P. 32(a)(5) and (6).

☐ This brief is accompanied by a motion for leave to file a longer brief pursuant to Ninth Circuit Rule 29-2 (c)(2) or (3) and is [ ] words or [ ] pages, excluding the portions exempted by Fed. R. App. P. 32(f), if applicable. The brief's type size and type face comply with Fed. R. App. P. 32(a)(5) and (6).

☐ This brief complies with the length limits set forth at Ninth Circuit Rule 32-4.
The brief is [ ] words or [ ] pages, excluding the portions exempted by Fed. R. App. P. 32(f), if applicable. The brief's type size and type face comply with Fed. R. App. P. 32(a)(5) and (6).

Signature of Attorney or Unrepresented Litigant: /s/ Shaun A. Goho

Date: Feb. 16, 2018

("s/" plus typed name is acceptable for electronically-filed documents)

(Rev.12/1/16)