Your Dicamba Report Card

then...

Our Dicamba Report Card

Kevin Bradley
University of Missouri
Survey of Dicamba and Xtend use and Satisfaction

Please provide the county or counties where you primarily apply pesticides or advise farmers who apply pesticides.

- Online survey sent out in fall
- *Primary respondents were those who planted the Xtend trait and/or applied dicamba in 2019
- Total # of respondents = 1081
- Not all respondents answered every question
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What category best describes you?

- Private Pesticide Applicator/Farmer: 535
- Commercial Pesticide Applicator: 315
- Farmer-Advisor: 227

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What percent of your soybean acreage did you (or your customers) plant with the Xtend trait in 2019?

<table>
<thead>
<tr>
<th>Category</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Private Pesticide Applicator/Farmer</td>
<td>67%</td>
</tr>
<tr>
<td>Commercial Pesticide Applicator</td>
<td>76%</td>
</tr>
<tr>
<td>Farmer-Advisor</td>
<td>71%</td>
</tr>
</tbody>
</table>

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What were your (or your customer’s) primary reasons for planting the Xtend trait in 2019?

- Weed Management
- Yield potential/genetics
- "Defensive" planting
- Other

Average Ranking (1=most important; 4=least important)

Farmer-Advisor (#=83)
Commercial Pesticide Applicator (#=257)
Private Pesticide Applicator/Farmer (#=424)
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Was an approved dicamba product (Engenia, Xtendimax, FeXapan) applied to your (or your customer’s) Xtend soybean acreage in 2019?

- Private Pesticide Applicator/Farmer: 393 respondents
  - Yes: 311
  - No: 82

- Commercial Pesticide Applicator: 255 respondents
  - Yes: 214
  - No: 41

- Farmer-Advisor: 164 respondents
  - Yes: 123
  - No: 41

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How was dicamba most commonly applied to your (or your customer’s) Xtend soybean acreage in 2019?

- Preplant Burndown Only: 63
- Preplant Burndown and 1 POST: 364
- Preplant Burndown and 2 POSTs: 48
- 1 POST Only: 275
- 2 POSTs Only: 54

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For any of the dicamba applications that were made on your acreage (or the acreage you advised on) in 2019, did you observe any symptoms of dicamba injury on any nearby sensitive plant species?

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Private Pesticide Applicator/Farmer (#=385)</td>
<td>78%</td>
<td>22%</td>
</tr>
<tr>
<td>Commercial Pesticide Applicator (#=252)</td>
<td>50.4%</td>
<td>49.6%</td>
</tr>
<tr>
<td>Farmer-Advisors (#=163)</td>
<td>53%</td>
<td>47%</td>
</tr>
</tbody>
</table>

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What do you believe were the primary factors that resulted in off-target movement and injury from these dicamba applications? (1=most important factor, 5=least important factor)

- Physical drift due to wind at application: 2.5
- Dicamba contamination of a spray tank/sprayer: 3.2
- Volatility and vapor drift after the application: 1.5
- Application made into an inversion: 3.2
- Other: 4.6

Average Ranking (1=most important; 5=least important)
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Did you notify the Missouri Department of Agriculture about the injury you observed from the dicamba applications that were made to your acres (or the acres you advised on) in 2019?

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What percent of the dicamba injury that you observed in your county or counties do you estimate was NOT reported to the Missouri Department of Agriculture?

![Bar chart showing percent not reported by different groups]

- Private Pesticide Applicator/Farmer (#=185): 74%
- Commercial Pesticide Applicator (#=225): 79%
- Farmer-Advisors (#=162): 73%

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Have we had Success or is it Something Else?

# of Official Dicamba-related Injury Cases Reported to the Missouri Department of Agriculture

<table>
<thead>
<tr>
<th>Year</th>
<th># of Cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>2016</td>
<td>216</td>
</tr>
<tr>
<td>2017</td>
<td>310</td>
</tr>
<tr>
<td>2018</td>
<td>135</td>
</tr>
<tr>
<td>2019</td>
<td>98</td>
</tr>
</tbody>
</table>

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Most Common Responses

1. Have notified MDA in the past but nothing has ever came of it, so no use to continue

2. Peacemaker core values, don't want to get neighbors in trouble

3. I did it to my own crops/garden/etc.
Survey of Dicamba and Xtend use and Satisfaction

Did you observe any non-performance issues or presumed weed resistance to dicamba in your Xtend soybean fields this year?

<table>
<thead>
<tr>
<th>% of Respondents</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Private Pesticide Applicator/Farmer (#=431)</td>
<td>16</td>
<td>84</td>
</tr>
<tr>
<td>Commercial Pesticide Applicator (#=279)</td>
<td>35</td>
<td>65</td>
</tr>
<tr>
<td>Farmer-Advisors (#=185)</td>
<td>31</td>
<td>69</td>
</tr>
</tbody>
</table>

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For those who answered “yes” to the previous question, what were the weed species that were NOT effectively controlled by dicamba in your field(s) this year?

1. Palmer amaranth
2. Waterhemp
3. Barnyardgrass
4. Marestail
5. Volunteer Corn
6. Giant Ragweed
7. Foxtail Species
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What do you think was the primary reason for the non-performance issues(s) on the weeds you mentioned?

- Weed is exhibiting signs of resistance to dicamba
- Antagonism with other products in the tank
- Not enough spray coverage
- Rain too soon after application
- Wrong rate
- Weeds too big at time of application

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Survey of Dicamba and Xtend use and Satisfaction

Rate your level of satisfaction with the Xtend trait and weed control system.

- Extremely Satisfied
- Moderately Satisfied
- Slightly Satisfied
- Neither Satisfied nor Dissatisfied
- Slightly Dissatisfied
- Moderately Dissatisfied
- Extremely Dissatisfied

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Survey of Dicamba and Xtend use and Satisfaction

Rate your level of satisfaction with the Xtend trait and weed control system.

<table>
<thead>
<tr>
<th>Level of Satisfaction</th>
<th>% of Responses</th>
<th>Respondents Who Did Plant Xtend (#=361)</th>
<th>Respondents Who Didn't Plant Xtend (#=43)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extremely Satisfied</td>
<td>56%</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Moderately Satisfied</td>
<td>27%</td>
<td>17</td>
<td>2</td>
</tr>
<tr>
<td>Slightly Satisfied</td>
<td>17%</td>
<td>5</td>
<td>2</td>
</tr>
<tr>
<td>Neither Satisfied nor Dissatisfied</td>
<td>10%</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>Slightly Dissatisfied</td>
<td>9%</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>Moderately Dissatisfied</td>
<td>3%</td>
<td>3</td>
<td>9</td>
</tr>
<tr>
<td>Extremely Dissatisfied</td>
<td>2%</td>
<td>2</td>
<td>2</td>
</tr>
</tbody>
</table>

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Rate the level of concern you have regarding the future use of these dicamba products and their potential impact on sensitive crops.

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Survey of Dicamba and Xtend use and Satisfaction

Rate the level of concern you have regarding the future use of these dicamba products and their potential impact on sensitive crops.

- Extremely Concerned
  - Respondents Who Did Plant Xtend (#=336): 15
  - Respondents Who Didn't Plant Xtend (#=41): 27
- Moderately Concerned
  - Respondents Who Did Plant Xtend (#=336): 40
  - Respondents Who Didn't Plant Xtend (#=41): 29
- Slightly Concerned
  - Respondents Who Did Plant Xtend (#=336): 29
  - Respondents Who Didn't Plant Xtend (#=41): 10
- Not Concerned at All
  - Respondents Who Did Plant Xtend (#=336): 16
  - Respondents Who Didn't Plant Xtend (#=41): 9

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What percent of the following soybean traits do you estimate will be planted in your county or counties in 2020?

- Xtend: 46%
- Roundup Ready: 4%
- Non-GMO: 2%
- LibertyLink GT27: 7%
- LibertyLink: 21%
- Enlist: 20%

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Now...

Our Dicamba Report Card
We aren’t very good at doing research “quickly”

We subject our research to the peer review process.
Being a Crock Pot University Researcher in a Microwave Culture

University Perspective on Company Research:

LOOK, HALF THE WORK IS DONE! ALL YOU NEED TO DO IS FILL IN THE TOP PART SO WE CAN LEGALLY SAY THE BOTTOM PART

DATA:

CONCLUSION: EATING CHOCOLATE WILL MAKE YOU LOOK YOUNGER AND THINNER
“Daddy works in a magical, faraway land called Academia.”
Top 10 Things **University** Research Has Taught us about this Dicamba Dilemma

10. Other herbicide applications made several days before or after a dicamba drift event will increase the severity of injury on non-Xtend soybean (Purdue)

9. Irrigation and/or rainfall likely reduces aerial movement of dicamba (Univ Neb, Missouri, Tenn, Arkansas)

8. Dicamba volatility is greater from leaves vs. **soil** (Univ Tennesse, Minnesota, and Purdue)
Top 10 Things University Research Has Taught us about this Dicamba Dilemma

7. Presence of dew increases dicamba volatility (Purdue and Univ Missouri)

6. Dicamba volatility is greater if applied to soils with lower pH (Univ Missouri)

5. Dicamba volatility is greater if applied w/ glyphosate and/or in low spray tank pH (glyphosate lowers spray tank pH) (Univ Minnesota, Tennessee, Missouri)
Top 10 Things University Research Has Taught us about this Dicamba Dilemma

4. Non-Xtend soybean are extremely sensitive to dicamba and will experience yield loss depending on dose and stage of growth at the time of application (almost every university with a weed scientist for the past 30+ years)

3. Higher temperatures increase the likelihood of dicamba volatility (Purdue and Univ Minnesota, Arkansas, Tennessee, others)
Top 10 Things University Research Has Taught us about this Dicamba Dilemma

2. Temperature inversions have a major impact on dicamba movement (Univ Missouri)

1. Volatility of the new dicamba products occurs for as much as 72 hours after the initial application (Univ Missouri, Tennessee, Arkansas, others)
Closing Thoughts

- Obviously there is a high level of satisfaction with the weed control and/or yield that the Xtend system provides.
- **Dicamba fatigue** has settled in; just because there aren’t reports to MDA doesn’t mean there still aren’t major issues.
- I continue to have concerns about the long-term effects this will have on our industry.
- Can LL, RR, Enlist, and conventional soybean exist in a world with Xtend?