Dicamba
2019 Growing Season

SFIREG Joint EQI & POM Meeting
September 23, 2019

-Dave Scott-
Indiana Overview

• Dicamba response resource expenditures

• Dicamba response strategy changes for 2019

• Dicamba investigation statistics & trends to date
REWARD OFFERED

FOR ANY INFORMATION ABOUT WHO IS REPORTING OUR LOCAL FARMERS TO THE ARKANSAS STATE PLANT BOARD FOR DICAMBA USE. IF YOU HAVE ANY INFORMATION, PLEASE CALL THE NAME AND NUMBER BELOW.

MR. SOMETHING
870-816-5994
Dicamba Response Expenditures
# OISC Off-Target Movement (Drift) Investigations - Ground Applications -

<table>
<thead>
<tr>
<th>Year</th>
<th>Ag Ground</th>
<th>Dicamba</th>
<th>% Dicamba</th>
</tr>
</thead>
<tbody>
<tr>
<td>2017</td>
<td>233</td>
<td>134</td>
<td>58%</td>
</tr>
<tr>
<td>2018</td>
<td>231</td>
<td>146</td>
<td>63%</td>
</tr>
<tr>
<td>As of 9/17/19</td>
<td>275</td>
<td>178</td>
<td>65%</td>
</tr>
<tr>
<td>2020</td>
<td>?</td>
<td>?</td>
<td>?</td>
</tr>
</tbody>
</table>

As of 9/17/19

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9-23-19
OISC Historic Ground Ag Drift Complaints

- Ground
- Dicamba
- 2,4-D

# INCIDENTS

- 2008: 56, 31, 11
- 2009: 41, 5, 5
- 2010: 38, 3, 3
- 2011: 39, 7, 7
- 2012: 47, 5, 3
- 2013: 71, 6, 11
- 2014: 71, 8, 13
- 2015: 71, 8, 13
- 2016: 57, 4, 10
- 2017: 233, 10, 132
- 2018: 230, 135, 168
- 2019: 275, 15, 15

9-23-19
OISC Dicamba Response Expenditures

Following are calculations used to estimate the cost to OISC of providing regulatory response and support to the use of dicamba-containing herbicides labeled for post-emergent use on soybeans.

• No societal or potential damage costs included

• No costs of diverting from other compliance obligations included
# OISC Dicamba Response Expenditures

<table>
<thead>
<tr>
<th>Year</th>
<th>OISC funds</th>
<th>EPA funds</th>
<th>Total compliance</th>
<th>Dicamba effort</th>
<th>Dicamba cost to OISC</th>
</tr>
</thead>
<tbody>
<tr>
<td>2017</td>
<td>$ 2,020,614</td>
<td>$ 426,000</td>
<td>$ 2,446,614</td>
<td>50%</td>
<td>$ 1,223,307</td>
</tr>
<tr>
<td>2018</td>
<td>$ 3,248,599</td>
<td>$ 467,479</td>
<td>$ 3,716,078</td>
<td>60%</td>
<td>$ 2,229,647</td>
</tr>
<tr>
<td>2019</td>
<td>$ 2,547,807</td>
<td>$ 435,000</td>
<td>$ 2,982,807</td>
<td>30%*</td>
<td>$ 894,842*</td>
</tr>
<tr>
<td>2020</td>
<td>$</td>
<td>$</td>
<td>$</td>
<td>%</td>
<td>$</td>
</tr>
</tbody>
</table>

* 2018 data may change
Dicamba Response Strategy
2019 Dicamba Drift Response Strategy

Need to:
• conserve dicamba response resources
• improve turn around time for investigation processing
• if misuse is a factor, change applicator behavior of dicamba users

1. Offer investigation options:
   • compliance/enforcement investigations; OR
   • documentary only investigations

2. Revise enforcement response policy for drift violations
OISC compliance/enforcement investigations

- Historically the focus of all OISC complaint investigations
- Collect defensible forensic evidence
- Attempt to identify source of off-target exposure
  - Increasingly difficult for dicamba with increased use
  - One non-target site, multiple immediate area dicamba users
- Attempt to identify cause of off-target movement
  - Drift, inversion, volatility, equipment contamination, etc...
- Take enforcement action if violation can be documented
  - Drift violation (label or state drift rule)
  - Drift management violation (label)
OISC documentation only investigations

• Previously never conducted by OISC

• **No** applicator enforcement/compliance objectives, just occurrence

• Complainant’s option at start of investigation or once on-site
  • Requires complainant of standing for personal property, but not public sites

• Limited forensic evidence collection, but instead:
  • Site visit
  • Symptomology observations & photos
  • Plant samples for PPPDL diagnosis to rule out other causes
  • Generic report documenting findings
2019 Compliance vs. Documentary Dicamba Investigations

• Alleged dicamba investigations... 178

• Compliance/enforcement investigations... 72 (40%)

• Documentary only investigations... 106 (60%)
2019...more dicamba acres, more potential sources, more investigations to conduct
2019... more dicamba acres, more potential sources (*more use on corn?*), more investigations
2019... more dicamba acres, more potential sources, more investigations to conduct
2019 Revised Enforcement Response Policy

• Off-Target Movement (Primarily Drift) ERP Guidance

• Seeking a meaningful way to change applicator behavior regarding drift & resulting violations.

• Guidance for responding to documented off-target movement violations that are based on non-compliance with pesticide label language or the state pesticide drift rule (357 IAC 1-12).
Current Maximum Penalty Schedule

• Five year period
• Private applicators:
  • $100 any violation
• All other applicators:
  • $250 first violation
  • $500 second violation
  • $1000 third or subsequent
• No fiscal incentive to change behavior
ERP Revisions

• Never revised previously to respond to one active ingredient and one use pattern, not even Imprelis

• At least 6 revisions in last 3 years

• Current draft revision
  • License suspensions & revocations
  • Identify major and minor drift violations
## 2019 Revised Enforcement Response Policy

<table>
<thead>
<tr>
<th>Violation</th>
<th>1&lt;sup&gt;st&lt;/sup&gt;</th>
<th>2&lt;sup&gt;nd&lt;/sup&gt;</th>
<th>3&lt;sup&gt;rd&lt;/sup&gt;</th>
<th>Subsequent</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Use Pesticide</td>
<td>Warning</td>
<td>Civil Penalty</td>
<td>Civil Penalty</td>
<td>Civil Penalty + 6 Month License Suspension</td>
</tr>
<tr>
<td>Restrictive Use Pesticide</td>
<td>Civil Penalty</td>
<td>Civil Penalty</td>
<td>Civil Penalty + 6 Month License Suspension</td>
<td>Civil Penalty + 5 Year Certification Revocation</td>
</tr>
<tr>
<td>Documented Human Exposure</td>
<td>Civil Penalty</td>
<td>Civil Penalty + 6 Month License Suspension</td>
<td>Civil Penalty + 1 Year Certification Revocation</td>
<td>Civil Penalty + 5 Year Certification Revocation</td>
</tr>
</tbody>
</table>
Label Misuse Violations Can Be Either:

• Violations of label performance standards:
  • It either moved off-target or it didn’t.
  • Usually requires physical evidence or adverse effect to confirm.
  • No harm (evidence), no foul.

• Violations of label design standards:
  • Proof of violation does not require an adverse effect.
  • Compliance can’t guarantee no adverse effect, but it may suggest that.
  • Usually requires applicator coop., honesty, & reporting accuracy to confirm.
  • Drift management violations.

• OISC has historically relied on performance standard violations to regulate drift.
Statistics, Trends & Data Analysis
OISC Historic Ground Ag Drift Complaints

# INCIDENTS

- Ground
- Dicamba
- 2,4-D
OISC Drift Investigations for 4 Most Frequent Active Ingredients

- Glyphosate
- Dicamba
- Atrazine
- Metolachlor
Site of Off-Target Movement

<table>
<thead>
<tr>
<th>Year</th>
<th>2017</th>
<th>2018</th>
<th>2019*</th>
</tr>
</thead>
<tbody>
<tr>
<td>non-DT soybeans</td>
<td>92%</td>
<td>94%</td>
<td>95%</td>
</tr>
<tr>
<td>melons</td>
<td>1%</td>
<td>2%</td>
<td>0%</td>
</tr>
<tr>
<td>tomatoes</td>
<td>1%</td>
<td>0%</td>
<td>1%</td>
</tr>
<tr>
<td>grapes</td>
<td>0%</td>
<td>0%</td>
<td>1%</td>
</tr>
<tr>
<td>garden</td>
<td>2%</td>
<td>1%</td>
<td>0%</td>
</tr>
<tr>
<td>ornamentals or trees</td>
<td>3%</td>
<td>2%</td>
<td>2%</td>
</tr>
<tr>
<td>other</td>
<td>2%</td>
<td>1%</td>
<td>1%</td>
</tr>
</tbody>
</table>

*data not complete or confirmed
Documentable **Cause** of Off-Target Movement

<table>
<thead>
<tr>
<th>Year</th>
<th>2017</th>
<th>2018</th>
<th>2019</th>
</tr>
</thead>
<tbody>
<tr>
<td>Confirmed dicamba exposure</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>Particle drift</td>
<td>23%</td>
<td>16%</td>
<td>?</td>
</tr>
<tr>
<td>Application during inversion</td>
<td>?</td>
<td>?</td>
<td>?</td>
</tr>
<tr>
<td>Volatilization</td>
<td>?</td>
<td>?</td>
<td>?</td>
</tr>
<tr>
<td>Failure to clean spray equipment</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Undeterminable</td>
<td>77%</td>
<td>84%</td>
<td>?</td>
</tr>
</tbody>
</table>
### Dicamba Investigation Violation Rate

<table>
<thead>
<tr>
<th>Year</th>
<th>2017</th>
<th>2018</th>
<th>2019*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Off-target dicamba symptomology</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>Drift/performance violation**</td>
<td>23%</td>
<td>16%</td>
<td>?</td>
</tr>
<tr>
<td>Drift mgmt./design violation</td>
<td>85%</td>
<td>79%</td>
<td>?</td>
</tr>
<tr>
<td>No violation documented</td>
<td>15%</td>
<td>21%</td>
<td>?</td>
</tr>
</tbody>
</table>

*Data not complete or confirmed
**Mgmt. violn. always when drift violn.
Violation Rate: Overall Ag Ground vs. Dicamba

2008: 51.79% Dicamba, 46.34% Ground
2009: 20.00% Dicamba, 20.00% Ground
2010: 33.33% Dicamba, 50.00% Ground
2011: 0.00% Dicamba, 0.00% Ground
2012: 56.41% Dicamba, 65.96% Ground
2013: 78.87% Dicamba, 69.01% Ground
2014: 50.00% Dicamba, 46.15% Ground
2015: 46.15% Dicamba, 59.15% Ground
2016: 52.63% Dicamba, 60.00% Ground
2017: 83.58% Dicamba, 75.11% Ground
2018: 72.60% Dicamba, 62.77% Ground
2019: 0.00% Dicamba, 0.00% Ground

DICamba
Ground
2017 & 2018 Dicamba Investigation Violation Summary

• Actual physical drift documented with evidence ~ 20%
• Cause of off-target movement indeterminable by investigation ~80%
• Drift management violations documented ~ 82%
• Drift management violations always documented when drift is documented.
• Drift mgmt. violation is not the sole cause of off-target movement
• Can the 80% of indeterminable causes be attributed to volatility or to impractical label restrictions?
2019 OISC Field Staff Observations to Date

• 10 investigators, most in year 3 of dicamba response

• Best guess of cause of movement based on available evidence?
  • Volatility...overwhelming first choice
  • Inversion...can’t distinguish from volatility symptoms or prove/disprove, but application timing did not seem to be an issue.
  • Physical drift at time of application...some #2, but mostly #3

• OISC staff survey results matched 2019 Illinois Fertilizer & Chemical Association (IFCA) Dicamba Survey results as top 3 and order.
What does dicamba success look like?

# INCIDENTS

![Graph showing the number of incidents over years for dicamba and 2,4-D.]
## 2019 Alleged Dicamba Off-Target Movement
**Complaints as of September 11, 2019 for Top Ten Soybean Producing States***

<table>
<thead>
<tr>
<th>State</th>
<th>2017 Soybean Production (bu)</th>
<th># Dicamba Complaints*</th>
<th>Complaints/Bushel X 10^{-6}</th>
<th>2019 Dicamba Cut-off Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>IL</td>
<td>611,900,000</td>
<td>708</td>
<td>1.16</td>
<td>June 30/July 15</td>
</tr>
<tr>
<td>IA</td>
<td>561,610,000</td>
<td>123</td>
<td>0.219</td>
<td>none</td>
</tr>
<tr>
<td>MN</td>
<td>380,230,000</td>
<td>20</td>
<td>0.00526</td>
<td>June 20</td>
</tr>
<tr>
<td>NB</td>
<td>327,700,000</td>
<td>43</td>
<td>0.131</td>
<td>none</td>
</tr>
<tr>
<td>ND</td>
<td>326,025,000</td>
<td>2</td>
<td>0.00613</td>
<td>July 10</td>
</tr>
<tr>
<td>IN</td>
<td>320,760,000</td>
<td>167</td>
<td>0.521</td>
<td>none</td>
</tr>
<tr>
<td>MO</td>
<td>289,590,000</td>
<td>88</td>
<td>3.04</td>
<td>none</td>
</tr>
<tr>
<td>OH</td>
<td>251,955,000</td>
<td>25</td>
<td>9.92</td>
<td>none</td>
</tr>
<tr>
<td>SD</td>
<td>241,230,000</td>
<td>14</td>
<td>5.80</td>
<td>June 30</td>
</tr>
<tr>
<td>AR</td>
<td>178,500,000</td>
<td>207</td>
<td>1.16</td>
<td>May 25</td>
</tr>
</tbody>
</table>

* Not confirmed
Comments or Questions?

Thank you!

Dave Scott
scottde@purdue.edu
765-494-1593