Dicamba

Dicamba Tolerant Crop Uses

North America Annual Regulatory Conference 2013
June 4 - 6, 2013
Doubletree at Hilton Hotel, RTP, NC

Jeff Birk and Scott Jackson
Registration

Monsanto will submit for Engenia + gliphosate premix after Engenia after trait deregulation.

Monsanto will submit for Clarity + gliphosate premix use on DT soybean.

Pending and Planned in the US

Dicamba Product Registrations
DT soybean and cotton trial deregulation expected mid-2015 or later

- Will provide a better indication of expected timelines for completion
- Expected to be available for review in June 2013

USDA is required to provide a work plan for the EIS

Triggers USDA to develop an Environmental Impact Statement (EIS)

USDAs could not conclude from their environmental assessment (EA)

New Challenges and Opportunities

USDA Environmental Impact Statement
New Challenges and Opportunities

USDA Environmental Impact Statement
BASF has conducted non-guideline field flux studies to quantify dicamba volatility.

DICamba drift

BASF has taken proactive measures to address this concern.

EPA continues to be concerned about the potential for off-target movement of dicamba.

Physical Drift and Volatility

Off Target Movement Concerns
New dicamba crop residue studies are being initiated in 2013 to allow for the setting of dicamba residue tolerances in over 200 crops. Dicamba residues resulting from spray drift.

The first new crop tolerances are expected to be established in 2015 with priorities set based on crop value, importance and occurrence of nut and vegetable crops that may be exposed to dicamba spray drift.
BEAD and HED.

EPA attendance is expected from Product Management teams, EFD.

Crop awareness programs, including use of proximity tools for improved sensitive area and stewardship.

Strategies for advancing applicator education and product stewardship.

Technology

Spray drift - causes and management, including latest advances in nozzle.

Herbicide resistant weeds - population development and management.

BASF will be hosting a field day for EPA/USDA to demonstrate.

University of Maryland, Beltsville, MD Research Station

EPA/USDA Field Day
Currently evaluating the opportunity to register this source in other regions.

Increase in dicamba technical demand by 10.5.

A U.S. registration strategy has been outlined that will meet the expected
current Chinese dicamba production capacity is sold out.

Yangnong will add new capacity 30/13.

Negotiations with Yangnong are ongoing to secure the source for BASF.

Yangnong (China) has been identified as a possible new source.

To address short and intermediate term demand for dicamba technical,

FOR USE IN US PRODUCTS ONLY

New Dicamba Technical Source
DT cotton

Additional DT soybean varieties/certification will be available as well as

herbicide system

Develop tank mix additive or other improvements for the Engenia

target crop residue tolerances in 2015/2016

Manage inadvertent residues from spray drift with EPA approved non-

source in 2015

Allieviate anticipated supply issues with new EPA approved dicamba

EIS Delays = Opportunity

Making the Most of the Available Time
of Buffers - 2012
Deposition Data for Determination
Development of Ground Spray
We did both II

OR

Field Trial

Wind Tunnel

There are 2 paths...

How do we get these improvements?

Spray Buffer Improvements
<table>
<thead>
<tr>
<th>Treatment Formulation</th>
<th>Rate (lb/ac)</th>
<th>Carrier Volume (gpa)</th>
<th>Speed (mph)</th>
<th>Nozzle</th>
<th>Travel</th>
</tr>
</thead>
<tbody>
<tr>
<td>BAS 183 22 H</td>
<td>7</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>BAS 183 22 H</td>
<td>4</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>BAS 183 22 H</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

Table 1: Study Treatments

3 Tank Mixes, 3 Nozzles, 2 Wind Speeds

B) Wind Target 10-15 mph
A) Wind Target 3-5 mph
Sample collector placement intervals: 4, 8, 16, 32, 45, 60, 75, 90, 105, 120 m

Figure 1. Field layout with sample collector placement.

Field Design Diagram
Deposition Variability Across the Field

3 Sampling Lines
<table>
<thead>
<tr>
<th>Wind Speed</th>
<th>106</th>
<th>108</th>
<th>110</th>
<th>112</th>
<th>114</th>
<th>116</th>
<th>118</th>
</tr>
</thead>
<tbody>
<tr>
<td>High Speed</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0-380</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>381-779</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>780-1168</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1179-1568</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1579-1968</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low Speed</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0-380</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>381-779</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>780-1168</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1179-1568</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1579-1968</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Results*
Meeting to be scheduled to present data to EPA

Final Report has been submitted to EPA

Concluding Our Work
air borne chemical movement - 2013
Comparison of multiple sampling methods for evaluation of off field
Additionally it was deemed important that BASF generate data on our own product to put into perspective data generated by others on our product. This work is viewed as proactive work to counter claims by activists and errant researchers.

This study is intended to document oversampling and poor correlation of 3D active air sampling when compared to mainstream techniques such as rotod sample and deposition collectors.

Potential errors of the samplers in an attempt to quantify the unnatural movement of particulates to the samplers. Infield doppler instruments will be used in tandem with air
<table>
<thead>
<tr>
<th>Nozzle</th>
<th>Volume GPA</th>
<th>Rate</th>
<th>Product</th>
<th>Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>XRG0002,</td>
<td>30</td>
<td>44 1/2</td>
<td>Roundup</td>
<td>4</td>
</tr>
<tr>
<td>XRG0004,</td>
<td>30</td>
<td>16 1/2</td>
<td>Clarity</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>30</td>
<td>6</td>
<td>Pursuit</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>30</td>
<td>4</td>
<td>Weeder</td>
<td>1</td>
</tr>
</tbody>
</table>

Treatments (4 actives, 3 nozzles)
Analysis is expected to begin soon.

Analytical methods are operational.

All samples are at the lab.

Study Status
BASF
The Chemical Company