What We Know About 2017 Dicamba Use & Related Activities To Date

151st Meeting
Indiana Pesticide Review Board

August 30, 2017

-Dave Scott-
Office of Indiana State Chemist

Brief History

- 2007…IPRB began studying new 2,4-D & dicamba tolerant crop technologies & potential for non-target impacts from widespread use
- 2016…Monsanto introduced DT soybeans into marketplace
- 2016… Some applicators misuse old dicamba formulations resulting in hundreds of off-target damage complaints in AR, MO,…
- November 30,2016…IPRB voted to initiate RUP rule making process

Brief History

- Dec. 2016-Feb. 2017….EPA registered new dicamba formulations
- April 7, 2017…Indiana OMB grants exemption from rule moratorium
- June 7, 2017…Proposed rule published in Indiana Register
- July 6, 2017…Public hearing on proposed rule (extend hearing record)
- July, 2016…dicamba damage complaint #s explode in upper Midwest
- August 30, 2017…IPRB to vote on final rule

Office of Indiana State Chemist

Pesticide

Dicamba Herbicide Updates

Dicamba containing herbicides, including new formulations such as XtendiMax with VaporGrip Technology (EPA Reg. No. 524-617), Engenia Herbicide (EPA Reg. No. 7969-345), and FeXapan Herbicide Plus VaporGrip Technology (EPA Reg. No. 352-913) have been in the news recently based on off-target movement (drift) complaints being filed with pesticide regulatory officials in Indiana and other states.

This website is intended to provide interested parties with the most up to date information related to the status of those complaints and the regulatory activities associated with dicamba herbicides in Indiana.

1. As of August 15, 2017, the Office of Indiana State Chemist (OISC) has received 239 total drift complaints for 2017, and 115 of those drift complaints are alleged to involve a Dicamba herbicide.
2. Dicamba Outreach - What You Should Know About Purchasing and Using Dicamba-Based Herbicides (pdf, 46kb)
3. Dicamba Use Outreach - Dicamba Use on Soybeans in Indiana (pdf, 37kb)
4. **Proposed Rule** - Restricted Use Classification of Dicamba Containing Herbicides
5. Options for Dealing with a Pesticide Drift Incident (PPP-110) (pdf, 658kb)
6. How to File a Fertilizer or Pesticide Complaint (pdf, 30kb)
7. Filing a Pesticide or Fertilizer/Manure Complaint (pdf, 86kb)
8. Understanding Soybean Response to Dicamba (BASF) (pdf, 1,333kb)
9. What have we learned so far about these incidents?
10. Association of American Pesticide Control Official (AAPCO) Dicamba page
11. Dicamba: EPA Meeting with State Representatives (07-13-17) (pdf, 122kb)
12. Removing Herbicide Residues from Agricultural Application Equipment (How Proper Cleaning Helps Prevent Crop Damage and Improves Performance)
13. County by County Map of Vegetation Samples Submitted to Purdue's Plant and Pest Diagnostic Laboratory (PPDL) for Identification of Dicamba Exposure Symptomology (08-14-17) (pdf, 60kb)
14. Response of Roundup Ready Soybean Yield to Dicamba Exposure (source: Purdue Extension)
15. Response of Glyphosate-Tolerant Soybean Yield Components to Dicamba Exposure (source: ResearchGate)

2017 outreach to users regarding legal use

- Written regulatory position & outreach
- Coordination with retailer associations
- Direct communication with retailer agronomists
- Media coverage
- Commercial & private applicator CEU programs:
  - OISC; Purdue CES; Industry (OISC monitored)

Office of
INDIANA STATE CHEMIST AND SEED COMMISSIONER
Protecting Indiana's Agriculture and Environment - Feed, Fertilizer, Pesticide and Seed

Purdue University • 175 South University Street
West Lafayette, IN 47907-2063
Telephone (765) 494-1492 • Facsimile (765) 494-4331
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Robert D. Waltz, Ph.D.
State Chemist &
Seed Commissioner

February 21, 2017
What You Should Know About Purchasing & Using
Dicamba-Based Herbicides

Regulatory Action in Indiana:

In response to requests for regulatory safeguards to protect non-target sites and crops, the IPRB voted unanimously on November 30, 2016 to start the rulemaking process to classify dicamba herbicides as state Restricted Use Pesticides (RUPs) for Indiana.

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February 21, 2017

Dicamba Use on Soybeans in Indiana

New Labels, New Requirements, & New Uses of Dicamba on Soybeans:

Currently there are three dicamba soybean products that have been accepted by U.S. EPA and are registered for use in Indiana in 2017, Monsanto's **XtendiMax with VaporGrip Technology** (EPA Reg. No. 524-617), BASF's **Engenia Herbicide** (EPA Reg. No. 7969-345), and DuPont's **FeXapan Herbicide Plus VaporGrip Technology** (EPA Reg. No. 352-913)**.**

The labels for these products have use directions and restrictions, many of which may be new to pesticide applicators. The below-listed requirements and restrictions apply to each of these products, unless specifically marked with the product name.

DICAMBA USE ON SOYBEANS IN ILLINOIS

The Pesticide Label is the LAW

Stewardship Do's and Don'ts

Illinois Fertilizer & Chemical Association
Supply • Service • Stewardship

DO use only the two products that are approved in Illinois for post-emerge use on Roundup Ready 2 Xtend™ soybeans: **Engenia (BASF) and XtendiMax with VaporGrip (Monsanto).**

DO NOT apply any other dicamba herbicides to Xtend soybeans. Doing so is a **serious violation** of the Illinois Pesticide Act (415 ILCS 60/1). Misuse will be investigated by the Illinois Department of Ag and willful violations of the Pesticide Act can be treated as a Class A Misdemeanor with fines ranging from $5,000 to $10,000. Misuse can also lead to civil litigation and threaten the continued availability of these products for agricultural use.

DO utilize a pre-emerge weed management program to help ensure effective early-season weed control.

DO NOT use Engenia and XtendiMax as a rescue treatment. They are **NOT** meant to be the only herbicide used to control weeds in soybeans.

DO NOT tank mix Engenia or XtendiMax with any other products such as ammonium sulfate, UAN, adjuvants or other herbicides without first consulting the product websites to determine if or when a tank mix is approved for these products. Go to *www.engeniatankmix.com* or *www.xtendimaxapplicationrequirements.com*.

DO thoroughly read and follow ALL label directions for Engenia and XtendiMax including weed height, wind speed restrictions, spray nozzle selection and boom height, required buffer zones, product use restrictions and scouting for sensitive crops. **It is equally vital to KNOW WHEN NOT TO APPLY these products to protect non-target, sensitive crops.**

DO consult FieldWatch™ (*www.fieldwatch.com)* and access their program DriftWatch™ to assist in identifying the location of sensitive specialty crops in your area such as vineyards, nurseries and vegetable crops. Take special precautions to ensure the fields being treated are Xtend soybeans and avoid all contact with non-Xtend soybeans.

driftwatch™
Specialty Crop Site Registry
by FieldWatch

DO NOT VIOLATE THE PESTICIDE LABEL. Talk to your crop adviser and ag retailer about viable options for weed control in soybeans. The continued availability of this new post-emerge technology depends upon everyone making good management decisions and complying with the pesticide label.

INDIANA
PrairieFarmer®

Open for business

KEY POINTS

- New TruHorizons facility represents a huge investment in Indiana.
- More competition for grain should improve marketing opportunities.
- TruHorizons' services will extend beyond just accepting grain.

BY DARRELL BOONE

DON ZOLMAN and hundreds of other Indiana farmers have a new option for marketing grain and buying inputs. When the newly constructed TruHorizons elevator near Milford in northern Kosciusko County started receiving grain on Sept. 8, it marked a new chapter in the way grain is marketed in northern Indiana.

"This is a pretty impressive facility, and

LIKES OPPORTUNITIES: Don Zolman is one of many farmers who believe the new TruHorizons grain complex will open up more marketing opportunities.

Hartstack says
to send a train off
southeastern U.S.
whichever market i
raise basis levels fo
70-mile radius of th

MARKETING HELP

Another plus for T
is Cargill's grain ma
expertise in world
able to sell grain i
or Gulf markets, Ca
tomers get the bes
at the elevator. If s
and options wizard
help walk them thr

Cargill has a num
the umbrella of its
keting contract ser
and risk managem
customers to asse
ation, evaluate the
ance and marketing
the right program,

Office of Indiana State Chemist
175 S. University Street, West Lafayette, IN 47907-2063

Request for Continuing Certification Hour (CCH) Approval Worksheet

1. **PROGRAM/CONFERENCE** (as this program will be advertised and posted):

Title: Spray Clinic | Meeting Address: 5501 S State Road 9

City: Columbia City | State: IN | Zip Code: 46725

2. **PROGRAM SPONSOR CONTACT** (this is the address where the attendance sheets will be emailed):

Name: John Woodmansee | Address: 115 S Line Street

City: Columbia City | State: IN | Zip Code: 46725

Telephone: 260-244-7615 | Fax: 260-244-6751 | E-mail: jwoodman@purdue.edu

3. **DATE(S) OF THE CONFERENCE**: Start Date: 03/07/2017 | End Date: 03/07/2017

Registration/Website URL: Scott Chanley, Ag Plus, Inc. 260-358-7210

4. **AGENDA** (list only those presentations for which you are seeking CCH approval):

Date: 03/07/2017 | Start Time: 9:00 a.m. | End Time: 10:30 a.m.

Speaker/Presenter (name and affiliation): BASF – Gery Welker, Technical Service Representative, John Nicholson, Business Representative, & Nathan Stelzel, Grower Agronomy Representative

Brief Description of Content (see item 4b of instructions for help):

Engenia label updates, Formulation differences, Xtendimax vs. Engenia labels, Spray technology advancements, Tank and system clean-out, application guidelines, tank contamination.

Requesting CCHs in Category(ies): 1, RT

(2nd) AGENDA (list only those presentations for which you are seeking CCH approval):

Date: 03/07/17 | Start Time: 10:45 a.m. | End Time: 11:15 a.m.

Speaker/Presenter (name and affiliation): John Woodmansee, Extension Educator

Rule 17. State Restricted Use Pesticide Products

357 IAC 1-17-1 State restricted use pesticide products

Authority: IC 15-16-4-50
Affected: IC 15-16-4; IC 15-16-5

Sec. 1. Pesticide products defined by the following categories or active ingredients are designated and classified as restricted use pesticides in the state of Indiana:

(1) Any pesticide classified by the U.S. Environmental Protection Agency as a restricted use pesticide.

(2) All formulations containing methomyl (Chemical Abstracts Service Reg. No. 16752-77-5).

(3) Any dicamba containing pesticide product bearing a label indicating the herbicide:

(A) contains a dicamba active ingredient concentration greater than or equal to 6.5 percent; and

(B) is intended for agricultural production uses but:

(i) does not also contain 2,4-D as an active ingredient; or

(ii) is not labeled solely for use on turf or other non-agricultural use sites.

Office of Indiana State Chemist
Public Submitted Comments

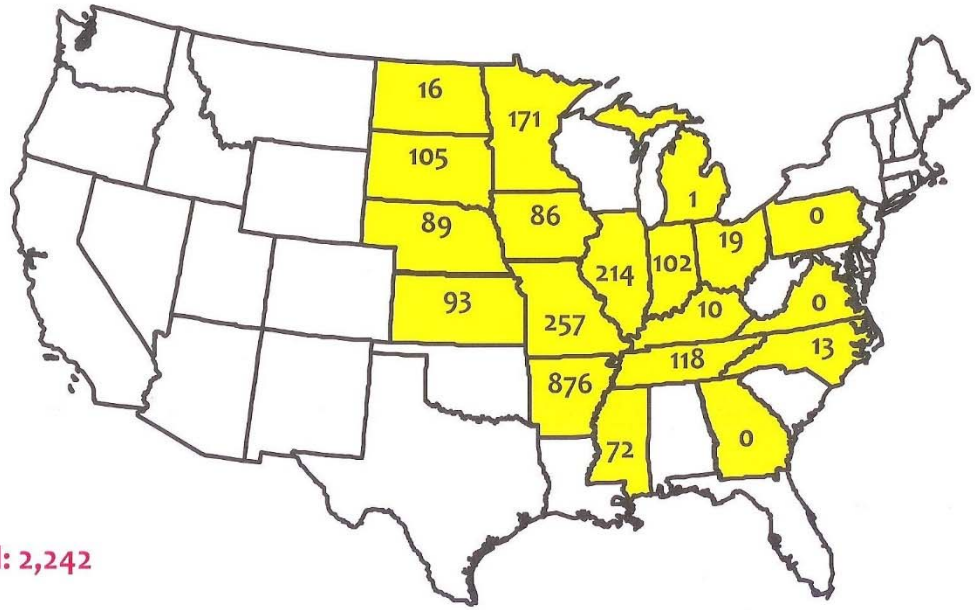
Comments regarding LSA#17-180 - Restricted Use Classification of Dicamba Containing Herbicides**:**

- Indiana Farm Bureau (07-05-17) (pdf, 647kb)
- Wallis Farms (07-14-17) (pdf, 61kb)
- Agribusiness Council of Indiana (07-15-17) (pdf, 499kb)
- Truax Family Farms (07-20-17) (pdf, 14 kb)
- Shannon Barr (07-21-17) (pdf, 12kb)
- Middlesworth Farm (07-20-17) (pdf, 51kb)
- Lewis Flohr (07-31-17) (pdf, 59kb)
- Winery Vineyard Association (07-29-17) (pdf, 75kb)
- Larry Hancock (08-07-17) (pdf, 65kb)

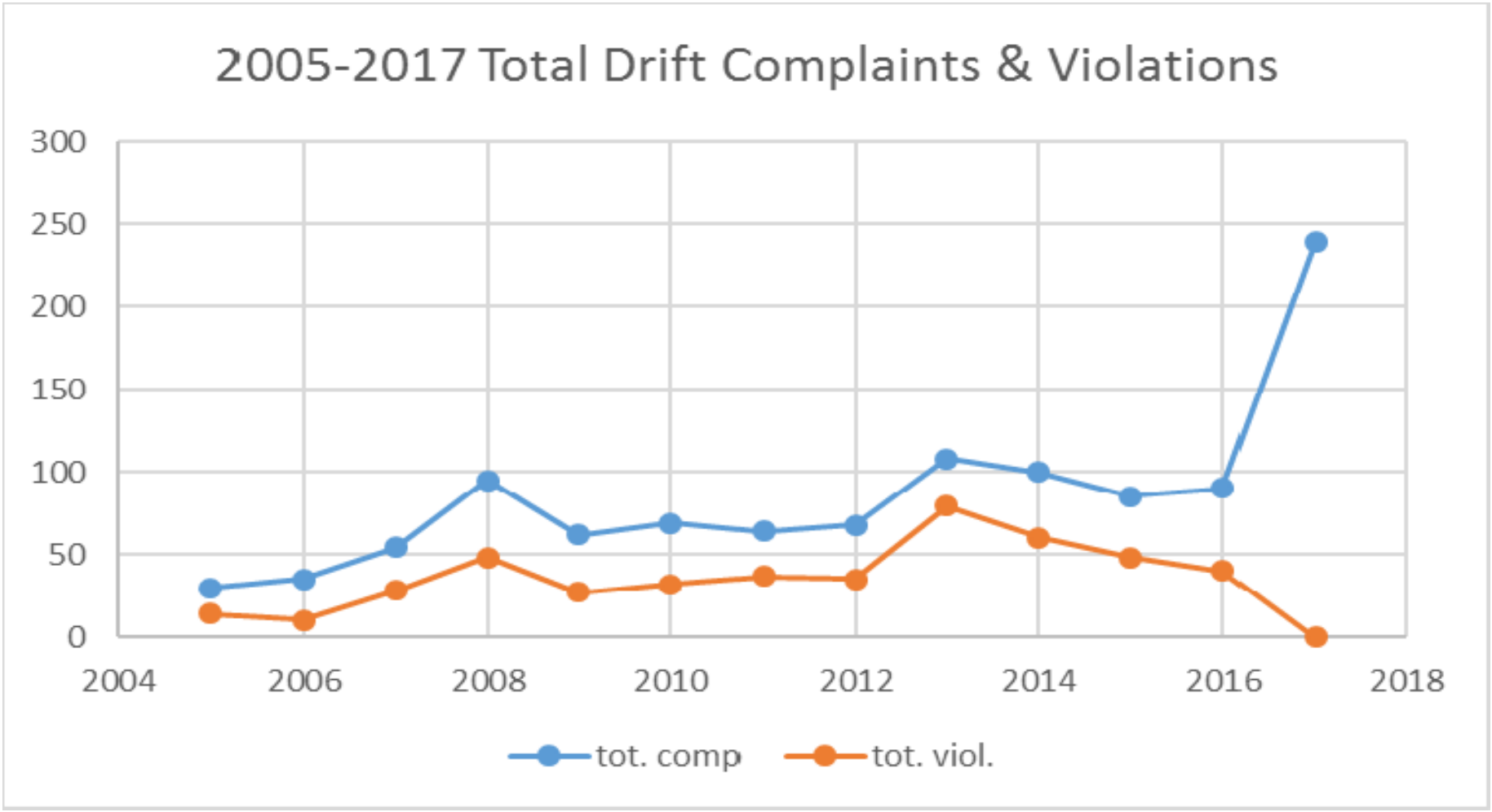
One Farmer Commenter:

…I am very hopeful there are meaningful changes made for the use of this Dicamba chemistry in Indiana and the Nation soon. The consequences of in-action, or very little label change will result in lawsuits, poor neighbor relations, a non-farm public that will become agitated over the movement of this chemistry, and money in the pockets of giant corporations like Monsanto and BASF and lower profits for farmers of Indiana who have damages and/or who are forced to “pay up” for Monsanto’s dicamba tolerant seed.

Official Dicamba-related Injury Investigations as Reported by State Departments of Agriculture (*as of August 10, 2017)



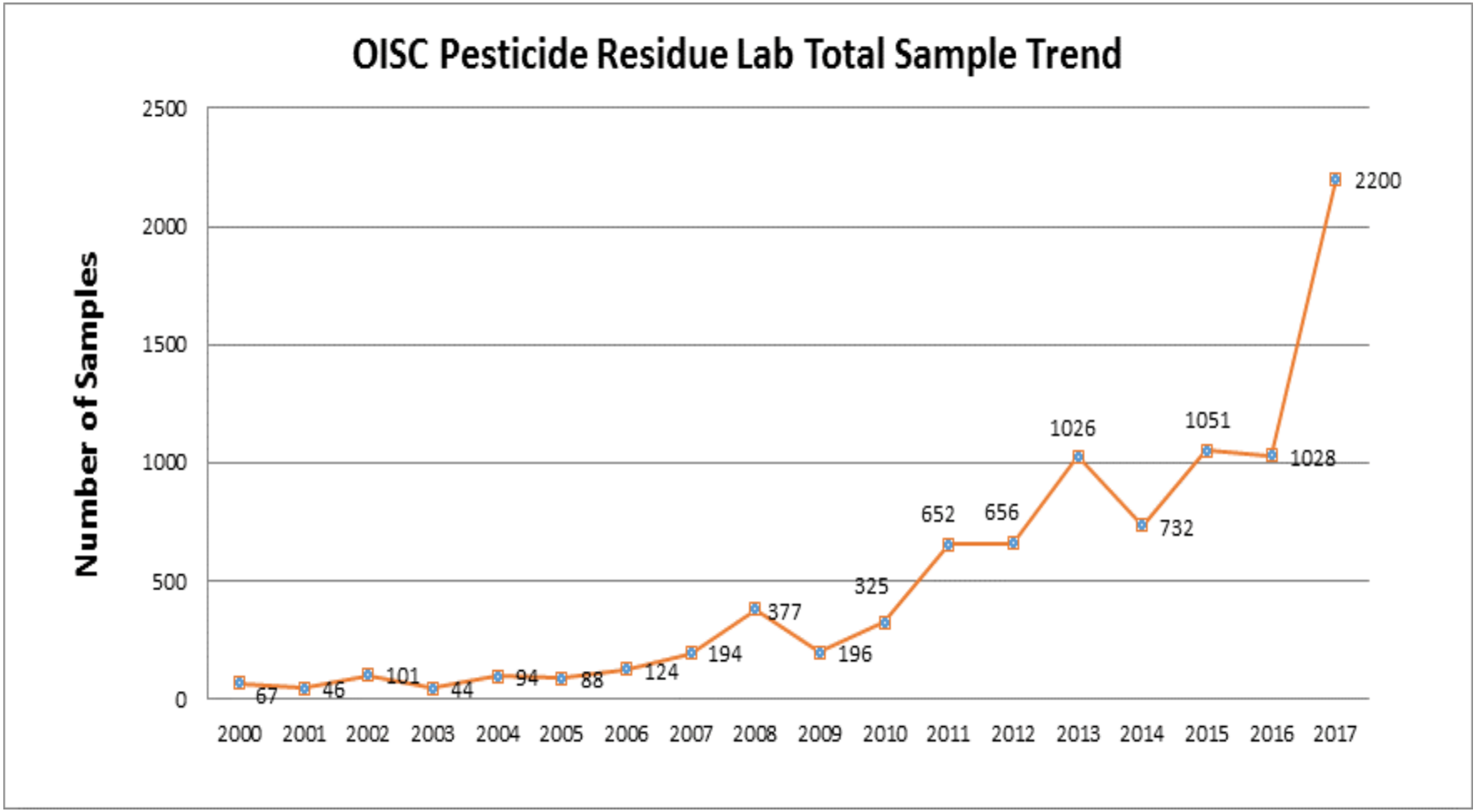
*Total: 2,242


2005-2017 Total Drift Complaints & Violations
300
250
200
150
100
50
0
2004
2006
2008
2010
2012
2014
2016
2018
tot. comp
tot. viol.

Recent Drift & Dicamba Data for Indiana

Year	Total Drift	"Dicamba"
2013	92	3
2014	83	5
2015	81	8
2016	74	3
2017	244	119

- As of August 25, 2017


OISC Pesticide Residue Lab Total Sample Trend
Number of Samples
2500
2000
1500
1000
500
0
67
46
101
44
94
88
124
194
377
196
325
652
656
1026
732
1051
1028
2200
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017

2017 Plant Samples Submitted to PPDL for Dicamba Symptomology Checks

(as of 08/14/17)

Investigation Objectives & Challenges

- Objectives:
  - Were off-target exposures caused by dicamba or something else?
  - Who was the source of the dicamba exposure?
  - Was new or old formulation dicamba used?
  - Was off-target exposure from drift, run-off, sprayer contamination, temperature inversion, volatilization, legal use or “off-label” use?
  - If misuse, what parts of the label were violated?

- Challenges:
  - Addressing all/most objectives with credible scientific evidence.
  - Collecting, processing, & evaluating this volume investigation data.
  - Identifying effective corrective actions in a timely manner.

Dicamba Investigation Spreadsheet

- Case #
- County
- City
- CA/PA/ No credential
- Pesticide(s) applied
- Target site/crop
- Non-target site/crop
- Application Date
- Symptoms 1st observed
- Sampling date
- Symptom/damage pattern
- Wind direction
- Wind speed
- Direct drift
- Temperature inversion
- Volatility
- Tank contamination
- Runoff
- Violation documented
- Violation cited

Dicamba Drift Investigation Procedures

- Respond within 5 days of tip/complaint
- Record complainant observations/statement
- Record complainant's recent pesticide use
- Record applicator's observations/statement
- Collect application records and/or *Pesticide Investigation Inquiry*
- Determine applicator credentialing
- Survey incident site
  - Create map, diagram, or aerial photo depicting structures, field boundaries, roads, lakes, streams, landmarks, trees, ornamentals, crops, impacted areas, photos/videos, samples, potential sources of exposure.
- Verify specific pesticides/labels applied
- Collect weather data (NWS or Weather Underground)
  - Triangulate if different from witness data

Investigation Sampling & Analysis

- Vegetation, soil, swab, or multiples, depending on active ingredients
- Similar environmental media and sample type when possible
- Impacted area/field
- Drift gradient sampling (least to most)
- Required buffer area
- Suspected target field or fields

- Analyze for dicamba & metabolites
- Analyze for tank mix partners…source?
- Try to distinguish between targeted, drift, & volatilization levels
- Try to correlate residue levels with symptom/damage levels

Investigation Challenges

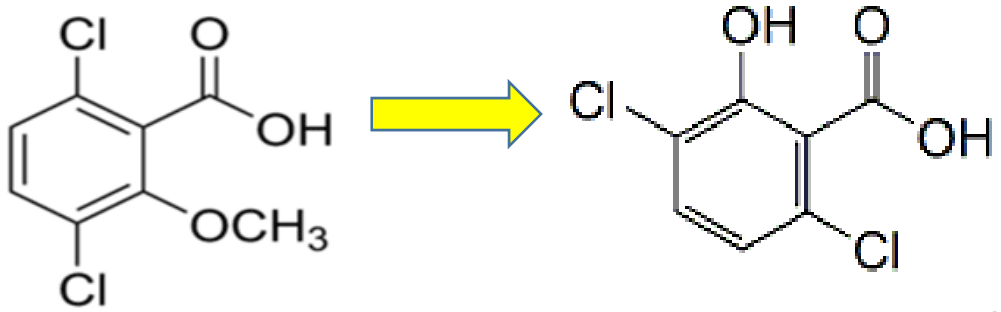
- Source could be multiple applicators, multiple appl. dates
- Source may not be limited to immediately adjacent field
- Buffer compliance may not be possible from sampling
  - Dicamba (metabolite) residues short lived in environment
- Drift/inversion/volatility may not be possible from sampling
  - Dicamba causes symptoms at sub-analytical levels
  - Part per trillion to single digit part per billion levels

Dicamba in the Environment

- Volatile- agriculture drift potential
- Dicamba salts and acid very soluble in water
- Half life in soil 4-20 days

- Metabolites
  a) 5-hydroxydicamba- not very stable
  b) 3,6-dichlrosalicylic acid (DCSA)- relatively stable

- DCSA is the major degradant, more stable than the parent compound Dicamba. At label use rate, DCSA can be detected in soil after 4-5 months.



Dicamba Fate in the Plants

- GMO (DT soybeans)
  - Quickly degraded
  - Dicamba → DCSA (hours to days)
  - Then DCSA → DCGA (after ~30 days)

- Non-GMO
  - Dicamba→ 5-OH Dicamba → DCSA
  - Half life= 8-28 days
  - Symptoms may not appear for 2-4 weeks

Case 2017/0935 K. Neal

- Application 6/5 ; Sampling 6/30
- Xtendimax + Roundup

	Dicamba	DCSA	5-OH Dicamba	Glyphosate
Soybean Rose field	**5**	**612**	**0**	**29590**
Veg between Trout and Rose soybean	**448**	**13**	**14**	**1920**
Soybean Trout field	**2**	**0**	**0**	**28**
Trout soybean Southeast corner	**0**	**0**	**0**	**14**

Case 2017/0993 K. Neal

- Products applied: Status (applied to target corn field) and Roundup
- Application xx/xx; Sampling 7/12

	Dicamba	DCSA	5-OH Dicamba	Glyphosate
Soybean Holscher	**0**	**0.4**	**0**	**TBD**
Soybean Horrall	**0**	**0**	**0**	**TBD**

17-0993 Horrall Soybeans

Case 2017/0951 S. Farris

- Application xx/xx ; Sampling 7/12
- Engenia + First Rate (Cloransulam-methyl) + Avalanche Ultra(Aciflurofen)

	Dicamba	DCSA	5-OH Dicamba	Cloransulam-methyl
Soybean Target field	**0**	**7.4**	**0**	**0**
Soybean vegetation 50 feet away east of target field	**BQL**	**BQL**	**0**	**0**
Soybean vegetation 120 feet away east of target field	**0**	**0**	**0**	**0**
Soybean vegetation 240 feet away east of target field	**BQL**	**0**	**0**	**BQL**

Off Target Soybeans
Case 17-0951

Case 2017/0832 S. Farris

- Application 5/25; Sampling 6/12
- Xtendimax

	Dicamba	DCSA	5-OH Dicamba
Victim Soybean 210 ft away from target	**25**	**0**	**0**
Victim Soybean 120 ft away from target	**26**	**0**	**0**
Victim Soybean 60 ft away from target	**19**	**0**	**0**
Target soil 54 ft from east victim's field	**993**	**87**	**2**
Target soil 110 ft from east victim's field	**770**	**170**	**0**

Investigation Challenges

- Reliable recorded weather data (wind & inversion) may be unavailable.

- Product ID, boom height, nozzles, ground speed, tank cleaning, buffers, tank mixes, susceptible crop awareness, etc. all rely on voluntary accurate records or truthfulness of applicator.

- No effective means to assess extent of impacts unless plant death or wait for yield data(state rule).

Compliance & Enforcement

"The Indiana Pesticide Review Board has urged OISC to apply the most stringent penalties available for violators whose actions might jeopardize the successful introduction of this new much-needed weed management option."

February 21, 2017 "Dicamba Use on Soybeans in Indiana"
http://www.oisc.purdue.edu/pesticide/pdf/dicamba_use_outreach_022117.pdf

Compliance & Enforcement (max. penalties)

- Farmers (private applicators)
  - $100, regardless of violation number or type
  - Certification suspension or revocation (5 years max.)

- Commercial applicators (for hire)
  - $250, first drift violation
  - $500, second drift violation
  - $1000, every subsequent violation within last 5 years
  - License or certification suspension (5 years max.)

The current rumor mill suggests…

- All-OISC Twitter Account
  - Over 100,000 tweets since inception
  - 333 active followers
  - Avg. 781 views of any tweet with “dicamba” in it
- Non-DT seed producer suggests to OISC that only about one of ten dicamba complaints being filed with OISC
  - Complaint may void or lessen crop insurance?
- Some glufosinate herbicides (Liberty Link) suggested to be contaminated with low-level growth regulator herbicides
- EPA may be in negotiations with registrants to do something w/labels

Where do we go from here?

- Finalizing all investigations will take many months.
- Having definitive data at the end is not a given.
- Farmers are making seed purchase decisions now.
  - Plant DT soybeans defensively for 2018?
  - Will more extensive 2018 use push complaints to “other” sites?
- For regulators, a 2018 similar to 2017 will require a significant realignment of resources and priorities.
  - OISC already has plans to add 2 additional chemists & $ 1.0 million of new equipment to meet analytical demands.
- AAPCO/SFIREG planning a nationwide stakeholder work group to discuss potential solutions.

Comments or Questions ?

Thank you !

Dave Scott

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