THE OHIO STATE UNIVERSITY

COLLEGE OF FOOD, AGRICULTURAL, AND ENVIRONMENTAL SCIENCES

Herbicide Drift: What's a Farmer to do?

Doug Doohan and Roger Downer

Dept. Horticulture & Crop Science

OSU/OARDC

Outline of Presentation

- Nature of the risk
- Drift Detection
- Protect Your Farm

Drift Will Happen – Protection is Needed

Particle Drift

- **the physical movement of spray droplets away from the target site at the time of application.**

Vapor drift

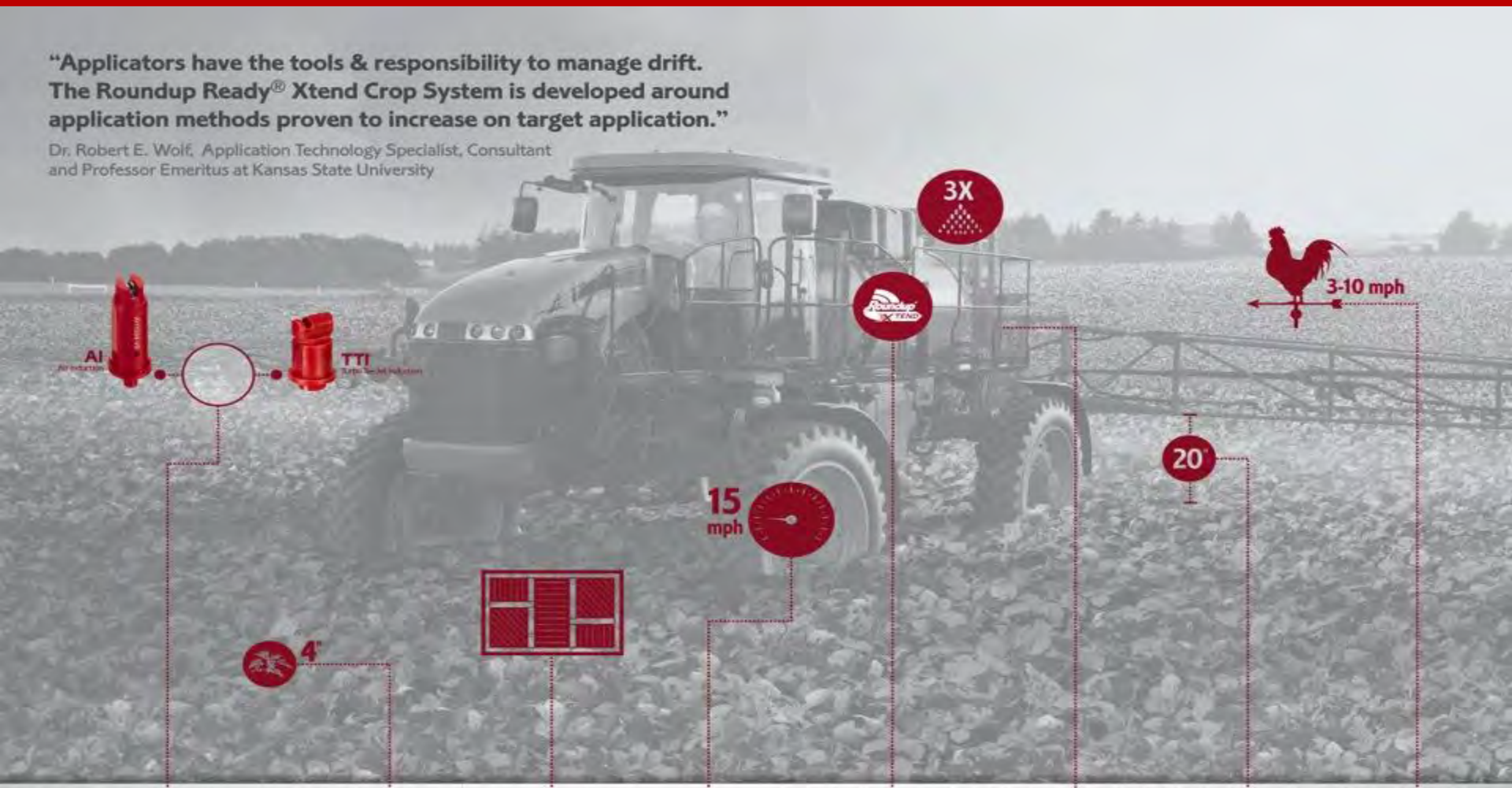
The result of volatilization that can occur when pesticide surface residues change from a solid or liquid to a gas or vapor after an application of a pesticide. Once airborne, volatile pesticides can move long distances off site.

Primary Causes of Drift

- Poor application techniques (e.g., inappropriate nozzles, pressure, flow rate, boom height, forward speed)
- Unfavorable weather conditions. (e.g., high wind speed, low humidity, high temperature, temperature inversion)

"Applicators have the tools & responsibility to manage drift. The Roundup Ready® Xtend Crop System is developed around application methods proven to increase on target application."

Dr. Robert E. Wolf, Application Technology Specialist, Consultant and Professor Emeritus at Kansas State University



Use nozzles and operating pressures that produce very coarse to ultra coarse droplets to **minimize drift**

Spray weeds **less than 4 inches tall**

Maintain the required label buffer to **protect sensitive areas**

Make sure **ground speed** is less than 15 mph

Use low volatility formulations such as Roundup Xtend and XtendiMax

Use **triple rinse** tank clean-out procedure

Maintain boom height **20 inches above crop canopy**

Apply when **wind speed** is between 3-10 mph

Always read and follow label directions

Pending Regulatory Approval

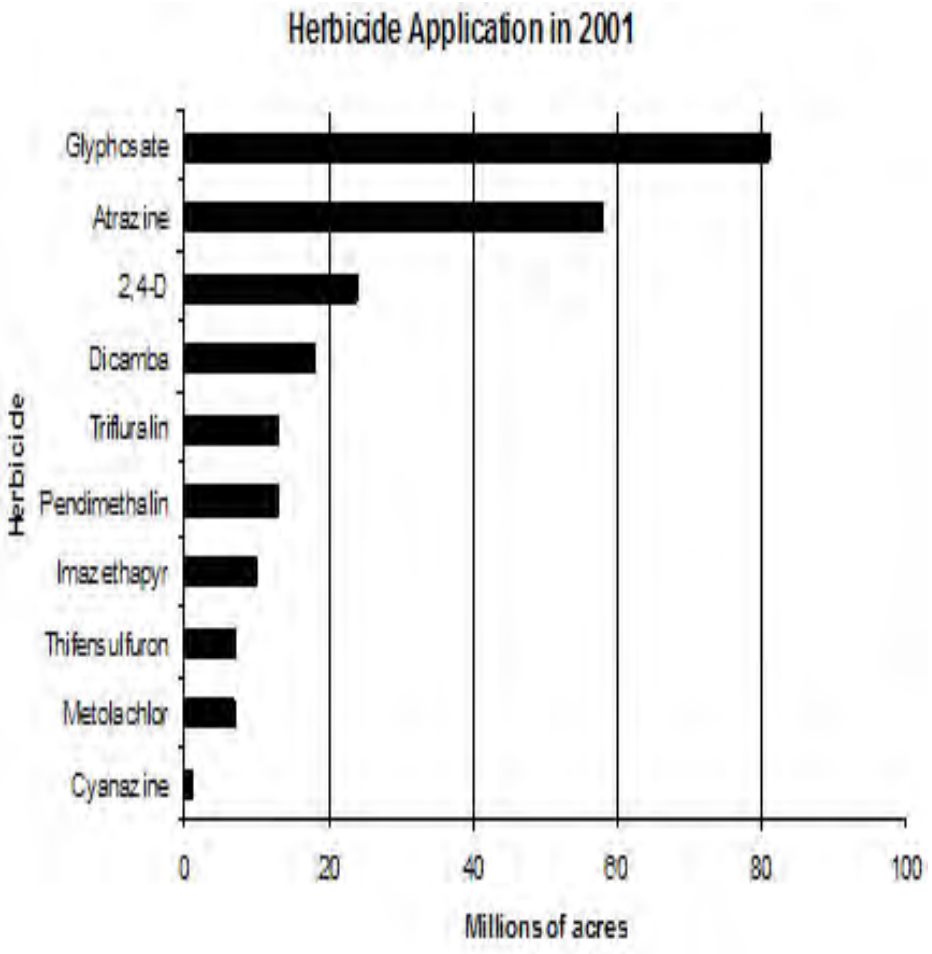
July 2012

Drift Management - things we can't control but need to be aware of.

- Wind speed (Too low (<4 mph*) or too high (> 15 mph))
- Humidity (low humidity = evaporation)
- Temperature (high temp = evaporation especially if humidity is also low).
- Temperature Inversions**

Oh! and just one more thing. ☺

- Weed-resistance (to glyphosate) problems are increasing.
- Row-crops with genetically modified (GM) tolerances to the herbicides 2,4-D and dicamba will be available to farmers to combat glyphosate-resistant weeds.
- Rapid adoption of these technologies is anticipated.
- Fruits, vegetables and nursery crops (specialty crops) are an integral part of diverse and healthy rural farm communities and often grow in close proximity to grain fields.

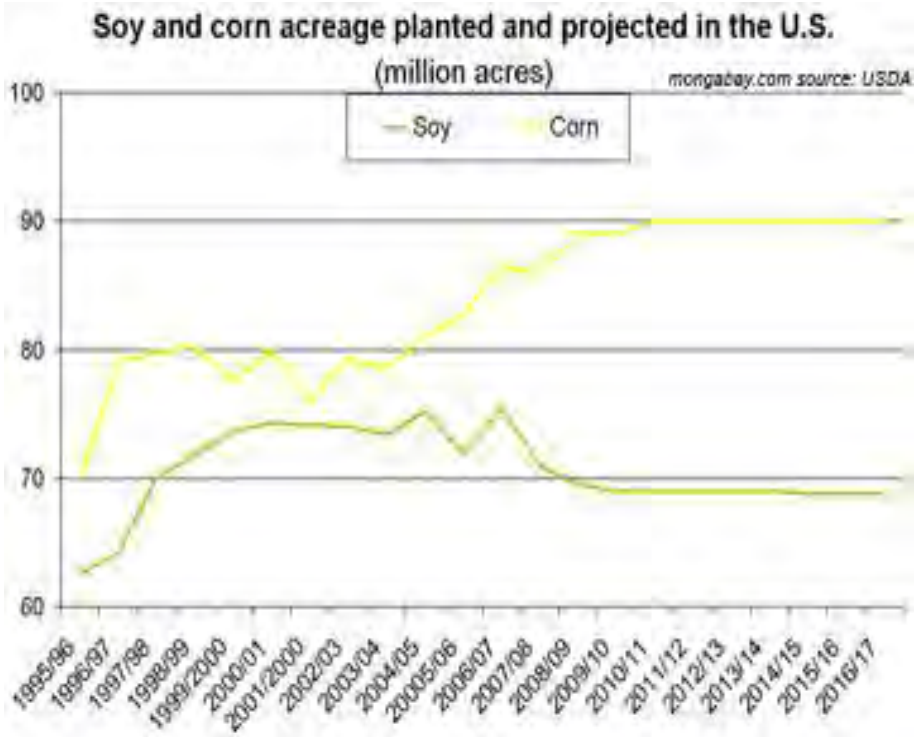


- 2,4-D introduced shortly after WW II
- Lawsuits for drift damage to grape, cotton and tomato documented in Akesson & Yates (1964)
- Bans in many states
- Dicamba introduced in 1960s
- Drift claims related Banvel use soon after registration
- 1990's 2,4-D subject of major international toxicology studies
- 2000-2010 Cloning of detoxifying bacterial genes, generation of tolerant crops.

Timeline of 2,4-D & Dicamba in USA

Off Site Movement (DRIFT)

- 2,4-D & dicamba, respectively estimated 75X and 100X riskier to terrestrial plants than glyphosate
- 1700 drift incidents reported nationally (AAPCO 2005)
  - Estimated 5-10% actual (SDEN 2012)
- Average of 30 in Ohio
  - 15% confirmed and action taken
- 2,4-D most common pesticide, dicamba in top seven



Projected Use

- 2,4-D in 2012 ca 50 million acres (pasture, grain, turf)
- 2,4-D tolerant corn, soybean = 160 million acres
- 30% of 160 million acres = 53 million acres for total of 103 million acres treated
- 3 applications/ season
  - More like 300 million acres
- 1700 drift incidents/year with 50 million acres
  - What will it be with 100-300 million treated acres?

Enlist™ Weed Control System

Technical Attributes:

New trait conferring 2,4-D tolerance[1,2]

- Removes planting intervals in burndown applications
- Widens/enables postemergence application window

Upon regulatory approvals, expected to be partnered with glyphosate-tolerant trait technologies

- In corn, will be stacked with SmartStax®[2]
- In soybeans, will be stacked with Roundup Ready® 2 Yield

Additional herbicide tolerances[1,2,]

- Glufosinate tolerance: soybeans/cotton
- Fop tolerance: corn

Non-Enlist corn treated with Enlist herbicide solution†

Enlist corn treated with Enlist herbicide solution†

Non-Enlist soybeans treated with Enlist herbicide solution†

Enlist soybeans treated with Enlist herbicide solution†

†4.7 pts./A and N-Pak AMS at 2.5% v/v

Enlist™ Weed Control System

Dow AgroSciences

OHIO STATE UNIVERSITY EXTENSION

AGRICULTURE AND NATURAL RESOURCES FACT SHEET HYG-6105-15

Reducing 2,4-D and Dicamba Drift Risk to Fruits, Vegetables and Landscape Plants

Douglas J. Doohan and **Roger A. Downer**, Horticulture and Crop Science

2,4-D and dicamba are common examples of a class of herbicides known as synthetic auxins. Auxins are naturally occurring plant hormones. Synthetic auxins can be used to kill weeds by inducing hormonal effects on sprayed plants. These effects are usually characterized by severe distortion of stems and leaves. Unintentional application of a synthetic auxin herbicide to a sensitive plant, either through direct application or spray drift, often causes severe injury, loss of yield, and even death of the non-target plants. Not all fruits, vegetables and landscape plants are highly sensitive to synthetic auxins, but most will react to exposure in characteristic ways (Figures 1–3).

Why should you be concerned about synthetic auxin herbicides? Simply because 2,4-D and dicamba are likely to be used much more extensively and intensively throughout the Midwest, starting in the near future. A little history will help to put the elevated risk in perspective. 2,4-D is considered to be the first modern herbicide and has been in continuous use on farms, roadsides and lawns since the late 1940s. Dicamba was first released as a commercial product in the 1960s and continues to be used for weed control in corn, wheat, pastures and lawns. Unfortunately, some older 2,4-D and dicamba formulations were notoriously prone to spray drift and to post-application volatilization. This caused unintentional damage to, and even death of, sensitive crops and other plants present in nearby fields and homesteads. Over time, lawsuits and government regulations resulted in changes to the way these herbicides were used, and to physical/chemical characteristics of the formulations, to reduce the potential for off-site movement. Nevertheless, 2,4-D and dicamba have been among the most likely herbicides to be implicated in spray drift cases. For example, survey results of state pesticide control officials listed 2,4-D as the herbicide most often involved in pesticide drift incidents (crop damage) every year the survey has been taken (2005 AAPCO Pesticide Drift Enforcement Survey). The same survey lists dicamba as the 3rd most commonly involved in drift incidents for two years in a row.

This level of drift occurrence far outpaces the relative use of these herbicides: 2,4-D is the 7th most commonly applied conventional pesticide active ingredient and dicamba is not even among the top 25. This is because these active ingredients are toxic to many broadleaf plants at ultra-low concentrations; hence, drift damage symptoms develop readily and are easy to see and identify.

There are several reasons why these herbicides are being used more by grain farmers. The main reason is that proliferation of weed species with high levels of resistance to the most commonly used herbicide, glyphosate, is making weed control with current methods ineffective (Figure 4).

In response, new approaches to managing resistant biotypes are being pursued. These new approaches currently center on the

Figure 1.- 2,4-D damage on grapes.

OSUE Fact Sheet – HYG 6105-15

To Do List

- Inform Commercial Applicators & Adjacent Property Owners
  - Annual Exercise
- Prevent Drift & Compromise at Home
- Register with Sensitive Crop Registry
- Keep Excellent Records
- Know symptoms of injury and check crops regularly
  - Act quickly
- Deploy Biological Detection Systems
  - Sentinel Plants

What if this happens to you

- Document, Document, Document
- Contact Department of Ag & Extension
- Symptoms may be diagnostic
  - Take lots of photos
- Samples may be crucial
  - First 3 days are important
- Look for evidence of a trail of symptoms
  - Wild grape, dogwood, hickory, locust

Prevention is better than cure

- We encourage open and frank communication between all parties.
- We encourage all specialty crop growers to register their fields with the Sensitive Crop Registry. http://www.agri.ohio.gov/scr/
- We strongly recommend all parties to keep records to help in any investigation.

Thank you!