Tracking Down Off-Target Movement of Herbicides: Tips and Tricks

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My Experience Investigating Drift

- Rice
- Cotton
- Soybean
- Sweet potato
- Corn
- Sugarcane
- Trees

- Newpath
- Beyond
- Roundup
- Ignite/Liberty
- 2,4-D
- Dicamba
- Permit
- Londax
- Metolachlor
- Grandstand
- Atrazine
- Paraquat
Recognizing drift, an art rather than science
  - Usually no one symptom can say it is one herbicide over the other
  - It may show nutrient deficiency, may be disease symptomology
  - Drift rates can be so low visual symptoms to not occur

Try to identify herbicide
  - One plant cannot be used to determine injury
  - When was symptomology first noticed?
  - When did application in question occur?
  - Ground vs aerial?
  - What time of day?
  - Weather conditions – nearest weather station can help?
  - Ask as many questions as possible?
Direction of Herbicide Drift

- Stand back and look at the entire area
  - More often than not, the best evidence is not in the field
  - Vegetation around field
  - Roadsides
  - Crops/Weeds in surrounding fields
  - Levees/Field roads
  - I really like to look at trees
The Easy Ones
Identifying Herbicide Drift

• Stand back and look at the entire area
  - More often than not the best evidence is not in the field
  - Roadsides
  - Vegetation around field
  - Crops in surrounding fields
  - Levees
  - I really like to look at trees
  - Most calls from aerial application vs. ground
  - Worst drift was from ground application
  - Most wide spread aerial application during inversion
  - Don’t make it harder than it is
Three types of Off-Target Movement of Pesticides

1. Physical Drift
   A. **Near Drift** – less than 0.3 miles
      - more wind blown drift
      - more pattern of distribution
      - more severe injury in a smaller defined area
      - I refer to this as misapplication
   B. **Far Drift** – greater than 0.3 miles
      - Movement in stable air – inversion
      - Tend to be less pattern
      - Generally more wide spread, large acreage sprayed

• Bird et al. 1996 – Spray Drift Task Force

   Atmospheric stability and wind speed, the only meteorological parameters correlated with physical drift
Inversion Layers and Spray Drift
Atmospheric Conditions

- Neutral atmosphere – normal temperature lapse of - 5.4 F/1000’
- Stable atmosphere – temperature increases with altitude
  - Often referred to as an inversion
- Applications should be made during Neutral atmosphere
  - This is due to mixing of the atmosphere from wind
- “Common sense” says spray with no wind
- In reality, 2 to 5 MPH winds are best
- I hope to explain inversions to you, to help you better understand what is going on
What Happens During and After Application
• Sinking parcel of air moving downward is less dense and rise to original position
• Rising parcel of air is denser than surrounding air and sink to original position
• Stable conditions winds become laminar; controlled airflow in a defined space, at a uniform speed, in a single direction
Cloud of 5-25 μ oil droplets

Unstable Conditions

Source: Ramsey (2001)
http://www.cdpr.ca.gov/docs/enforc/nd/2001/ramsey.ppt
Georgia Dome Implosion
November 20, 2017
Wind Blown Drift
Misapplication
Three types of Off-Target Movement of Pesticides

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2. Volatility – movement after application pesticide turns to gas
   - high temperatures, low humidity
   - Move over wide spread area

3. Blowing soil
   - Not as common
Three types of Off-Target Movement of Pesticides

2. Volatility – movement after application pesticide turns to gas
   - Severity depends on conditions during volatility
   - Turbulent conditions – the volatilized pesticide is usually be dispersed
   - Under stable atmosphere – can move long distance
   - Much harder to track
   - History repeats itself
   - Auxin herbicides historically are volatile
   - Oops – Auxin Herbicides
   - Mimic Hormones
   - Don’t take much – 0.0000001 active, 0.0001 mls
How to Minimize Drift

1. Read the label
2. Know your immediate environment
   - Adjacent crops
   - Weather conditions – wind speed and direction
3. Reduce pressure
   - Nozzle selection
4. Increase spray volume
   - Slowdown – this will also help with droplet shear
5. Boom height
6. If you think you shouldn't spray – Don’t, it can wait
7. Common sense goes a long way
Impacts of Drift

1. Environmental impact
2. Yield impact
3. Financial impact
4. Psychological impact, loss of sleep, stress
5. Relationship impact
6. Drift is no accident, it can be avoided
7. No one wins!