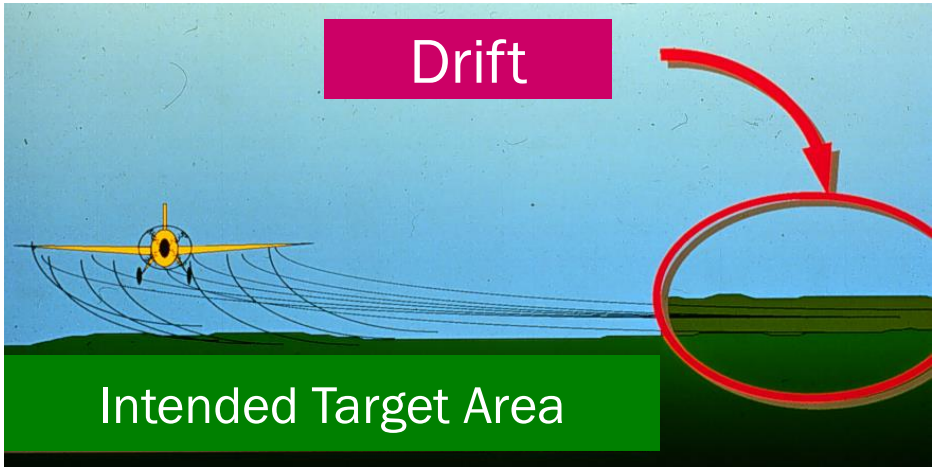
Reducing Pesticide Drift

Pesticide drift is…

…the unintentional airborne movement of pesticides outside of the target area.

2,4-D damage on tomato

This is drift...

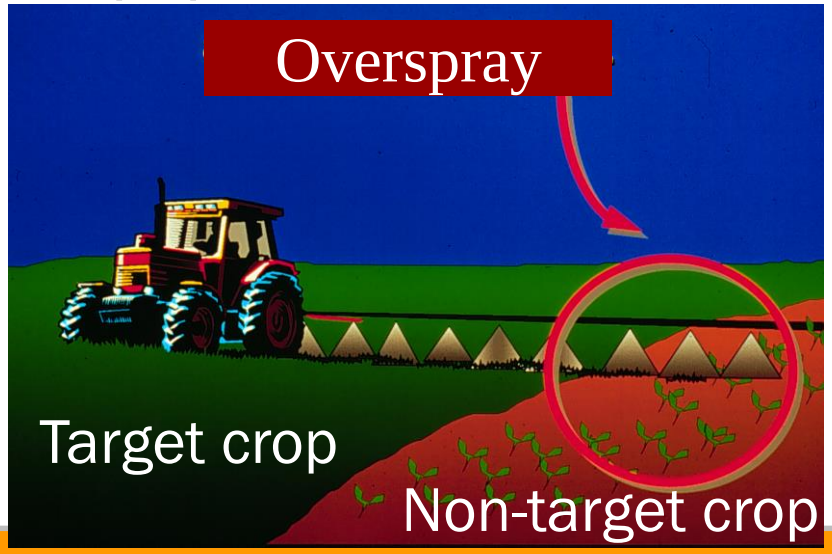


...so is this...

This is not drift…

⇧ Applicator Error

Equipment Problems ⇩



…and neither is this.

Why is drift a problem?

- Poor Pest Control
- Wasted Chemicals
- Damage to Off-Target Sites
- Environmental Concerns
  - Water Quality
  - Air Quality
- Public Awareness

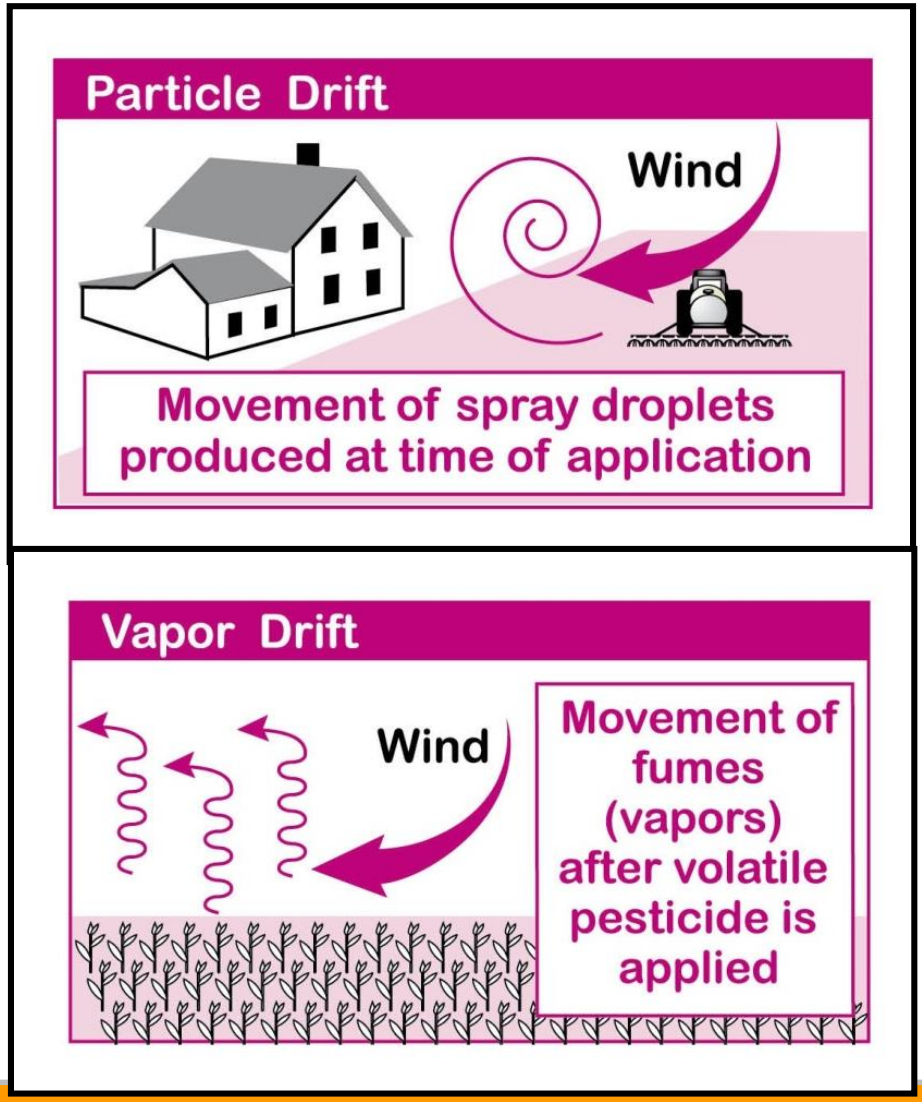
Should YOU be concerned about spray drift?

- Are there drift-susceptible, or organic, crops nearby?
- Are you using highly active or nonselective herbicides?
- Are there sensitive areas (rural homes, schools, honeybee colonies, surface streams, etc.) close by that you should protect from drift?
- Are you trying to avoid litigation or conflict with your neighbors?

There are two types of drift

- Particle
- Vapor

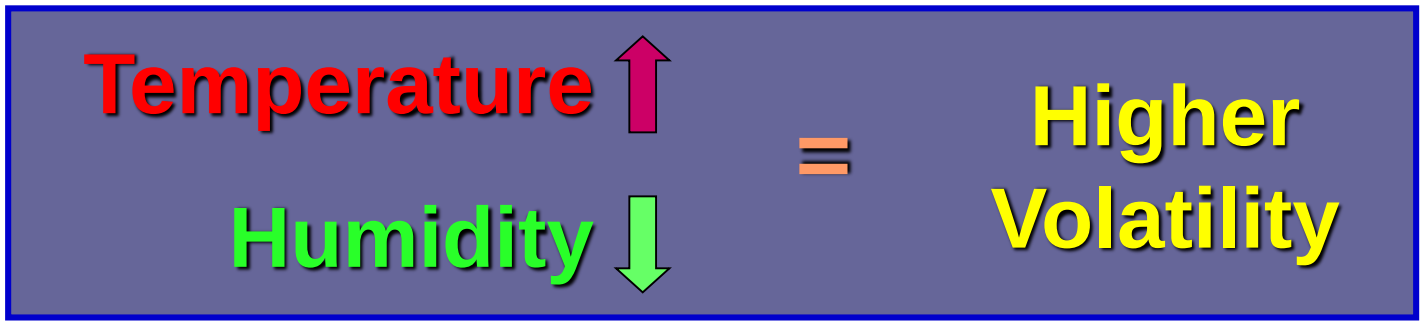
1.



...and, 2.

Avoiding Vapor Drift

- Follow label directions!
- Several active ingredients are quite volatile and pose harm when the vapor moves off target
  - Labels may state cut-off temperatures for application
  - Labels may require pesticide to be incorporated into the soil



Soybean damage from dicamba

- Dicamba works by mimicking a hormone called auxin.
- Controls elongation and division

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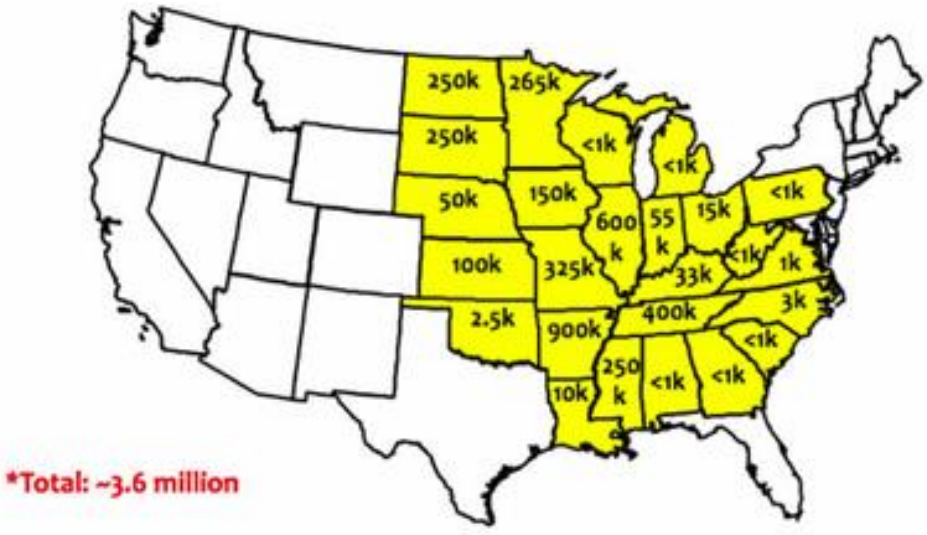
A Co$tly Case of Vapor Drift

Example 2017 the national dicamba-drift

*Total: 2,708



*Total: ~3.6 million

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Factors Affecting Particle Drift

Equipment and Application

- Nozzle Type
- Nozzle Size
- Nozzle Pressure
- Boom Height

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Factors Continued

Spray Characteristics

- Droplet size
- Chemical
- Formulation
- Additives

Factors Continued

Weather

- Wind
- Temperature
- Humidity
- Inversions

Drift and Droplet Size Relationship

- All nozzle tips produce a range of droplet sizes that depend on the size of the nozzle tip opening and nozzle pressure
- Spray droplets are measured in microns using laser beams

One micron (µm) = 1/25,000 inch

Human hair is 100 microns in diameter

Droplets: Large vs. Small

Large Droplets: less potential to drift

- Fall more quickly
- Evaporate more slowly
- Are less affected by wind

Small Droplets:

- Harder to manage
- Evaporate quickly
- Affected by the wind

Nozzle Output

Nozzles are color coded by output

- For example, nozzles pictured here have a 0.4 gallons per minute output at 40 PSI.

Nozzle Knowledge

Match nozzle type to the application at hand

- Type of pesticide (herbicide, insecticide, fungicide…) and whether its action is contact or systemic (coverage)
- Time of application
  - PRE or POST
- Operating Pressure
- Susceptibility to drift

Choose Nozzles to Manage Pests & Drift

The “Nozzle Compromise”: Using nozzles and pressure to produce the largest droplet size possible (> 150 microns) while achieving good target coverage sometimes involves a tradeoff.

Drift reducing nozzle tips

- Low pressure (extended range)
- Pre-orifice
- Pre-orifice and turbulence chamber
- Air-induction

Chemical drift retardants

- Drift control agents
- Check on compatibility
- May affect nozzle pattern
- Effective?

Boom height

"Lower the boom"

- Shorter the distance a droplet has to travel, the less chance for drift
- Be careful to stay within manufacturer's guidelines

More keys to drift management

Avoid adverse weather conditions

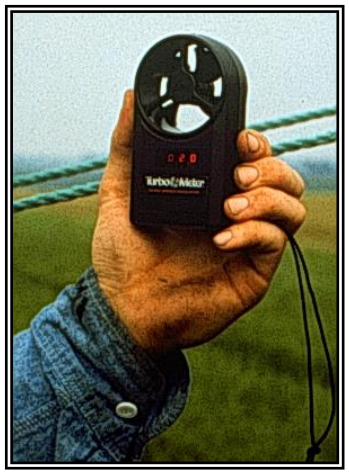
- Wind speed and direction
- Inversions
- High temperatures

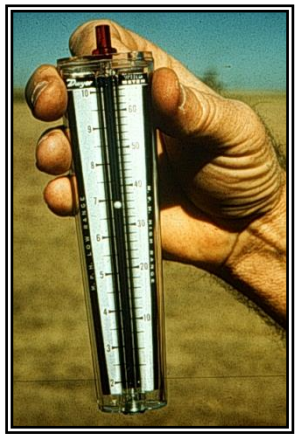
Know the location of all sensitive areas

- No-spray buffer zone

Don’t get blown away!

- Drift potential usually increases with increasing wind speed.
- Droplet size and boom height can influence drift.
- Minimize using small droplets and ensure the application is made at the proper height.
- Use a wind gauge and avoid spraying in winds above 10 mph.





No room for guessing

- Difficult to “guess” wind speed
- Use a wind meter for most accurate results
- Local weather station (or radio station) is a guide, but conditions can vary in a short distance

A wind meter is a sound investment for <u>good recordkeeping</u>

Which way is the wind blowing

- Wind **direction** is very important
- Drift potential is lowest at wind speeds between 3 and 10 mph (gentle but steady breeze) blowing in a safe direction **away** from sensitive areas.
- "Dead calm" (0-3 mph winds) conditions are **never** recommended.

Be Aware of temperature inversions

Occurs when air is STABLE

- air at ground has cooled (heavier air)
- warm air has risen (lighter air)

- result is stagnant, stable air = inversion
- long distance drift can result from applications made during inversions

When can a temperature inversion occur?

- Can occur anytime
- Usually develops at dusk
- May continue through night
- Breaks up when ground warms up in morning
- It may appear ideal, but is not

Temperature Inversion

Costlier Pursuits of Drift Reduction

Consider using these sprayer technologies:

1. Spray Shields
2. Electrostatic Sprayers
3. Air-assisted Sprayers

1.

2.

3.

Summary

- **Drift management** depends on proper planning and decision making
- Choose the **right tip** and **pressure**.
  - The goal is to get the largest droplets without sacrificing good target coverage.
  - Drift reducing nozzles do not eliminate drift, they only reduce it.
- Lower the **boom** as far as possible
- Assess **weather** conditions
  - Deciding **not to spray** or **stopping** in the midst of poor spraying conditions is the best way to prevent drift!

In Conclusion

You have the most important role in lessening spray drift problems.

Do your part to keep agrichemical applications on target.