

# MINIMIZING PESTICIDE SPRAY DRIFT

Tips on Working Safely with Pesticides in North Carolina

## INVERSION

Cold Air

Warm Air

Cold Air

## NORMAL

Cold Air

Warm Air

You can recognize an inversion by observing a column of smoke. If the smoke appears to hit a “ceiling” and moves downwind without mixing vertically, conditions are not good for spraying.

Drift is the movement of pesticides through the air away from the target site of application. There are two kinds of drift: particle drift and vapor drift.

- ❑ **Particle drift** is the movement of fine particles, or droplets, through the air while the pesticide is being applied.
- ❑ **Vapor drift** is the movement of pesticide in the form of a gas or vapor during or after application.

### Factors Influencing Vapor Drift

Three primary factors affect vapor drift:

1. **Formulation of the pesticide** — Volatile herbicides are of greatest concern.
2. **Weather conditions** — High temperatures and low humidity during and shortly after the application of volatile pesticides contribute to vapor drift.
3. **Atmospheric conditions** — Do not use these products when a temperature inversion “sandwiches” warm air between cooler air at the surface and further up in the atmosphere (see illustration at left). Inversions can occur when wind speeds are low or calm. The lack of vertical air mixing causes drift particles and/or vapors to form a concentrated cloud that can travel a long distance before settling in a non-target area.

Irresponsible use of volatile herbicides has led to considerable damage to susceptible crops and garden plants far away from the application site. Always read and follow the label restrictions to prevent vapor drift.

### Spray Droplet Characteristics Influencing Spray Particle Drift

- ❑ **Spray droplet size** is the most important factor affecting particle drift. Smaller droplets drift longer distances than larger droplets. Spray drift potential increases as droplets get smaller than 150 microns in size and decreases as droplets get larger than that dimension
- ❑ **Spray droplet size** varies with nozzle type and size, spray pressure, and spray mix viscosity. Selecting nozzles designed to produce larger droplets, using the lowest spray pressure that will give acceptable coverage, and increasing the viscosity of pesticide mixture by adding drift retardants to the spray tank all represent measures that can be taken to reduce spray drift. The pesticide active ingredient itself does not significantly affect particle drift.
- ❑ The most effective combination of these measures will vary from day to day depending on wind and weather conditions. For that reason it is important to maintain an on-farm supply of nozzles to replace worn nozzles or so that droplet size can be easily adjusted as needed.

(over)

## Weather Conditions Influencing Spray Particle Drift

Wind speed and direction, relative humidity, temperature, and atmospheric stability all have an impact on spray drift. Of these, wind speed is the most important. Refer to the label for specific warnings against pesticide applications during windy conditions. Hot, dry conditions reduce spray droplet size through evaporation and thereby increase drift potential. Pesticide application also should be avoided during temperature inversions as described in vapor drift.

Use a wind-speed gauge to record wind speed and direction before application to decide whether or not the application should proceed and to record wind speeds at various intervals during the application



## Taking Steps to Minimize Spray Drift

Pesticide applicators can take a number of steps to minimize the potential for spray drift caused by droplet size and weather conditions.

**Equipment Adjustments:** Routine maintenance and equipment adjustments can reduce spray drift potential while maintaining acceptable target area coverage for optimal pest control results. These would include:

- Changing spray nozzles so that droplet size is appropriate for prevailing weather conditions.
- Calibrating spray equipment regularly to assure accuracy of spray delivery.
- Replacing worn nozzles at the beginning of each season and more frequently when a large number of acres are sprayed or when abrasive formulations (e.g., wettable powders) are applied.
- Using shielded or shrouded sprayer booms when possible.
- Keeping boom height at the lowest recommended height for the nozzles being used. Nozzles with wider spray angles allow lower boom heights.
- Using minimal spray pressure and periodically checking pressure gauges for accuracy.

**Sound Judgment:** Successful drift management depends on the prudent judgment of the applicator before and during application. Plan each phase of a spraying job carefully to minimize chances for errors and reduce drift potential.

To minimize concerns for downwind safety to neighbors and the environment, the key is to recognize the sensitive areas around each field before beginning the application so that you will be prepared to adjust to any changes in weather conditions as they occur.

## Spray Drift and North Carolina Law

The use of pesticides in North Carolina is governed by the North Carolina Pesticide Law of 1971 and by regulations adopted by the North Carolina Pesticide Board. These regulations have specific sections that pertain to pesticide drift resulting from ground or aerial application of pesticides. If you apply or contract for aerial application of pesticides, you also need to be aware of the restrictions on aerial deposits. No aerial deposit of pesticides is permitted on the following restricted sites:

- Within 300 feet of the premises of schools, hospitals, nursing homes, churches, or any building (other than a residence) which is used for business or social activities if either the premises or the building is occupied by people.
- Within 100 feet of any residence.
- On the right-of-way of a public road or within 25 feet of the road, whichever is the greater distance.
- In or near any body of water in such a manner as to be hazardous to non-target aquatic life if the pesticide is labeled toxic or harmful to aquatic life.
- Onto any non-target area in such a manner that is more likely than not that adverse effect will occur.

For more information on spray drift regulations, contact the North Carolina Department of Agriculture and Consumer Services, Pesticide Section at: 919-733-3556

The information in this document is for educational purposes only. Individuals who use agricultural chemicals are responsible for ensuring that the intended use conforms to the product label and complies with current regulations.

*Technical Reviewer: Wayne Buhler, Ph.D., College of Agriculture and Life Sciences, NC State University*

**For questions regarding human health and pesticides, call the Carolinas Poison Center 1-800-848-6946 (1-800-84TOXIN).**