Recommendations for Minimizing Drift When Spraying Turfgrass

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Off-target pesticides are environmental pollutants and each time you spray turf areas with pesticides there is a chance they will drift, especially during windy weather. Along with environmental concerns, drift is a major concern because of wasted chemical and reduced pesticide control. Generally for applicators spraying turfgrass, the close proximity of susceptible vegetation, wildlife and water supplies makes it even more important to follow proper drift control techniques.

The primary way to control drift is to read the pesticide label. Instructions on the label are given to ensure the safe and effective use of pesticides with minimal risk to the environment. Surveys indicate that approximately 67% of the drift complaints involved application procedures known to be "off-label."

There are two ways that pesticides move downwind to cause damage: droplet drift and vapor drift. Vapor drift is the result of the volatilization of pestcide molecules, making vapor drift independent of the application. Most investigations show that the distances that vapor can travel are much greater than the distances traveled by droplet drift of nonvolatile pesticides. Because the volatilities of pesticides are generally known, appropriate formulations can generally be used. In the turf area it is a common practice to use low-volatile formulations of 2,4-D herbicides.

Droplet drift is the off-target movement of spray droplets formed during application. Droplet drift is affected by a number of equipment and environmental factors. To understand this type of drift it is necessary to be familiar with spray droplet measurements. Droplet diameters are measured in microns (1 micron = 1 millionth of a meter), which as you can imagine, is a very small increment. Droplets of less than 100 microns are difficult to see with the naked eye. Droplets of 50 microns or less will evaporate rapidly and move readily with vertical and horizontal air motion. Depending on local weather conditions, these droplets can be displaced for considerable distances, but their movement is difficult to predict. Larger droplets of 100 to 200 microns in diameter that move off-target remain airborne for less than 30 seconds and usually deposit down wind in less than 30 feet.

Techniques used when applying pesticides to turf greatly determine the amount of spray drift potential. The type of nozzle, pressure, nozzle height and spray volume all affect the amount of off-target movement. Of the many nozzle types available for applying pestcides, the following are specifically designed for reducing drift.

1. **Extended Range Flat Spray Tip (XR)**: Provides excellent drift control when operated in a pressure range of 15 to 25 psi. This nozzle would be ideal for an applicator who likes the uniform distribution of a Flat Fan type nozzle, and wants the advantage of lower operating pressures for drift control.
2. **Fulljet Wide Angle Full Cone Spray Tip (FL)**: Provides excellent drift control when operated in a pressure range of 15 to 25 psi. This nozzle is ideal for the operator who may be currently using a wide angle hollow cone nozzle, and wants the distribution uniformity advantage of a Full Cone type nozzle.
3. **Floodjet Wide Angle Flat Spray Tip (TK)**: Provides excellent drift control when operated in a pressure range of 10 to 25 psi. This Flat Fan type nozzle requires a minimum of 100% overlap to maintain a uniform distribution. The 100% overlap minimizes the chance of skips or untreated areas due to undulating terrain or boom fluctuations.

For effective drift control, nozzles should be used at low pressures. Low boom heights are also an advantage so long as you don't sacrifice swath uniformity. The closer the boom or nozzle is kept to the turf the less chance for drift. Correct spray heights for each nozzle type is determined by nozzle spacing and spray angle.

Spray volume is also a means of decreasing drift potential. Increasing the spray volume results in larger droplets that are less likely to move off-target. To increase the spray volume, increase the nozzle size. The larger the nozzle orifice the larger the droplets. In windy conditions, increasing water carrier volumes from a normal 1 or 2 gallon/1000 ft_2 to 3 or 4 gallons/1000 ft_2 by using larger nozzles will reduce the potential for off-target drift.

Meterological factors that affect drift include wind velocity and direction, temperature, relative humidity and atmospheric stability. Though wind velocity is the most critical weeather related factor causing drift, good application techniques can minimize its effects. A turf application made in a 1 or 2 MPH breeze in which a large number of fine droplets are aplied may result in more drift than an application made in a 10 MPH wind utilizing good drift control procedures.

Wind direction relative to surrounding vegetation is also important in minimizing damage from drift. Applicators often overlook the presence of sensitive vegetation adjacent and downwind of the spraying operation. If possible leave a buffer zone next to the sensitive plants. Spray sensitive areas after the wind velocity decreases.

Downwind drift can be reduced from 50 to 80 percent with the use of spray thickening agents. There are a number of products available as thickening agents, but remember to follow the directions carefully. Incorrect concentrations or mixing proceudres can lead to poor distribution patterns and low flow rates. These additives do not eliminate drift, however, with careful use can be effective in reducing drift.

SUMMARY OF RECOMMENDATIONS TO REDUCE DRIFT WHEN SPRAYING TURFGRASS

Recommendation	Example	Explanation
Select nozzle type that produces course droplets.	XR Flat Fan, FullJet and FloodJet.	Use as large droplets as practical to provide the necessary coverage.
Use the lower end of recommended pressure range.	Use less than 25 psi for nozzles mentioned.	Higher pressures generate many more small droplets.
Use as low as possible boom height.	Keep nozzles as close to the turf as possible without sacrificing uniformity.	Wind velocity effects increase with higher booms. Even a few inches lower can reduce drift.
Increase the spray volumes.	If the normal carrier rate is 1 gal/1000 ft^2 increase to 2 or 3 gal/1000 ft^2	Large capacity nozzles will generate larger size droplets.
Spray when wind speeds are low and wind direction is away from sensitive plants.	Leave a buffer zone if sensitive plants are downwind. Spray buffer when wind conditions permit.	More driftable droplets will move off-target if wind speeds are high.
Use drift control agents.	Commercially available spray thickeners.	Thickeners increase the average droplet size in a nozzle droplet spectrum.