

Reducing Spray Drift

What is Spray Drift?

Spray drift is the movement of pesticide spray droplets away from the intended target site. This is generally caused by air movement, low humidity or high temperatures.

The loss of pesticide due to spray drift is a major concern from an environmental perspective, maintaining effective pest control and for maximizing the effect of input dollars spent on farm.

Spray Drift Effect on the Environment

Pesticides are chemicals designed to kill crop pests. When used properly there is a relatively low risk to applicators, the crop and the environment. However, spray drift can cause unintended harm to sensitive organisms and eco-systems away from the target site. Therefore, it is critical to minimize drift to limit the introduction of pesticides into water systems, sensitive crops, landscapes and residential areas.

All pesticides are different and have different effects on sensitive areas. The majority of the time, the impact of spray drift is negligible. However, producers must be diligent and prevent spray drift in all situations to prevent possible larger environmental impacts off site.

Farmers should take proper measures in communicating and educating about their farm practices to inform neighbors and public building owners. The majority of concerns regarding pesticide application are on spray drift. Other than communication and education other actions the farmer can undertake are the development of a drift reduction plan and following best management practices.

Spray Drift Effect on Pest Control

It is important to minimize spray drift from a pest control perspective. As spray drift increases, the amount of product that reaches the target pest decreases. This can result in a decreased level of pest control which could lead to a negative effect on crops yields. As well, time and energy is wasted by the producer in applying a product that doesn't adequately reach the target pest.

Another concern with a decreased amount of product reaching the target pest is the selection pressure this puts on the pest. It is well documented that if pesticides are used repeatedly, especially on pests that have multiple generations per year, pesticide tolerance can develop. This can be hastened with lower pesticide amounts reaching the target pests allowing more pests to survive. It is critically important, if a producer feels they need to apply a pesticide that the intended product amount reaches the target pest.

What Affects Spray Drift?

There are several factors that affect spray drift and the distance droplets will travel.

Droplet Size

The smaller the droplet size the greater the impact of wind speed. Larger droplets have more weight and drop faster and are not as affected by wind speeds. Small droplets can stay in the air for extended periods of time making them more prone to drift. Droplet size is mainly affected by the nozzle type and orifice size as well as the operating pressure. As the operating pressure increases droplet size decreases. As well as the nozzle orifice size decreases, so does the droplet size. Try to use nozzle types and operating pressures that give larger droplet sizes.

Boom Height

The higher the boom height, the greater the chance for spray drift. The simple lowering of the boom will decrease exposure of droplets to wind. Moving from an 80° nozzle to a 110° nozzle will allow the producer to lower the boom by 3-4 inches.

Wind Speed

Obviously wind speed is one of the biggest factors with regard to spray drift. Greater than 20km/hr is a high risk for spray drift with any droplet size. It is advisable to cease application until after wind speeds have decreased.

Dead calm conditions are also not ideal conditions for spraying. Smaller droplets can remain in the air for long periods of time then drift sometime later if winds arise. Applicators must pay attention when these conditions are present.

Temperature and Humidity

High temperatures, greater than 20 degrees C, cause drift through increased evaporation and volatilization of the pesticide. Low relative humidity combined with low wind, will keep small droplets in the air for long periods of time as well. These factors will increase the chance of pesticides moving off size.

Sprayer Speed

The speed of the tractor and spray can impact spray drift by creating convection currents around the tractor. There is a greater affect on spray drift at higher ground speeds.

Methods to Reduce Spray Drift and its Impact

The methods that we can use to reduce spray drift and its impacts:

- (1) Always spray down wind of environmentally sensitive areas (water ways, sensitive crops, and residential areas)
- (2) Create a buffer zone around sensitive areas. An area where no pesticides are applied, between the crop and the sensitive area. The size of this area will vary depending on the crop, the pesticide and the nature of the sensitive area. Regulatory officials are currently working on the guidelines to further define this zone.
- (3) Always spray when wind speeds are below the maximum specifications for the nozzle type you are using.
- (4) Try not spray when temperatures are above 20 degrees C or when relative humidity is low (generally not a concern in Nova Scotia)
- (5) Always spray within the pressure and water volume specifications of the nozzle you are using.

(6) Increase the spray angle of your nozzles, thus decreasing boom height. (i.e. 110 degree angle nozzles operate ideally at a height of 15 – 18 inches above the target canopy, 80 degree nozzles operate ideally 17 – 19 inches above the target canopy)

(7) Use shield guards on spray booms.

(8) Plant wind rows in large open fields to reduce wind speeds in field and limit drift movement off site.

(9) Use drift reduction nozzles: These nozzles produce larger more uniform spray droplets at higher pressures.

Air assist nozzles (Turbo drop™, AI Teejet™) These nozzles contain a pressure reduction chamber with a narrow port used to draw air into the pressure chamber. The air and the liquid are mixed like a water aspirator. As the liquid is discharged from the nozzle tip droplets filled with air are produced. After leaving the nozzle air inside the droplets expands making the droplets larger and causes an increase in velocity of the droplet. The droplets also shatter on contact with the target thus causing better coverage. The larger faster moving droplets greatly reduce drift potential.

Low drift nozzles (Drift Guard™, Rain Drop™, Turbo Teejet™)

These nozzles have a pre-orifice chamber at the tip that slows down the liquid creating a more uniform spray pattern and larger droplets than a conventional flat fan nozzle at the same operating pressure. Some of these brands also have a wide pressure operating range (15-90 psi) (turbo teejet)

It is always very important to understand the limitations of the nozzle type you are using. Finally, it is critical to understand the pesticide you are spraying. All pesticides have specific application instructions on their labels. Some pesticides can have a much greater impact on non target organisms than others, so special drift reduction and mitigation measures may be required for that specific product on its' label. **As always, fully read and understand the label of the product you are applying.**

Additional Resources:

<http://www.gov.ns.ca/enla/pests/>

<http://www.griffin.peachnet.edu/caes/soybeans/2005guide/nozzles.pdf>

<http://www.teejet.com/MS/TeeJet/support2.asp?ID=86>

<http://www.stopsoybeanrust.com/images/TJusergde.pdf>

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