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PESTICIDE APPLICATION AND HANDLING TECHNOLOGY: DECREASING DRIFT POTENTIAL DURING APPLICATION

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Accidental spray drift from pesticide applications can result in dangerous conditions for humans, animals, and the environment. It also can mean extra costs for the applicator due to wasted chemical and inefficient applications. Although complete elimination of spray drift is nearly impossible, drift problems and their effects on our environment can be minimized with proper application techniques and favorable weather conditions.

Drift, or off-target movement, is the movement of a pesticide through air, during or after application, to a site other than the intended site of application. Spray drift consists of two types: particle drift and vapor drift. Particle drift occurs at the time of application where spray droplets physically move away from the target site and deposit on non-target areas. Drift can also occur after an application has been made. This type of drift, most commonly known as vapor drift, is the movement of fumes from the target area due to pesticide volatilization (changing from a liquid to a gas). Vapor drift becomes a significant concern only if the pesticide applied is highly volatile and the atmospheric conditions become suitable for rapid vaporization of the pesticide.

Regardless of where it occurs, spray drift is undesirable. Some serious implications of spray drift are:

- Unintentional contamination and plant injury of non-target sensitive crops and food stuffs which may result in crop losses, costly litigation, or mandatory destruction of the crop.
- It may result in under-application of chemicals and ineffective pest control, which leads to additional applications, inefficient use of application equipment and applicator time, reduced yield, and ultimately, higher chemical and production costs.
- It may contribute to pollution of the air and water resources and may affect the health and safety of susceptible humans and livestock.

There are many factors that influence drift including spray characteristics and weather. Spray droplet size is the most important factor affecting drift. Spray droplets are measured in microns (1 micron = 1/25,000 inch). Droplet size where drift potential becomes insignificant depends on wind speeds, but lies in the range of 150 to 200 microns for wind speeds of 1 to 9

miles per hour. Small droplets can drift long distances because of their light weight. As droplets evaporate and get smaller, drift distances will increase.

Proper nozzle selection and operating conditions have the most influence on droplet size. Various nozzles produce a wide range of droplet sizes, varying from less than 10 microns to several hundred microns, depending on nozzle design and operating pressure. Smaller drops are produced by higher pressures. To control drift, the largest nozzle possible should be selected that supply the desired application rate. Thus, lower pressures can be used and larger droplets will result. Nozzle manufacturer catalogs will supply information on application rate and the acceptable range of pressures for specific designs of nozzles.

Weather also affects drift potential, especially wind speed. High winds can carry spray droplets far from their target. As mentioned earlier, the larger the droplet, the less it is affected by wind and the faster it falls. Wind direction is also important in reducing the damage caused by drift. Spraying when the wind has shifted away from sensitive areas can reduce drift damage.

Other meteorological factors include temperature and humidity. High temperatures and low humidity increase the rate of evaporation from spray drops. Small drops that completely evaporate leave crystals of pesticide in the air that may be carried through the atmosphere for several days. Pesticide volatility increases with increasing temperature, therefore, providing a chance of vapor drift with higher temperatures. To minimize the possibility of drift due to weather conditions, applications should be made when winds speeds are between 2 and 10 miles per hour and temperatures are mild.

Another approach to reducing spray drift is to use thickening agents or drift retardants to increase the viscosity of the liquid. The increased viscosity prevents the formation of many of the small drops that create the drift hazard.

Spray drift can be harmful to humans, animals, and the environment, but it can be minimized with proper application techniques and favorable weather conditions. Spray drift, both particle and vapor drift, can cause plant injury to non-target crops, can affect the health of susceptible humans and livestock, and will result in extra production costs. Drift can be minimized by selecting proper nozzles and operating to produce larger droplet sizes. Favorable weather conditions and proper application techniques along with good applicator judgement will also reduce the chances of drift. Although spray drift cannot be completely eliminated, it is important to do everything possible to reduce the chances of drifting chemicals and to do a good job managing pesticide applications.

RESOURCES:

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