Understand Pesticide Spray Drift

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Saskatchewan

Introduction

As the agricultural season reaches its peak, many growers employ pesticide spraying as a critical component of their integrated pest management strategies. Pesticides protect crops from damage and help to maintain both quality and yield of crops. When applying pesticides, it is essential to ensure even distribution across crop foliage while also minimizing losses due to drift, vaporization and runoff.

To effectively reduce these risks, it is crucial for applicators to be thoroughly informed about the product specifications and to practice robust spray drift management techniques. This includes monitoring weather conditions and timing applications carefully to avoid adverse effects. Additionally, making precise adjustments to spray equipment and establishing protective buffer zones around sensitive areas can significantly mitigate the risk and impact of spray drift.

This guide outlines key strategies for managing spray drift, covering environmental and technical practices to minimize risks and advanced technologies to reduce dispersion. It also emphasizes the importance of adhering to general regulatory guidelines that govern pesticide usage and spray drift control at various governmental levels.

Drift Management Practices

Environmental Factors

- *Temperature and Relative Humidity:*
    - These elements significantly influence the evaporation rate of liquid tank mixes. Specifically, hot and dry conditions exacerbate spray drift as pesticides evaporate into smaller, more easily dispersed droplets.
    - Optimal spraying conditions are when the relative humidity is above 40 per cent and temperatures are below 25 C.
- *Wind Direction and Speed:*
    - Proper assessment of wind direction and speed is crucial. Spraying activities should protect sensitive habitats located downwind by adjusting the spray direction.
    - It is recommended to spray with a crosswind, ensuring that the wind direction is stable.
    - The optimal conditions for spraying involve light winds (speeds greater than 1-2 km/h). High wind speeds or dead calm conditions, which can lead to

temperature inversions, must be avoided. High wind speeds are generally considered to be greater than 16 km/h. But depending on the product, the requirements might vary. Check the label before applying.

- *Temperature Inversions:*
    - During inversions, warmer air above traps cooler air near the ground, creating conditions where spray droplets remain concentrated and suspended above the surface. This can lead to extensive drift when the wind picks up.
    - Spraying under these conditions, often occurring during early mornings or late evenings, is strongly discouraged.
- *Measuring and Monitoring Weather Conditions:*
    - Applicators should use handheld weather sensors to measure key parameters. For ground and aerial applications, wind speed should be measured at 1.5 meters above the ground or at the height of the spray boom. In orchards or vineyards, wind speed measurements should be taken near the top of the canopy and from upwind locations.
    - A continuous monitoring approach, assessing wind for a two to three-minute interval to record sustained and average wind speeds and directions, is advised. *Adjustments or cessation of spraying may be necessary if conditions deteriorate or deviate from the label instructions.*

Technical Factors

- *Nozzle Adjustments:*
    - Pressure and Coarseness: Lowering the pressure of nozzles reduces drift by increasing droplet size. However, lower pressure also means less volume output, necessitating adjustments in sprayer travel speed, managed by modern flow rate controllers.
    - Carrier Volume: Using higher carrier volumes reduces drift by creating a coarser spray and diluting the spray solution, resulting in less active ingredient in drifted droplets. It is always important to follow the label instructions.
    - Low-Drift Nozzles: Low-drift nozzles create coarser sprays at conventional pressures, effectively reducing drift. These nozzles use additional orifices or turbulence chambers to increase droplet size, matching the droplet size spectrum of larger conventional nozzles.

- *Drift-Reducing Adjuvants:*
    - Polymers: Starch or polyacrylamide polymers increase spray viscosity, reducing fine droplets. However, their impact on herbicide efficacy is uncertain, and they alter spray patterns, potentially causing uneven coverage and rapid degradation under pump shear stress.
- *Travel Speed:*
    - Effects of Speed: Faster travel speeds increase air shear stress on the spray, causing finer, more drift-prone droplets. They also keep the spray aloft longer, exposing it to wind drift. Thus, higher speeds, even with coarser sprays, tend to increase drift.
- *Boom Height:*
    - Optimal Height: Lowering the boom to the minimum recommended height protects the spray from wind. However, suspended booms on self-propelled sprayers may sway, requiring a balance between minimum height and stability.

Regulatory Compliance

Buffer Zones for Pesticide Spray Drift Management

- Buffer zones play a crucial role in mitigating the risk of pesticide spray drift, particularly when applying near sensitive habitats or areas. To effectively reduce the impact of potential spray drift, applicators should maintain a designated spray buffer zone—the area between the edge of the treated swath (the area where pesticides are applied) and the sensitive habitat.
- This buffer serves as a no-spray zone to prevent drift from affecting non-target areas, ensuring the spray does not contaminate water bodies, wildlife habitats or other sensitive environments. It is important to note that buffer zones can vary among different active ingredients, formulations, methods of application and proximity to the nearest sensitive habitat. Detailed information on specific buffer zone requirements can be found on the pesticide product label.
- The Pest Management Regulatory Agency (PMRA) provides a Spray Buffer Zone Calculator, which can be used by applicators to calculate the appropriate buffer size required for their specific pesticide application and local conditions. This tool is essential for those who wish to accurately determine the size of the buffer allowing for more precise application while still minimizing the risk of drift. More information can be found at Spray buffer zone calculator for pesticide applicators - Canada.ca.

- The Saskatchewan Ministry of Agriculture provides a complimentary online mapping tool for specialty crops and bees within the province via FieldWatch. This tool allows for the mapping of sensitive crops and is freely accessible to applicators. Pesticide applicators are encouraged to register on the platform to identify vulnerable crops, thereby facilitating the planning of pesticide applications. More information is available at FieldWatch | Pesticides | Government of Saskatchewan

Record Keeping for Pesticide Applications

- Under provincial legislation, maintaining detailed records of pesticide applications is mandatory for licensed applicators. While farmers are not required to keep such records, doing so can also be beneficial and serve multiple purposes. Detailed records help in:
    - Tracking Pesticide Use: Recording the type and amount of pesticide used can help manage costs and inventory.
    - Legal Compliance: Ensuring all applications meet local and national regulations.
    - Environmental Stewardship: Documenting efforts to reduce environmental impact, such as spray drift.
    - Operational Efficiency: Analyzing data to improve future pesticide applications for better efficacy and safety.
- Records should include specifics like the exact time and date of application, weather conditions (especially wind speed and direction), types and amounts of pesticides used, targeted pests, crop types, any incidents of drift and any other issues.
- Users can download a spray records template from the following link: Pesticide Licensing Program - Pesticide Applicator Licence | Pesticide Licensing Program | Government of Saskatchewan.

Pesticide Labels

- Each pesticide registered in Canada must have a Health Canada-approved label that includes a registration number and vital information on safe and effective usage. It is important to note that applying a pesticide product in any manner that differs from the instructions on the label is against the law.
- Labels contain detailed instructions on how to correctly mix, apply, store and dispose of the pesticide. They also include safety information such as necessary

personal protective equipment and first aid instructions in case of accidental exposure.

- Applicators are strongly advised to read these labels carefully before use. Pesticide product labels are available online at Pesticide Label Search - Health Canada (hc-sc.gc.ca).

Pesticide Complaints and Investigations

- Pesticide regulation in Canada is a collaborative effort between federal and provincial governments, requiring integrated coordination between various authorities.
    - The Ministry of Agriculture regulates licensed applicators within the province through *The Pest Control Products (Saskatchewan) Act* and *The Pest Control Products Regulations 2015*.
        - The ministry is responsible for investigating complaints relating to pesticide drift, misapplication, misuse and unsafe practice by a licensed applicator.
    - Health Canada regulates the registration and use of pesticides in Canada through the *Pest Control Products Act* and the *Pest Control Products Regulations*.
        - Health Canada is responsible for pesticide drift, misapplication, misuse or unsafe practice *by an individual or agriculture producer*.
    - Transport Canada is responsible for/regulates the flight of the aircraft while performing a pesticide application, including but not limited to low-flying aircraft and flying over built-up areas or towns.
- Should you suspect exposure to spray drift, please consult Pesticide Investigations and Regulations in Saskatchewan | Pesticides | Government of Saskatchewan for further information.