Process Recommendations for Drift Reduction Technology Studies

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Adapted from 2015 ACS presentation on Uniformity in Spray Drift Field Studies

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Introduction

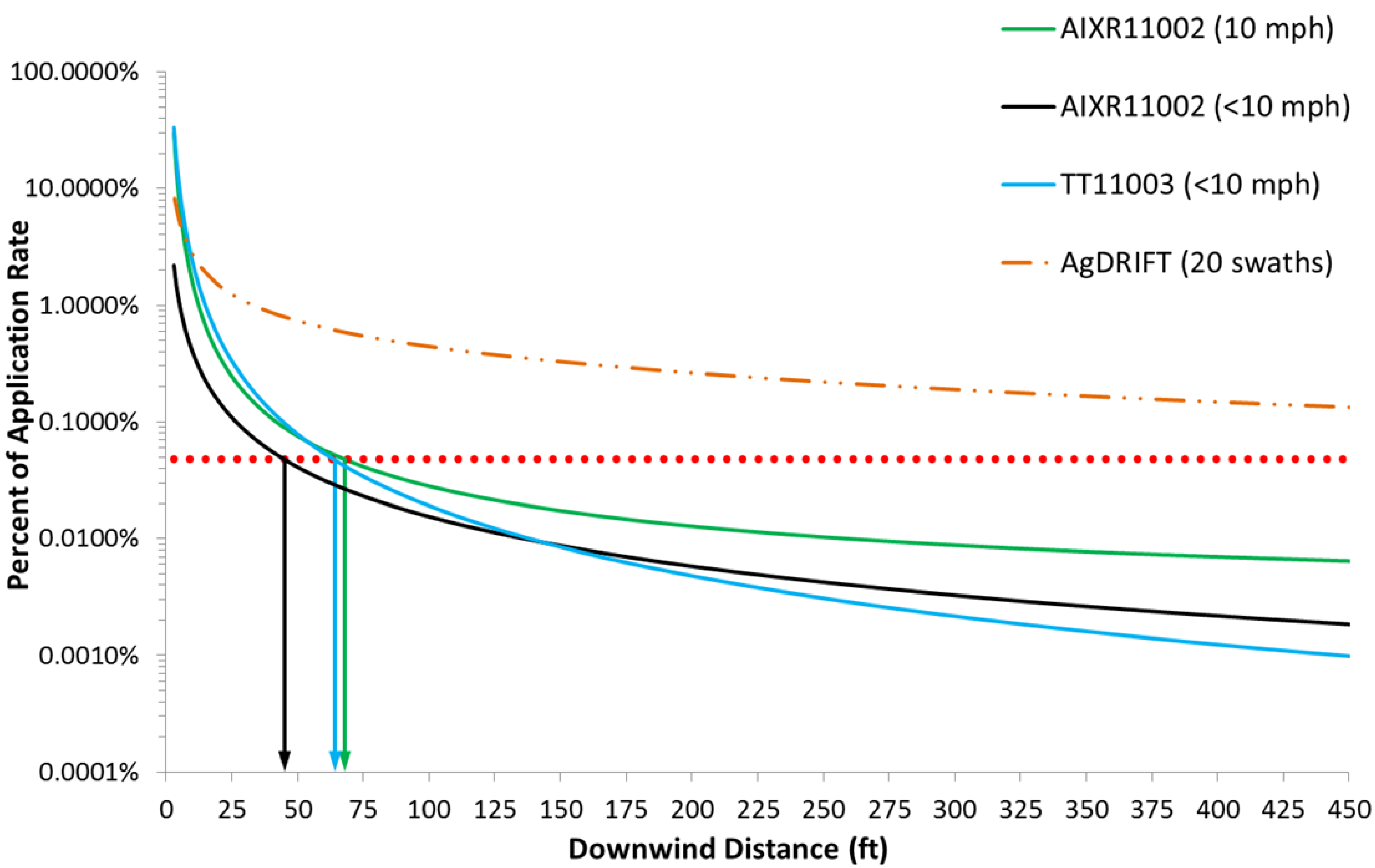
The October 2014 launch of USEPA's Drift Reduction Technology (DRT) program provides registrants with an opportunity to gain quantitative credit in the risk assessment by demonstrating reduced drift from spray techniques, modern spray nozzle design and/or adjuvants.

Registrants can take advantage of this credit by generating drift data for specific active ingredients and formulations using different nozzle technologies.

These data can then be used to reduce spray setbacks (or buffers) on product labels for both off-target organisms and endangered species.

Introduction

The current option for registrants is to use the AgDrift or AgDisp models to generate predictions that can be matched to effects metrics to generate spray buffers or setbacks. Field study data are significantly lower than model predictions.



Introduction

First step: Product research to determine ideal droplet spectrum to target to maximize efficacy and reduce drift. This will vary depending on contact or systemic, herbicide/insecticide/fungicide.

Label should have low maximum wind speed (10 mph) and low release height.

Then review nozzles to determine the best class to test in wind tunnel. Test many nozzles with specific product tank mix at various orifice sizes and pressures. If there are common tank mixes or adjuvants in the mix then those should be tested independently as well. As many different nozzle brands as possible. These can all have a significant impact on droplet spectrum/drift.

Introduction

Guidelines for study design standards currently exist from EPA, ASABE, and ISO.

But they provide only <u>general</u> guidelines for study layout and quality standards.

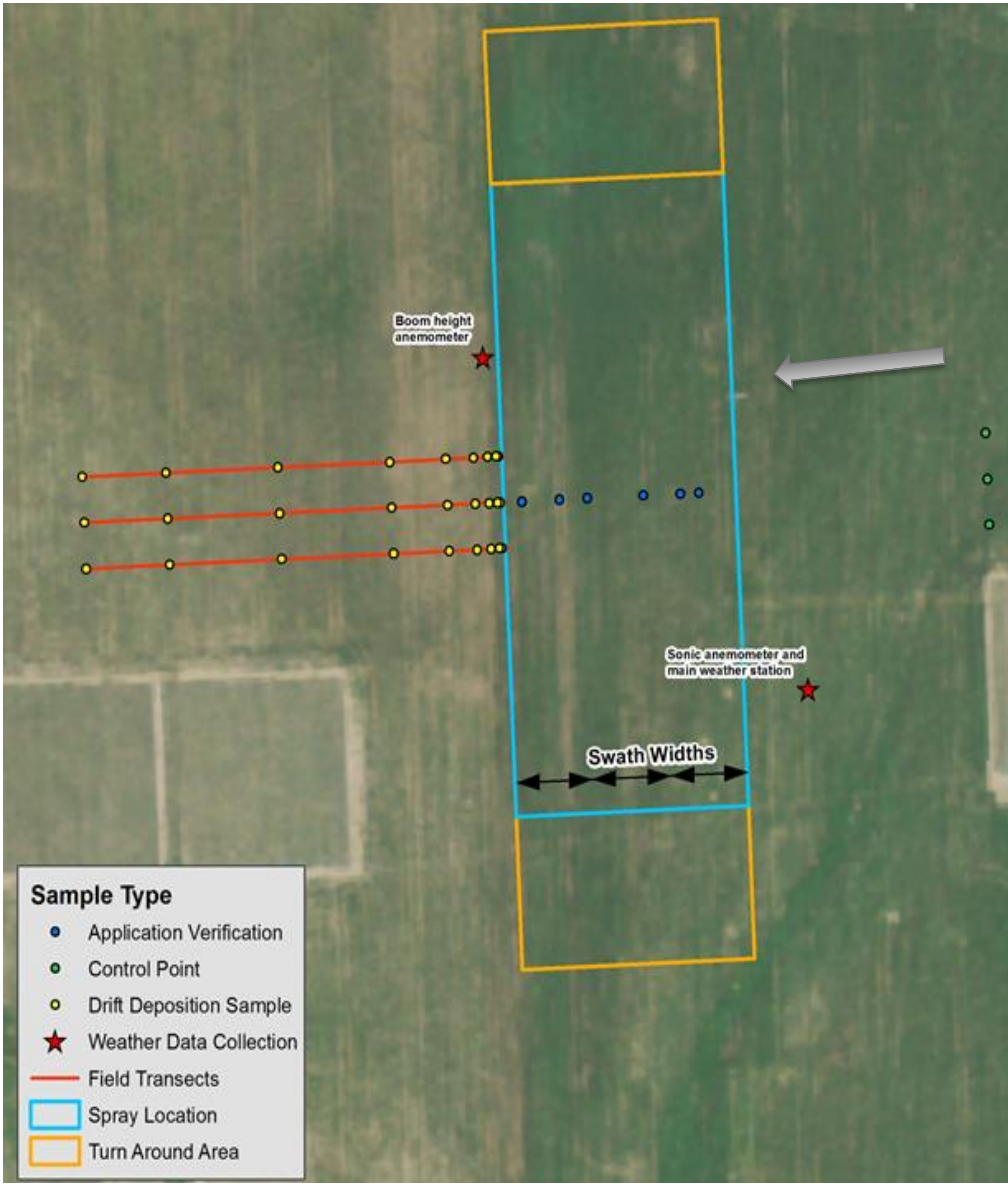
There are many issues that can impact data quality and comparability among studies:

Application equipment

Collectors

Dust

Weather Data



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Application Equipment

The application method is the most important aspect of these studies!

80-120 foot boom groundspray equipment is in common use by growers and professional applicators. These tests should reflect the way the products are used.

This is expensive equipment, GPS guidance with computerized controls (>$250,000).

Incredibly accurate delivery system – they have to be! The growers income depends on it.

Application Equipment

Calibrate and verify accuracy of these systems:

Verify sprayer speed to speedometer or GPS;

Confirm accuracy of the site glass and internal meters with a flow meter;

Confirm pressure reading is accurate at the nozzles;

Place in manual mode and confirm output of each nozzle system used.

Then rely on the on-board computer system to accurately run the sprayer.

Application Equipment

Additional benefits: Fast – the 240+ feet of spray width can be covered quickly with 2-3 passes. Minimizing the effect of variations in wind speed and direction.

Multiple nozzles on a single housing allowing for quick transition to the next nozzle when wind conditions are right for the test.

Automatic hydraulic boom adjustment.

Collectors

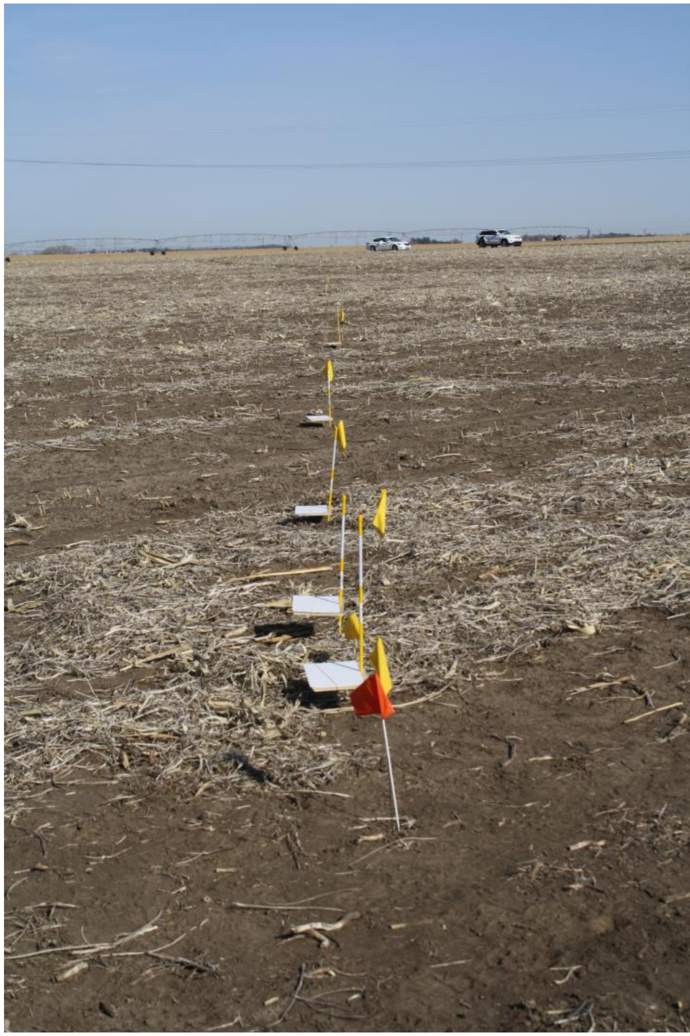
Filter paper versus petri dishes

One of these two methods should be used; studies have shown that results are similar in side by side testing.

Both are easy to use. Dishes can be tougher to extract. Paper can blow away if not secured properly.

Collectors

Collectors should be placed where they cannot be obstructed so at the height of the field roughness or crop canopy. The minimum boom height should then be adjusted accordingly.



Dust

Under normal application circumstances drifting dust is not an issue but because in a research trial the same ground is typically sprayed multiple times it can be important to account for or eliminate dust.

Options for minimizing dust:

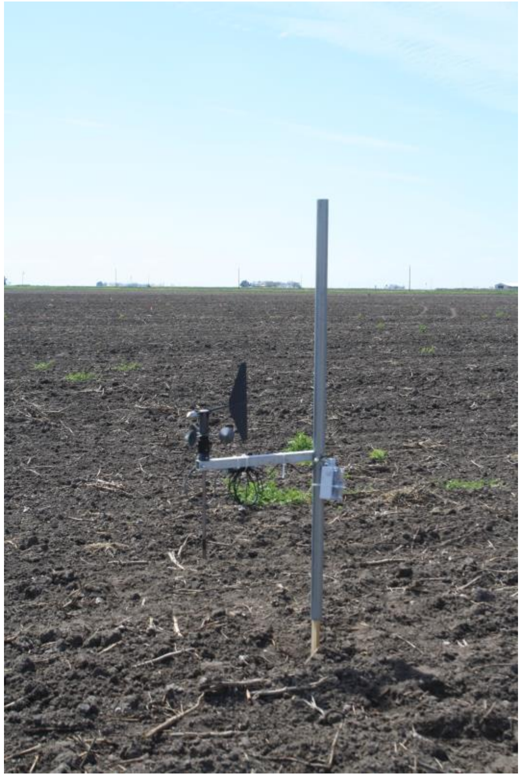
Plant a cover crop or wet the ground between applications;

Retrofit the sprayer with extra wide tires that create less soil disturbance;

Do not apply to the same ground (time consuming and possibly expensive);

Run blank sprays and adjust results of dust from residue results.

Weather Data – Cup versus sonic anemometers



Sonic anemometers provide wind speed in three directions rather than cup anemometers which are only 1D. The vertical wind gives us valuable information on up-lifting and atmospheric stability which are key factors affecting drift.

Sonic anemometers have higher resolution, tighter quality tolerances, and no hysteresis. The start-ups and slow-downs from wind gust inherent in the physical nature of cup anemometers.

Boom height anemometers - wind speed is always lower near the ground so it is useful to have data at the height the spray is being released.

Conclusions

There are many complicated aspects of drift studies that require that choices of materials and equipment be made. Making good choices will ensure the quality comparability of these types of studies.

Data generated from comparable studies will help develop an eventual model or other statistical representation of the results that will allow omitting these expensive field studies in the assessment of drift technologies. Eventually droplet spectra data from wind tunnels can be entered into the model to generate reliable results that reflect the reality of the field.