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Accomplice provides superior drift control for high speed applications

The Problem

In recent years, the U.S. EPA has increasingly focused regulatory attention on the issue of pesticide drift. Pesticide drift occurs when droplets or particulate matter from a foliar application of a pesticide do not land on the target crop but on adjacent areas. The EPA's concern with drift has been largely centered on the use of broad spectrum and total vegetation herbicides, as off target residues of these products have been known to severely damage vegetation surrounding treated fields. It is important to note that greater than 90% of the field corn, soybeans and cotton grown in the U.S. have been genetically modified (GMO crops) to be resistant to these types of herbicides. The herbicides involved include the total vegetation herbicides glyphosate and glufosinate and broad spectrum herbicides dicamba and 2,4-D. The magnitude of the issue is substantial. USDA reports that planted acreage in 2020 for corn is 92 million acres, soybean is 83.5 million acres and cotton is 12.5 million acres.

Accomplice Results

30%

Greater drift reduction for high speed applications

What causes drift?

Drift occurs when drops from a spray nozzle are small enough that they can be transported by the wind away from the target crop. EPA guidelines indicate that drops with diameters less than 105 microns are prone to drift under typical application conditions. It should be noted that spray drops evaporate during their journey to the crop, reducing drop size and diameter. Consequently, two factors are important determinants in whether a drop is prone to drift, the distance the drop travels to the target and the rate of evaporation. Under optimum spray conditions, for example, a wind speed of 3 mph, 12 inch distance from the nozzle to the plant and temperature at 60 degrees F and relative humidity at 75%, a 105 micron drop will likely land on the target plant. If we increase the evaporation rate, temperature at 85 degrees F and relative humidity at 20%, the chances that same 105 micron diameter drop will reach the target plant are dramatically reduced. If the wind speed is increased to 10 mph in either evaporation scenario, the distance the drop has to travel will be substantially increased and chances the 105 micron drop will reach the target are dramatically reduced.

How can you reduce drift?

The most common target for reducing drift is increasing drop diameter. This is usually accomplished mechanically and/or by adding drift reduction adjuvants (DRAs). From a mechanical perspective, increasing drop diameters can be achieved by selecting nozzles that produce larger drops, sometimes referred to as “rain drop” nozzles. Spray pressure is also important as drop diameters generally decrease with increases in spray pressure. DRAs are products which contain ingredients that when tank mixed with the pesticide, modify the flow characteristics of the spray causing an increase in drop diameters. Typically, the modification is to increase the viscosity of the spray.

Another important means of reducing drift, that is often ignored, is reducing drop evaporation from the nozzle to the target plant. Many DRAs use modified vegetable oils as their primary drift reduction ingredient. These oils increase drop diameters during their formation but do not impact the rate of evaporation. Humectants, on the other hand, can be used to slow the evaporation rate

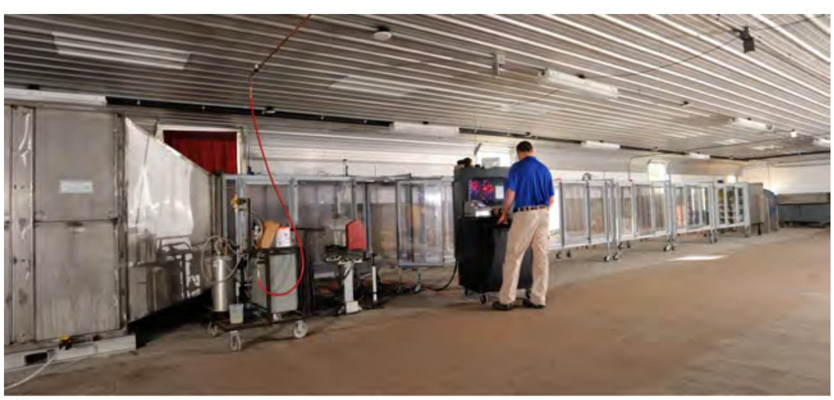
If rain drop nozzles reduce drift, why do we still have a problem with drift?

The answer to this question has two components. First, growers have been instructed for decades that maximum coverage is critical for the optimum performance of most agricultural chemicals. In order to achieve maximum coverage, growers often use nozzles that produce small drops and frequently add adjuvants containing surfactants to spread out the drops on the leaf surface. Second, rain drop nozzles can be an inefficient means of delivering a pesticide. They usually require higher spray volumes to get similar levels of coverage. And large drops are more prone to bouncing or running off the leaf.

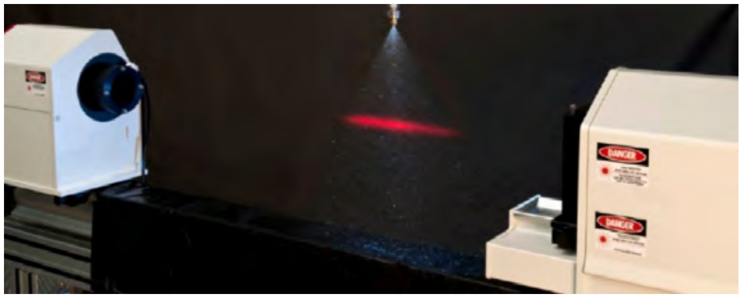
Accomplice is the Solution to Your Drift Problems

Producing Fewer Small Drops

The most frequently used method of determining drop diameters involves the use of a wind tunnel that can simulate the wind speed of either a ground sprayer or airplane.



The spray is analyzed using a laser refraction technology that measures drop sizes of the spray coming out of a nozzle. The data that is generated is typically expressed as either the number of drops less than 105 microns, or Dv 10 which is the drop diameter where 10% of drops are smaller and 90% of the drops are larger. The larger the Dv10, the less prone the spray will be to produce drift prone droplets.

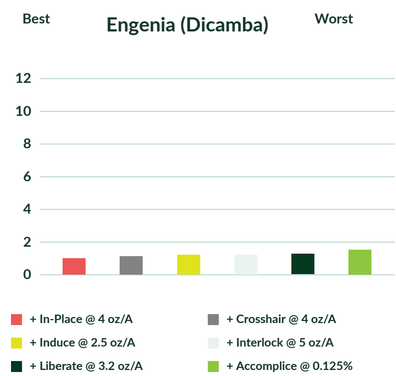


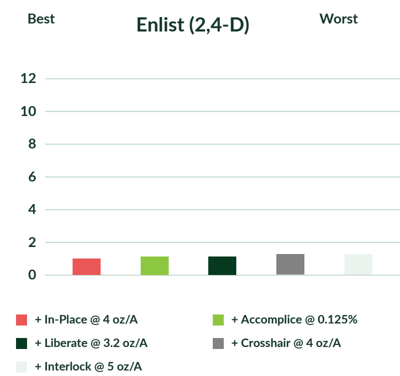
Accomplice and leading DRAs were tested at the University of Nebraska, Pesticide Application Technology Lab in North Platte, Nebraska using low wind speed (16 mph) and high wind speed (125 mph), to simulate ground and aerial spray applications, respectively. Two broad spectrum herbicides were tank mixed with Accomplice and the leading DRAs.

When tested using low wind speeds, Accomplice and the leading DRAs were effective in reducing the % <105 micron drops to levels lower than 2% and had Dv 10 values ranging from 265 to 291 microns, demonstrating substantial drift reduction. Accomplice provided drift reduction similar to the leading DRAs.

Simulated Ground Sprays*

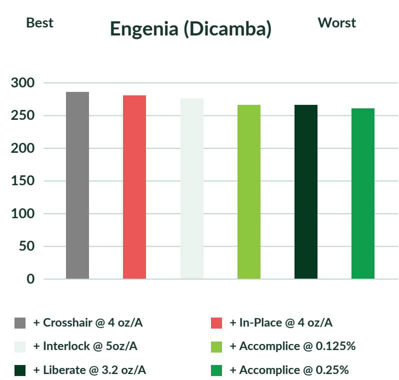
% <105 micron drops**

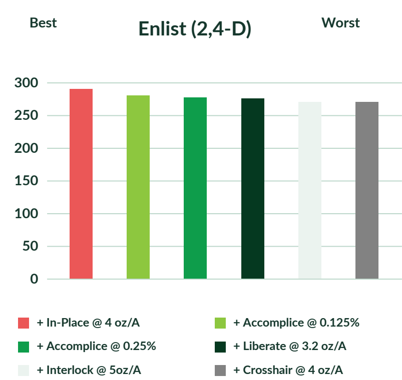




* Air speed = 16 mph
** Percent of total drops that are less than 105 microns in diameter

Dv10**



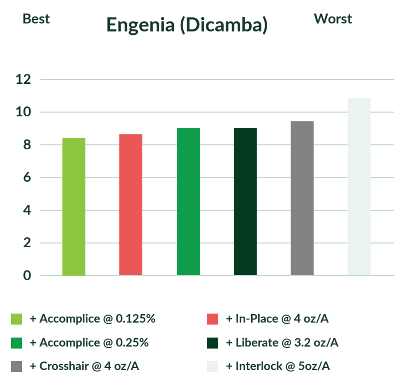


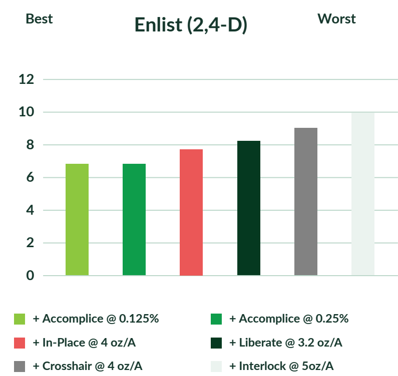
* Air speed = 16 mph
** Dv10 is the drop diameter in a spray where 10% of the drops are smaller and 90% of the drops are larger

When tested using high wind speed (125 mph), Accomplice provided the highest levels of drift reduction compared to the leading DRAs. In terms of the % <105 microns with 2,4-D, Accomplice had 7% whereas the leading DRAs had up to nearly 10% resulting in substantially greater number of small, drift prone drops being produced. In terms of Dv 10s, Accomplice had drop diameters ranging from 112 to 115 microns with dicamba and 125 microns with 2,4-D. In contrast, the leading DRAs had drop diameters ranging from 102 to 112 microns, again resulting in a substantially greater number of drift prone drops.

Simulated Aerial Spray*

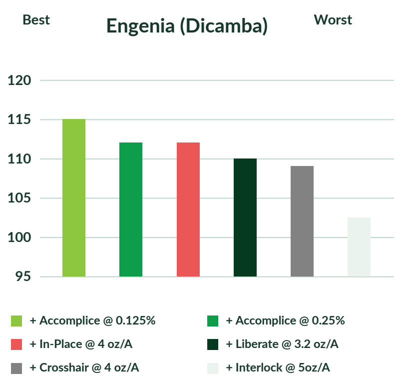
% <105 micron drops**

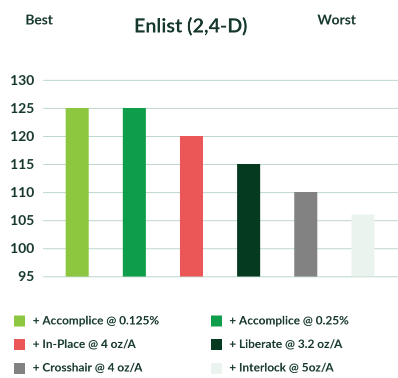




* Air speed = 125 mph
** Percent of total drops that are less than 105 microns in diameter

Dv10**



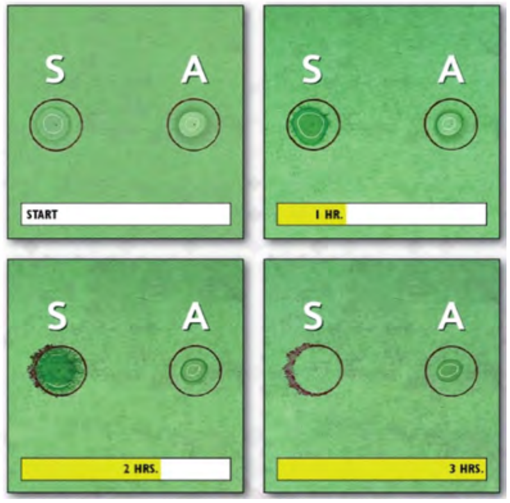


* Air speed = 125 mph
** Dv10 is the drop diameter in a spray where 10% of the drops are smaller and 90% of the drops are larger

Reducing Evaporation

Accomplice is a unique DRA. While the leading DRAs are focused solely on increasing drop diameter, Accomplice has been formulated with humectants that have a high binding capacity with water which slows the rate of evaporation as the drop travels from the nozzle to the target plant. This distinction is important. Accomplice allows drops to maintain their volume, reducing drift and getting more spray volume to the target.

The figure below illustrates the impact that Accomplice has on evaporation compared to a leading surfactant. The photo at the upper left is drops of water with either a surfactant (S) or Accomplice (A) immediately after they were pipetted on to the surface. The other photos were taken over time to compare evaporation rates. Accomplice reduced the evaporation rate by 50%.



Summary

Accomplice reduces small drops comparable to leading DRAs when used with ground applications. Accomplice is better at reducing small drops compared to leading DRAs when used with aerial applications. More importantly, Accomplice doesn't stop working after the spray drop leaves the nozzle. The humectants in Accomplice slow down evaporation, stopping the drop from becoming smaller and more drift prone.

Accomplice's Added Benefit

Many times growers will add a DRA to the tank for the sole purpose of reducing drift potential. Drift reduction is only one of the many benefits of adding Accomplice to your spray tank. It delivers more spray volume to the target plant, keeps it on the plant, and for contact and systemic pesticides, gets more into the plant.

WRITTEN BY

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