Do "drift retardant" chemicals work?

If used properly (at appropriate rates), these products indeed reduce spray drift by hindering formation of small, drift-prone droplets

By Erdal Ozkan

At Ohio State, we conducted experiments to determine effect of using drift retardant chemicals on spray pattern, droplet size and spray drift.

Results of these tests indicate that if used properly (at appropriate rates), these products indeed reduce spray drift by hindering formation of small, drift-prone droplets.

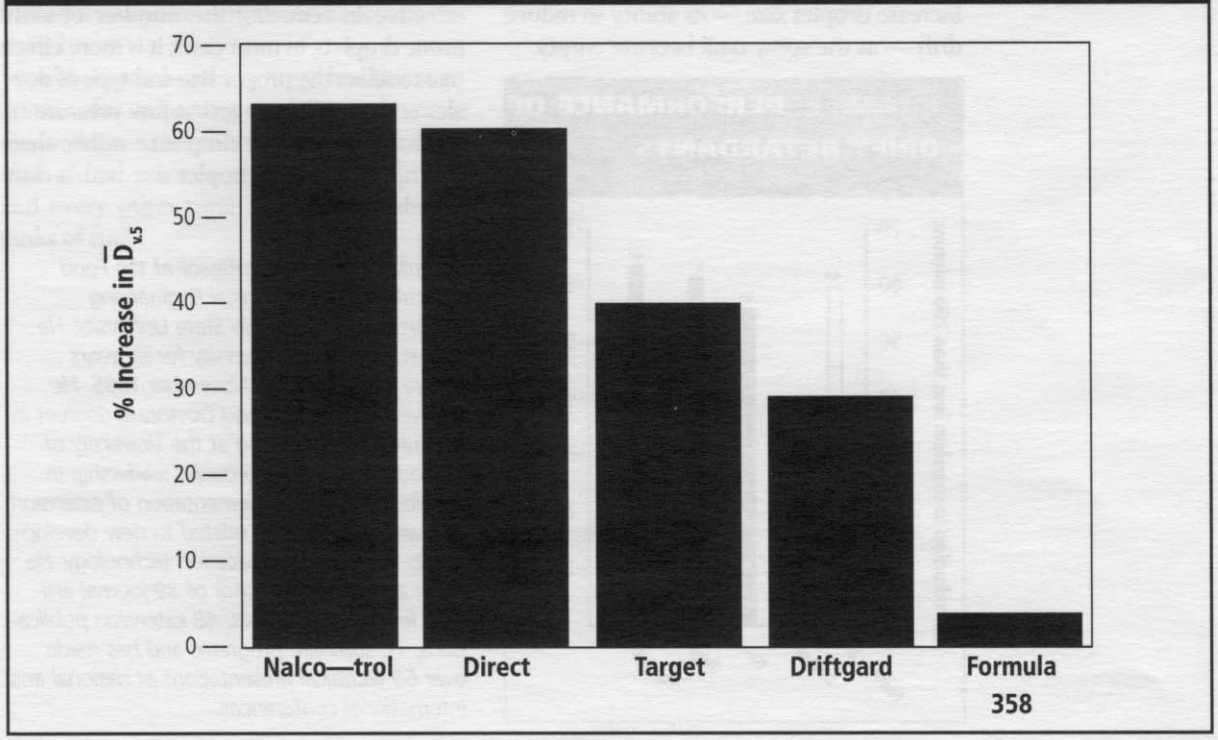
There are many "drift retardant" chemicals commercially available to pesticide applicators (there are over 30 of them). These products are normally some type of long chain polymer or gum that increases the viscosity of the spray mixture which result in a courser spray. Unfortunately, the information related to performance of these products is limited.

Results of a study conducted by USDA-ARS Engineers in Texas indicated that the effect of polymer concentration on droplet size is dependent on polymer type. For example, polyvinyl and polyacrylamide polymers were found to be more effective than linear alkyl epoxide or polymide copolymers in increasing volume median diameter and reducing the percentage of spray volume composed of small droplets subject to spray drift.

At Ohio State we have tested five drift retardant chemicals to determine their effects on droplet size, spray pattern, and spray drift reduction. In comparison to spraying water only, all drift retardants tested reduced volume of portion of small droplets in the spray but at varying magnitudes.

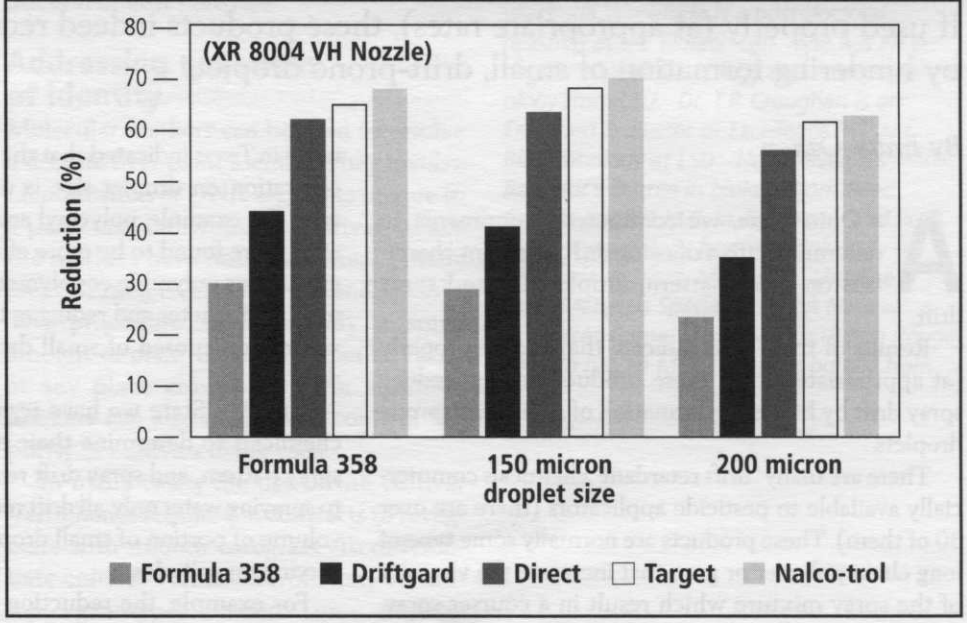
For example, the reduction of spray volume contained in droplets smaller than 100 microns ranged from 30 percent with the least effective product, to 68 percent with the most effective product.

FIGURE 1. INCREASE IN WEIGHTED VOLUME MEDIAN DIAMETER ($D_{v.5}$) WITH DIFFERENT DRIFT RETARDANTS



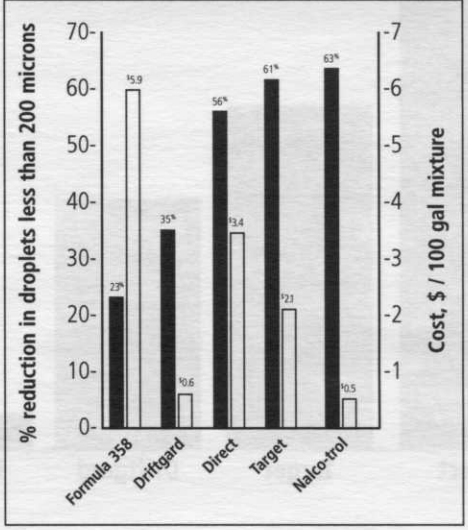
It is usually more effective to select the proper nozzles and operate sprayers at low pressure to produce desired drop size than to increase droplet size with a drift retardant chemical.

FIGURE 1. REDUCTION IN SPRAY VOLUME IN DROPLETS LESS THAN 100, 150 AND 200 MICRONS



Some studies have found that some of these polymers tend to be sheared by passing through a sprayer pump, as would occur in normal bypass, hydraulic mixing in common agricultural sprayers. This means that the drift retardant would lose its ability to increase droplet size — its ability to reduce drift — as the spray tank became empty.

FIGURE 2. PERFORMANCE OF DRIFT RETARDANTS



Gums are not sheared as easily as the long chain polymers, and some types of polymers (polyethylene oxide) are sheared in fewer passes through a pump than other types of polymers (polyacrylamides).

Although drift retardant chemicals are effective in reducing the number of drift prone droplets, in most cases, it is more effective to select the proper size and type of nozzles and operate sprayers at low pressure to produce the desired drop size rather than attempt to increase droplet size with a drift retardant chemical.

Dr. Erdal Ozkan is a professor at the Food Agricultural and Biological Engineering Department at the Ohio State University. He was at Iowa State University for six years before joining OSU in November 1985. He received his Master's and Doctorate degrees in agricultural engineering at the University of Missouri. In Ohio, he provides leadership in development and implementation of extension educational programs related to new developments in pesticide application technology. He is the author or co-author of 39 journal articles, four book chapters, 48 extension publications, 16 software programs and has made over 60 technical presentations at national and international conferences.