Effects of Spray Coverage and Nozzle Selection on Weed Control

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Herbicides play an important role in weed control efforts in California orchards and vineyards. Effective weed control with herbicides is influenced by many factors, but hinges on one's ability to apply sprays accurately, uniformly, and efficiently. Spraying with minimal drift and adequate coverage are important factors that influence herbicide performance. Spray droplet size influences both spray drift potential and spray coverage. Spray droplets <200 microns in diameter are light, remain airborne a long time, and are the most prone to drift. To help avoid spray drift, weed sprays should be applied using spray droplets larger than 225 microns (at least medium-sized). As a general rule, nozzles, tip sizes, and operating pressures should be selected to produce large enough spray droplets that reduce the risk of drift, while giving adequate coverage for the herbicide type (contact, systemic, or preemergent) used. Selecting a larger tip size to produce more volume per acre, may or may not be an effective way of mitigating reduced coverage where large spray droplets are used.

Recently, new spray nozzle designs have been introduced to help reduce drift potential by producing larger spray droplets. These new nozzle designs include extended range (XR), chamber (also referred to as "turbo"), venturi I (air assisted), and venturi II (combination of chamber and venturi I). However, little is known how these new spray nozzle designs affect spray coverage and weed control under field conditions. Several trials were conducted from 2008 - 2011 to evaluate drift-reducing spray nozzles and their effects on spray coverage and weed control when contact-type postemergent herbicides were used. Trials were conducted in a variety of settings, including orchards, vineyards, and open ground. Drift-reducing nozzles were compared to standard flat fan nozzles. Flat fan nozzles produced medium-sized spray droplets, while the drift-reducing nozzles produced droplet sizes from coarse to extremely coarse.

Although the number of spray droplets per in^2 and percent cover on water-sensitive paper increased with an increase in a spray volume of 20 to 40 gpa, it did not necessarily result in significantly better weed control. Turbo and Turbo TwinJet nozzles provided similar weed control to XRs or flat fans. Air induction nozzles gave the least amount of spray coverage and weed control. Although these nozzles gave comparable weed control to the other spray nozzle designs initially, overall control was reduced 10 to 20% later as weed regrowth occurred. A spray volume of at least 50 gpa was needed to help compensate for the larger size in droplets produced by air induction-type nozzles. It appears that drift-reducing nozzles can play an important role in postemergent weed control efforts, even where contact-type herbicides are used.