# EFFECT OF HOODED SPRAYER AND SPRAY QUALITY ON HERBICIDE PARTICLE DRIFT

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## Abstract

The use of auxin-resistant technologies by cotton growers has increased rapidly over the last few years as more growers are planting cotton varieties resistant to 2,4-D or dicamba across the Cotton Belt. Increased concerns around spray particle drift from auxin herbicides have resulted in more restrictive pesticide applications such as product registration label for use of Dicamba in cotton includes a downwind buffer of 310 feet in areas where endangered species are located. Crop canopy can influence spray drift and various spray drift research studies have been conducted in soybean, due to which the 2020 product registration label provides flexibility to soybean growers for reducing the downwind buffer to 110 feet through use of approved hooded broadcast sprayers. The main objective of this study is to measure and compare spray particle drift originating from an open and hooded boom broadcast sprayer at different spray qualities (droplet size ranging from fine to ultra-coarse) in cotton in an effort to determine if a hooded boom sprayer can help in reducing spray particle drift.

A study was conducted at the Southeast Research and Education Center located in Midville, Georgia in 2021. The study treatments consisted of two sprayer types (open and hooded boom) and six different spray qualities: Fine, Medium, Coarse, Very-Coarse, Extremely Coarse, and Ultra-Coarse. Field tests were conducted on July 30, 2021 when the cotton was at 6-8 leaf stage. The selected spray area in the field measured 6.1 m (20 ft wide; spray boom width) x 150 m (492 ft.) long where mylar cards (2.75 in. x 4 in.) were placed at 1, 2, 3, 5, 10, 20, 30, 45, 60, 75, 90 and 105 m downwind from the center of the spray area and perpendicular (±30° adjusted for wind direction) to the sprayer pass. Similarly, three mylars cards were placed within the swath and one mylar card was placed 30 m (98 ft.) upwind of the spray pass. The spray solution consisted of a mixture of Xtendimax (Dicamba @22 fl oz/ac) plus Roundup PowerMAX 3 (glyphosate @30 fl oz/ac) along with a Rhodamine WT dye (@ 0.2% v/v). For extraction, samples were washed with a 10/90:alcohol/water solution and then a 30-ml sample was used in the fluorometer to obtain a raw fluorescence unit (RFU) values. For each pass, RFU values were converted to percent of in-swath deposit to standardize data among the treatments and to determine percent drift originating from each spray quality.

Results showed that the spray drift for open boom sprayer was measured up to a distance of 20 m for medium and very coarse spray qualities, up to a distance of 10 m for fine spray droplet, and up to a distance of 5 m for coarse, extremely coarse and ultra-coarse droplet sizes. However, the spray particle drift for the hooded sprayer was only measured up to the maximum distance of 3 m for the medium droplet size, up to 2 m for the very coarse droplet size, and up to only 1 m for rest of the droplet sizes. Based on these data, it was concluded that the hooded sprayer was able to reduce the spray drift from 77 to 93% at the downward distance of 1 to 10 m with the largest drift reduction (up to 90%) achieved closest to the spray area (1-2 m from the spray area). In summary, the study results suggested that hooded sprayer can effectively reduce spray particle drift during pesticide applications in cotton and can be utilized as an effective drift reduction tool by cotton growers for safe post-emergence pesticide applications in cotton.