

Spray Deposition and Quality as Affected by Ground Speed for a Boom Sprayer without a Rate Controller

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Proper selection of application rate, also referred to as spray or carrier volume – is an important consideration for achieving adequate coverage, efficacy and pest control in peanut. For conventional boom sprayers without a rate controller, target application rate is achieved by maintaining a consistent ground speed – selected during sprayer calibration – for the given nozzle size and pressure. However, ground speed variations are common in the field during pesticide applications. In order to understand the effect of ground speed, and consequently reduced volume, on spray deposition and quality, field tests were conducted with a commercial boom sprayer in 2021. The sprayer was calibrated to deliver an application rate of 20 gallons per acre with at 6 mph and spray pressure of 30 PSI. The spray boom (54-ft wide) was split into three sections with each section representing a different nozzle type/droplet size – medium, very coarse and ultra coarse. During testing, herbicide applications in peanut were made at five different ground speeds of 6, 8, 10, 12 and 14 mph, keeping the same nozzle size and pressure selected during calibration to evaluate the influence of increased speed on coverage and spray quality. Each sprayer pass consisted of three different nozzle types (representing droplet sizes) split evenly across the boom (54 ft length) and the length of each sprayer pass was approximately 600 ft long. Spray deposition and quality was collected by placing water sensitive paper at three different locations across the boom on the ground during application. Weed counts were recorded at 10-14 days after application while yield data was collected by harvesting all six rows within each plot. The study results showed that an increase in ground speed influenced both spray coverage and quality across all three nozzle types. Regardless of the nozzle type, the highest ground speed of 14 mph had the lowest coverage whereas the 6-mph speed had the highest coverage, which was expected as an increase in ground speed without changing nozzle size and/or pressure resulted in reduced application rate than the target, which consequently lead to decreased coverage. For the same nozzle type, spray quality also differenced among the ground speeds again due to influence of reduced spray volume with an increase in ground speed. Pesticide applications are critical to protect peanut yield and ground speed variations during pesticide applications are inevitable. This study highlights the importance of integrating a simple spray technology i.e. a rate controller on peanut sprayers to maintain the target application rate and uniformity across the field despite changes in ground speed.