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## Spray Deposition and Quality Assessment at Different Ground Speeds for a Boom Sprayer with and without a Rate Controller

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### Abstract

Appropriate selection of application parameters including ground speed during pesticide applications is an important consideration for achieving adequate coverage and efficacy. Ground speed variations are common during pesticide applications which can influence both spray deposition and quality. Field tests were conducted with a commercial boom sprayer without a rate controller (CNS) in 2021 and with a rate controller (SRC) in 2022 in order to understand the effect of ground speed, and consequently reduced volume, on spray deposition and quality. In both years, sprayer was calibrated to deliver an application rate of 20 gallons per acre at 6 mph and spray pressure of 30 PSI. The spray boom (54-ft wide) was further split into three sections with each section representing a different nozzle type/droplet size – medium, very coarse and ultra coarse. During testing, spray applications were made at six different ground speeds of 6, 8, 10, 12, 14 and 16 mph, keeping the same nozzle size and pressure selected during calibration. Spray deposition and quality was collected by placing water sensitive paper on the ground at three different locations across the boom. The results showed that the spray deposition reduced drastically with an increase in ground speed across all nozzle types for CNS primarily due to decrease in quantity of spray droplets per unit area. However, spray deposition was consistent for SRC across ground speed upto 10 mph and decreased thereafter across all nozzle types. Ground speed affected spray quality for both sprayers; however, the spray quality variations were greater for SRC due to an increase in spray pressure with ground speed. The results of this study indicated agricultural sprayers equipped



with a rate controller provide adequate and consistent spray deposition compared to conventional sprayers (no rate controller) when ground speed changes occur during pesticide applications. While spray quality is also affected when using a rate controller, best management practices including proper nozzle selection and application at nominal ground speeds should be followed to minimize these effects and ensure effective technology utilization.

**Keywords:** agricultural sprayers, ground speed, rate controller, spray coverage, spray quality.