

Influence of Application Volume and Droplet Size on Spray Penetration into Peanut Canopy

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Peanut, unlike the other row crops, has well-developed and dense canopy growth at late vegetative growth stage. The lower portions (middle and bottom) of the canopies become a major region for disease and pest infestation. Adequate spray coverage and penetration into the peanut canopy is critical for effective pest management. For fungicide applications, both spray volume and droplet size are important application parameters that can influence both coverage and spray penetration into the peanut canopy. The objective of this study was to assess spray penetration into peanut canopy at three application volumes (10, 15 and 20 gallons per acre; GPA), with each spray volume applied using three nozzles that produced medium, very coarse and ultra-coarse spray droplets. The study was conducted in plots that measured 4-rows wide (12 ft) by 80 ft long. Fungicide applications were made with a 6-row boom sprayer (5.5 m) equipped with a rate controller and individual nozzle control capabilities. To assess spray coverage and penetration, water sensitive paper was placed at three different heights (top, middle and bottom) in the canopy in the center two rows during fungicide applications at 47, 62, 92 and 122 days after planting. Canopy measurements and leaf area index (LAI) were also collected in the center two rows prior to each application. Visual disease ratings (for leaf spot and white mold) were recorded at pre-determined intervals throughout the season while yield was collected by harvesting center two rows in each plot. The study results showed that spray coverage was influenced by both spray volume and droplet size. Higher volume (20>15>10 GPA) and smaller droplet size (Medium > Very Coarse> Ultra Coarse) increased spray coverage during all applications. Both spray volume and droplet size had a significant interaction with position within the canopy. Higher spray volume increased spray penetration up to middle of the canopy while both medium and very coarse droplets provided comparable coverage in the middle of the canopy. Spray penetration at the bottom of the canopy as well as disease ratings and peanut yield did not differ among the application volumes or droplet sizes. The results from this study suggested that fungicide application efficiency can be improved by utilizing a combination of higher spray volume and/or smaller droplet size. Future research needs to investigate the influence of these applications parameters on spray coverage, penetration and efficacy in fields with high disease/pest pressure in the season.