THE EFFECT OF NOZZLE DESIGN ON SPRAY DRIFT REDUCTION AND HERBICIDE EFFICACY J. A. McGinty Texas A&M AgriLife Extension Service Corpus Christi, TX P.A. Baumann Texas A&M AgriLife Extension Service College Station, TX

Abstract

In light of synthetic auxin-tolerant traits scheduled for commercial release in corn, cotton, and soybean, there is an increased need for understanding the influence of spray nozzle design on physical spray drift reduction. By utilizing a low-speed wind tunnel with a laser diffraction sensor, a study was conducted to examine the effect of several spray nozzle designs on the droplet size spectra of agricultural sprays. Nozzles tested in this experiment included the TeeJet XR 11002, DG 11002, AIXR 11002, AI 11002, and TTI 11002. Sprays produced by nozzles utilizing a preorifice design or a combination of pre-orifice and air-inclusion designs were observed to have significantly larger median droplet diameters than nozzles without these features. When operated at 30 psi, median droplet diameters of sprays produced by the TTI nozzle were 344% larger than those of the XR nozzle. When the portion of the total spray volume contained in droplets 100 µm in diameter or less was examined at an operating pressure of 60 psi, sprays produced by the XR nozzle resulted in a nearly 50-fold increase in these very fine spray droplets compared to sprays produced by the TTI nozzle. A field study was also conducted to investigate the effect of the previously mentioned spray nozzles on the efficacy of paraguat and glyphosate herbicides. In plots treated with paraguat, Palmer amaranth control was observed to be significantly lower 3 days after treatment (DAT) where applications were made with the TTI nozzle, however this difference was not observed at any point beyond 3 DAT. No significant differences in weed control were observed among spray nozzles in glyphosate-treated plots. All treated plots, regardless of the spray nozzle utilized or the herbicide applied, exhibited in excess of 93% control of Palmer amaranth.