

**Herbicide Efficacy and Economic Return as Affected  
by Precision Agriculture Technology**

Dr. Dan Reynolds, 45-2019

Field experiments were conducted across three sites in Mississippi in 2018 to evaluate the effect of carrier volume and spray quality on non-dicamba-resistant soybean response to a sublethal dose of dicamba. Treatments consisted of dicamba at 5.6 g ae ha<sup>-1</sup> plus glyphosate at 8.7 g ae ha<sup>-1</sup> (equivalent to 1% of recommended use rate) applied to soybean at the R1 growth stage using a pulse-width-modulation (PWM) sprayer calibrated to deliver 140, 105, 70, 35, 14, or 7 L ha<sup>-1</sup>. Each carrier volume was applied using either TT11002 or XR110015 nozzles, which resulted in approximately Fine and Coarse spray qualities, respectively. Additionally, a colorimetric dye was included in spray solutions to quantify spray coverage of each treatment. Spray coverage decreased with decreased carrier volumes and overall ranged from 21 to 3%. Conversely, soybean injury increased as carrier volume decreased. Likewise, soybean height 14 d after treatment (DAT) was reduced 34 to 37% from carrier volumes of 70 to 140 L ha<sup>-1</sup>; however, when carrier volume was reduced to 14 or 7 L ha<sup>-1</sup>, plant height was reduced 45%. By 28 DAT soybean height was similar among volumes of 35 to 140 L ha<sup>-1</sup> (39 to 42% reduction); however, volumes of 14 and 7 L ha<sup>-1</sup> resulted in 46 and 51% reductions in height, respectively. Soybean yield was reduced by 14% from treatment applied at 140 L ha<sup>-1</sup>. Further reductions in carrier volume resulted in paralleled yield loss with the greatest yield loss of 41% which occurred from a treatment carrier volume of 7 L ha<sup>-1</sup>. When averaged across carrier volumes, Fine and Coarse sprays caused 30 and 26% yield loss, respectively. These data indicate that carrier volume profoundly affects soybean response to dicamba and should be considered in future related research.