FIELD AND WIND TUNNEL EVALUATIONS OF DRIFT REDUCTION NOZZLES AND AGENTS FOR GLYPHOSATE APPLICATIONS. John F. Fietsam and Bryan G. Young, Graduate Research Assistant and Assistant Professor, Department of Plant, Soil, and General Agriculture, Southern Illinois University, Carbondale, IL 62901.

Field and wind tunnel studies were conducted in 2001 and 2002 to evaluate the performance of drift reduction nozzle and agent combinations for applications of glyphosate. Glyphosate was applied at 210 g ae/ha alone and in combination with two drift reduction agents, 30% polyacrylamide (PA) and hydroxypropyl guar (HPG). PA and HPG were applied at two rates of 0.05 and 0.1 ml ai/L and 300 and 600 mg ai/L, respectively. Each treatment was applied using one of four 110015 nozzle types [XR TeeJet(XR), Turbo TeeJet(TT), AI TeeJet(AI), and DG TeeJet(DG)]. Treatments were applied in a water carrier at 94 L/ha. In field studies, water-sensitive cards were placed in each plot to collect droplet data. Similarly, water-sensitive cards were used to collect droplet data at a distance of 4 m downwind from the nozzle in the wind tunnel studies. DropletScan software was used to analyze all cards in terms of coverage, number of droplets collected, and volume median diameter (VMD).

In field evaluations, nozzle type, agent type and rate, and combinations of each increased VMD, while reducing both coverage and droplet counts. Drift reduction nozzles increased VMD compared to XR nozzles, with increases ranging from 30 µm with DG nozzles to 144 µm with AI nozzles. Similarly, VMD was increased as the rate of either PA or HPG increased. All treatments with drift reduction nozzles reduced droplet counts compared to the standard treatment of XR nozzles with no agent. Treatments with DG and TT nozzles reduced the number of droplets collected by at least 2,390 droplets regardless of agent rate, while treatments with AI nozzles reduced droplet counts by no less than 5,500 droplets. Coverage was reduced by 5 to 14% with the use of a drift reduction nozzle type compared to treatments with XR nozzles, and by 3 to 6% with half and full rates of an agent, respectively.

In wind tunnel evaluations, physical spray drift, coverage, and droplet counts were all reduced with combinations of drift reduction nozzles and agents. Total drift was reduced by up to 42% for all treatments applied through DG and AI nozzles. The amount of drift was also reduced by 13 to 18% with the use of a full rate of either PA or HPG, respectively, in combination with XR nozzles. All drift reduction nozzle types when used in combination with a full rate of either type of agent reduced both coverage and droplet counts relative to the standard treatment of XR nozzles and no agent.

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