THE INFLUENCE OF SPRAY COMPONENTS AND NOZZLE TYPE ON SPRAY DISTRIBUTION AND COVERAGE. Gregory K. Dahl, Joe V. Gednalske and Eric Spandl, Research Coordinator, Manager of Product Development and Agronomist, Winfield Solutions LLC, St. Paul, MN 55164.

The influence of herbicide, formulation, adjuvant system, nozzle type and size can greatly affect the size and distribution of spray droplets. Comparisons were made between an XR 11004 extended range flat fan nozzle, an AI 11004 air induction nozzle and an AIXR 11004 air induction extended range nozzle. Mixtures sprayed through each of the nozzles included water alone, an adjuvant system that simulated the spray droplet size distribution of fully loaded K-salt glyphosate herbicides, the simulated glyphosate adjuvant system along with a modified vegetable oil deposition aid and drift control adjuvant and the simulated glyphosate adjuvant system with a guar type spray thickener drift control adjuvant. All treatments were applied at 10 gpa. The XR flat fan and the AIXR nozzles were sprayed at 30 psi and the AI nozzle was sprayed at 50 psi. Each spray mixture by nozzle comparison was conducted with no wind present and then again with a 7.5 to 8 mph wind.

A high speed photograph was taken of each spray mixture, nozzle type and wind combination. The camera used was a Hasselblad 553 medium format camera with a Leaf 65 digital back. The lens used was a Zeiss Sonnar 120 mm. Shots were taken at f 8.5 at 1/500 second shutter speed. The pictures were backlit with a Prism SPOT strobe using a 500 nanosecond flash.

The high speed photography provided excellent detail of the spray droplets in the spray patterns. The XR flat fan pattern contained smaller droplets than the patterns for the AI or AIXR nozzles. The simulated glyphosate adjuvant system contained many more very small droplets than water or the other mixtures and this was most evident with the XR flat fan nozzle. Both mixtures with deposition and drift reduction had fewer fines than the simulated glyphosate adjuvant alone mixture when using the XR flat fan nozzle. The mixture with modified vegetable oil deposition and drift control had fewer fines than the simulated glyphosate adjuvant alone when sprayed through the AI and AIXR nozzles. The guar type spray thickener drift control adjuvant greatly decreased the spray angle demonstrating why it should not be used with AI or AIXR nozzles.

2008 North Central Weed Science Society Proc. 63:128.