

ENHANCING HERBICIDE SELECTIVITY WITH WATER REPELLENTS. Eric A. Nelson and Donald Penner, Department of Crop and Soil Sciences, Michigan State University, East Lansing, MI 48824.

A potential method of enhancing herbicide selectivity is the addition of water repellent adjuvant that would decrease injury to the crop by reducing foliar absorption while maintaining weed control. Potential situations for water repellent use include: application of soil active herbicides to turf so the spray solution is bounced through the thatch to the soil, application of herbicides that may cause excessive crop injury if foliar contact occurs such as a planned preemergence application to a partially emerged crop or a postemergence application of a herbicide that may cause crop injury. For a water repellent to be useful, the herbicide must have soil activity since the spray solution would be bounced off of weed foliage and crop foliage alike. The objectives of this research were to determine if adjuvants with water repellent properties could reduce herbicide retention on foliage and thereby absorption of the spray solution and to determine if herbicide efficacy was maintained with a reduction in foliar herbicide retention.

Water repellent adjuvants evaluated were DC 2-1322, DC 1-6184, and DC 772. These adjuvants were evaluated with three herbicides, isoxaflutole, pendimethalin, and flumioxazin, on three plant species. Two formulations of pendimethalin and isoxaflutole were evaluated. Pendimethalin formulations were EC and CS, while isoxaflutole formulations were SC and WDG. Flumioxazin was also formulated as a WDG. The commercially available silicone surfactant Sylgard 309 was evaluated as a positive control. Plant species evaluated were: 1) wheat, a hard to wet plant due to leaf orientation, 2) cabbage, a hard to wet plant due to a very waxy cuticle, and 3) tomato, an easier to wet plant. To evaluate spray retention, each treatment was applied with the dye Chicago Sky Blue. Spray retention was measured by washing the leaves after application and measuring the absorbance of the rinsate with a spectrophotometer at 625 nm. Herbicide efficacy was evaluated with the same treatments as above when soil contact was allowed on half of the plants and prevented on half of the plants. Thus, it was possible to isolate injury due to foliar as well as soil uptake of the herbicides.

Spray retention and plant injury were greatest on all species when Sylgard 309 was applied with all herbicides and formulations. Flumioxazin injury on cabbage only occurred when Sylgard 309 was included in the spray mixture. The water repellents, DC 2-1322 and DC 772 appeared ineffective with these herbicides and these plant species. DC 1-6184 effectively reduced spray retention for all three herbicides evaluated, regardless of formulation, on all three species. The EC formulation resulted in greater spray retention than the other formulations. The efficacy of DC 1-6184 was more evident if the spray application was restricted to the plant foliage. The adjuvant DC 1-6184 has potential to decrease injury while maintaining weed control with certain herbicides.