

Establishment & Productivity of Alfalfa (*Medicago sativa*) Following Application of Residual Corn (*Zea mays*) Herbicides

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Alfalfa establishment failure has been reported in fields where corn was grown the previous season. Herbicides containing clopyralid, mesotrione, acetochlor, and/or flumetsulam applied in corn have been implicated as a potential causal factor. Experiments were conducted to assess the impact (carryover effect) of these residual herbicides on alfalfa establishment and biomass production following corn. Clopyralid, mesotrione, acetochlor, and flumetsulam were applied to corn (V4) alone or mixed with other active ingredients found in two commercial herbicide premixes (clopyralid + acetochlor + mesotrione and clopyralid + acetochlor + flumetsulam) at two locations and compared to a nontreated control. Soil was collected in November, just prior to soil freezing, and a greenhouse bioassay evaluated establishment and productivity of three alfalfa cultivars. Alfalfa was also planted into herbicide-treated fields the following spring and evaluated for establishment and resulting productivity. Greenhouse results show that locations and cultivars responded differently to the herbicide treatments. At one location, aboveground biomass of every alfalfa cultivar was reduced 29–37% when the premix of clopyralid + acetochlor + flumetsulam was applied to corn. Additionally, aboveground biomass was reduced from application of mesotrione and flumetsulam, but this was only significant with select cultivars. The other location, however, found increases in aboveground biomass when flumetsulam (35–41%, all cultivars) and clopyralid (28%, one cultivar) were applied during corn, a phenomenon called hormesis. When alfalfa was planted into treatments the following spring (field bioassay), no differences in alfalfa plant density or aboveground biomass were present at either location. Differences observed in the fall suggest the potential for herbicide carryover exists if adequate breakdown does not occur over the winter and spring. Results also document that alfalfa cultivars have different sensitivities to these herbicides. Knowledge of this information could be useful for future plant breeding efforts or to inform growers about management practices. More research is needed, but these approaches show promise to further reduce the risk of herbicide carryover after corn is grown.