

EFFICACY AND DEGRADATION OF MESOTRIONE AND ISOXAFLUTOLE IN THE SOIL.
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Soil dissipation rates determine temporal efficacy relationships for herbicides with soil activity. Little is known about the relative dissipation rates of two recently introduced herbicides: mesotrione and isoxaflutole. Our study had three objectives: 1) to determine if there is a significant difference in the length of control between preemergence (PRE) applications of isoxaflutole and mesotrione 2) to explore the possibility of a soil pH interaction with herbicide degradation rates and 3) to estimate the half-lives with relation to the degradation rates. Greenhouse bioassay experiments were conducted on field-sampled soils treated with isoxaflutole and mesotrione in 2002, 2003 and 2004 at three Illinois locations. Soil types at the three locations were Flanagan silt loam with 3.6% O.M., Drummer silt loam with 4.5% O.M., and Cisne silt loam with 2.1% O.M. These studies were conducted on established pH plots where the pH was adjusted to incremental levels ranging from < 6.0 to > 7.5 . Mesotrione was applied PRE at 211 g ha^{-1} , 158 g ha^{-1} , and 105 g ha^{-1} while isoxaflutole rates were 105 g ha^{-1} , 78 g ha^{-1} , and 52 g ha^{-1} . Soil samples were taken from the middle of each plot 5 to 10 days after application and at every 14 days up to 40 days after application. Soil samples were returned to the greenhouse and planted with velvetleaf and common waterhemp as bioassay species. Soil samples were then mixed and re-planted after successive 15-day grow-out periods until no visible control was observed. This same method was adapted for use in estimating half-lives by using the greenhouse spray chamber to apply $\frac{1}{4}X$ to $\frac{1}{128}X$ rates of the two herbicides. Herbicide efficacy based on bioassay results found mesotrione at 211 g ha^{-1} rates consistently outperformed all isoxaflutole rates. Soil-dissipation rates based on decrease of velvetleaf control from 100% to 80% ranged from 7 to 28 days.

