



Factors Influencing Observed Tillage Impacts on Herbicide Transport

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The widespread use and potential human health effects of the herbicides atrazine and glyphosate have generated interest in establishing how no-tillage impacts loading of these herbicides to runoff water in comparison to other tillage practices. In this study, potentially confounding factors such as time in tillage practice and type and distribution of residue cover, are weighed against inherent tillage impacts to soil structure in terms of relative effects on herbicide transport with runoff water. In this study, two small watersheds (one in no-till (NT) and one rotational till (RT)) were monitored during the first three years since conversion of the RT watershed from NT. In addition, rainfall simulation was applied to plots within each watershed during the first, third, and fifth years since the conversion. Runoff atrazine and glyphosate losses from RT areas were compared to losses from NT areas as a ratio of RT:NT. Results indicate a trend of increasing RT:NT value with time in tillage. Watershed monitoring indicated greater herbicide loading to runoff water from the NT watershed than the RT watershed during the first year since RT conversion, but this relationship reversed by the third year since conversion to RT. In addition, rainfall simulations were performed on small boxes of NT or RT soil having varying types and levels of residue cover in an attempt to isolate residue cover effects from true tillage effects.