EFFECT OF GROWTH MEDIA ON COMMON LAMBSQUARTERS AND GIANT RAGWEED BIOTYPES RESPONSE TO GLYPHOSATE. Jessica R. Schafer, Andrew M. Westhoven, Greg R. Kruger, Vince M. Davis, Steven G. Hallett, and William G. Johnson. Graduate Research Assistant, Department of Botany and Plant Pathology, Purdue University, West Lafayette, IN 47907, Agronomist, AgriGold, West Lafayette, IN 47907, Graduate Research Assistant, Department of Botany and Plant Pathology, Purdue University, West Lafayette, IN 47907, Assistant Professor, Department of Crop Science, University of Illinois, Urbana, IL 61801, Associate Professor, and Professor, Department of Botany and Plant Pathology, Purdue University, West Lafayette, IN 47907.

A well recorded but rarely cited phenomenon is observed in plants treated with glyphosate: plants grown in unsterile media suffer more damage following a glyphosate application than those grown in sterile soil. This reveals that glyphosate predisposes plants to disease and this secondary mode of action of the herbicide is important. In particular, conducting greenhouse studies in pathogen free potting soil may obscure an important component of the mode of action of glyphosate. Research conducted to investigate the activity of glyphosate has provided differing results when performed in different soil media. The objective of this study was to determine the effect of soil microbes on the response of sensitive and insensitive common lambsquarters (*Chenopodium album*) and giant ragweed (*Ambrosia trifida*) biotypes in response to glyphosate. We treated sensitive and insensitive biotypes grown in sterile and unsterile media to a range of glyphosate rates. Plants grown in unsterile soils had the greatest dry weight reduction across all rates. Both sensitive and insensitive biotypes were able to survive in sterile soil at 3.36 kg ae/ha while plants grown in unsterile soil did not survive. Interestingly, for each biotype, the impact of glyphosate was greater in the unsterile soils than the sterile. Our findings confirm that the insensitive biotype of each weed was more sensitive to glyphosate in unsterile soil, than the sensitive biotype in sterile soil. Soil microbes play an important role in the mode of action of glyphosate. Thus, it is possible that the evolution of resistance to glyphosate may stem not only from the resistance to the herbicide itself, but also resistance to soil microbes. Further research will investigate whether or not the insensitive biotypes of common lambsquarters and giant ragweed studied here exhibit elevated levels of resistance to soil microbes.

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A well recorded but rarely cited phenomenon is observed in plants treated with glyphosate: plants grown in sterile media suffer much less damage following a glyphosate application than ones grown in field soil. Screening studies for glyphosate resistance in common lambsquarters (*Chenopodium album*) and giant ragweed (*Ambrosia trifida*) biotypes has revealed inconsistent results in greenhouse and field studies, where soil media differs. The objective of this study was to determine the effect of various growth media on the response of resistant and susceptible common lambsquarters and giant ragweed biotypes to glyphosate. Biotypes were grown in three different soil medias: commercial potting mix, 1:1 sand-bark mix, and field soil, differing in soil microbe communities. Glyphosate treatments included 0.84 and 3.36 kg ae/ha. Current experiments being conducted with biotypes grown in field soil, and the same soil that had been sterilized by gamma irradiation, treated with 6 different rates of glyphosate. Plants grown in potting and sterile soil had the lowest amount of dry weight reduction, while plants grown in field soil had the highest amount of dry weight reduction. Both susceptible and resistant biotypes were able to survive in sterile soil at a 4-fold rate, while plants grown in unsterile were killed. From these results, it is apparent that the activity of glyphosate was decreased in the presence of soil microbes in both susceptible and resistant biotypes of common lambsquarters and giant ragweed. Concluding that soil microbes play a role on the mode of action of glyphosate, and may reveal insight to the mechanism of glyphosate resistance.

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