

PHYSIOLOGICAL BASIS OF GLYPHOSATE RESISTANCE IN RIGID RYEGRASS (*LOLIUM RIGIDUM*). Marulak Simarmata and Donald Penner, Michigan State University, Department of Crop and Soil Science, East Lansing, MI 48824.

Rigid ryegrass collected in California in 1998 has been selected for 7 generations to separate the susceptible (S) and resistant (R) biotypes. Past research has not elucidated the basis for glyphosate resistance in rigid ryegrass. Foliar absorption, distribution in the plant, and intercellular movement of glyphosate into chloroplast did not explain the observed resistance. Inheritance of glyphosate resistance appears to be multigenic. The objective of this study was to determine the role of metabolism and 5-enolpyruvylshikimate-3-phosphate synthase (EPSPS) in glyphosate sensitive (S) and glyphosate resistant (R) biotypes. Metabolism of ¹⁴C-glyphosate was not evident in either the susceptible or glyphosate resistance rigid ryegrass. EPSPS activity from the (R) biotype was inhibited 0 and 25% at 0.5 and 5 mM glyphosate; and the EPSPS activity from the (S) biotype was inhibited 38 and 51% at 0.5 and 5 mM glyphosate, respectively. The data indicate that the difference in sensitivity of EPSPS to glyphosate is a major contributor to the observed glyphosate resistance in the (R) biotype of rigid ryegrass.