POTENTIAL MOLECULAR MECHANISMS OF GLYPHOSATE RESISTANCE IN CONYZA CANADENSIS. C. Neal Stewart, Jr., Laura L. Good, Matthew D. Halfhill, Murali R. Rao. Department of Plant Sciences, University of Tennessee, Knoxville, TN 37996

Conyza canadensis (Asteraceae) (horseweed or marestail) is a weedy winter annual that is the first dicot species to evolve resistance to glyphosate herbicide. First seen in Delaware in 2000, resistant biotypes (4x to 13x) are found in at least 13 US states and are spreading. We are currently performing a population genetic and phylogeographic analysis to better understand the spread. However, most important is the molecular mechanism responsible for resistance; it is still unknown, but there are clues as to what it might be and what it is not. We know it is not caused by mutations in the EPSPS gene or its expression; therefore it must be a non-target mechanism. We know that resistance is inherited in simple Mendelian fashion. We know that shikimate accumulates in both resistant and susceptible biotypes when sprayed with glyphosate with slightly altered patterns and that there is different translocation between the two biotypes. Our working hypothesis is that altered gene expression of a non-target metabolism or transport gene causes resistance. To that end, we have carried out heterologous microarray experiments using *Arabidopsis thaliana* chips to identify candidate genes that are upregulated in resistant, glyphosate-treated *C. canadensis* plants. While no *C. canadensis* candidate gene has yet been cloned or characterized, we have developed a horseweed transformation system to test for heterologous or *C. canadensis*–based resistance.

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