PREVALENCE OF AN UNUSUAL RESISTANCE MECHANISM FOR PPO INHIBITORS IN WATERHEMP. Ryan M. Lee, Aaron G. Hager, and Patrick J. Tranel, Post-doctoral Research Assistant, Assistant Professor, and Associate Professor, Department of Crop Sciences, University of Illinois, 1201 W. Gregory Dr, Urbana, IL 61801.

The mechanism of resistance to protoporphyrinogen oxidase (PPO)-inhibiting herbicides in waterhemp has been shown previously to be the result of a single codon deletion in the *PPX2L* gene, a gene encoding both plastidic- and mitochonridal-targeted PPO proteins. This mechanism of resistance is unique because it represents the first time a deletion mutation has been implicated in herbicide-resistance. Furthermore, when this mechanism was initially characterized it was presumed that waterhemp contained three *PPX* genes, *PPX1*, *PPX2S* and *PPX2L*, and that the resistant biotypes were missing *PPX2S*. First, to obtain a better understanding of this unique mechanism of resistance, we examined the relationship between the *PPX2* genes in waterhemp using allele testing and sequence data. Based on these experiments we conclude that *PPX2L* is the only *PPX2* gene present in waterhemp. Next, to determine the prevalence of the deletion mutation in Illinois waterhemp, we developed an allele-specific PCR marker that amplifies only the 3-bp deletion allele, ΔG210, of *PPX2L*. By utilizing this marker, we determine that the ΔG210 *PPX2L* gene was present in all six examined PPO-resistant waterhemp populations from Illinois. Thus, the ΔG210 mutation likely is the predominant mechanism of resistance to PPO-inhibiting herbicides in Illinois waterhemp.

2007 North Central Weed Science Society Proceedings 62:102.