AN ALTERNATIVE TO THE GLYCINE DELETION: WHY R98L WAS SELECTED IN COMMON RAGWEED PROTOPORPHYRINOGEN OXIDASE. Stephanie L. Rousonelos, Ryan M. Lee, and Patrick J. Tranel, Graduate Research Assistant, Postdoctoral Research Assistant, and Professor, Department of Crop Sciences, University of Illinois, Urbana, IL 61820.

Research was performed to elucidate the mechanism of resistance to PPO-inhibiting herbicides in a common ragweed biotype from Delaware. A point mutation was identified in the *PPX2* gene that causes an amino acid substitution of Arg to Leu. This particular amino acid residue has been previously established as highly conserved throughout most species and plays a vital role in binding the enzyme substrate. Confirmation that this mutation was responsible for resistance was obtained by genetic complementation of an *Escherichia coli* PPO mutant and subsequent growth assays in the presence of varying concentrations of lactofen. The resistance-conferring mutation in common ragweed *PPX2* is different than that selected in the corresponding waterhemp gene, which was a deletion of a glycine codon (ΔG210). Inspection of the DNA sequences at each mutation location in the genes of the two species provided an explanation as to why the two different mutations were selected. In the case of waterhemp, a tri-nucleotide repeat likely enabled the ΔG210 mutation, whereas such a repeat was not present at the homologous location of common ragweed *PPX2*. For common ragweed, the *PPX2* mutation of an Arg to Leu codon required a single nucleotide change; in waterhemp *PPX2* however, two nucleotide changes would be required to obtain the same amino acid change. These findings provide the opportunity to predict what mutations might be selected as resistance mechanisms to PPO inhibitors in other weed species.