HERBICIDE JOINT ACTION RESPONSES OF PPO INHIBITOR-RESISTANT AND SUSCEPTIBLE WATERHEMP BIOTYPES. William L. Patzoldt, Aaron G. Hager, and Patrick J. Tranel. Graduate Research Assistant, Assistant Professor, and Associate Professor, Department of Crop Sciences, University of Illinois, Urbana, IL 61801.

Since 2001, waterhemp populations from several counties in Illinois have been confirmed resistant to protoporphyrinogen oxidase (PPO)-inhibiting herbicides. To further complicate management, many PPO inhibitor-resistant waterhemp populations are also resistant to acetolactate synthase (ALS) inhibitors and triazines. As multiple herbicide resistance continues to spread among Illinois waterhemp populations, the number of chemical options for waterhemp control will concomitantly decrease. Realizing that herbicides with novel sites of action are not likely to be commercialized in the near future, our objective is to examine the potential for the joint action of existing herbicide chemistries to improve the control of PPO inhibitor-resistant waterhemp populations. Herbicide combinations were identified based on those products producers currently use, and those that have the potential to act synergistically. Herbicide joint action responses were analyzed using the additive dose model based on the calculation of GR_{50} (growth reduction by 50%) rates for each herbicide. Herbicide combinations tested included PRE applications of clomazone and sulfentrazone, and various POST combinations that included lactofen, carfentrazone, bentazon, or mesotrione. Additionally, the use of sequential applications of lactofen or acifluorfen is being evaluated as a possible control strategy for PPO inhibitor-resistant waterhemp. Results thus far suggest that a PRE-applied combination of clomazone and sulfentrazone acts synergistically in PPO inhibitor-resistant waterhemp, but not in the susceptible waterhemp biotype.

2004 North Central Weed Science Proceedings 59:26.