

PROTOPORPHYRINOGEN OXIDASE (PROTOX)-RESISTANT COMMON WATERHEMP RESPONSE TO HERBICIDES AT DIFFERENT GROWTH STAGES. Douglas E. Shoup*, Jeanne S. Falk, Kassim Al-Khatib, and Dallas E. Peterson, Graduate Research Assistant, Graduate Research Assistant, Professor, and Professor, Department of Agronomy, Kansas State University, Manhattan, KS 66506.

A biotype of common waterhemp in Kansas with resistance to protox-inhibiting herbicides has a high level of resistance to acifluorfen, lactofen, fomesafen, and sulfentrazone when applied as a postemergence treatment. However, field experiments with preemergence treatments of sulfentrazone or flumioxazin resulted in greater than 85% control of the resistant common waterhemp biotype. Two experiments were conducted at the site where the resistant biotype was confirmed to determine common waterhemp response to herbicides at different stages of growth. The first experiment was conducted in 2002 and 2003. Protox-inhibiting herbicides acifluorfen, lactofen, fomesafen, sulfentrazone, flumioxazin, oxyfluorfen, and azafenidin were applied as preemergence and postemergence treatments. A second experiment was conducted in 2003 to evaluate common waterhemp response to herbicides applied at three different growth stages: two leaf, four to six leaf, and eight to ten leaf. Herbicide treatments were acifluorfen, fomesafen, bentazon, acifluorfen + bentazon, fomesafen + bentazon, bentazon + paraquat, and 2,4-DB. In 2002, all protox-inhibiting herbicides applied preemergence gave greater than 80% common waterhemp control, whereas postemergence herbicide control was less than 55% for all herbicides except flumioxazin, where control was 78%. In 2003, only preemergence treatments of lactofen, fomesafen, and oxyfluorfen gave greater than 80% common waterhemp control, whereas oxyfluorfen was the only postemergence herbicide that gave less than 55% control. For the second experiment, common waterhemp control at the two-leaf growth stage was greater than 80% for all herbicides except bentazon and 2,4-DB where control was 46 and 73%, respectively. At the four- to six-leaf growth stage, control was greater than 80% for all herbicide treatments except acifluorfen at the low rate, bentazon, and 2,4-DB, where control was 74, 77, and 48%, respectively. At the eight- to ten-leaf growth stage, only acifluorfen + bentazon, fomesafen + bentazon, and paraquat + bentazon gave greater than 80% common waterhemp control. Control with all other herbicide at the eight- to ten-leaf growth stage was between 50 and 68%.