

CHARACTERIZATION OF A WATERHEMP POPULATION WITH MULTIPLE HERBICIDE RESISTANCE ACROSS THREE MODES OF ACTION. Travis R. Legleiter*, Eric B. Riley, Kristin K. Payne and Kevin W. Bradley, University of Missouri, Columbia, MO.

Greenhouse experiments were conducted to determine the distribution and extent of resistance to glyphosate, acetolactate synthase- (ALS), and protoporphyrinogen oxidase-inhibiting (PPO) herbicides in a waterhemp (*Amaranthus rudis* Sauer) population located in Platte County, Missouri. Fourteen individual common waterhemp seedheads were harvested across a 5-km area at the Platte County site in 2006 and the location of each waterhemp accession (W01-W14) was recorded using a handheld global positioning system. Seed from each waterhemp accession and from two susceptible waterhemp accessions were gleaned from the collected seedheads, stored at 5° C for 3 months, and then planted in 25 by 50 cm greenhouse flats. After emergence, waterhemp seedlings were thinned to 20 plants per flat. All plants were treated with the potassium salt of glyphosate at 1.7 kg ae ha⁻¹, lactofen at 0.44 kg ha⁻¹, or thifensulfuron at 0.009 kg ha⁻¹ once waterhemp reached 15 cm in height. An untreated check was also included for comparison. Visual ratings and survivorship were recorded at weekly intervals up to three weeks after treatment (3 WAT), at which time all plants were harvested and fresh and dry weights determined. All 14 accessions from the Platte County site exhibited greater than 65% survivorship in response to glyphosate and greater than 70% survivorship in response to thifensulfuron. Four of the Platte County waterhemp accessions also exhibited a differential response to lactofen. Utilizing the previously-recorded GPS coordinates, the results from these experiments indicate that glyphosate- and ALS-resistance occurs across the entire 5 km area at the Platte County site that was surveyed in 2006 while multiple resistance to glyphosate, ALS-, and PPO-inhibiting herbicides is more sporadic and confined to an area of approximately 2 km or less.