

CHARACTERIZATION OF PROTOPORPHYRINOGEN OXIDASE RESISTANCE IN MISSOURI WATERHEMP (*Amaranthus rudis*). Jianmei Li¹, Reid J. Smeda¹, Kelly A. Nelson², and William G. Johnson¹. ¹University of Missouri Columbia MO 65211; ²University of Missouri Novelty MO 63460.

Resistance to PPO-inhibiting herbicides was suspected in two common waterhemp biotypes from Bethel and Meadville, Missouri. Greenhouse and growth chamber experiments were conducted to confirm resistance and also to delineate possible mechanisms of resistance. Pots studies were conducted with 13 to 18-cm plants treated with 0 to 3.36 kg ai/ha acifluorfen and 0 to 1.76 kg ai/ha lactofen. When compared to a known susceptible population, the Bradford biotype, the I₅₀ R/S ratio was 28 for the Bethel biotype and 10 for the Meadville biotype treated with acifluorfen; the I₅₀ R/S ratio was 44 for the Bethel biotype and 11 for the Meadville biotype treated with lactofen. In the growth chamber, leaf discs from both resistant and susceptible biotypes were pre-incubated in 30 µM acifluorfen in the dark for 20 h, exposed to light, and then periodically sampled for electrolyte leakage. Conductivity changes were found to increase steadily for the Bradford biotype treated with acifluorfen indicative of membrane disruption. However, little conductivity changes occurred for the Bethel biotype, and only moderate changes for the Meadville biotype. Results confirm resistance to PPO-inhibiting herbicides exists in two biotypes of common waterhemp; the mechanism of resistance does not appear to be based upon altered uptake and translocation.