

**POPULATION DIFFERENCES IN WATERHEMP TREATED WITH GLYPHOSATE AND LACTOFEN.** Jianmei Li, Reid J. Smeda, and Jimmy D. Wait, Research Specialist, Associate Professor, and Research Associate, University of Missouri, Columbia, MO 65211.

Common waterhemp (*Amaranthus rudis*) is a widely distributed and troublesome weed to manage in Missouri crops. Past herbicide practices have led to selection of biotypes resistant to sulfonylureas, imidazolinones, triazines, glyphosate, and diphenyl ethers. The introduction and wide spread adoption of glyphosate-resistant crops (72% of Missouri soybean production area in 2002) has permitted a new and powerful tool to manage waterhemp, but may lead to new management challenges. This study investigated differential sensitivity of common waterhemp biotypes to glyphosate as well as lactofen. Waterhemp seed was collected from 100 sites (biotypes) throughout Missouri in the fall of 2002. Dose response curves to glyphosate and lactofen were developed with a waterhemp biotype (Bradford) known to be sensitive to both herbicides using plant dry weight. The  $I_{50}$  for the Bradford biotype in response to glyphosate and lactofen was 0.06 kg ae/ha and 0.016 kg ai/ha, respectively. Seeds of each biotype were grown under greenhouse conditions and up to 25 plants from each biotype were treated at 10- to 13-cm with the above rate of glyphosate or lactofen. Using the Bradford biotype for comparison, the mean dry weight of 10 biotypes was higher, 41 biotypes were similar to, and 49 biotypes were lower than the Bradford biotype at the 90% confidence interval. Plant dry weight response within each biotype was highly variable, and ranged from 90% less than to 100% greater than the Bradford mean plant response. For lactofen, the mean dry weight of 3 biotypes was higher, 17 biotypes were similar, and 80 biotypes were lower than the Bradford biotype at the 95% confidence interval. Individual plant dry weight ranged from 90% less than to 10% greater than the Bradford mean response. Greater variation in waterhemp response may contribute to management challenges for glyphosate compared to lactofen.