

**BIOLOGICAL CHARACTERISTICS OF COMMON LAMBSQUARTERS BIOTYPES WITH TOLERANCE TO GLYPHOSATE.** Andrew M. Westhoven, Jeff M. Stachler, Mark. M. Loux, and William G. Johnson, Graduate Research Assistant, Purdue University, Extension Program Specialist, Professor, The Ohio State University, Columbus, OH, 43210, and Associate Professor, Purdue University, West Lafayette, IN 47907.

A number of common lambsquarters biotypes with elevated tolerance to glyphosate have previously been identified in Ohio and Indiana through greenhouse studies. However, information regarding their growth and fitness characteristics has not been reported. A field study was conducted in West Lafayette, Indiana, in 2006 and 2007 to determine the growth rate and seed production of eight glyphosate-tolerant biotypes in comparison to two glyphosate-susceptible biotypes. Acid-treated seed was germinated in 288-cell trays in the greenhouse and plants were transplanted in rows spaced 76 cm apart in the field in early June. Measurements from nontreated areas included height, growth stage, leaf area, dry weight, time to flower, and seed production at 2, 6, and 10 weeks after transplanting and 16 weeks after transplanting (plant maturity). Tolerant biotypes were grouped for comparison with susceptible biotypes via orthogonal contrasts. Tolerant biotypes amassed more height, leaf area, dry weight, and were further along in growth stage than susceptible biotypes early in the growing season. Tolerant biotypes were taller at 6 and 10 weeks after transplanting, but had significantly lower dry weight at plant maturity. Tolerant biotypes were observed to initiate floral primordia between 6 and 8 weeks after transplanting, while susceptible biotypes did not initiate floral primordia until approximately 12 weeks after transplanting. However, no apparent fitness penalty was observed from biotypes with tolerance to glyphosate based on seed production estimates. Other research has shown that advanced growth stage and taller common lambsquarters plants are correlated with higher levels of glyphosate tolerance. The early-season growth characteristics could contribute to common lambsquarters biotypes showing enhanced tolerance to glyphosate.