WATERHEMP RESISTANCE TO GLYPHOSATE: FACT OR FICTION? Reid J. Smeda and Christopher L. Schuster, Assistant Professor and Graduate Research Assistant, Department of Agronomy, University of Missouri, Columbia, MO 65211.

The adoption rate of glyphosate-resistant soybean (+70% in Missouri in 2002) has placed significant pressure for the selection of glyphosate-resistant weeds. To date, our group has identified potentially resistant common waterhemp near Monticello, MO and Sutter, IL. For both populations, there was no history for extensive POST application of glyphosate leading up to the identification of plants that survived field application rates (0.84 kg ae/ha).

Research to determine the extent of potential resistance has proven challenging, due to the low percentage of surviving plants in the general population. Seed were collected from plants located at each site, and put through two generations of selection with glyphosate (0.84 kg/ha). Seed from the original, first, and second generation for the Monticello, Sutter, and a known glyphosate sensitive (Bradford) population were screened in the greenhouse in both the summer and the winter to determine the relative percent of plants with little or no injury (0 to 35%). Visual evaluation of plants 2 weeks after treatment showed that winter screened plants surviving for the Monticello, Sutter, and Bradford populations ranged from 13.4 to 15.9%, 7.0 to 13.0%, and 0.2%, respectively when averaging over the original, first and second generation seed. However, for summer screened plants, survival for the Monticello, Sutter, and Bradford populations ranged from 0.2 to 1.4%, 0.3 to 0.9%, and 0%, respectively when averaging over the original, first and second generation seed. Recent screening has determined that third generation selected plants also exhibit a low percentage of plants that survive rates of glyphosate recommended for control.

Variability in the percentage of common waterhemp from Monticello and Sutter to survive when challenged with glyphosate has led to asexual propagation of shoot cuttings. Shoot cuttings from common waterhemp plants that survived 0.84 kg/ha glyphosate were propagated in liquid growth media, then transferred to soil media in pots. Cloned plants were treated at 12 cm with 0 to 3.36 kg/ha glyphosate. At 2 weeks after treatment, 25 and 31 of 36 plants from Monticello and Sutter, respectively, initiated new growth at glyphosate rates $\geq$ 0.84 kg/ha. Only 1 of 24 plants from the Bradford population survived. Both the Monticello and Sutter common waterhemp plants exhibit initial injury to glyphosate, but even plants treated with 3.36 kg/ha survived and formed reproductive structures

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