

**IDENTIFICATION, CHARACTERIZATION, AND MANAGEMENT OF
GLYPHOSATE-RESISTANT WATERHEMP (*Amaranthus rudis* Sauer.) IN
MISSOURI.**

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ABSTRACT

The possibility of glyphosate resistance in waterhemp has been of concern to Midwest corn and soybean producers due to a heavy dependence on glyphosate as a weed control tool and the increased incidence and problematic nature of waterhemp in corn and soybean. Two populations of waterhemp in Platte and Holt County, Missouri were not controlled by glyphosate applications in glyphosate-resistant soybeans during the 2005 growing season. Progeny of the surviving waterhemp plants from Platte and Holt County were 19- and 9-fold resistant to glyphosate as compared to a susceptible population, respectively. Further investigations at the Platte County field revealed that 20 to 53% of the population survived an 8-fold application of glyphosate, and tank mixtures of glyphosate and protoporphyrinogen oxidase (PPO-) inhibiting herbicides provided inconsistent control across the location. Screenings of fourteen waterhemp accessions from the Platte county site indicated that glyphosate and acetolactate synthesis (ALS-) resistant waterhemp is present across a 503-ha area and accessions resistant to glyphosate, ALS-, and PPO-inhibiting herbicides occur sporadically across a 87-ha area. An array of conventional preemergence (PRE) and postemergence (POST) corn herbicides and glufosinate based herbicide programs demonstrated excellent control of the glyphosate-resistant waterhemp population in corn. Management of glyphosate-resistant waterhemp in soybeans required the use of a PRE herbicide, with PRE fb POST programs providing the most consistent and adequate control of the population over a two year period.