

RESULTS FROM A 2008 SURVEY TO DETERMINE THE DISTRIBUTION OF GLYPHOSATE-RESISTANT WEEDS IN MISSOURI. Kevin W. Bradley, Kristin K. Payne, Eric B. Riley, Travis R. Legleiter, and Jimmy D. Wait, Associate Professor, Graduate Research Assistant, Research Specialist, Senior Research Specialist, Research Associate, Division of Plant Sciences, University of Missouri, Columbia, MO 65211.

In 2008, a random survey of soybean fields containing late-season weed escapes was conducted to determine the frequency and distribution of glyphosate-resistant weeds in Missouri. In this survey, seed from 121 weed samples were collected for subsequent herbicide resistance characterizations in greenhouse experiments. The majority of soybean fields contained waterhemp (*Amaranthus rudis* Sauer), and in fact this species comprised 73% of the total weed seed samples collected and screened for resistance in these experiments. Other weed seed samples collected for resistance characterization included giant ragweed (*Ambrosia trifida* L.), palmer amaranth (*Amaranthus palmeri* S. Wats.), common cocklebur (*Xanthium strumarium* L.), common lambsquarters (*Chenopodium album* L.), and velvetleaf (*Abutilon theophrasti* Medik.). All weed species were sprayed at the appropriate growth stage with glyphosate at rates up to or including 1.7 kg ae/ha, which represents at least twice the recommended use rate (2X) for the species evaluated in these experiments. For the purposes of this research, a weed population was defined as resistant if 60% or more of the plants treated with a 2X rate of glyphosate survived and were clearly capable of reproduction three weeks after treatment. The results from greenhouse experiments confirmed glyphosate resistance in 45 separate populations of waterhemp in 28 counties throughout Missouri. Based on data collected from each field at the time of weed seed sampling, soybean fields confirmed with glyphosate-resistant waterhemp were more than twice as likely to be free of other late-season weeds compared to fields with susceptible waterhemp, but previous crop, row spacing, and tillage type were not different between fields that contained glyphosate-resistant or susceptible waterhemp. This suggests that soybean fields with only one weed species present may be more of an indicator of resistance than fields with multiple weed species in the latter part of the growing season. Glyphosate resistance was also confirmed in three populations of palmer amaranth from one county in southeastern Missouri and in one population of giant ragweed from west central Missouri. All other weed species collected for resistance characterization were controlled by standard or 2X rates of glyphosate in greenhouse experiments. The results from these experiments indicate that glyphosate-resistance in waterhemp is now a widespread phenomena in some of the primary corn and soybean production regions of Missouri.