

Public Abstract

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

Glyphosate is the active ingredient found in the herbicide sold under the trade name Roundup released by Monsanto Company in 1974 and is now available in 67 non-residential labeled herbicides. The user friendliness, environmental safety, low cost, and effectiveness of glyphosate as a broad-spectrum herbicide have favored the use of glyphosate for weed control especially since the introduction of glyphosate-resistant crops in 1996. Glyphosate use has dramatically increased over the last decade, especially on soybean acres. The increased and extensive use of glyphosate has led to the development of glyphosate-resistant weeds throughout the United States. Occurrences of glyphosate-resistant horseweed, common and giant ragweed, and common waterhemp have been identified throughout the north central region of the U.S. The most recent has been the development of glyphosate-resistant waterhemp, which first occurred in the State of Missouri and has now been identified in Illinois, Kansas, and Minnesota. The troublesome nature, competitiveness, and increased incidence of waterhemp in corn and soybean over the last decade have increased the concern over glyphosate-resistant waterhemp.

Investigations of the glyphosate-resistant waterhemp population first identified in Missouri revealed that the population was 19 times more resistant to glyphosate than susceptible waterhemp plants. The population was also confirmed to be resistant to ALS- and PPO-inhibiting herbicides, which are both alternative weed control options available to soybean producers. The occurrence of resistance to these three herbicide classes practically eliminated all in-crop herbicide options available for broadleaf weed control in soybeans. The management of this population in soybeans required the use of herbicides applied prior to soybean planting, referred to in the industry as preemergence herbicides. The use of preemergence herbicides in addition to an in-crop glyphosate application to control other weed species complicates and significantly increases the cost of weed control options in soybeans..

An array of herbicides available for weed control in corn provided excellent control of the glyphosate-resistant waterhemp population, due to the history of the site in which corn had not been grown over the last fifteen years. Glufosinate, also a broad-spectrum herbicide, provided excellent control of waterhemp in glufosinate-resistant corn.

The identification of glyphosate-resistant waterhemp in multiple states and additional confirmations in Missouri indicate that this population is not an isolated incidence and proper steps need to be taken to further prevent the spread of populations of glyphosate-resistant waterhemp.