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Improving glyphosate performance in Roundup Ready soybean

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Abstract
Although glyphosate resistant weeds have been documented in states surrounding Iowa, at this time our only confirmed glyphosate-resistant species is horseweed/marestail (Conyza canadensis). However, over the past decade we have selected for a weed spectrum that possesses a higher level of tolerance than was present at the start of the Roundup Ready era of weed management. Because of this, glyphosate control failures are more common now than they were ten years ago.

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Improving glyphosate performance in Roundup Ready soybean

By Bob Hartlser, Department of Agronomy

Although glyphosate resistant weeds have been documented in states surrounding Iowa, at this time our only confirmed glyphosate-resistant species is horseweed/marestail (Coryza canadensis). However, over the past decade we have selected for a weed spectrum that possesses a higher level of tolerance than was present at the start of the Roundup Ready era of weed management. Because of this, glyphosate control failures are more common now than they were ten years ago.

There are several ways to reduce performance issues when using glyphosate for postemergence weed control. The most important is to apply the herbicide in a timely fashion. The majority of control failures are at least partially caused by spraying weeds that exceed four inches in height. Lambsquarters, waterhemp, horseweed and giant ragweed are species where timeliness is especially critical in obtaining consistent results.

The second factor resulting in inconsistent results is too low of rate. Base the rate on the most difficult to control weed in the field. The third factor, and least understood, is the influence of environmental conditions on herbicide efficacy. Light, temperature, soil moisture, relative humidity and numerous other factors all interact to influence the susceptibility of a plant to any herbicide. Lambsquarters is particularly responsive to environmental conditions, and under certain conditions becomes almost immune to postemergence applications. Timely application to small weeds greatly reduces the impact of the environment on weed response to postemergence herbicides.

Persons who have experienced inconsistent results in the past typically are interested in additional materials to add to the tank to minimize problems. The types of additives recommended for use with glyphosate varies among products, although all glyphosate products recommend the use of AMS or other nitrogen sources. A variety of AMS alternatives (water conditioners) are marketed for use with glyphosate, but many do not provide enough active ingredient to reduce the antagonistic effects of salts present in the carrier. The specific recommendations for surfactants vary among glyphosate products and should be followed. The use of surfactants with ‘fully loaded’ formulations has not consistently overcome problems associated with spraying large weeds or weather-related issues.

In certain situations addition of a second herbicide to glyphosate may improve weed control. There should be a specific purpose for adding a second product to the tank rather than arbitrarily adding something in the hope of improving performance. Control of big giant ragweed can be improved with the addition of an ALS herbicide (cloransulam – First Rate/Amplify, chlorimuron – Classic) or a PPO inhibitor (Flexstar, Phoenix, Cobra). Addition of Harmony GT or a PPO inhibitor has been shown to improve the consistency of wild buckwheat control. Cloransulam, chlorimuron or a PPO inhibitor can improve the control of annual
moringglories. There are no products for use in soybean that will consistently improve the performance of glyphosate on lambsquarters and waterhemp.

In summary, glyphosate remains the most effective herbicide we have to control weeds in soybean and corn. However, consistent results can only be obtained through good management of the product. Proper rate selection and timing of application are the most important steps.

Bob Hartzler is a professor of weed science with extension, teaching and research responsibilities.