Controlling Glyphosate-Resistant Kochia in Roundup Ready® Corn with Herbicides that Allow Rotation to Sugarbeet

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Introduction
Although not yet found in Wyoming, glyphosate-resistant (GR) kochia has become widespread in western Kansas and has recently been confirmed in Nebraska, Colorado, and Montana. Multiple tactics will need to be used to manage GR kochia once it shows up in sugarbeet rotations. It is critical that we focus on kochia management in all crops in the rotation, not just in sugarbeet. Ironically, though, use of a crop rotation will also limit the available herbicide options. For example, many corn herbicides provide excellent control of kochia (a summer annual weed), but will not allow rotation to sugarbeet the following year. It is important that we determine which herbicide programs in corn will provide the best control of GR kochia and will also allow planting of Roundup Ready® sugarbeet the following year.

Objectives
Our objective was to evaluate corn herbicides for kochia control that allow rotation to sugarbeet or dry bean the following year.

Materials and Methods
Field studies were conducted near Lingle, Wyoming, and Scottsbluff, Nebraska, in 2012 and 2013. Corn was planted in 30-inch rows (Lingle) and 22-inch rows (Scottsbluff) between May 7 and May 13 both years. Herbicide treatments were applied at 16.8 gallons (Lingle) and 20 gallons (Scottsbluff) of total volume per acre at 30 psi with TeeJet® 11002 nozzles. Plots were 10 feet wide by 30 feet long at Lingle, and 11 feet wide by 45 feet long at Scottsbluff. The experiment was a randomized complete block with four replicates at each location. Kochia control was evaluated approximately 14 days after post-emergence (POST) herbicide application at all sites.

Results and Discussion
Preemergence (PRE) herbicides followed by Roundup® POST provided at least 87% kochia control in 2012 and more than 97% in 2013. At the time of POST herbicide application, Sharpen® plus Prowl® H2O PRE provided greater control of kochia compared to Verdict® PRE (99 and 60% control, respectively) in 2012, but both treatments provided at least 97% control in 2013. Prowl H2O, however, requires at least 12 months between application and sugarbeet planting. Therefore, it will not be an option unless corn is planted early and sugarbeet planted late.
Status® provided the greatest and most consistent kochia control of any POST treatment, averaging 95% across locations and years (Figure 1). Laudis® plus Buctril® was the only other treatment to provide greater than 90% kochia control when averaged over locations and years. All other POST treatments provided variable kochia control.

Based on these results, a PRE treatment of Verdict followed by Status plus Roundup POST would provide excellent season-long kochia control in corn and be an excellent treatment to proactively manage glyphosate-resistant kochia. This treatment will contain three separate herbicide modes of action that are effective on kochia (saflufenacil, PPO; dicamba, auxin; glyphosate, EPSPS). The cost of this treatment would be roughly $45/acre and will allow rotation to sugarbeet the following year.

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**Figure 1.** Kochia control from postemergence herbicide programs averaged over four environments.