

Glyphosate-Resistant Common Waterhemp Control in Dicamba-Tolerant Xtend™ Soybean

RFR-A1975

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Introduction

The purpose of this study was to compare postemergence herbicide programs for crop injury and control of glyphosate-resistant common waterhemp in Roundup Ready Xtend™ soybean.

Materials and Methods

The study was established using a randomized complete block design with four replications. The crop rotation was soybean following soybean. The pre-plant seedbed was prepared with a tandem disc. Roundup Ready Xtend™ soybean, Asgrow AG24X7 was planted at 140,000 seeds/acre in 30-in. rows May 14. Preemergence (PRE) herbicide treatments were applied May 14 delivering 15 gallons/acre with 11015TTI tips at 35 psi. Postemergence (POST) treatments were applied June 13 to V2 soybean delivering 15 gallons/acre with 11015TTI tips at 35 psi. Weed species in the study included velvetleaf, common waterhemp, and common lambsquarters.

The common waterhemp population in the trial was very resistant to glyphosate. Velvetleaf and waterhemp were 3 in. tall and common lambsquarters 7 in. tall at the POST application. Average population densities for velvetleaf, waterhemp, and lambsquarters were 0.02, 12, and 0.02 plants/ft², respectively. Visual estimates of percent soybean injury and weed control during the

growing season were compared with an untreated control; 0 percent = no injury or control, and 99 percent = complete crop kill or control.

Results and Discussion

Summarized in Tables 1 and 2 are the results of the study. Flexstar, Prefix, and Warrant Ultra similarly affected soybean causing 18–20 percent visual injury eight days after application (Table 1). The remaining treatments caused 5–10 percent injury.

Xtendimax With VaporGrip Technology, Tavium Plus VaporGrip Technology, and Xtendimax with VaporGrip Technology + Warrant provided 75–79 percent glyphosate-resistant common waterhemp control when observed June 28, 15 days after application (Table 1). Xtendimax With VaporGrip Technology + Warrant Ultra, Engenia + Zidua and Engenia + Outlook gave 81–84 percent control. Tavium Plus VaporGrip Technology + Flexstar and Xtendimax With VaporGrip Technology + Prefix gave 88 and 90 percent control, respectively. PRE Boundary + POST Tavium Plus VaporGrip Technology provided complete waterhemp control. Velvetleaf and common lambsquarters control differences between the treatments June 28 were not as great, excluding the two-pass treatment; control was 75–84 and 90–99, respectively.

End-Season glyphosate-resistant common waterhemp control decreased significantly because of regrowth, depending on herbicide treatment, by August 7, 55 days after POST application (Table 2). Control by Xtendimax With VaporGrip Technology + Warrant Ultra dropped to 53 percent and was 71–76 percent for all other treatments, providing opportunity for late-season weed seed additions. The two-pass residual program with PRE Boundary +

POST Tavium Plus VaporGrip Technology provided the most consistent season-long waterhemp control. Velvetleaf control by the treatments, however, improved by August 7 ranging from 89 to 98 percent. Common lambsquarters control generally remained steady through August 7. Two-pass layered residual programs with dicamba POST are recommended to prevent glyphosate-resistant waterhemp control failures in Xtend soybean,

considering the extended emergence period of waterhemp.

Acknowledgements

Thanks to Dallas Maxwell, John Beckman, and the Armstrong/Neely-Kinyon Research Farm staff for their assistance with this study. Funding for this work was provided by Syngenta Crop Protection, Inc.

Table 1. Postemergence control of glyphosate resistant common waterhemp in dicamba tolerant soybean (June data).

Treatment	Rate	Appln timing	Glxma ^c Jun 21 % inj	Abuth Jun 28 ----- % weed control	Amata Jun 28 -----	Cheal Jun 28 -----
Xtendimax W/VaporGrip Tech.+ Roundup PowerMAX + Intact + AG13063 - Ridion ^a	22.0 fl oz + 26.0 fl oz + 0.5% v/v ^b + 1.0% v/v	POST	5	75	76	99
Tavium Plus VaporGrip Tech. + Roundup PowerMAX + Intact + AG13063 - Ridion	56.5 fl oz + 26.0 fl oz + 0.5% v/v + 1.0% v/v	POST	10	77	79	99
Tavium Plus VaporGrip Tech. ++ Flexstar + Roundup PowerMAX + Intact + AG13063 - Ridion	56.5 fl oz + 1.0 pt + 26.0 fl oz + 0.5% v/v + 1.0% v/v	POST	20	81	88	99
Xtendimax W/VaporGrip Tech.+ Prefix + Roundup PowerMAX + Intact + AG13063 - Ridion	22.0 fl oz + 2.0 pt + 26.0 fl oz + 0.5% v/v + 1.0% v/v	POST	19	84	90	99
Xtendimax W/VaporGrip Tech.+ Warrant + Roundup PowerMAX + Intact + AG13063 - Ridion	22.0 fl oz + 1.5 qt + 26.0 fl oz + 0.5% v/v + 1.0% v/v	POST	5	79	75	98
Xtendimax W/VaporGrip Tech. + Warrant Ultra + Roundup PowerMAX + Intact + AG13063 - Ridion	22.0 fl oz + 48.0 fl oz + 26.0 fl oz + 0.5% v/v + 1.0% v/v	POST	18	83	84	95
Engenia + Zidua + Roundup PowerMAX + Intact + AG13063 - Ridion	12.8 fl oz + 1.5 fl oz + 26.0 fl oz + 0.5% v/v + 1.0% v/v	POST	9	83	83	90
Engenia + Outlook + Roundup PowerMAX + Intact + AG13063 - Ridion	12.8 fl oz + 10.0 fl oz + 26.0 fl oz + 0.5% v/v + 1.0% v/v	POST	8	80	81	97
Boundary + (Tavium Plus VaporGrip Tech.+ Roundup PowerMAX + Intact + AG13063 - Ridion)	1.8 pt + (56.5 fl oz + 26.0 fl oz + 0.5% v/v + 1.0% v/v)	PRE + (POST)	10	98	99	99
Untreated			0	0	0	0
LSD (P = 0.05)			4	6	6	5

^aAG13063 - Ridion = Adjuvant.

^bv/v = Volume of product per volume tank mix.

^cGlxma = soybean, Abuth = velvetleaf, Amata = common waterhemp, Cheal = common lambsquarters.

Table 2. Postemergence control of glyphosate resistant common waterhemp in dicamba tolerant soybean (August data).

Treatment	Rate	Appln timing	Abuth ^c Aug 7	Amata Aug 7	Cheal Aug 7
	product/acre		----- % weed control -----		
Xtendimax W/VaporGrip Tech.+ Roundup PowerMAX + Intact + AG13063 - Ridion ^a	22.0 fl oz + 26.0 fl oz + 0.5% v/v ^b + 1.0% v/v	POST	93	73	98
Tavium Plus VaporGrip Tech. + Roundup PowerMAX + Intact + AG13063 - Ridion	56.5 fl oz + 26.0 fl oz + 0.5% v/v + 1.0% v/v	POST	96	76	99
Tavium Plus VaporGrip Tech. ++ Flexstar + Roundup PowerMAX + Intact + AG13063 - Ridion	56.5 fl oz + 1.0 pt + 26.0 fl oz + 0.5% v/v + 1.0% v/v	POST	89	71	99
Xtendimax W/VaporGrip Tech.+ Prefix + Roundup PowerMAX + Intact + AG13063 - Ridion	22.0 fl oz + 2.0 pt + 26.0 fl oz + 0.5% v/v + 1.0% v/v	POST	95	76	99
Xtendimax W/VaporGrip Tech.+ Warrant + Roundup PowerMAX + Intact + AG13063 - Ridion	22.0 fl oz + 1.5 qt + 26.0 fl oz + 0.5% v/v + 1.0% v/v	POST	99	76	96
Xtendimax W/VaporGrip Tech. + Warrant Ultra + Roundup PowerMAX + Intact + AG13063 - Ridion	22.0 fl oz + 48.0 fl oz + 26.0 fl oz + 0.5% v/v + 1.0% v/v	POST	96	53	96
Engenia + Zidua + Roundup PowerMAX + Intact + AG13063 - Ridion	12.8 fl oz + 1.5 fl oz+ 26.0 fl oz + 0.5% v/v + 1.0% v/v	POST	99	75	99
Engenia + Outlook + Roundup PowerMAX + Intact + AG13063 - Ridion	12.8 fl oz + 10.0 fl oz+ 26.0 fl oz + 0.5% v/v + 1.0% v/v	POST	97	76	99
Boundary + (Tavium Plus VaporGrip Tech.+ Roundup PowerMAX + Intact + AG13063 - Ridion)	1.8 pt + (56.5 fl oz + 26.0 fl oz + 0.5% v/v + 1.0% v/v)	PRE + (POST)	98	98	99
Untreated			0	0	0
LSD (P = 0.05)			6	13	2

^aAG13063 - Ridion = Adjuvant.^bv/v = Volume of product per volume tank mix.^cAbuth = velvetleaf, Amata = common waterhemp, Cheal = common lambsquarters.