



# Weed Control Programs in Roundup Ready 2 Xtend<sup>®</sup> Soybeans

## Trial Objective

- The use of residual herbicides in pre- and post-emergence programs is essential for managing weed species with extended emergence patterns, such as Palmer amaranth.
- The objective of this study was to compare weed control and yield from different pre- and post-emergence herbicide programs in Roundup Ready 2 Xtend<sup>®</sup> soybeans.

## Research Site Details

Location	Soil Type	Previous Crop	Tillage Type	Planting Date	Soybean Product	Seeding Rate (seeds/acre)	Herbicide Application Date
Gothenburg, NE	Clay loam	Corn	Conventional	5/8/18	2.4 MG	140K	5/9 (PRE) 6/12 (POST)

- The trial was arranged in a randomized complete block design with four replications.
- The different herbicide treatments compared in this trial are listed in Table 1.
- Kochia emerged at planting, so kochia control assessments reflect both the foliar efficacy of the treatments in addition to residual control of kochia that emerged after planting and herbicide application (PRE- and POST-emergence).
- Palmer amaranth and kochia pressure was extremely high and both species are glyphosate-resistant at this site (Figure 1).
- Post-emergence treatments were applied at the V3 soybean growth stage when weeds were approximately four inches in height.

**Table 1. Herbicide treatments.**

Treatment	Pre-emergence Herbicide (rate/acre)	Post-emergence Herbicide (rate/acre)*
1	Warrant <sup>®</sup> Herbicide (48 fl oz)	XtendiMax <sup>®</sup> herbicide with VaporGrip <sup>®</sup> Technology (22 fl oz) Roundup PowerMAX <sup>®</sup> herbicide (32 fl oz)
2	Valor <sup>®</sup> SX (2 oz)	XtendiMax <sup>®</sup> herbicide with VaporGrip <sup>®</sup> Technology (22 fl oz) Roundup PowerMAX <sup>®</sup> herbicide (32 fl oz) Warrant <sup>®</sup> Herbicide (48 fl oz)
3	Warrant <sup>®</sup> Herbicide (48 fl oz) Tricor <sup>®</sup> 4F (8 fl oz)	XtendiMax <sup>®</sup> herbicide with VaporGrip <sup>®</sup> Technology (22 fl oz) Roundup PowerMAX <sup>®</sup> herbicide (32 fl oz) Warrant Ultra <sup>®</sup> Herbicide (48 fl oz)
4	Fierce <sup>®</sup> (3 oz) Tricor <sup>®</sup> 4F (8 fl oz)	XtendiMax <sup>®</sup> herbicide with VaporGrip <sup>®</sup> Technology (22 fl oz) Roundup PowerMAX <sup>®</sup> herbicide (32 fl oz) Warrant Ultra <sup>®</sup> Herbicide (48 fl oz)
5	XtendiMax <sup>®</sup> herbicide with VaporGrip <sup>®</sup> Technology (22 fl oz) Valor <sup>®</sup> SX (2 oz) Tricor <sup>®</sup> 4F (8 fl oz)	XtendiMax <sup>®</sup> herbicide with VaporGrip <sup>®</sup> Technology (22 fl oz) Roundup PowerMAX <sup>®</sup> herbicide (32 fl oz) Warrant <sup>®</sup> Herbicide (48 fl oz)
6	XtendiMax <sup>®</sup> herbicide with VaporGrip <sup>®</sup> Technology (22 fl oz) Warrant <sup>®</sup> Herbicide (48 fl oz) Tricor <sup>®</sup> 4F (8 fl oz)	Roundup PowerMAX <sup>®</sup> herbicide (32 fl oz) Cobra <sup>®</sup> (10 fl oz)
7	Fierce <sup>®</sup> (3 oz) Tricor <sup>®</sup> 4F (8 fl oz)	XtendiMax <sup>®</sup> herbicide with VaporGrip <sup>®</sup> Technology (22 fl oz) Roundup PowerMAX <sup>®</sup> herbicide (32 fl oz) Warrant <sup>®</sup> Herbicide (48 fl oz)
8	XtendiMax <sup>®</sup> herbicide with VaporGrip <sup>®</sup> Technology (22 fl oz) Valor <sup>®</sup> SX (2 oz)	XtendiMax <sup>®</sup> herbicide with VaporGrip <sup>®</sup> Technology (22 fl oz) Roundup PowerMAX <sup>®</sup> herbicide (32 fl oz) Cobra <sup>®</sup> (10 fl oz)
9	Warrant <sup>®</sup> Herbicide (48 fl oz) Tricor <sup>®</sup> 4F (8 fl oz)	XtendiMax <sup>®</sup> herbicide with VaporGrip <sup>®</sup> Technology (22 fl oz) Roundup PowerMAX <sup>®</sup> herbicide (32 fl oz) Warrant <sup>®</sup> Herbicide (48 fl oz) Select Max <sup>®</sup> (6 fl oz)
10	XtendiMax <sup>®</sup> herbicide with VaporGrip <sup>®</sup> Technology (22 fl oz) Warrant <sup>®</sup> Herbicide (48 fl oz)	XtendiMax <sup>®</sup> herbicide with VaporGrip <sup>®</sup> Technology (22 fl oz) Roundup PowerMAX <sup>®</sup> herbicide (32 fl oz)
11	Warrant <sup>®</sup> Herbicide (48 fl oz) Tricor <sup>®</sup> 4F (8 fl oz)	XtendiMax <sup>®</sup> herbicide with VaporGrip <sup>®</sup> Technology (22 fl oz) Roundup PowerMAX <sup>®</sup> herbicide (32 fl oz) Warrant <sup>®</sup> Herbicide (48 fl oz)

\*All post-emergence treatments contained a labeled water conditioning agent (1% v/v) and a drift reducing adjuvant (DRA) at 0.5% v/v.



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**Table 2. Rainfall amounts.**

Date	Rainfall (inches)	Date	Rainfall (inches)
5/10	0.68	6/6	0.68
5/13	0.7	6/19	1.4
5/18	2.5	6/20	1.8
5/19	2.0	6/24	0.4
5/27	2.0	7/17	2.4



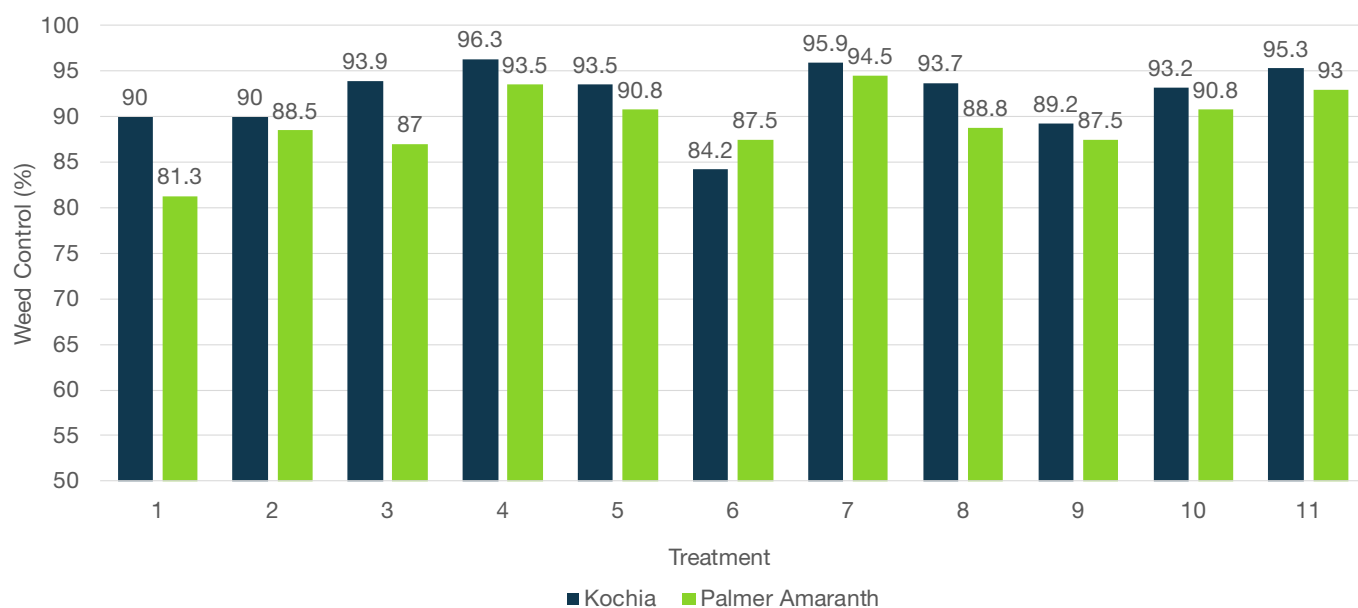
**Figure 1. Non-treated plot at crop maturity 148 days after planting.**

## Understanding the Results

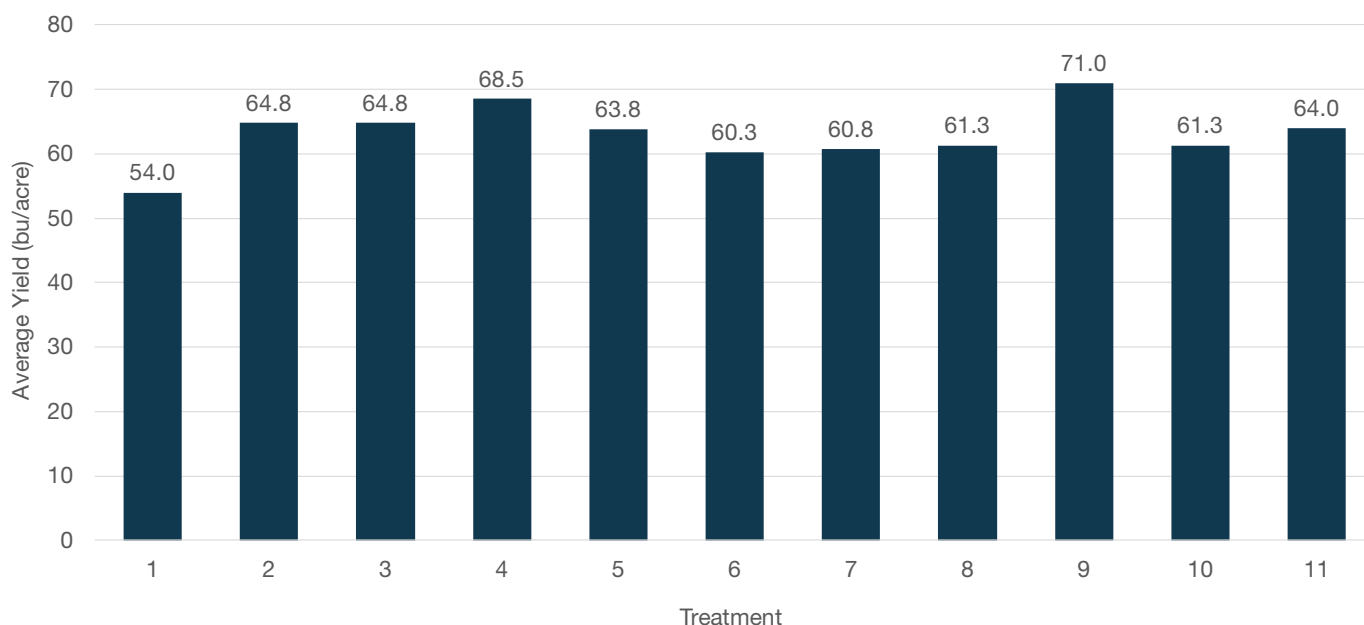
- No significant differences were observed in weed control but numerical differences were observed (Figure 2).
- The addition of XtendiMax® herbicide with VaporGrip® Technology with Warrant® Herbicide in the pre-emergence application (Treatment 10) resulted in improved Palmer amaranth and kochia control at the end of the season compared to Warrant® Herbicide alone (Treatment 1).
- Treatments containing Fierce® + Tricor® 4F followed by XtendiMax® herbicide with VaporGrip® Technology + Roundup PowerMAX® herbicide + Warrant® Ultra Herbicide (Treatment 4) or Warrant® Herbicide (Treatment 7) resulted in numerically higher levels of kochia and Palmer amaranth control compared to the other treatments (Figure 2 and 4).
- Including Warrant® Ultra Herbicide (Group 14 + 15 herbicide) with XtendiMax® herbicide with VaporGrip® Technology + Roundup PowerMAX® herbicide in the POST application provides an additional site of action on emerged weeds and weeds that have not yet emerged compared to Warrant® Herbicide (Group 15 herbicide).
- No significant differences in yield were observed between the different treatments (Figure 3).



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**Figure 2. Weed control at crop maturity (148 days after the pre-emergence application and 113 days after the post-emergence application) from the different herbicide treatments (Table 1).**

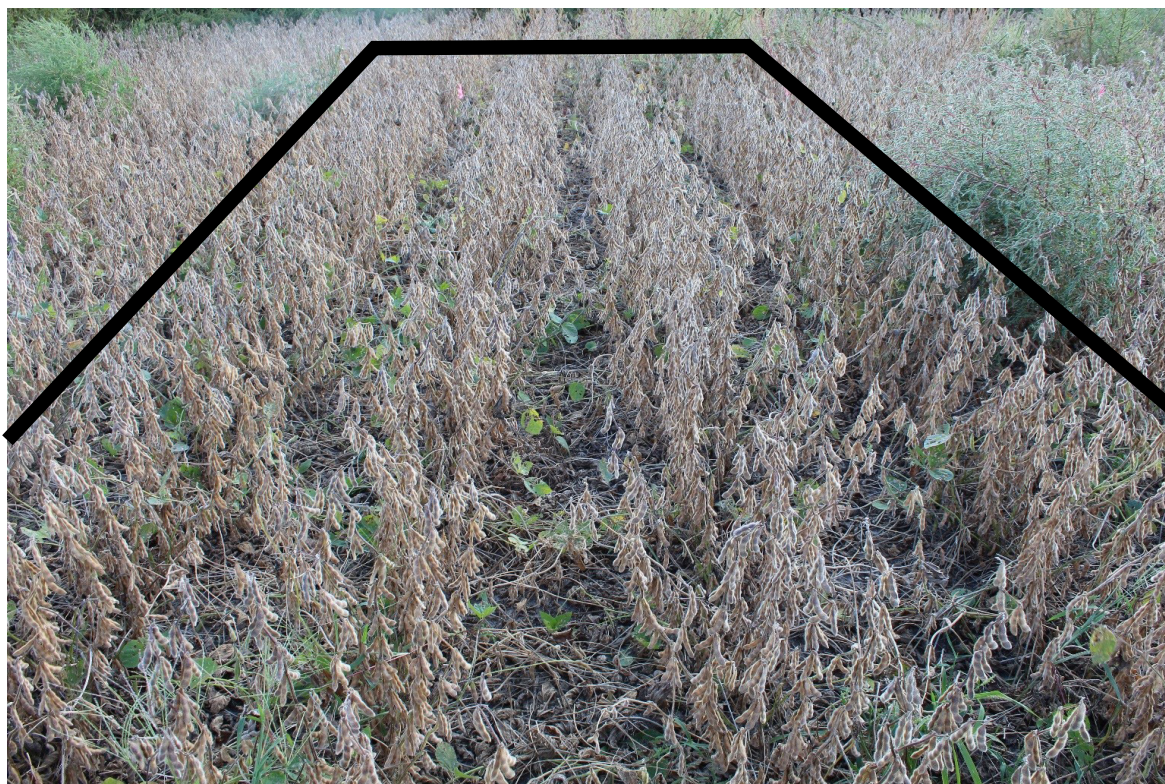


**Figure 3. Average yield resulting from the different herbicide treatments (Table 1).**





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**Figure 4. Treatment 7 at crop maturity 148 days after planting.**

## **What Does This Mean for Your Farm?**

- Excellent control of Palmer amaranth and kochia can be obtained by combining multiple effective sites of action in both the pre- and post-emergence herbicide applications.
- Strong pre-emergence programs followed by a timely application of XtendiMax<sup>®</sup> herbicide with VaporGrip<sup>®</sup> Technology + Roundup PowerMAX<sup>®</sup> herbicide + Warrant<sup>®</sup> Herbicide or Warrant<sup>®</sup> Ultra Herbicide resulted in numerically higher levels of weed control.
- Dicamba is a valuable tool for both pre- and post-emergence weed control in soybean, but additional residual pre-emergence herbicides are still needed.



# Weed Control Programs in Roundup Ready 2 Xtend® Soybeans

## Legal Statements

The information discussed in this report is from a single site, replicated demonstration. This information piece is designed to report the results of this demonstration and is not intended to infer any confirmed trends. Please use this information accordingly.

**XtendiMax® herbicide with VaporGrip® Technology is part of the Roundup Ready® Xtend Crop System and is a restricted use pesticide.** ALWAYS READ AND FOLLOW DIRECTIONS FOR USE ON PESTICIDE LABELING. It is a violation of federal and state law to use any pesticide product other than in accordance with its labeling. XtendiMax® herbicide with VaporGrip® Technology and products with XtendFlex® Technology may not be approved in all states and may be subject to use restrictions in some states. Check with your local product dealer or representative or U.S. EPA and your state pesticide regulatory agency for the product registration status and additional restrictions in your state. For approved tank-mix products and nozzles visit [XtendiMaxApplicationRequirements.com](http://XtendiMaxApplicationRequirements.com)

**Monsanto Company is a member of Excellence Through Stewardship® (ETS).** Monsanto products are commercialized in accordance with ETS Product Launch Stewardship Guidance, and in compliance with Monsanto's Policy for Commercialization of Biotechnology-Derived Plant Products in Commodity Crops. This product has been approved for import into key export markets with functioning regulatory systems. Any crop or material produced from this product can only be exported to, or used, processed or sold in countries where all necessary regulatory approvals have been granted. It is a violation of national and international law to move material containing biotech traits across boundaries into nations where import is not permitted. Growers should talk to their grain handler or product purchaser to confirm their buying position for this product. Excellence Through Stewardship® is a registered trademark of Excellence Through Stewardship.

**ALWAYS READ AND FOLLOW DIRECTIONS FOR USE ON PESTICIDE LABELING.** IT IS A VIOLATION OF FEDERAL AND STATE LAW to use any pesticide product other than in accordance with its labeling. NOT ALL formulations of dicamba or glyphosate are approved for in-crop use with Roundup Ready 2 Xtend® soybeans. ONLY USE FORMULATIONS THAT ARE SPECIFICALLY LABELED FOR SUCH USES AND APPROVED FOR SUCH USE IN THE STATE OF APPLICATION. Contact the U.S. EPA and your state pesticide regulatory agency with any questions about the approval status of dicamba herbicide products for in-crop use with Roundup Ready 2 Xtend® soybeans.

**Roundup Ready 2 Xtend® soybeans contains genes that confer tolerance to glyphosate and dicamba.**

**Glyphosate** will kill crops that are not tolerant to glyphosate. **Dicamba** will kill crops that are not tolerant to dicamba. **Glufosinate** will kill crops that are not tolerant to glufosinate. Contact your seed brand dealer or refer to the Technology Use Guide for recommended weed control programs.

**Roundup Technology®** includes glyphosate-based herbicide technologies.

**Performance may vary**, from location to location and from year to year, as local growing, soil and weather conditions may vary. Growers should evaluate data from multiple locations and years whenever possible and should consider the impacts of these conditions on the grower's fields.

**ALWAYS READ AND FOLLOW PESTICIDE LABEL DIRECTIONS.** Warrant® Herbicide and Warrant® Ultra Herbicide are not registered in all states and may be subject to use restrictions. The distribution, sale, or use of an unregistered pesticide is a violation of federal and/or state law and is strictly prohibited. Check with your local dealer or representative for the product registration status in your state. Bayer, Bayer Cross Design, Roundup PowerMAX®, Roundup Ready 2 Xtend®, Roundup Technology®, VaporGrip®, Warrant® and XtendiMax® are registered trademarks of Bayer Group. Cobra®, Fierce®, Select Max® and Valor® are registered trademarks of Valent U.S.A. Corporation. All other trademarks are the property of their respective owners. ©2018 Bayer Group, All Rights Reserved. 181115074932 112318CAM

