

## USING XTENDIMAX® HERBICIDE WITH VAPORGRIP® TECHNOLOGY, A RESTRICTED USE PESTICIDE, AS A BURNDOWN FOR PIGWEEDS AND MARESTAIL AND FOR IN-SEASON WEED CONTROL IN THE ROUNDUP READY® XTEND CROP SYSTEM

The Roundup Ready® Xtend Crop System includes the herbicide-resistant crops Roundup Ready 2 Xtend® soybeans, XtendFlex® soybeans, and in-crop applications of XtendiMax® herbicide with VaporGrip® Technology, a Restricted Use Pesticide (RUP), which must be used with VaporGrip® Xtra Agent or an equivalent Volatility Reduction Adjuvant (VRA). The combination can provide up to 14 days of soil activity on certain small-seeded broadleaf weeds including Palmer amaranth, waterhemp, and marestail.\* Residual control should be accomplished with the use of different site of action herbicide products tank-mixed with XtendiMax® herbicide with VaporGrip® Technology (for approved tank-mix products and nozzles, please visit [XtendiMaxApplicationRequirements.com](https://www.ruppseeds.com/xtendimax-application-requirements)). Plant-back restrictions apply to crops that are not tolerant to dicamba by genetics or by herbicide-resistant traits.

Actively growing weeds can quickly “eat into” crop yield and profitability by using the nutrients, water, and light that crops need to help maximize yield potential. Starting the growing season clean and applying herbicides when weeds are actively growing and less than 4-inches tall greatly improves herbicide efficacy. In minimum tillage situations, apply XtendiMax® herbicide with VaporGrip® Technology with VaporGrip® Xtra Agent or an equivalent volatility reducing adjuvant (VRA), plus a Roundup® brand glyphosate-only agricultural herbicide and an approved drift reducing adjuvant (DRA) with a soil residual herbicide prior to planting. In conventional tillage situations, especially under dry conditions, apply XtendiMax® herbicide with VaporGrip® Technology with VaporGrip® Xtra Agent or an equivalent VRA, tank-mixed with a soil residual herbicide at planting to provide weed control on early weed flushes like Palmer amaranth prior to activation of the soil residual herbicide by rain or irrigation.

Tough-to-control weeds such as waterhemp, Palmer amaranth, and marestail can be managed with the use of XtendiMax® herbicide with VaporGrip® Technology. Repeated use of herbicides with the same site of action may lead to selection for resistant weeds; therefore, it is important to use the labeled herbicide rates to help maximize weed control and utilize other herbicides with different sites of action. Integrated weed management principles that should be followed include:

- The scouting of fields before and after herbicide applications.
- The use of broad-spectrum soil-applied residual herbicide(s).
- The use of sequential herbicide applications with multiple, effective sites of action.
- The use of appropriate herbicides and product rates for respective weed species at sizes present.
- The use of crop rotation, where possible, can help manage weeds because different herbicides with different sites of action can be used.
- The use of non-chemical weed control practices such as tillage, cultivation, cover crops, and row spacing.

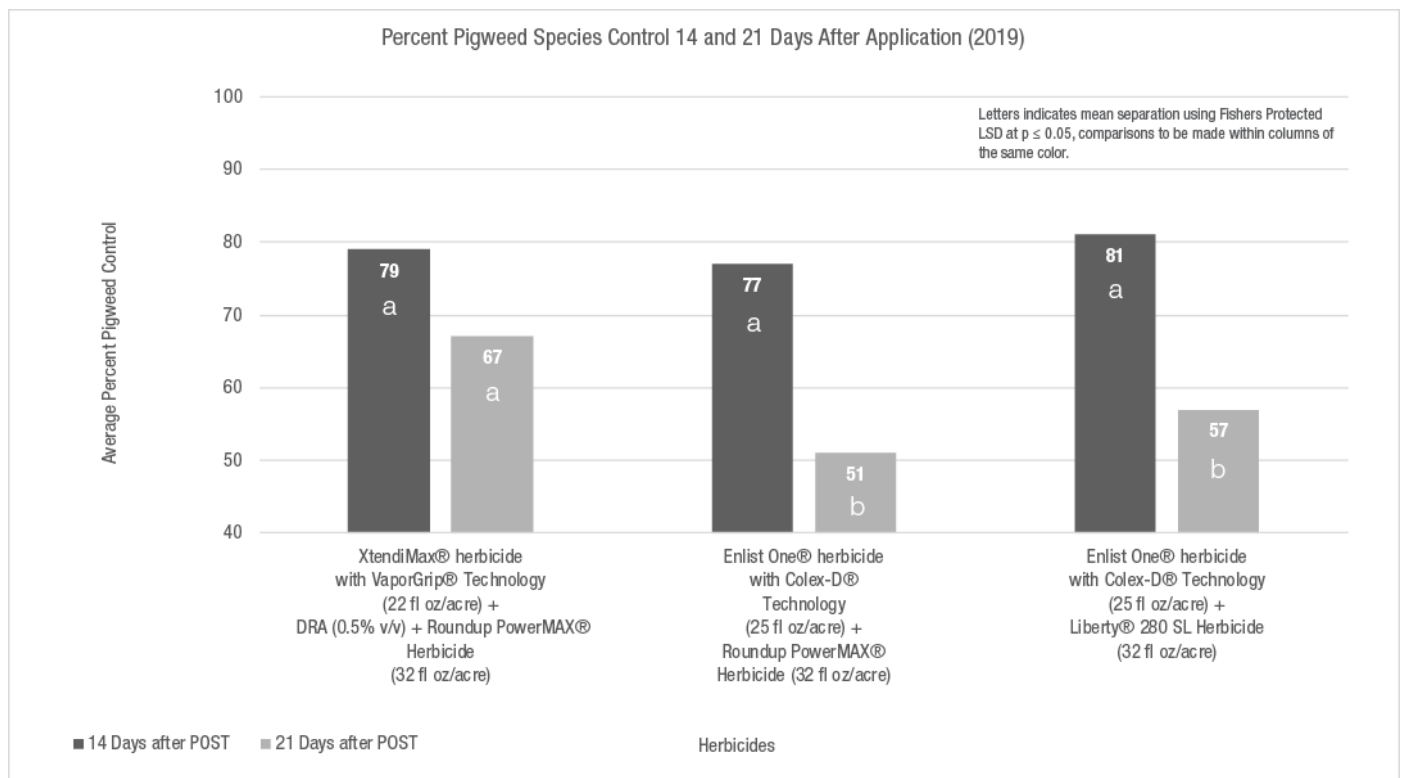
### Roundup Ready 2 Xtend® Soybeans

Roundup Ready 2 Xtend® Soybeans offer tolerance to dicamba and glyphosate. Dicamba tolerance offers improved control over herbicide-resistant and other tough-to-control broadleaf weeds.

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## Pigweed Species Control

Bayer research in the Midwest and South in 2019 points to the effectiveness and use of XtendiMax® herbicide with VaporGrip® Technology, a restricted use pesticide, as a burndown herbicide. The research focused on tank mixes. The first was a mix of XtendiMax® herbicide with VaporGrip® Technology (22 fl oz/acre) plus Roundup PowerMAX® herbicide (32 fl oz/acre) plus a DRA. The second was a mix of Enlist One® Herbicide with Colex-D® Technology (25 fl oz/acre) plus Roundup PowerMAX® herbicide (32 fl oz/acre). The third tank-mix was Enlist One® Herbicide with Colex-D® Technology (25 fl oz/acre) plus Liberty® 280 SL Herbicide (32 fl oz/acre). The three tank mixes were similar for percent weed control 14 days after application (Figure 1). After 21 days, the percent weed control for the XtendiMax® herbicide with VaporGrip® Technology tank mix was significantly higher than the other two tank mixes showing better burndown control and the soil activity benefit of XtendiMax® herbicide with VaporGrip® Technology for controlling the new flush of pigweed species that emerged after the POST were applied (Figures 1 and 2).



**Figure 1. Comparison of average percent weed control efficacy for three tank-mixes at 14 and 21 days after application (DAA). Pigweed species included glyphosate-resistant Palmer amaranth, glyphosate-resistant common waterhemp, common waterhemp, and redroot pigweed. The trial locations, conducted in 2019, were in Georgia, Illinois, Iowa, Minnesota, Ohio, Mississippi, and Tennessee.**

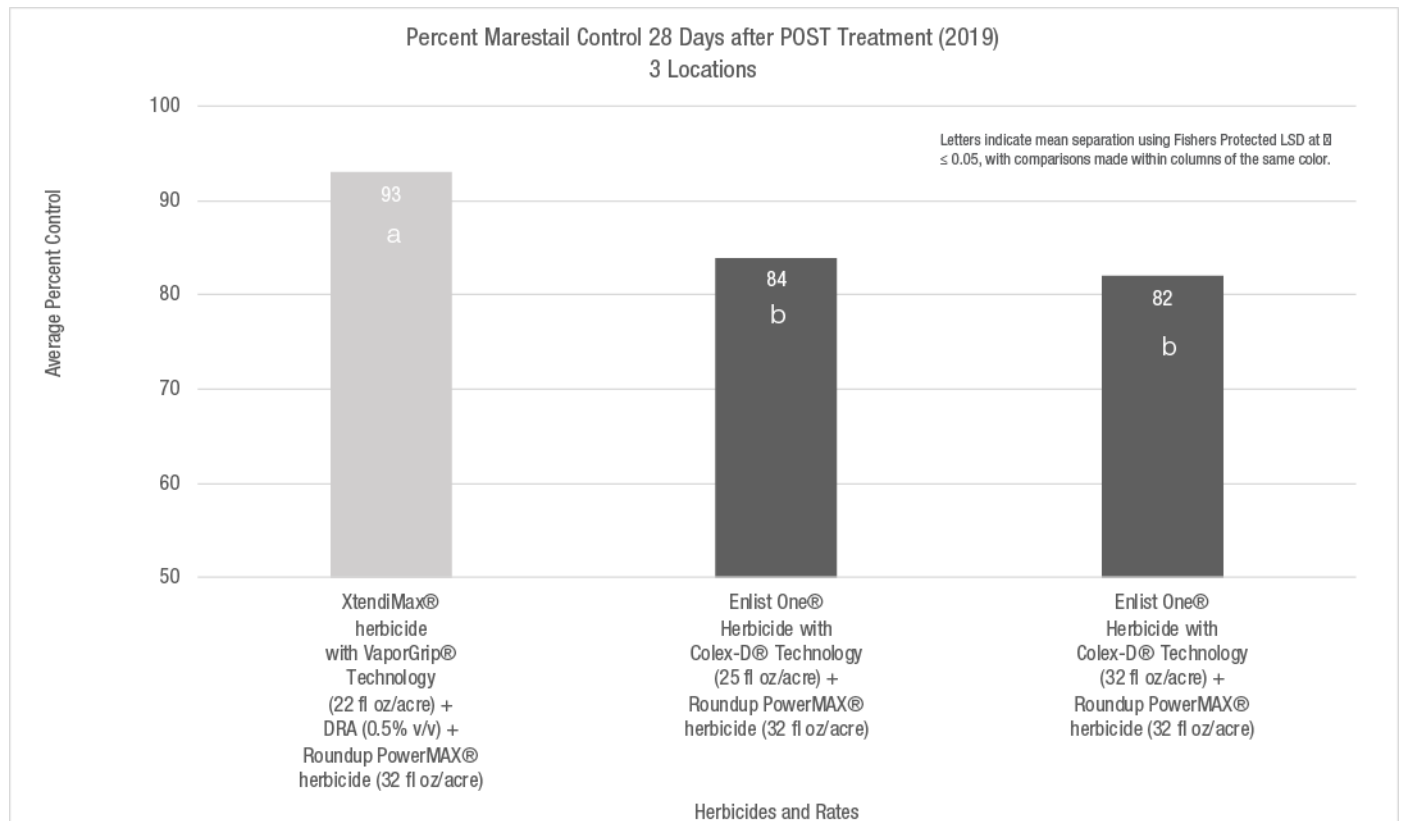
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## Marestail Control

The control of marestail at three locations 28 days after treatment was significantly higher with tank mixes of XtendiMax® herbicide with VaporGrip® Technology (22 fl oz/acre), a restricted use pesticide, plus Roundup PowerMAX® Herbicide (32 fl oz/acre) than tank mixes of Enlist One® Herbicide with Colex-D® Technology at rates of 25 and 32 fl oz/acre plus Roundup PowerMAX® Herbicide (32 fl oz/acre) (Figure 3). This is because XtendiMax® herbicide with VaporGrip® Technology, in addition to providing post-emergence and burndown control, is also helping to prevent another flush of weeds to emerge due to its soil activity benefit keeping fields clean longer compared to the competitive treatment. The tank mixes with XtendiMax® herbicide with VaporGrip® Technology included a DRA at 0.5% v/v.



**Figure 2. XtendiMax® herbicide with VaporGrip® Technology (22 fl oz/acre) plus Roundup PowerMAX® Herbicide (32 fl oz/acre) plus 0.5% DRA v/v tank-mix (Left) showing higher postemergence and soil activity over Enlist One® Herbicide with Colex-D® Technology (25 fl oz/acre) plus Roundup PowerMAX® Herbicide (32 fl oz/acre) tank-mix (Right) for glyphosate- and PPO-resistant Palmer amaranth at Union City, TN. Application made 6-12-2019. Picture taken 6-24-2019.**



**Figure 3. Comparison of weed control efficacy for XtendiMax® herbicide with VaporGrip® Technology compared to Enlist One® Herbicide with Colex-D® Technology 28 days after application for marestail control. The trial locations, conducted in 2019, were in Missouri, Illinois, and Minnesota.**

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## XtendFlex® Soybeans

XtendFlex soybeans have tolerance to dicamba, glyphosate, and glufosinate which provides farmers greater flexibility for managing tough-to-control weeds including waterhemp, Palmer amaranth, marestail, PPO-inhibitor resistant weeds, and glyphosate resistant weeds. The Roundup Ready® Xtend Crop System with XtendFlex® Soybeans controls 335+ weeds.\*\*

Research trials conducted in Illinois, Indiana, Minnesota, Missouri, and Tennessee demonstrated the benefit of planting XtendFlex® soybeans.

The trials were comprised of PRE (at planting), Early POST (14 to 21 days after PRE), and Mid-POST (14 days after early POST) applications. Weed control ratings were recorded 14 days after the Early POST application and 28 days after the Mid-POST application.

The herbicides used in the trials consisted of:

- PRE/At planting:
  - flumioxazin (2 oz wt/acre)
  - Warrant® Herbicide (48 fl oz/acre) + metribuzin (0.33 lb wt/acre)
  - XtendiMax® herbicide with VaporGrip® Technology, a restricted use pesticide (RUP) (22 fl oz/acre) + Warrant® Herbicide (48 fl oz/acre) + drift reducing adjuvant (DRA) (0.5% v/v)
  - XtendiMax® herbicide with VaporGrip® Technology (22 fl oz/acre) + flumioxazin (2 oz wt/acre) + DRA (0.5% v/v)

- Early POST:
  - Reflex® herbicide (16 fl oz/acre)
  - XtendiMax® herbicide with VaporGrip® Technology (22 fl oz/acre) + Roundup PowerMAX® Herbicide (32 fl oz/acre) + DRA (0.5% v/v)
  - or
  - XtendiMax® herbicide with VaporGrip® Technology (22 fl oz/acre) + Roundup PowerMAX® Herbicide (32 fl oz/acre) + DRA (0.5% v/v) + Warrant® Herbicide (48 fl oz/acre)
- Mid POST:
  - Cobra® herbicide (10 fl oz/acre)
  - Warrant® Ultra herbicide (50 fl oz/acre)
  - Liberty® herbicide (32 fl oz/acre) + AMS

The average percent of waterhemp control was significantly greater in XtendFlex® soybeans when tank mixes included XtendiMax® herbicide with VaporGrip® Technology compared to when only PPO-inhibiting herbicides were used in PRE, Early Post, and Mid-POST applications (Figure 4).

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Comparison of Waterhemp Control in 2019 with PPO Herbicides and XtendiMax® Herbicide with VaporGrip® Technology, a Restricted Use Pesticide, tank-mixes in XtendFlex® Soybeans  
7 Locations: Illinois(4), Minnesota (1), Missouri (1), and Indiana(1)

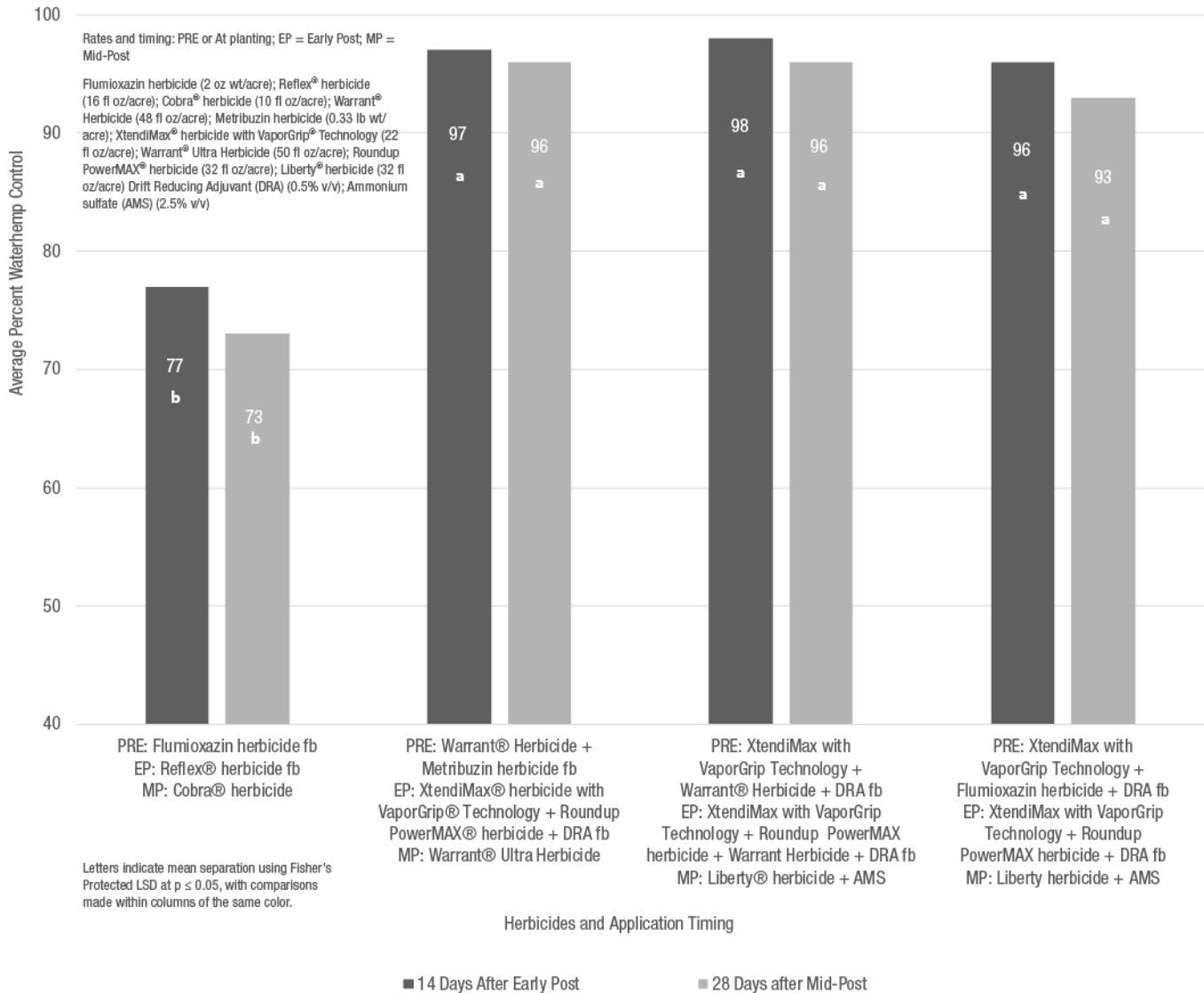


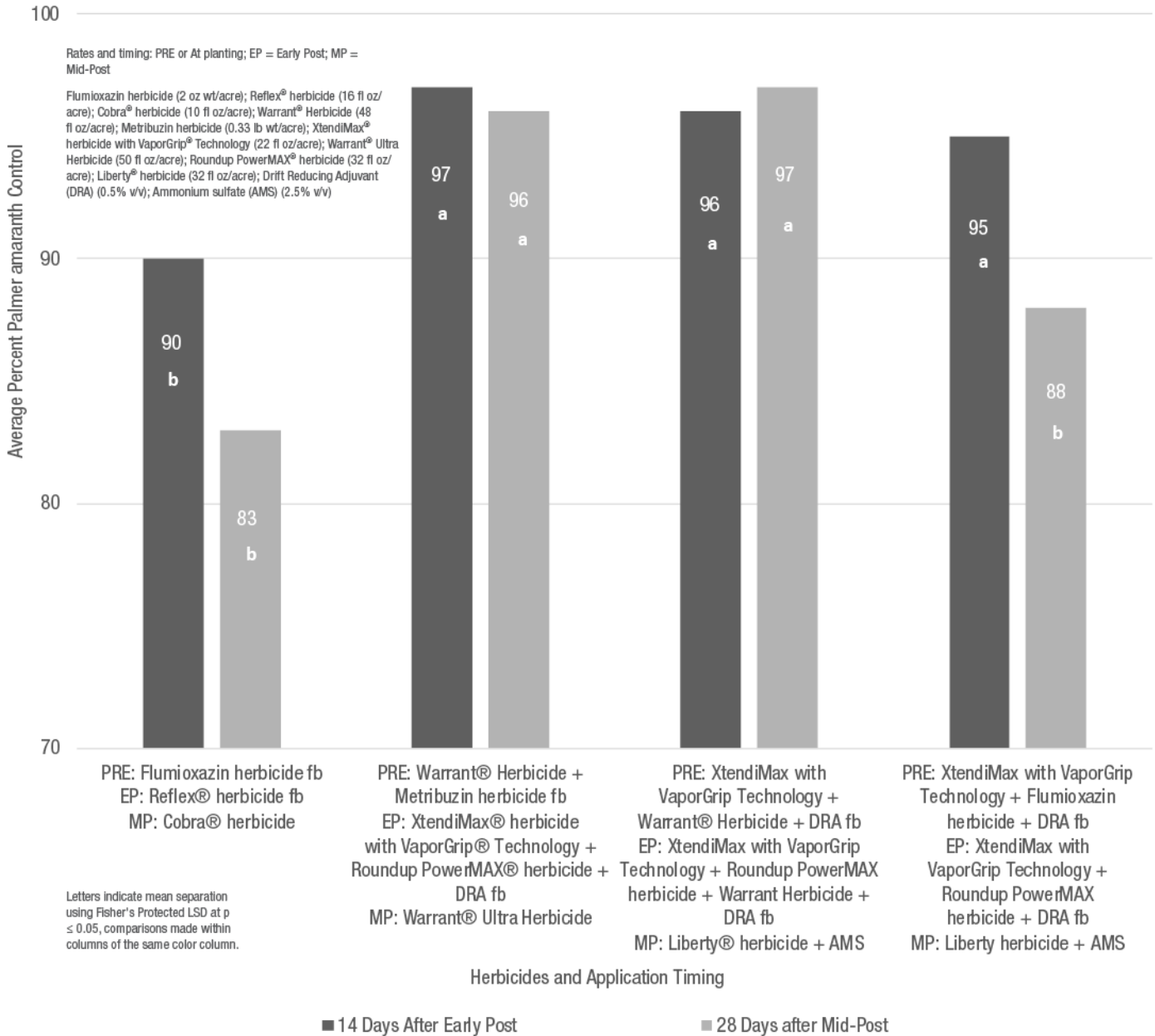
Figure 4. Comparison of waterhemp control in 2019 using PPO herbicides PRE, Early POST (EP), and Mid-POST (MP) and with tank mixes of XtendiMax® herbicide with VaporGrip® Technology in XtendFlex® soybeans at 7 locations - Illinois (4), Minnesota (1), Missouri (1), Indiana (1).



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The average percent of Palmer amaranth control 14 days after Early POST and 28 days after Mid-POST was significantly greater in XtendFlex® soybeans when tank mixes included XtendiMax® herbicide with VaporGrip® Technology, a restricted use pesticide, compared to when only PPO-inhibiting herbicides were used in PRE, Early POST, and Mid-POST applications (Figure 5).

**Comparison of Palmer amaranth Control in 2019 with PPO Herbicides and XtendiMax® Herbicide with VaporGrip® Technology, a Restricted Use Pesticide, tank-mixes in XtendFlex® Soybeans  
6 Locations: Missouri (3) and Tennessee(3)**



**Figure 5. Comparison of Palmer amaranth control in 2019 using PPO herbicides PRE, Early Post (EP), and Mid-Post (MP) and with tank mixes of XtendiMax® herbicide with VaporGrip® Technology in XtendFlex® soybeans at 6 locations – Tennessee (3), Missouri (3).**

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Glyphosate and PPO-resistant Palmer amaranth Control (68 days after Planting), Union City, TN (2019)  
XtendFlex® Soybeans



Untreated check

Pictures taken: 68 Days After Planting  
Early POST Application: 16 Days After Planting  
Mid POST Application: 30 Days After Planting

PRE: Warrant® Herbicide (48 fl oz/acre) + Xtendimax® herbicide with VaporGrip® Technology (22 fl oz/acre) fb  
EP: Xtendimax herbicide with VaporGrip Technology, a restricted use pesticide, (22 fl oz/acre) + Roundup PowerMAX® herbicide (32 fl oz/acre) + Warrant Herbicide (48 fl oz/acre) + DRA (0.5% v/v) fb  
MP: Liberty® herbicide (32 fl oz/A)+ AMS

**Figure 6. Demonstrated control (68 days after planting) of glyphosate- and PPO-resistant Palmer amaranth at Union City, TN in 2019.**

Applicators of XtendiMax® herbicide with VaporGrip® Technology, a restricted use pesticide, MUST review the label, follow state regulations for application, and use VaporGrip® Xtra Agent or an equivalent Volatility Reduction Adjuvant. Additional information can be found at [www.XtendiMaxApplicationRequirements.com](http://www.XtendiMaxApplicationRequirements.com).

\*Results may vary, depending on rainfall and soil type. Always use dicamba with traditional residual herbicides in pre-emergence and postemergence applications that have different, effective sites of action, along with other Diversified Weed Management Practices.

\*\*Based on approved EPA herbicide labels for the herbicides recommended for use in each system as of January 2021.

## Legal Statements

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

Bayer is a member of Excellence Through Stewardship® (ETS). Bayer products are commercialized in accordance with ETS Product Launch Stewardship Guidance, and in compliance with Bayer's Policy for Commercialization of Biotechnology-Derived Plant Products in Commodity Crops. Commercialized products have 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.

XtendiMax® herbicide with VaporGrip® Technology is part of the Roundup Ready® Xtend Crop System, is a restricted use pesticide and must be used with VaporGrip® Xtra Agent (or an equivalent volatility reduction adjuvant). For approved tank-mix products (including VRAs and DRAs), nozzles and other important label information visit [XtendiMaxApplicationRequirements.com](http://XtendiMaxApplicationRequirements.com).

ALWAYS READ AND FOLLOW PESTICIDE LABEL DIRECTIONS. 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. NOT ALL formulations of dicamba, glyphosate or glufosinate are approved for in-crop use with products with XtendFlex® Technology. 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 or products with XtendFlex® Technology.

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.

Roundup Ready 2 Xtend® soybeans contain genes that confer tolerance to glyphosate and dicamba. Products with XtendFlex® Technology contains genes that confer tolerance to glyphosate, glufosinate 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 Bayer Technology Use Guide for recommended weed control programs.

XtendiMax® is a restricted use pesticide. Not all products are 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. Tank mixtures: The applicable labeling for each product must be in the possession of the user at the time of application. Follow applicable use instructions, including application rates, precautions and restrictions of each product used in the tank mixture. Not all tank mix product formulations have been tested for compatibility or performance other than specifically listed by brand name. Always predetermine the compatibility of tank mixtures by mixing small proportional quantities in advance. Roundup PowerMAX®, Roundup Ready 2 Xtend®, Roundup Ready 2 Yield®, Roundup Ready®, VaporGrip®, Warrant®, XtendFlex® and XtendiMax® are registered trademarks of Bayer Group. Reflex® is a registered trademark of a Syngenta group company. Liberty® and LibertyLink® and the Water Droplet Design® are trademarks of BASF Corporation. Cobra® is a registered trademark of Valent U.S.A. Corporation. All other trademarks are the property of their respective owners. For additional product information call toll-free 1-866-99-BAYER (1-866-992-2937) or visit our website at [www.BayerCropScience.us](http://www.BayerCropScience.us). Bayer CropScience LP, 800 North Lindbergh Boulevard, St. Louis, MO 63167. ©2021 Bayer Group. All rights reserved. 2004\_S4