What You’ll Learn...

- Cotton plants are extremely sensitive to early-season weed competition during the first 40 days of development.
- Improperly timed or ineffective weed management applications may cause a significant reduction in yield opportunity.
- For optimal weed management, any preemergence (PRE) or postemergence (POST) herbicide application should be made when weeds are less than 4 inches tall.

Successful, season-long weed management begins with a burndown application, that includes a residual herbicide, to kill emerged weeds and prevent additional weeds from emerging in cotton. Growers should then follow with a PRE application of residual herbicides plus an additional burndown herbicide at planting. After cotton emergence, most growers should make one or two POST herbicide applications. At layby, late-emerging weeds may be controlled using a hooded sprayer or directed sprayer. Large weeds may need to be removed by hand.

Cotton is sensitive to weed competition during the early growth stages. Effective pre-plant weed control conserves soil moisture, facilitates planting by providing a clean seedbed, and helps provide critical weed control through planting and after crop emergence.

Importance of Timing Weed Management

Timely weed management can help maximize cotton yield potential. Studies conducted at the Learning Center in Leland, Mississippi in 2007 and Scott, Mississippi in 2008 evaluated the yield response of cotton to delayed weed control. Results from the trials showed cotton yields were reduced when cotton did not receive timely early-season weed control. Cotton yields were reduced by 21%, 37%, and 46% when weed control was delayed by 14, 21, and 28 days, respectively. Additional results indicated that control was best for small weeds and cotton plants became stunted relative to delayed weed control (Figures 1 and 2). For best management, weeds should be controlled as early as possible. Applications of herbicides to weeds that are bigger than the label requirements will likely result in poor control and enable increased weed survival. In Genuity® Bollgard II® with Roundup Ready® Flex cotton or Bollgard II® XtendFlex® cotton, the use of Roundup® brand agricultural herbicides can be an effective and economical tool for weed control when properly applied. Along with Roundup brand agricultural herbicides, the use of residual herbicides in a weed control program can be an integral practice for combating tough-to-control weeds. Certain residual herbicides can be tank-mixed with Roundup brand agricultural herbicides. Refer to product label for tank-mixing partners and instructions for use. As weed populations become more difficult to control, it is recommended that a season-long weed management program be established that includes herbicide applications at pre-plant, early POST, and layby. To successfully control weeds, at least two herbicide applications should include overlapping residual herbicides with different sites of action.

Figure 1. Vigorous, well developed cotton with optimal herbicide application timing (1 to 2 leaf cotton).

Figure 2. Weed competition visibly stunted cotton growth and yield potential when herbicide application delayed 28 days after optimal timing.
Weed Management Recommendations

It is important to start the season with a clean field prior to planting. In the Southwest, herbicide recommendations vary by geography as production practices and environmental conditions differ by region.

In the East Texas region, a postharvest herbicide application in the fall can help control weeds into the winter months. A preemergence (PRE) herbicide program or tillage is recommended for all regions. PRE applications should be made far enough in advance to control existing weeds prior to planting. For East Texas, West Texas, and Oklahoma, a residual herbicide, such as Warrant® Herbicide, Rowel® Herbicide, or Valor® EZ at labeled rate, can be applied PRE to cotton. At planting, Gramoxone® SL can be applied with the addition of a recommended residual herbicide, such as fluometuron, diuron, pyrithiobac, Warrant Herbicide, or pendimethalin in East Texas and Gramoxone with Caparol or diuron.

For early in-season control, Roundup PowerMAX® tank-mixed with pyrithiobac, Warrant Herbicide, or Dual Magnum® can be applied early postemergence (POST) at 1-leaf cotton, no more than 14 days after a PRE application in East or West Texas.

Always read and follow product labels and application directions. Fields should be scouted before and after any burndown, PRE, or in-crop herbicide application to check for herbicide efficacy or potential resistant weed populations.

Early weed control is essential for reducing weed populations. As a way to help Texas and Oklahoma farmers manage tough weeds, Roundup Ready PLUS® Crop Management Solutions is again offering incentives for the 2017 growing season. These incentives help farmers who plant Genuity® Bollgard II® with Roundup Ready® Flex cotton or Bollgard II® XtendFlex® cotton varieties to proactively manage glyphosate-resistant Palmer amaranth by encouraging the use of residual herbicides with multiple sites of action.

Specifically for early-season weed management, the 2017 Roundup Ready PLUS® Crop Management Solutions will incentivize the use of Warrant Herbicide, Warrant® Ultra Herbicide, Rowel Herbicide, Valor EZ, Caparol®, Dual Magnum®, and Gramoxone SL herbicides for proactive weed management. For more information on Roundup Ready PLUS® Crop Management Solutions, please contact your local Monsanto authorized retailer or visit www.roundupreadyPLUS.com

**Table 1. Texas and Oklahoma Herbicide Recommendations in Genuity® Bollgard II® with Bollgard II® XtendFlex® Cotton.**

<table>
<thead>
<tr>
<th>Practice</th>
<th>West Texas/Southeast Oklahoma</th>
<th>East Texas/Oklahoma</th>
</tr>
</thead>
<tbody>
<tr>
<td>Burndown</td>
<td>Roundup PowerMAX® Herbicide + dicamba or 2,4-D</td>
<td>Warrant® Ultra (east of highway 77) or Rowel® Herbicide + Roundup PowerMAX® Herbicide (west of highway 77)</td>
</tr>
<tr>
<td>Pre-plant</td>
<td>Trifluralin (conventional tillage)</td>
<td></td>
</tr>
<tr>
<td>POST 1</td>
<td>XtendiMax™ Herbicide with VaporGrip™ Technology + Roundup PowerMAX® Herbicide + Intact® + Warrant® Herbicide</td>
<td>XtendiMax™ Herbicide with VaporGrip™ Technology + Roundup PowerMAX® Herbicide + Intact® + Warrant® Herbicide</td>
</tr>
<tr>
<td>POST 2</td>
<td>XtendiMax™ Herbicide with VaporGrip™ Technology + Roundup PowerMAX® Herbicide + Intact®</td>
<td>XtendiMax™ Herbicide with VaporGrip™ Technology + Roundup PowerMAX® Herbicide + Intact®</td>
</tr>
<tr>
<td>Layby</td>
<td>Roundup PowerMAX® Herbicide + diuron</td>
<td>MSMA + diuron</td>
</tr>
</tbody>
</table>

Use Warrant® Herbicide a maximum of two applications per season. Warrant® Herbicide and Warrant® Ultra Herbicide are not labeled for use in Arizona. When using Warrant Herbicide and Warrant Ultra Herbicide, see label for restrictions regarding geography and use rate. No more than two applications of Warrant Herbicide may be applied in a single growing season. If using Warrant Ultra Herbicide no more than one additional application of Warrant Herbicide may be applied in a single growing season. POST - Postemergence, PRE - Preemergence. Always read and follow pesticide label directions. Additional restrictions may apply.
TEXAS AND OKLAHOMA EARLY-SEASON WEED MANAGEMENT IN COTTON

This document is intended to provide information about these weeds and guidelines for control. As tough-to-control weeds, knowledge about the biology and weed control programs will help in their management. For additional information, contact your local seed representative. Developed in partnership with technology, Development & Agronomy by Monsanto.

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 Bollgard® II® XtendFlex® or XtendFlex® cotton. ONLY USE FORMULATIONS THAT ARE SPECIFICALLY LABELED FOR SUCH USES AND APPROVED FOR SUCH USE IN THE STATE OF APPLICATION. XTENDIMAX™ HERBICIDE WITH VAPORGRIP™ TECHNOLOGY AND IN CROP USES MAY NOT BE APPROVED IN ALL STATES. 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 Bollgard® II® XtendFlex®, Bollgard II® XtendFlex® or XtendFlex® cotton.

Bollgard® III XtendFlex®, Bollgard II® XtendFlex® cotton contains genes that confer tolerance to glyphosate, dicamba and glufosinate. 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 Monsanto dealer or refer to Monsanto’s Technology Use Guide for recommended weed control programs.

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.

B.t. products may not yet be registered in all states. Check with your Monsanto representative for the registration status in your state. Roundup Technology® includes Monsanto’s glyphosate-based herbicide technologies. Individual results may vary, and performance may vary from location to location and from year to year. This result may not be an indicator of results you may obtain as local growing, soil and weather conditions may vary. Growers should evaluate data from multiple locations and years whenever possible. ALWAYS READ AND FOLLOW PESTICIDE LABEL DIRECTIONS. Roundup Ready technology contains genes that confer tolerance to glyphosate, an active ingredient in Roundup® brand agricultural herbicides. Agricultural herbicides containing glyphosate will kill crops that are not tolerant to glyphosate. Rowel® Herbicide, Warrant® Herbicide and Warrant® Ultra Herbicide are not registered in all states. Rowel® Herbicide, Warrant® Herbicide and Warrant® Ultra Herbicide may be subject to use restrictions in some states. 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 Monsanto 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. Monsanto has not tested all tank mix product formulations 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. Bollgard II®, Genuity Design®, Genuity Icons, Genuity®, Respect the Refuge and Cotton Design®, Roundup PowerMAX®, Roundup Ready PLUS®, Roundup Ready®, Roundup Technology®, Roundup®, Rowel®, VaporGrip™, Warrant® and XtendiMax™ are trademarks of Monsanto Technology LLC. Dual Magnum® and Gramoxone® are registered trademarks of a Syngenta group company. Some of the product(s) discussed herein are restricted use pesticide(s) and may not be registered in all states. 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 product representative for the product registration status in your state. All other trademarks are the property of their respective owners. ©2017 Monsanto Company.

Below opening a bag of seed, be sure to read, understand and accept the stewardship requirements, including applicable refuge requirements for insect resistance management, for the biotechnology traits expressed in the seeds or seed in the Monsanto Technology Stewardship Agreement that you sign. By opening and using a bag of seed, you are reaffirming your obligation to comply with the most recent stewardship requirements.

Development & Agronomy by Monsanto.