What You’ll Learn...

- Roundup® brand agricultural herbicides need to get on the plant, in the plant, and throughout the plant for good weed control.
- Absorption and translocation can be affected by several factors including weather conditions, mechanical injury, and insect damage.
- The right rate is determined by the largest weed or the most difficult to control weed in a field.
- Apply within labeled timing for each crop.
- Use only approved tank-mix partners and follow proper herbicide mixing order to help ensure the effectiveness of herbicide applications.

Coverage, Absorption, and Translocation

Coverage is often compromised by the canopy of the weeds or crop. Coverage can be improved by choosing the proper nozzles, adjusting the boom height, and spraying at an appropriate ground speed. Use of spray volumes that range from 10 to 20 gallons per acre generally provides good coverage on target weeds.

Weeds need to be actively growing for good absorption and translocation of the herbicide. Environmental conditions can affect absorption and translocation. Dry weather causes weeds to have thickened cuticles, which are harder for herbicides to penetrate. Dry weather can also increase dust that can bind with glyphosate, the active ingredient in Roundup agricultural herbicides, making it less available for absorption into the plant. Adjusting the rate and using proper additives can help under these conditions.

Translocation requires actively growing weeds with a good plumbing system - the xylem and phloem. Mechanical damage from tillage, planting, or spray equipment can compromise the plumbing. Tillage that injures, but does not kill the weeds can make them appear shorter because much of the plant is below the soil surface. Planters and drills can cause the same effect. Lack of weed control in sprayer wheel tracks can be due to the restricted plumbing system of a plant and/or the presence of dust. Stem boring insects can also damage the plumbing, restricting translocation. When weeds injured by stem boring insects have been sprayed with a Roundup agricultural herbicide, the portion of the plant above the insect damage should die. Below the insect damage, the weed often remains green and may regrow. Giant ragweed and marestail are two examples of weed species where this has occurred.

Use the Right Rate

The rate for the field should be determined by the largest or most difficult to control weed, not the most prevalent. The general recommendation for Roundup agricultural herbicides is to use 32 fl oz/acre and to spray when weeds are 4 inches or less. If the field has predominantly 3 to 4 inch velvetleaf, but also contains numerous 12 inch lambsquarters, the recommended rate would increase to 44 fl oz/acre due to the height of the lambsquarters.

Annual weeds that are older and more mature or hardened-off may require 44 fl oz/acre even if they are less than 12 inches tall. Environmental stress, such as dry weather, can cause weeds to be short for their age, requiring a higher rate for good control. Tough to control annual weeds like common and giant ragweed and perennial weeds generally require the higher rate of 44 fl oz/acre.

While weed characteristics such as species, size, and age are important to determine the right herbicide rate to use, there are crop restrictions that must be followed. For Roundup PowerMAX® herbicide, the maximum single in-crop rate for corn is 32 fl oz/acre; for soybean this rate is 44 fl oz/acre. Always check the herbicide label for application restrictions, and use full rates to help achieve complete control of existing weeds.

Ammonium Sulfate (AMS)

AMS conditions hard water and can be added to the tank at 8.5 to 17 pounds (1 to 2% by weight) of spray grade AMS or equivalent rate of liquid AMS product per 100 gallons spray solution. Although not always necessary, additional nonionic surfactant can also be added to Roundup PowerMAX® herbicide at 1 to 2 quarts per 100 gallons spray solution to improve control.

Making Re-Treatments

When re-treatment is necessary, allow time for weeds to recover and resume growth, and follow label restrictions, if any, on re-application timing. Use the right rate of a Roundup agricultural herbicide, considering weeds are older, taller, and will probably be even more difficult to control. If sprayer wheel tracks were the problem, avoid the previous tracks. Weeds need to be actively growing for the best results.

Tank Mixtures

Labels for Roundup® agricultural herbicides include approved tank-mix partners. Combining Roundup agricultural herbicides with recommended tank-mix

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**APPLICATION REMINDERS FOR ROUNDUP® BRAND GLYPHOSATE AGRICULTURAL HERBICIDES**

Table 1. In-crop application guidelines.

<table>
<thead>
<tr>
<th>Crop</th>
<th>Maximum Single In-Crop</th>
<th>Maximum Total In-Crop</th>
<th>POST Application Timing Restrictions</th>
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</table>
| Corn with Roundup Ready® 2 Technology or Roundup Ready® Corn 2 | 32 fl oz/acre | 64 fl oz/acre | • Can be applied up to 48 inch corn  
   • Can be applied from emergence through V8 or until corn reaches 30 inches (free standing), whichever comes first  
   • Drop nozzles are recommended for optimum spray coverage and weed control when corn is 24 to 30 inches  
   • For corn heights of 30 to 48 inches, drop nozzles are required and should be kept below the crop canopy |
| Roundup Ready® soybeans, Roundup Ready 2 Yield® soybeans, and Roundup Ready 2 Xtend® soybeans | 44 fl oz/acre | 64 fl oz/acre | • Can be applied from cracking through flowering (R2)  
   • R2 ends when a 3/16 inch pod appears at one of the four uppermost nodes on the main stem with a fully developed leaf |

(Continued from page 1)

partners like dicamba can increase performance on certain weed species. Tank mixtures that could cause antagonism and reduce the effectiveness of Roundup agricultural herbicides should be avoided. Tank mixing with insecticides, fungicides, and nutrients or foliar fertilizers is generally not recommended.

**Application Timing**

The timing of weed control can affect yield potential. Weeds should be controlled prior to 4 inches to help maximize yield potential. Except for preharvest applications, DO NOT apply after R2 stage in Roundup Ready® soybeans, Roundup Ready 2 Yield® soybeans, and Roundup Ready 2 Xtend® soybeans or after V8 or 30 inch corn with Roundup Ready 2 Technology or Roundup Ready Corn 2 (without drop nozzles) (Table 1). For preharvest applications in soybeans, apply prior to harvest after pods have set and lost all green color. Follow all appropriate label instructions and restrictions including the time between preharvest application and soybean harvest.

**Herbicide Mixing Order Matters...**

1. Tank should be filled 1/2 with water and gentle agitation started.
2. Ammonium sulfate (AMS) should be added, allowing it to fully dissolve to tie up any hard water ions.
3. Any dry formulations, suspensions, wettable powders, or flowables should be added, and should be agitated to fully dissolve any dry products.
4. Drift reduction agents should be added.
5. Water soluble formulations (liquids) should be added.
6. Finally, Roundup® agricultural herbicides should be added. If using Roundup PowerMAX®, nonionic surfactant can be added last.

For additional information, contact your local seed representative. Developed in partnership with Technology Development & Agronomy by Monsanto.

As at this printing no dicamba herbicide product has been approved for commercial in-crop use with Roundup Ready 2 Xtend® soybeans. DO NOT APPLY DICAMBA HERBICIDE IN-CROP TO Roundup Ready 2 Xtend® soybeans IN 2016 unless you use a dicamba herbicide product that is specifically labeled for that use in the location where you intend to make the application. While no in-crop use of dicamba is currently approved, some dicamba products may be labeled for weed control prior to planting a crop and subject to minimum plant back restrictions. IT IS A VIOLATION OF FEDERAL AND STATE LAW TO MAKE AN IN-CROP APPLICATION OF ANY DICAMBA HERBICIDE PRODUCT ON Roundup Ready 2 Xtend® Soybeans, OR ANY OTHER PESTICIDE APPLICATION, UNLESS THE PRODUCT LABELING SPECIFICALLY AUTHORIZES THE USE. 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 and follow all pesticide product labeling. 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. 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 RM, where applicable, grain marketing and all other stewardship practices and pesticide label directions. Roundup Ready technology contains genes that confer tolerance to glyphosate, the active ingredient in Roundup® brand agricultural herbicides. Agricultural herbicides containing glyphosate will kill crops that are not tolerant to glyphosate. Roundup Ready 2 Xtend® soybeans contain genes that confer tolerance to glyphosate and dicamba. Glyphosate herbicides will kill crops that are not tolerant to glyphosate. Dicamba will kill crops that are not tolerant to dicamba. Contact your Monsanto dealer or refer to Monsanto’s Technology Use Guide for recommended weed control programs. 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. Genuity®, Roundup PowerMAX®, Roundup Ready 2 Xtend®, Roundup Ready 2 Yield®, Roundup Ready PLUS®, Roundup Ready®, Roundup Technology®, and Roundup® are registered trademarks of Monsanto Technology LLC. All other trademarks are the property of their respective owners. ©2016 Monsanto Company. 14068060610 061416LJM2 | RoundupReadyPLUS.com