

U.S. Technology Use Guide

2019 TUG

and Insect Resistance Management Overview



The Quickest, Easiest Way to Sign Your Technology Stewardship Agreement (TSA)

Monsanto uses the AgCelerate Stewardship electronic licensing platform, an industry-wide licensing solution enabling growers to manage their licensing requirements. If you previously signed a TSA, you can now go to AgCelerate.com, register and verify your grower information.

Growers who have not previously signed a TSA can register at AgCelerate.com and complete the entire licensing process online.

AgCelerate provides a single registration process that enables you to sign Seed/License Agreements for multiple trait providers.

Spend more time on your business, and less time on paperwork. Go to AgCelerate.com and register today!



Additional Helpful Apps



Climate FieldView™ offers a comprehensive, connected suite of digital ag tools to help you optimize resources and maximize yield. Using real-time and historical crop and weather data, Climate FieldView delivers customized insights that help you make important agronomic decisions with confidence. *App available from climate.com and itunes.apple.com*



FieldView™ Cab for iPad® device is a simple and powerful farm management app that enables growers to collect and understand field data through rich maps and reports. It combines the best in real-time cab monitoring with simple field data analysis into a mobile app that benefits from the portability and connectivity of the iPad®. *App available from climate.com and itunes.apple.com*



Featuring a mobile version of the Crop PHD tool, **Weed Manager Plus** delivers accurate weed management recommendations for your region, a tank mixing tool and a measurement conversion calculator for commercial growers. *App available through Farms.com*



RRXtend Spray app helps you plan sprays more effectively by providing weather forecasts including inversion risk probability and the ability to create and retain application records. The RRXtend Spray app also provides access to valuable Roundup Ready® Xtend Crop System information, educational videos, training information and other stewardship information. *App available from itunes.apple.com and play.google.com*

This 2019 Technology Use Guide (TUG) provides a concise source of technical information about the Monsanto Company's, a subsidiary of Bayer AG ("Monsanto"), current portfolio of biotechnology-derived products and seed treatments, and it sets forth requirements, recommendations or Best Management Practices (BMPs) for the use of these products. Growers planting corn or cotton insect-resistance traits must also read and follow the applicable 2019 Insect Resistance Management (IRM) Grower Guide.

This TUG is not a pesticide product label. It is intended to provide additional information and to highlight approved uses from certain product labels. Read and follow all precautions and directions in the label booklet and separately published supplemental labeling for the agricultural herbicide product you are using, as well as any other pesticide products. Nothing in this TUG should be construed as a substitute for reading all product labeling.



Stewardship Overview

A Message About Stewardship

Monsanto Company is committed to enhancing grower productivity and profitability through the introduction of new agricultural biotechnology traits and other products. These new technologies bring enhanced value and benefits to growers, and growers assume responsibility for the proper management of these products. Growers planting seed with biotech traits and/or seed treatments agree to implement the following stewardship requirements, including, but not limited to:

- Reading, signing and complying with the Technology Stewardship Agreement (TSA) and reading all annual license terms and updates before purchase or use of any seed containing a Monsanto trait.
 - Reading and following the directions for use on all product labels.
 - Reading and following the applicable IRM Grower Guide prior to planting; complying with the applicable IRM requirements for specific biotech traits as mandated by the U.S. Environmental Protection Agency (EPA).
 - Observing regional planting restrictions mandated by the EPA.
 - Using seed containing Monsanto technologies solely for planting a single commercial crop.
 - Complying with any additional stewardship requirements, such as grain or feed use agreements, product marketing requirements or geographical planting restrictions that Monsanto deems appropriate or necessary to implement for proper stewardship or regulatory compliance.
 - Selling crops or material containing biotech traits only to grain handlers that confirm their acceptance, or using those products on-farm.
 - Not moving seed and material containing biotech traits across international boundaries and into nations where import is not permitted.
 - Not using, planting, applying, selling, promoting and/or distributing a product within a state where the product is not yet registered.
- In addition, growers are encouraged to:
- Follow applicable stewardship recommendations as outlined in this TUG.
 - Follow the Herbicide Resistance Management Recommendations and the Corn Rootworm Best Management Practices (BMPs) to help minimize the risk of resistance development.

Stewardship Overview

Why is Stewardship Important?

- 1 Signing the TSA provides growers access to Monsanto's germplasm and the biotech trait technologies therein, and provides limited warranties on Monsanto Technology performance.
- 2 Following IRM requirements guards against insect resistance to *Bacillus thuringiensis* (*B.t.*) technologies, enabling the long-term durability of these technologies and meeting EPA requirements.
- 3 Utilizing biotech seed only for planting a single commercial crop helps preserve the effectiveness of biotech traits and encourages investment for future biotech innovations, which further improves farming technology and productivity.

Seed Patent Infringement

If Monsanto reasonably believes that a grower has planted saved seed containing a Monsanto biotech trait in violation of the terms of the grower license and/or Monsanto's patent rights, it will request invoices and records to confirm that fields in question have been planted with newly purchased seed. This information is to be provided within seven days after written request. Monsanto may inspect and test all of the grower's fields to determine if saved seed has been planted. Any inspections will be coordinated with the grower and performed at a reasonable time to best accommodate the grower's schedule.

If you have questions about seed stewardship or become aware of individuals utilizing biotech traits in a manner other than as noted above, please call **1-800-768-6387** (1-800-ROUNDUP). Letters reporting unauthorized or improper use of biotech traits may be sent to:

Monsanto Stewardship
800 N. Lindbergh Boulevard E3NA
St. Louis, MO 63167

For more information on Monsanto's practices related to seed patent infringement, please visit: monsanto.com/products/product-stewardship/seed-patent/ or monsanto.com/company/commitments/human-rights/articles/monsantos-commitment-farmers-patents/.

Anyone may provide Anonymous or Confidential information as follows:

"Anonymous" reporting results when a person reports information to Monsanto in such a way that the identity of the person reporting the information cannot be identified. This kind of reporting includes telephone calls requesting anonymity, emails and unsigned letters.

"Confidential" reporting results when a person reports information to Monsanto in such a way that the reporting person's identity is known to Monsanto. Every effort will be made to protect a person's identity, but it is important to understand that a court may order Monsanto to reveal the identity of people who are "known" to have supplied relevant information.

- Continuing multi-year, targeted monitoring of insect populations through the Agricultural Biotechnology Stewardship Technical Committee (ABSTC) and the Cotton Technology and Stewardship Committee (CTSC), consortiums of agricultural biotechnology companies and associations.
- Actively investigating reports of insect resistance.
- Conducting thorough, generational studies on sample insect populations, as appropriate, to determine if stable and inherited resistance is present.
- Monitoring and studying the occasional performance issues in fields with very high insect population densities that exceed control thresholds.

Establishing Healthy Pollinator Habitat

Pollinators are essential to agricultural systems. By providing high-quality habitat for pollinators such as bees and monarch butterflies, you provide benefits to your farm by increasing the diversity of pollinators in your area and improving soil health. All these benefits add up to a productive and sustainable farmscape.

Consider establishing a diverse habitat that has a mixture of wildflowers, milkweed and other beneficial plants to supply nutrition and breeding areas for a variety of pollinators, including bees, butterflies and birds. Plant this habitat in sites such as field borders, pivot corners, conservation lands, ditches, and buffers.

Every region is different. To get started, visit your local USDA service center (nrcs.usda.gov/wps/portal/nrcs/main/national/contact/local) or reach out to your local ag extension office (npic.orst.edu/pest/countyext.htm).

Monsanto is working with experts in biodiversity including academics, growers, conservation groups and government agencies across the U.S. to improve the habitat and ecosystem for the monarch butterfly and pollinators such as honey bees. We work with Monarch Watch, National Fish & Wildlife Foundation, Keystone Policy Center Monarch Collaborative, Iowa Monarch Conservation Consortium, Pheasants Forever, Missourians for Monarchs Collaborative and Sand County Foundation, among others.

Commitment to Steward Insect-Protected Traits

Monsanto is committed to the success of our grower customers by providing practical, flexible and cost-effective solutions that address on-farm challenges, contribute to grower choice and provide economic benefits to our customers. To ensure insect-protected *B.t.* traits remain a viable tool for growers, we are committed to ongoing conversations with the corn and cotton industries on the following IRM efforts to establish the most comprehensive approach to the stewardship of corn and cotton insect-protected traits.

Monsanto's ongoing IRM efforts include:

- Continually working to increase overall awareness of the need for, and adoption of, strong IRM programs through our Monsanto seed dealers, as well as the academic community.
- Carefully evaluating the need for — and practicality of — updating our BMPs or agronomic recommendations as new scientific data becomes available. Updates may include information tailored to local growing conditions, refuge compliance, scouting techniques, the addition of soil-applied insecticides, maturity and harvest schedules, soil management practices, crop rotation and adoption of products with multiple modes of action.
- Expanding our offering of multi-trait corn hybrids and cotton varieties that provide multiple modes of action and increase protection for growers. We encourage growers to try these seeds with enhanced protection as the product line expands in their area.
- Researching and developing other genes in our pipeline so that we can continue to deliver products with new and increased modes of action.

Crop or Material Handling Stewardship Statement

The following Excellence Through Stewardship® statement applies to Roundup Ready® Corn 2, DroughtGard® Hybrids with Roundup Ready® Corn 2, VT Double PRO® Corn, DroughtGard® Hybrids with VT Double PRO® Corn, VT Double PRO® RIB Complete® Corn Blend, DroughtGard® Hybrids with VT Double PRO® RIB Complete® Corn Blend, Genuity® VT Triple PRO® Corn, DroughtGard® Hybrids with Genuity® VT Triple PRO® Corn, Genuity® VT Triple PRO® RIB Complete® Corn Blend, DroughtGard® Hybrids with Genuity® VT Triple PRO® RIB Complete® Corn Blend, SmartStax® Corn, SmartStax® RIB Complete® Corn Blend, Trecepta® Corn, Trecepta® RIB Complete® Corn Blend, Genuity® Bollgard II® Cotton, Genuity® Bollgard II® with Roundup Ready® Flex Cotton, Bollgard II® XtendFlex® Cotton, Bollgard II® XtendFlex® Cotton, XtendFlex® Cotton, Genuity® Roundup Ready® Flex Cotton, Genuity® Roundup Ready® Spring Canola, Genuity® Roundup Ready® Winter Canola, Performance Series® Sweet Corn, Genuity® Roundup Ready 2 Yield® Soybeans, Roundup Ready 2 Xtend® Soybeans and Vistive® Gold Soybeans with Roundup Ready 2 Yield® Technology:

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.

The following Excellence Through Stewardship statement applies to Roundup Ready® Alfalfa and HarvXtra® Alfalfa with Roundup Ready® Technology:

Forage Genetics International, LLC ("FGI") is a member of Excellence Through Stewardship® (ETS). FGI products are commercialized in accordance with ETS Product Launch Stewardship Guidance, and in compliance with FGI's Policy for Commercialization of Biotechnology-Derived Plant Products in Commodity Crops. 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. Growers should refer to biotradestatus.com for any updated information on import country approvals. Excellence Through Stewardship® is a registered trademark of Excellence Through Stewardship.

The following Excellence Through Stewardship statement applies to Roundup Ready® Sugarbeets:

KWS SAAT SE ("KWS") is a member of Excellence Through Stewardship® (ETS). KWS has imposed strict rules on itself relating to the responsible use of genetic engineering and plant materials created using it. KWS has been a member of the industry initiative "Excellence Through Stewardship™" (ETS) since 2013 and is certified on the basis of this standard as to the responsible use of genetically engineered plant material throughout its lifecycle. ETS is an integral component of our quality management. This product (and any crop, material or byproduct produced or resulting from it) can only be exported to, or used, processed or sold in countries where all necessary regulatory and other legal approvals have been expressly granted. It is illegal to transfer material containing biotechnology traits into countries where import of this material is restricted or not permitted. Excellence Through Stewardship® is a registered trademark of Excellence Through Stewardship.

Please see the product specific sections of Genuity® Roundup Ready® Flex Pima Cotton, Roundup Ready® Alfalfa and HarvXtra® Alfalfa with Roundup Ready® Technology for important information including material handling on those products.

Monsanto is a member of the Seed IP Alliance (SIPA), an organization established to promote the understanding and value of seed innovations as well as to facilitate and promote the respect of intellectual property rights for the benefit of members, growers, industry associates, consumers and the agricultural community. For more information about SIPA, visit seedipalliance.com

Insect Resistance Management Requirements

An effective insect resistance management (IRM) program is a vital part of responsible product stewardship for insect-protected biotech products.

Monsanto is committed to implementing an effective IRM program for all its insect-protected technologies in all countries where they are commercialized. Such programs are based on available knowledge, practicality, grower acceptance and implementation of the plan.

The EPA requires that Monsanto implement, and that growers who purchase insect-protected products follow, an IRM plan. IRM programs for *B.t.* traits are based on an assessment of the biology of the major target pests, grower needs and practices and appropriate pest management practices. These mandatory regulatory programs have been developed and updated in cooperation with grower and consultant organizations, including the National Corn Growers Association, the National Cotton Council, extension specialists, academic scientists and regulatory agencies.

These programs contain several important elements. One key component is a refuge. A refuge is simply a portion of the relevant crop (corn or cotton) that does not contain a *B.t.* technology for the target insect pests. The lack of exposure to a *B.t.* protein allows susceptible insects emerging from the refuge to mate with the rare resistant insects that may emerge from the *B.t.* crop. Susceptibility to the *B.t.* technology would then be passed onto their offspring, helping to preserve the long-term effectiveness of that and possibly other *B.t.* technologies.

Growers who purchase seeds containing a *B.t.* technology must plant a refuge.* Refuge size, configuration and management are described in detail in the current IRM Grower Guide and in the Corn and Cotton sections of this Technology Use Guide.

Monsanto is committed to the preservation of *B.t.* technologies. Please do your part to preserve *B.t.* technologies by implementing the correct IRM plan on your farm. Failure to follow IRM requirements and to plant a proper refuge may result in the loss of a grower's access to Monsanto *B.t.* technologies.

Compliance Monitoring Program

The EPA requires Monsanto to take corrective measures in response to a finding of grower IRM non-compliance. As mandated by the EPA, Monsanto or an approved agent of Monsanto must monitor refuge management requirements. The Monsanto TSA signed by the grower requires that upon request by Monsanto or its approved agent, a grower must provide the location of all fields planted with Monsanto *B.t.* technologies and the locations of all associated required refuge areas. The grower must fully cooperate with any field inspections and allow Monsanto or an agent of Monsanto to inspect all fields and refuge areas to ensure an approved IRM program has been followed. All inspections will be performed at a reasonable time and arranged in advance with the grower so that the grower can be present.

Questions? We're Here to Help.

Monsanto works to develop and implement IRM programs that strike a balance between available knowledge and practicality, with grower acceptance and implementation of the plan as critical components. Refuge requirements vary by the type of product being planted and the location of planting. Growers must plant the amount of refuge acres for a product that is required for their growing region. **Please contact your seed dealer with any questions about IRM or refuge requirements and/or call 1-800-768-6387.**

Growers should monitor their fields and contact their seed dealer or Monsanto at 1-800-768-6387 if performance problems are observed.

IRM Requirement

Growers must read the current IRM Grower Guide prior to planting for information on required IRM. You may download a copy of the current cotton IRM requirements at monsanto.com/products/product-stewardship/ or you may call 1-800-768-6387 to request a copy by mail. The corn IRM Grower Guide is now located on the seed bag tag.



Before 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 seed as set forth in the Monsanto Technology/Stewardship Agreement that you sign. By opening and using a bag of seed, you are reaffirming your obligation and agreement to comply with the most recent stewardship requirements.

*In some areas, a natural refuge option is available for Bollgard II® Technology and Bollgard® 3 Technology. For Performance Series® sweet corn products, instead of planting a refuge, the crop must be destroyed no later than 30 days following harvest (but preferably within 14 days). When planted in the Corn-Growing Area, there are no requirements for a separate structured refuge for SmartStax® RIB Complete® Corn Blend, Trecepta® RIB Complete® Corn Blend, VT Double PRO® RIB Complete® Corn Blend, DroughtGard® Hybrids with VT Double PRO® RIB Complete® Corn Blend, Genuity® VT Triple PRO® RIB Complete® Corn Blend, and DroughtGard® Hybrids with Genuity® VT Triple PRO® RIB Complete® Corn Blend. However, in the Cotton-Growing Area, a separate 20% planted, structured refuge is required when planting Trecepta® RIB Complete® Corn Blend, VT Double PRO® RIB Complete®, DroughtGard® Hybrids with VT Double PRO® RIB Complete®, Genuity® VT Triple PRO® RIB Complete® and DroughtGard® Hybrids with Genuity® VT Triple PRO® RIB Complete®. In the Cotton-Growing Area, the planting of SmartStax® RIB Complete® corn blend is not permitted. See the current IRM Grower Guide on the corn bag tag for details.

Integrated Pest Management Recommendations

Integrated pest management (IPM) describes an effective and environmentally sustainable approach to pest management that relies on a combination of common-sense practices.

IPM programs use current, comprehensive information on the life cycles of pests and their interaction with the environment. This information is used to manage pests in a manner that is least impactful to people, property and the environment.

Preventing Pest Adaptation

Use BMPs, in conjunction with the appropriate seed product, to help obtain the greatest yield benefits.

Use seed products, seeding rates and planting technologies appropriate for each crop and geographical area. As much as possible, manage the crop to avoid plant stress.

- Use proper crop rotation practices and products to control pests and make it more difficult for pests to adapt. In areas where crop rotation is not practiced, or where rotation occurs but high pest populations are observed, the use of products with multiple modes of action, such as SmartStax® RIB Complete® Corn Blend, is strongly recommended.
- Employ appropriate scouting techniques and treatment decisions to preserve beneficial insects that can provide additional insect pest control.
- Manage for appropriate maturity and harvest schedules. Destroy crop residue immediately after harvest to avoid regrowth and minimize selection for insect resistance in late-season infestations.
- Use soil management practices that encourage destruction of over-wintering pests.

Monitoring Pests

Carefully monitor fields for all pests to determine the need for remedial insecticide treatments. For target pests, scouting techniques and supplemental treatment decisions should consider the fact that larvae must hatch and feed before they will be affected by the *B.t.* protein(s). Fields should be scouted regularly following periods of heavy or sustained egg lay, especially during bloom or flowering, to determine if significant larval survival has occurred.

In cotton, scouting should include a modified whole-plant inspection, including terminals and all stages of fruit. Larvae larger than 1/4 inch (3- to 4-days old) are generally recognized as survivors that may not be controlled by products with Bollgard II® and Bollgard® 3 Cotton Technologies.

Controlling Cotton Pests

Monsanto recommends the use of appropriate remedial insecticide treatments to help provide desired levels of control if any cotton insect pest reaches locally established thresholds in products with Bollgard II® and Bollgard® 3 Cotton Technologies.

Although products with Bollgard II® and Bollgard® 3 Cotton Technologies can sustain less damage from some of the most troublesome lepidopteran pests, they will not provide protection against all pests and may require insecticide treatments of target pests under conditions of high pest pressure. Insect pests should be monitored and treated with insecticides when necessary, using recommended thresholds and following label directions. Whenever possible, select insecticides that are least harmful to beneficial insects.

Performance Series® Sweet Corn

Performance Series® Sweet Corn can control corn earworm under typical infestation levels but supplemental insecticide applications may be required when corn earworm populations are above economic thresholds to ensure quality ears at harvest. Protection from corn earworm must be coupled with thorough scouting and spray programs to help maximize marketable yield potential.



Weed Management

Monsanto believes product stewardship is a fundamental component of customer service and responsible business practices.

Monsanto is committed to the proper use and long-term effectiveness of its proprietary herbicide brands through a four-part stewardship program:

- 1) developing appropriate weed control recommendations,
- 2) continuing research to refine and update recommendations,
- 3) educating on the importance of effective weed management, and
- 4) responding to repeated weed control inquiries through a product performance evaluation process.

As a leader in the development and stewardship of Roundup® agricultural herbicides, the Roundup Ready® crop system, the Roundup Ready® Xtend Crop System and other products, Monsanto invests significantly in research conducted in conjunction with academic scientists, extension specialists and crop consultants. This includes an evaluation of the factors that can contribute to the development of herbicide resistance and how to properly manage weeds to delay the selection for herbicide resistance. Visit **RoundupReadyPLUS.com** for practical, BMP-based information on reducing the risk for development of dicamba- or glyphosate-resistant weeds and for managing the risk on a field-by-field basis. In addition, visit the Weed Science Society of America (WSSA) at **wssa.net** and **www.iwilltakeaction.com** to access herbicide resistance training lessons that provide in-depth educational information.

Herbicide Classification Group Number

Glyphosate, the active ingredient in products such as Roundup WeatherMAX®, Roundup PowerMAX® and Roundup PowerMAX® II herbicides, is a Group 9 herbicide based on the mechanism of

action classification system of the WSSA. Using the same system, glufosinate, the active ingredient in Liberty® brand herbicides, is a Group 10 herbicide, and dicamba, the active ingredient in XtendiMax® herbicide with VaporGrip® Technology, is a Group 4 herbicide. Acetochlor, an active ingredient in Harness® and Warrant®, is a Group 15 herbicide. To learn more about herbicide group classification, visit or download available apps at **www.iwilltakeaction.com** or **www.hracglobal.com**. Any weed population may contain plants naturally resistant to any herbicide group(s). Such resistant weed plants may not be effectively managed when using a herbicide(s) to which the weed plant is resistant. They may be effectively managed utilizing another herbicide from a different mechanism of action group, by mixing herbicide with herbicides from different groups, and/or by using cultural or mechanical weed control practices. It is important to note that a weed plant may be resistant to more than one herbicide group. Consult your local brand representative, state cooperative extension service, professional consultants or other qualified authorities to determine appropriate actions for treating specific resistant weeds.

Weed Management Recommendations

Proactively implementing diversified weed control strategies to help minimize selection for weed populations resistant to one or more herbicides is recommended. A diversified weed management program may include the use of multiple herbicides with different mechanisms of action and overlapping weed spectrum, with or without mechanical operations (e.g., tillage) and/or other cultural practices. Research has demonstrated that using the labeled rate of the herbicide and following label use directions are important steps that help delay the selection for herbicide resistance in weeds. Scouting after a herbicide application is important because it facilitates the early identification of weed shifts and/or possible herbicide-resistant weeds and thus provides direction on future weed management practices. One of the best ways to manage resistant populations is to implement measures to avoid allowing weeds

Read and follow all product labeling before making in-crop or other applications of Monsanto branded glyphosate herbicides, Monsanto branded dicamba herbicides or using any other pesticide. For supplemental labels or fact sheets for Monsanto products, call 1-800-768-6387. Monsanto does not restrict your ability to use any herbicide so long as the product is specifically registered and labeled for in-crop use on the applicable crop. Read the product label or contact the product manufacturer if you have questions about EPA or state approvals for in-crop use. MONSANTO DOES NOT MAKE ANY REPRESENTATIONS, WARRANTIES OR RECOMMENDATIONS CONCERNING THE USE OF PRODUCTS MANUFACTURED OR MARKETED BY OTHER COMPANIES, INCLUDING BUT NOT LIMITED TO THOSE THAT ARE LABELED FOR USE IN CROP(S) CONTAINING MONSANTO TECHNOLOGY. MONSANTO SPECIFICALLY DISCLAIMS ALL RESPONSIBILITY FOR THE USE OF THESE PRODUCTS IN CROPS CONTAINING MONSANTO TECHNOLOGY. ALL QUESTIONS AND COMPLAINTS ARISING FROM THE USE OF PRODUCTS MANUFACTURED OR MARKETED BY OTHER COMPANIES, OR THE IMPACT TO MONSANTO TECHNOLOGY FROM THE USE OF SUCH PRODUCTS, SHOULD BE DIRECTED TO THOSE COMPANIES.

to reproduce by seed or to proliferate vegetatively. Cleaning equipment between sites and avoiding movement of plant material between sites will greatly aid in reducing the spread of resistant weed seed.

It is important to start with a clean field, using either a burndown herbicide application or tillage, and to optimize herbicide performance by controlling weeds early when they are small and actively growing.

In summary,

- Scout your fields before and after application.
- Start with a clean field, free of weeds.
- Use a diverse set of weed control tools, including residual herbicides that use a different mechanism of action that are effective on the target weeds.
- Add other herbicide products, at the right rate and timing for postemergence weed control as allowed by the product label. Control weed escapes and remove weeds before they set seed.
- Clean equipment before leaving the field to prevent spread of weed seeds.

The Roundup Ready PLUS® Crop Management Solutions by Monsanto are based on the principle of growers implementing diversified weed management recommendations as described above. It is composed of recommendations and education and may include incentive programs. Roundup Ready PLUS® platform represents Monsanto's commitment to provide solutions to growers to help avoid and/or manage herbicide resistance to glyphosate, dicamba and other herbicides. For more information visit **RoundupReadyPLUS.com**.

Monsanto supports the Take Action Pesticide-Resistance Management partnership. Take Action is an industry-wide partnership between university weed scientists, major herbicide providers and organizations representing corn, cotton, sorghum, soybean and wheat growers to help prevent and manage herbicide-resistant weeds. The Take Action effort encourages the development of a proactive strategy to manage herbicide-resistant weeds that incorporates a diverse set of controls. To find out more, visit **www.iwilltakeaction.com/weeds**, or contact your local extension office.



What To Do When Dicamba- or Glyphosate-Resistant Weeds Are Suspected or Present

Monsanto investigates and studies new claims of potential dicamba- or glyphosate-resistant weeds. Report any incidence of repeated non-performance of Monsanto branded glyphosate, dicamba or acetochlor products on a particular weed to the appropriate company representative, local retailer or county extension agent. When dicamba-, glyphosate- or acetochlor-resistant weed biotypes are confirmed, Monsanto provides recommended control measures, which may include additional herbicides, tank-mixes (when not restricted on the label), mechanical, or cultural practices. Monsanto actively communicates all this information to growers through multiple channels, including the herbicide label, **weedscience.org** (a website on herbicide-resistant weeds), supplemental labeling, this TUG, media and written communications, **RoundupReadyPLUS.com** and grower meetings. Monsanto will report any confirmed inability to control likely dicamba-resistant weeds at **weedscience.org**.

Growers must be aware of, and proactively manage for, dicamba- or glyphosate-resistant weeds in planning their weed control program. If a weed is known to be resistant to dicamba or glyphosate, then a resistant population of that weed is, by definition, no longer controlled with labeled rates of dicamba or glyphosate herbicides. Roundup WeatherMAX®, Roundup PowerMAX® and Roundup PowerMAX® II Herbicides are not warranted to cover the failure to control glyphosate-resistant weed populations; XtendiMax® with VaporGrip® Technology is not warranted to cover the failure to control dicamba-resistant weed populations.

Recommendations for Managing Resistant Weeds with Roundup Ready PLUS® Crop Management Solutions

Various weed biotypes are known to be resistant to glyphosate and dicamba. For the current weed control recommendations for dicamba- or glyphosate-resistant weed biotypes, refer to **RoundupReadyPLUS.com**. A complete list of specimen labels can be located at **monsanto.com/products/safety-information/msds**. Approved labels, including supplemental labeling, must be in the possession of the user at the time of pesticide application and can be obtained by calling **1-800-768-6387** or by contacting your State Pesticide Lead Agency for more information.



Weed Management *continued*

Glyphosate Endangered Species Requirement

Before making an application of any glyphosate-based herbicide product, licensed growers of crops containing Roundup Ready® Technology must access the website pre-serve.org to determine whether any mitigation requirements apply to the planned application to those crops, and must follow all applicable requirements. The mitigation measures described on the website are appropriate for all applications of any glyphosate-based herbicide to all crop lands.

Growers making ground or air applications to crop land with a use rate of less than 3.5 lbs or 0.7 lbs of glyphosate a.e./A, respectively, or glyphosate applied in Alaska, Oklahoma, Pennsylvania or South Dakota are not required to access the website. If a grower does not have web access, the seed dealer can access the website on behalf of the grower to determine the applicable requirements, or the grower can call **1-800-332-3111** for assistance.

Tank-mixing with Roundup® Herbicides

Roundup WeatherMAX®, Roundup PowerMAX® and Roundup PowerMAX® II are products sold for in-crop use in 2019.

Tank-mixtures of Roundup WeatherMAX®, Roundup PowerMAX® and Roundup PowerMAX® II with insecticides, fungicides, micronutrients

or foliar fertilizers are not recommended as they may result in reduced

weed control, crop injury, reduced pest control or antagonism. Refer to the product label, supplemental labeling or fact sheets published separately by Monsanto for the Roundup® agricultural herbicides tank-mix recommendations.



Surfactant Use with Glyphosate Products in Glyphosate-Tolerant Crops

The addition of surfactants or additives containing surfactants to glyphosate spray solutions may increase the potential for crop injury.

When using Roundup WeatherMAX®, Roundup PowerMAX® or Roundup PowerMAX® II Herbicides, NO additional surfactant is needed for optimal performance for applications in crops with Roundup Ready® Technology. Other glyphosate products labeled for use in such crops may require the addition of surfactant or other additives to help optimize performance, except when used in Roundup Ready® Flex Cotton. Nonetheless, Monsanto does not recommend the addition of surfactant or additives containing surfactant to spray solutions of any glyphosate agricultural product used for postemergence (in-crop) or preharvest applications on these crops.

and is occurring. They recommend that coexistence strategies be developed on a case-by-case basis considering the diversity of products currently in the market and under development, the agronomic and biological differences in the crops themselves and variations in regional farming practices and infrastructure. Any coexistence strategy is designed to meet market requirements and should be developed using current science-based industry standards and best management practices. Those strategies must be flexible, facilitate options and choice for the grower and the food and feed supply chain, and be capable of being modified as changes in markets and products warrant.

Successful coexistence of all agricultural systems depends on communication, cooperation, flexibility and mutual respect for each system among growers. Agriculture has a history of innovation and change, and growers have always adapted to new approaches or challenges by utilizing appropriate strategies, farm management practices and new technologies.

The responsibility for implementing best practices to satisfy specific marketing standards or certification lies with the grower who is growing a crop to satisfy a particular market. That grower is inherently agreeing to employ those practices appropriately to ensure the integrity and marketability of his or her crop. In each case, the grower is seeking to produce a crop that is supported by a special market price and consequently assumes responsibility for satisfying the market specifications to receive that premium. That said, each grower needs to be aware of the planting intentions of his or her neighbor to gauge the need for appropriate BMPs.

Coexistence of Biotech Cropping System with Other Agricultural Production Systems

Coexistence in agricultural production systems and supply chains is well established and well understood. Different agricultural systems have coexisted successfully for many years around the world.

Standards and best practices were established decades ago and have continually evolved to deliver high-purity seed and grain to support production, distribution and trade of products from different agricultural systems. For example, production of similar commodities such as field corn, sweet corn and popcorn or oilseed rape varieties with low erucic acid content for food use and high erucic acid content for industrial uses has occurred successfully in close proximity for many years.

The introduction of biotech crops generated renewed discussion focused on coexistence of biotech cropping systems with conventional cropping systems and organic production. These discussions have primarily focused on the potential marketing impact of the introduction of biotech products on other systems. The health and safety of biotech products are not an issue because their food, feed and environmental safety are demonstrated before they are allowed to enter the agricultural production system and supply chain.

The coexistence of conventional, organic and biotech crops has been the subject of several studies and reports. These reports conclude that coexistence among biotech and non-biotech crops is readily achievable

Identity Preserved Production

Some growers may choose to preserve the identity of their crops to meet specific markets. Examples of Identity Preserved (IP) corn crops include production of seed, white, waxy or sweet corn, specialty oil or protein crops, food-grade crops and any other crop that meets specialty needs, including organic and non-genetically modified specifications. An example of IP crops is Vistive® Gold Soybeans with Roundup Ready 2 Yield® Technology. Growers of these crops assume the responsibility and receive the benefit for ensuring that their crop meets mutually agreed-upon contract specifications.

Based on historical experience with a broad range of IP crops, the industry has developed generally accepted IP agricultural practices. These practices are intended to manage IP production to meet quality specifications, and are established for a broad range of IP needs. The accepted practice with IP crops is that each IP grower has the responsibility to implement any necessary processes. These processes may include sourcing seed appropriate for IP specifications; field management practices such as adequate isolation distances, buffers between crops, border rows and planned differences in maturity between adjacent fields that might cross-pollinate; and harvest and handling practices designed to prevent mixing and to maintain product integrity and quality. These extra steps associated with IP crop production are generally accompanied by incremental increases in cost of production and consequently the price of the goods sold.

General Recommendations for Management of Mechanical Mixing and Pollen Flow

For all crop hybrids or varieties that growers wish to identity preserve or otherwise keep separated, they should take steps to prevent mechanical mixing. Growers should make sure all seed storage areas, transportation vehicles and planter boxes are cleaned thoroughly both prior to and subsequent to the storage, transportation or planting of the crop. Growers should also make sure all combines, harvesters and transportation vehicles used at harvest are cleaned thoroughly both prior to and subsequent to their use during and after harvest of the grain produced from the crop. Growers should also make sure all harvested grain is stored in clean storage areas where the identity of the grain can be preserved.

Self-pollinated crops, such as soybeans, do not present a risk of mixing by cross-pollination. If the intent is to use or market the product of a self-pollinated crop separately from general commodity use, growers should plant fields a sufficient distance away from other crops to prevent mechanical mixture during harvest.

Growers planting cross-pollinating crops, such as corn or alfalfa, who desire to preserve the identity of these crops or to help minimize the potential for these crops to outcross with adjacent fields of the same crop kind, should use the same generally accepted BMPs to manage mixing that are used in any of the currently grown IP crops of the same kind.

It is generally recognized in the industry that a certain amount of incidental, trace level pollen movement occurs, and it is not possible to achieve 100% purity of seed or grain in any crop production

system. Several factors can influence the occurrence and extent of pollen movement. As stewards of biotechnology, growers are expected to consider these factors and talk with their neighbors about their cropping intentions.

Growers should consider the following factors that can affect the occurrence and extent of cross-pollination to or from other fields. Information that is more specific to the crop and area may be available from state extension offices.

- **Cross-pollination potential.** Some plants are incapable of cross-pollinating, while others, like alfalfa, require cross-pollination to produce seed. Importantly, cross-pollination only occurs within the same crop kind, like corn to corn.
- **The amount of pollen produced within the field.** The pollen produced by the crop within a given field, known as pollen load, is typically high enough to pollinate all the plants in the field. Therefore, most of the pollen that may enter from other fields falls on plants that have already been pollinated with pollen that originated from plants within the field. In crops such as alfalfa, the hay cutting management schedule significantly limits or eliminates bloom, and thereby restricts the potential for pollen and/or viable seed formation.
- **The existence and degree of overlap in the pollination period of crops in adjacent fields.** This will vary depending on the maturity of crops, planting dates and the weather. For corn, the typical pollen shed period lasts from 5 to 10 days for a particular field. Therefore, viable pollen from neighboring fields must be present when silks are receptive in the recipient field during this brief period to produce any grain with traits introduced by the out-of-field pollen.
- **Distance between fields of different varieties or hybrids of the same crop.** The greater the distance between fields, the less likely their pollen will remain viable and have an opportunity to mix and produce an outcross. For wind-pollinated crops, most cross-pollination occurs within the outermost few rows of the field. In fact, many white and waxy corn production contracts require the grower to remove the outer 12 rows (30 ft.) of the field to remove most of the impurities that could result from cross-pollination with nearby yellow dent corn. Furthermore, research has also shown that as fields become further separated, the incidence of wind-modulated cross-pollination drops rapidly. Essentially, in-field pollen has an advantage over the pollen coming from other fields for receptive silks because of its volume and proximity to silks.

Identity Preserved Production *continued*

- **The distance pollen moves.** How far pollen can travel depends on many environmental factors, including weather conditions during pollination, especially wind direction and velocity, temperature and humidity. For bee-pollinated crops, the grower's choice of pollinator species and apiary management practice may reduce field-to-field pollination potential. All these factors will vary from season to season, and some factors from day to day and from location to location.
- **For wind-pollinated crops, the orientation and width of the adjacent field in relation to the dominant wind direction.** Fields located upwind during pollination will show dramatically lower cross-pollination for wind-pollinated crops, like corn, compared to fields located downwind.

Treated Seed

Best Management Practices and Requirements

The use of seed applied treatments by growers is an effective tool to provide the necessary protection of seeds for a strong, healthy start. Seed treatments deliver a precise application that shields seeds from the insects and diseases that exist in the soil during those early developmental stages.

Below are some recommended BMPs and requirements for the handling and planting of treated seed:

- Always follow the directions on seed bags and/or tags for proper storage, handling, planting and disposal practices, based on the specific treatments applied to the seed.
- Always follow personal protective equipment (PPE) requirements on seed bags and/or tags.
 - PPE generally includes wearing a long-sleeved shirt, long pants, shoes, socks and chemical-resistant gloves of a defined material/thickness.
 - Always check the seed bag and/or tag for any additional PPE requirements, and assess each activity to determine if additional PPE is appropriate to protect workers (for example, when cleaning out the planter).
- During planting, be aware of the presence of honey bee hives, or crops or weeds in the flowering stage within or adjacent to the field, which could attract pollinators.
 - Eliminate flowering plants and weeds in and around the field prior to planting.
 - Fill the planter at least ten yards inside the field to be planted.
- Minimize dust by:
 - Using advanced seed flow lubricants that minimize dust.
 - Avoiding off-site movement of dust from treated seeds during planting or when opening seed containers by observing wind speed and direction.
 - Avoiding shaking the bottom of the treated seed bag when filling the planter. This reduces the release of dust that could have accumulated during transport.

- For pneumatic planters, direct the air exhaust downward towards the soil surface, if possible, to decrease the potential for dust drift.
- Collect and properly dispose of any spilled treated seed to minimize exposure to people, livestock, wildlife and the environment.
- Return leftover seed to its original containers if seed is intended for storage and use at a later date.
- Completely clean any equipment of remnant seed and dust that have held treated seed and dispose of appropriately. There is zero tolerance for treated seed kernels in the commodity grain channel.
- Refer to seed bags and/or tags for the annual maximum amount of active ingredient(s) that can be applied to each acre. Consider all foliar, furrow, treated seed, plant back, rotational crop and seed disposal contributors that include the same active ingredient(s) and ensure that they do not cumulatively exceed the maximum amount.

Planting may be an allowable option to dispose of leftover treated seeds. However, when this option is chosen, a grower must follow the product guidelines and adhere to any annual maximum allowances as well as grazing and plant back restrictions found on the seed bag and/or tag. If planting seed treated with products other than Acceleron® Seed Applied Solutions, please refer to the specific product label to determine if there are any planting restrictions. Additionally, if disposing of rinse water or applied foliar applications of the same active ingredient on the same acreage intended for over-seeding, calculate the total load of active ingredient to ensure that the maximum amount applied per year is not exceeded. Before over-seeding, confirm that it is allowed in the state and county of proposed over-seeding.

For more information, refer to the Guide to Seed Treatment Stewardship, produced by the American Seed Trade Association (ASTA) and Crop Life America (CLA) at seed-treatment-guide.com.



Honey Bee Health Information

From time to time, claims circulate that insect-protected, genetically modified crops harm bees. The insecticidal proteins produced by the currently available insect-protected crops are derived from a common soil bacterium, and Monsanto screens all the proteins we use for toxicity to honey bees and other non-target organisms. None of the proteins have provided any evidence of harm in either short- or long-term testing with both adult and larval honey bees. Likewise, there are no credible reports of harm caused by insect-protected, genetically modified crops on honey bees.



Overwinter losses of honey bee colonies are an ongoing concern. There are many possible causes, with the Varroa mite posing the largest single threat. Additionally, parasites, diseases, pesticides used to control mites and diseases, poor nutrition, transportation stress and pesticides, including neonicotinoid insecticides, are often cited as challenging honey bee health.

Monsanto has many efforts underway to improve honey bee health:

- We are working to develop a product targeted to address Varroa mites.
- We established seed treatment BMPs to manage risks to beneficial insects such as bees.
- Our Honey Bee Advisory Council helps guide our honey bee health research and development efforts.
- We actively support collaborations with the honey bee industry, USDA and university researchers, people engaged in pollinator-dependent agriculture as well as corn and soybean growers to identify ways to protect and improve honey bee health.

In one such collaboration with the Honey Bee Health Coalition, we're joining growers, universities, conservation groups and others as the issue of honey bee health is too big, too important and too complex for one company or group — we have to work together. For more information, visit the organization's website: honeybeehealthcoalition.org.



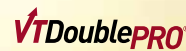
Products with SmartStax® technology contain Cry1A.105, Cry2Ab2, Cry1F, Cry3Bb1, Cry34Ab1 and Cry35Ab1 from *B.t.* that together control European corn borer, southwestern corn borer, southern cornstalk borer, corn earworm¹, fall armyworm, stalk borer, lesser corn stalk borer, sugarcane borer, black cutworm, western corn rootworm, northern corn rootworm and Mexican corn rootworm. Routine applications of insecticides to control these insects are usually unnecessary when corn containing SmartStax® Technology is planted. Applications of soil applied insecticides are not recommended for control of corn rootworm except under limited circumstances and under consultation with extension, crop consultant or other local experts. Additionally, soil applied insecticides should not be necessary for corn rootworm control with this product. Products with SmartStax® technology also contain Roundup Ready® 2 Technology and LibertyLink® Technology that provide tolerance to in-crop applications of labeled glyphosate herbicides and glufosinate herbicides, respectively, when applied according to label directions.



Products with Trecepta® technology contain Cry1A.105, Cry2Ab2 and Vip3Aa20 from *B.t.* that together controls European corn borer, southwestern corn borer, southern cornstalk borer, corn earworm, fall armyworm, stalk borer, sugarcane borer, beet armyworm, true armyworm, black cutworm, western bean cutworm, lesser cornstalk borer and dingy cutworm. Products containing this technology also contain Roundup Ready® 2 Technology that provides tolerance to in-crop applications of labeled glyphosate herbicides when applied according to label directions.



Products with Genuity® VT Triple PRO® technology contain Cry1A.105, Cry2Ab2 and Cry3Bb1 from *B.t.* that together control European corn borer, southwestern corn borer, sugarcane borer, southern cornstalk borer, corn earworm¹, fall armyworm, stalk borer, lesser corn stalk borer, western corn rootworm, northern corn rootworm and Mexican corn rootworm. Products with Genuity® VT Triple PRO® technology also contain Roundup Ready® 2 Technology that provides tolerance to in-crop applications of labeled glyphosate herbicides when applied according to label directions.



Products with VT Double PRO® technology contain Cry1A.105 and Cry2Ab2 from *B.t.* that together control European corn borer, southwestern corn borer, sugarcane borer, southern cornstalk borer, corn earworm¹, stalk borer and fall armyworm. Products with VT Double PRO® technology also contain Roundup Ready® 2 Technology that provides tolerance to in-crop applications of labeled glyphosate herbicides when applied according to label directions.



Roundup Ready® Corn 2 products and corn with Roundup Ready® 2 Technology contain in-plant tolerance to glyphosate, the active ingredient in Roundup® agricultural herbicides: SmartStax®, SmartStax® RIB Complete®, VT Double PRO®, VT Double PRO® RIB Complete®, DroughtGard® Hybrids with VT Double PRO®, DroughtGard® Hybrids with VT Double PRO® RIB Complete®, Genuity VT Triple PRO®, Genuity VT Triple PRO® RIB Complete®, DroughtGard® Hybrids with Genuity VT Triple PRO®, DroughtGard® Hybrids with Genuity VT Triple PRO® RIB Complete®, Trecepta®, Trecepta RIB Complete®.



Products with DroughtGard® Hybrids technology contain cold shock protein B from *Bacillus subtilis*, a protein that can mitigate the effects of drought stress: DroughtGard® Hybrids with VT Double PRO®, DroughtGard® Hybrids with VT Double PRO® RIB Complete®, DroughtGard® Hybrids with Genuity VT Triple PRO®, DroughtGard® Hybrids with Genuity VT Triple PRO® RIB Complete®.



The Acceleron® portfolio delivers coverage on four fronts: fungicides, insecticides, nematocides and bio-enhancers – to help protect your seed investment against diseases, insects and nematodes, as well as moisture or nutrient stress. For more information talk to your local retailer or visit acceleronsas.com.



NemaStrike™ Technology is offered as part of Acceleron® Seed Applied Solutions. It has a novel mode of action that stays in the root zone, providing broad spectrum control of plant parasitic nematodes. In corn, controlled species include, but are not limited to: lesion, lance, needle, sting and stubby root nematodes. For more information, talk to your local retailer or discover more at nemastriketechology.com.



RIB Complete® Corn Blend products have refuge seed contained in the bag along with traited seed, resulting in a refuge configuration that is interspersed within the field: SmartStax® RIB Complete®, VT Double PRO® RIB Complete®, DroughtGard® Hybrids with VT Double PRO® RIB Complete®, Genuity VT Double PRO® RIB Complete®, DroughtGard® Hybrids with Genuity VT Triple PRO® RIB Complete®.

Trecepta® RIB Complete® Corn Blend, VT Double PRO® RIB Complete® Corn Blend, DroughtGard® Hybrids with VT Double PRO® RIB Complete® Corn Blend, Genuity® VT Triple PRO® RIB Complete® Corn Blend and DroughtGard® Hybrids with Genuity® VT Triple PRO® RIB Complete® Corn Blend require a 20% planted, structured refuge in the Cotton-Growing Area. See map on page 21.

¹ Cry1A.105 and Cry2Ab2 from *B.t.* controls or suppresses corn earworm.

Corn technologies

Weed Management

Products with Roundup Ready® 2 Technology enable flexibility, broad-spectrum weed control and proven crop safety. Growers can select the weed control program that best fits the way they farm and provides them the greatest benefit. Options include the use of a residual herbicide with Roundup® agricultural herbicides and tank-mixing other herbicides with Roundup® agricultural herbicides.

Corn yield is very sensitive to early season weed competition. Weed control systems must provide growers the opportunity to control weeds before they become competitive.

Roundup Ready® 2 Technology provides a mechanism to control weeds at planting and once they emerge. Failure to control weeds with the right rate, at the right time and with the right herbicide product, can lead to increased weed competition, weed escapes, the potential for selecting herbicide tolerant weeds and possible decreased yields. Use a diverse set of weed management tools, including multiple effective herbicides with different mechanisms of action alone or in tank mixes, as appropriate, with Roundup® agricultural herbicides, based on the weed spectrum in the field and according to label directions.

Recommendations

Follow all pesticide product labeling. If there is any conflict between the recommendations in this guide and the applicable pesticide product labeling, the pesticide product labeling controls. Follow the recommendations below to help minimize the risk of developing glyphosate-resistant weed populations in a Roundup Ready® 2 Technology system.

Start clean with burndown herbicide(s), residual herbicide(s) or tillage. Early season weed control is critical to yield.

Apply preemergence residual herbicides such as Harness® Xtra, Degree Xtra®, TripleFLEX® Herbicide or other residual herbicides at the application rate specified on the product label.

- Soil residual herbicides are critical to control emerging glyphosate-resistant weeds, such as Palmer amaranth.
- Residual herbicides should be used multiple times during the growing season if glyphosate-resistant weeds are expected. Or, apply a preemergence residual herbicide at the appropriate application rate tank-mixed with a minimum of 22 oz/A Roundup WeatherMAX® Herbicide in-crop before weeds exceed 4" in height.

Follow with a postemergence in-crop application of Roundup WeatherMAX® Herbicide at a minimum of 22 oz/A for additional weed flushes before they exceed 4" in height.

Roundup WeatherMAX® Herbicide may be tank-mixed with other herbicides for postemergence weed control as specified on the product label.

Equipment should be cleaned before moving from field to field to minimize the spread of weed seed.

Report any incidence of repeated non-performance of Roundup® agricultural herbicides or other glyphosate products on a particular weed to the appropriate company representative, local retailer or county extension agent.



Integrated Pest Management (IPM)

Sustainable Agriculture

Monsanto *B.t.* corn products are highly compatible with the goals of IPM and sustainable agriculture. Sustainability of corn agricultural systems is enhanced when growers follow recommended IPM practices, including cultural and biological control tactics, pest sampling and appropriate use of pest thresholds for management practices. These latter measures are not only important for non-*B.t.* refuge acres, but are equally important for detecting and controlling non-target pests that exceed established thresholds on *B.t.* crops.

Pests Not Controlled

Specific *B.t.* corn products offer control against several of the key lepidopteran and coleopteran insect pests, but will not control all insect pests in corn. Therefore, it is important to understand that, in some cases, severe infestations of target and/or non-target insects may require additional control measures/treatment. Fields should be scouted regularly, especially during periods of heavy or sustained pest presence. Consult local IPM monitoring guidelines to identify insects that should be routinely monitored, and for recommended controls and thresholds. When insecticide treatments are required, select products that have the least impact on beneficial insects. Consult your local crop adviser or extension specialist for the most up-to-date information.

An IPM Checklist

Pest scouting:

- Use appropriate scouting techniques and treatment decisions.

Insecticide applications:

- Select insecticide treatments that have minimal negative impact on beneficial insects, whenever possible. These insects are conserved by *B.t.*-protected crops and can contribute to insect pest control.
- Rotate insecticide mode of action or use products with multiple modes of action to help reduce the risk of insect pests developing chemical resistance.

Cultural practices:

- Select cultivars well-adapted to your setting, giving appropriate attention to impact of crop maturity and timing of harvest on pest severity.
- Use recommended cultural control methods to reduce pest overwintering; destroy crop promptly after harvest, and use other soil management practices to reduce overwintering insects.

Additional Information

Various weed biotypes are known to be resistant to glyphosate. For the current weed control recommendations for glyphosate-resistant weed biotypes, refer to RoundupReadyPLUS.com or call 1-800-768-6387. A complete list of specimen labels can be located at monsanto.com/products/safety-information/msds/. Approved labels, including supplemental labeling, for Roundup® agricultural herbicides must be in the possession of the user at the time of pesticide application and can be obtained by calling 1-800-768-6387 or by contacting your State Pesticide Lead Agency for more information.

Corn Refuge Requirements

Growers must read the IRM Grower Guide prior to planting for information on required IRM. The corn product IRM Grower Guide is now located on the seed bag tag.

Resistance naturally evolves to many pest control tactics. The risk of insect pests developing resistance is real, but may be reduced with proper planning. The best way to preserve the benefits and insect protection of *B.t.* technology is to develop and implement an IRM plan.

A key component of any IRM plan is a refuge.

A refuge is a block or strip of the same crop that does not contain a *B.t.* technology for controlling targeted insect pests, or the refuge can be included in an EPA approved seed blend product provided by qualified seed producers/conditioners, licensed by Monsanto. There are no requirements for a separate structured refuge for approved seed blend products when planted in the

U.S. Corn-Growing Area because the refuge seed is contained within the bag/container. Monsanto does not recommend the planting of seed blend products in the Cotton-Growing Area. If planted in a cotton area, an additional 20% separate structured refuge is required. SmartStax® RIB Complete® Corn Blend is not permitted to be sold or planted in the Cotton-Growing Area.

The primary purpose of a refuge is to maintain a population of insect pests that are not exposed to *B.t.* proteins.

The lack of exposure to *B.t.* proteins allows susceptible insects emerging from the refuge to mate with the rare resistant insects that may emerge from the *B.t.* crop. Susceptibility to *B.t.* technology would then be passed on to their offspring, helping to preserve the long-term effectiveness of *B.t.* technologies.

To help reduce the risk of insects developing resistance, the refuge should be planted with a similar non-*B.t.* product (e.g., a similar relative maturity), as close as possible to, and at the same time as, the crop containing *B.t.* technologies.

As a condition of registration of *B.t.* products by the EPA, seed companies are required to conduct IRM compliance assessments during the growing season to ensure grower compliance.

Failure to follow IRM guidelines and properly plant a refuge may result in the loss of access to *B.t.* technologies. Do your part to ensure these technologies are preserved by fully cooperating in refuge management. Continued availability of *B.t.* technologies depends on

grower compliance with EPA registration conditions. With an effective IRM plan in place, growers will continue to benefit from effective and consistent insect protection and top-yield potential found in crops containing these technologies.

Refuge Planting

Grower mixing of non-*B.t.* seed with *B.t.* technologies is not permitted. However, non-*B.t.* seed can be included in an EPA approved seed blend product, if provided by qualified seed producers/conditioners, licensed by Monsanto.

Plant the structured refuge at the same time as the *B.t.* technologies to help ensure that development is similar among products.

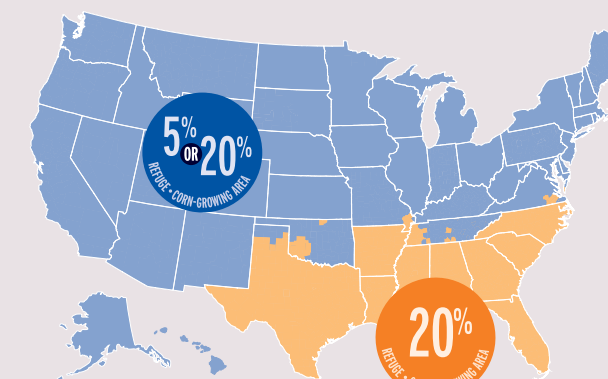
To avoid inadvertent mixing of seed in the planting process, be sure to clean all seed out of hoppers when switching from non-*B.t.* seed to traited seed, or vice versa.

Adjacent and separate refuge fields must be planted and managed by the same grower.

If *B.t.* corn technologies are planted on rotated ground, then the corn refuge can be planted on either continuous corn ground or on rotated ground.

If *B.t.* corn technologies are planted on continuous corn ground, then the corn refuge must also be planted on continuous corn ground.

Requirements by Growing Area



The following states and counties are within the **Corn-Growing Area**. The blue circle structured refuge requirements apply to non-refuge in a bag *B.t.* corn products grown in this area.

- | | | |
|---------------|--|--|
| Alaska | Missouri— <i>all counties except Dunklin, New Madrid, Pemiscot, Scott & Stoddard</i> | South Dakota |
| Arizona | Montana | Tennessee— <i>all counties except Carroll, Chester, Crockett, Dyer, Fayette, Franklin, Gibson, Hardeman, Hardin, Haywood, Lake, Lauderdale, Lincoln, Madison, Obion, Rutherford, Shelby & Tipton</i> |
| California | Nebraska | Texas— <i>only the counties of Carson, Dallam, Hansford, Hartley, Hutchinson, Lipscomb, Moore, Ochiltree, Roberts & Sherman</i> |
| Colorado | Nevada | Utah |
| Connecticut | New Hampshire | Vermont |
| Delaware | New Jersey | Virginia— <i>all counties except Dinwiddie, Franklin City, Greenville, Isle of Wight, Northampton, Southampton, Suffolk City, Surrey & Sussex</i> |
| Hawaii | New Mexico | Washington |
| Idaho | New York | West Virginia |
| Illinois | North Dakota | Wisconsin |
| Indiana | Ohio | Wyoming |
| Iowa | Oklahoma— <i>all counties except Beckham, Caddo, Comanche, Custer, Greer, Harmon, Jackson, Kay, Kiowa, Tillman & Washita</i> | |
| Kansas | Oregon | |
| Kentucky | Pennsylvania | |
| Maine | Rhode Island | |
| Maryland | | |
| Massachusetts | | |
| Michigan | | |
| Minnesota | | |



The following states and counties are within the **Cotton-Growing Area**. The orange circle structured refuge requirements apply to *B.t.* corn products grown in this area.

- | | | |
|---|---|--|
| Alabama | Oklahoma— <i>only the counties of Beckham, Caddo, Comanche, Custer, Greer, Harmon, Jackson, Kay, Kiowa, Tillman & Washita</i> | Texas— <i>all counties except Carson, Dallam, Hansford, Hartley, Hutchinson, Lipscomb, Moore, Ochiltree, Roberts & Sherman</i> |
| Arkansas | South Carolina | Virginia— <i>only the counties of Dinwiddie, Franklin City, Greenville, Isle of Wight, Northampton, Southampton, Suffolk City, Surrey & Sussex</i> |
| Florida | Tennessee— <i>only the counties of Carroll, Chester, Crockett, Dyer, Fayette, Franklin, Gibson, Hardeman, Hardin, Haywood, Lake, Lauderdale, Lincoln, Madison, Obion, Rutherford, Shelby & Tipton</i> | |
| Georgia | | |
| Louisiana | | |
| Mississippi | | |
| Missouri— <i>only the counties of Dunklin, New Madrid, Pemiscot, Scott & Stoddard</i> | | |
| North Carolina | | |

Corn Refuge Requirements

Follow all pesticide label directions. See page 21 for Growing Area descriptions.

Product	Corn-Growing Area Structured Refuge	Cotton-Growing Area Structured Refuge	Common or Single-Pest Configuration Options		
			Within	Adjacent	1/2 Mile
SmartStax	5%	20%	●	●	*

Under typical growing conditions for products planted with SmartStax® technology, routine applications of insecticides to control pests are usually unnecessary. However, the refuge can be protected from lepidopteran damage by use of non-B.t. insecticides if the population of one or more target lepidopteran pests in the refuge exceeds economic thresholds.¹ The refuge can also be protected from corn rootworm damage by an appropriate seed treatment or soil insecticide; but insecticides labeled for adult corn rootworm control must be avoided in the refuge during the period of corn rootworm adult emergence. If insecticides are applied to the refuge for control of corn rootworm adults, the same treatment must also be applied in the same timeframe to SmartStax®. SmartStax® technology contains Roundup Ready® 2 Technology and LibertyLink® herbicide tolerance traits, but your refuge may or may not. Select an appropriate herbicide for your refuge before spraying the refuge, to avoid crop damage.

SmartStax RIB COMPLETE	NO structured refuge required	Not for use in the Cotton-Growing Area.	●	●	●
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Trecepta CORN	5%	20%	●	●	●
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The refuge can be treated with a non-B.t. foliar-applied insecticide for control of lepidopteran pests (i.e., corn borer), if pest pressure reaches an economic threshold for damage.¹ Microbial B.t. insecticides must not be applied to the refuge corn.

Trecepta RIB COMPLETE CORN	NO structured refuge required	Not recommended for the Cotton-Growing Area. If planted, an additional 20% structured refuge is required.	●	●	●
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Cotton-Growing Area: The 20% separate structured refuge can be protected from lepidopteran damage by use of non-B.t. insecticides if the population of one or more target pests of Trecepta® RIB Complete® corn blend exceeds economic thresholds in the refuge. Microbial B.t. insecticides must not be applied to the refuge corn. In addition, refuge can be protected from corn rootworm damage by appropriate seed treatment or soil insecticide.

Product	Corn-Growing Area Structured Refuge	Cotton-Growing Area Structured Refuge	Common or Single-Pest Configuration Options		
			Within	Adjacent	1/2 Mile
VT TRIPLE PRO CORN and DROUGHTGARD HYBRIDS WITH VT TRIPLE PRO	20%	20%	●	●	**

The refuge can be treated with a soil-applied or seed-applied insecticide to control rootworm larvae and other soil pests. The refuge can also be treated with a foliar-applied insecticide not containing a B.t. for control of late-season pests (i.e., corn borer), if pest pressure reaches an economic threshold for damage.¹ However, if rootworm adults are present at the time of foliar application, then the Genuity® VT Triple PRO® corn field must be treated in a similar manner.

VT TRIPLE PRO CORN RIB COMPLETE and DROUGHTGARD HYBRIDS WITH VT TRIPLE PRO RIB COMPLETE	NO structured refuge required	Not recommended for the Cotton-Growing Area. If planted, an additional 20% structured refuge is required.	●	●	●
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Cotton-Growing Area: The 20% separate structured refuge can be protected from lepidopteran damage by use of non-B.t. insecticides if the population of one or more target pests of RIB Complete® corn blend exceeds economic thresholds in the refuge.¹ In addition, refuge can be protected from corn rootworm damage by appropriate seed treatment or soil insecticide.

VT Double PRO and DroughtGard HYBRIDS VT Double PRO	5%	20%	●	●	●
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The refuge can be treated with a non-B.t. foliar-applied insecticide for control of lepidopteran pests (i.e., corn borer), if pest pressure reaches an economic threshold for damage.¹ Microbial B.t. insecticides must not be applied to the refuge corn.

VT Double PRO RIB COMPLETE and DroughtGard HYBRIDS VT Double PRO RIB COMPLETE	NO structured refuge required	Not recommended for the Cotton-Growing Area. If planted, an additional 20% structured refuge is required.	●	●	●
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Cotton-Growing Area: The 20% separate structured refuge can be protected from lepidopteran damage by use of non-B.t. insecticides if the population of one or more target pests of VT Double PRO® RIB Complete® corn blend exceeds economic thresholds in the refuge.¹ Microbial B.t. insecticides must not be applied to the refuge corn. In addition, refuge can be protected from corn rootworm damage by appropriate seed treatment or soil insecticide.

¹1/2 mile option for SmartStax® is only available to growers in the following states: AK, AL, AR, AZ, CA, CT, DE, FL, GA, HI, ID, LA, MA, MD, ME, MS, MT, NC, NH, NJ, NM, NV, NY, OR, PA, RI, SC, TN, UT, VA, VT, WA, WV, WY.

**1/2 mile option for Genuity® VT Triple PRO® is only available to growers planting separate refuge areas for corn borers and corn rootworm.

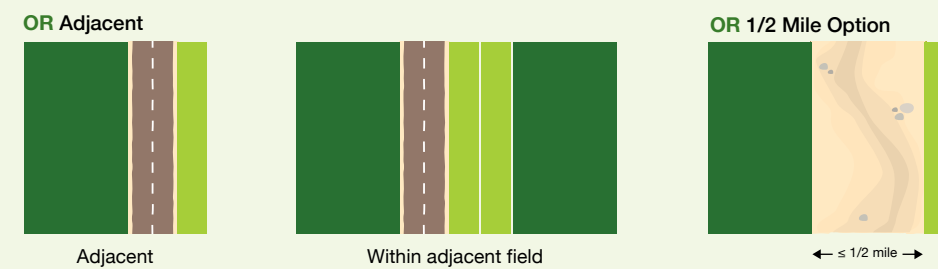
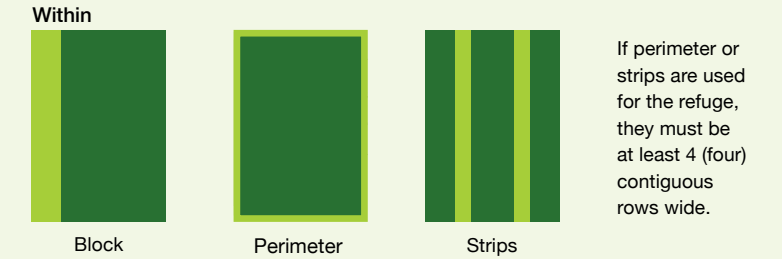
¹Economic thresholds will be determined using methods recommended by local or regional professionals (e.g., extension service agents and crop consultants).

Corn Structured Refuge Requirements

Common and Single-Pest Structured Refuge Configuration Options

The graphic depictions of refuge configurations in this overview are offered merely as examples to growers and are not necessarily drawn to scale.

- B.t. Technology
 - Non-B.t. Refuge (i.e., Roundup Ready® Corn 2 or conventional corn)
 - Designates road, ditch, path, etc.
- Sample configurations shown are for a 20% refuge



How to Calculate a Separate Structured Refuge



Refer to this diagram for the example below.

- A** Total Corn Acres*
- B** Refuge Acres
- C** B.t. Acres
- %** Percent of Required Refuge— 5% or 20%
Based on total corn acres

As part of our commitment to enhancing grower productivity and profitability, growers can download a free Insect Resistance Management (IRM) corn refuge calculator at refuge.irmcalculator.com. Or scan this QR code to start planning today.

Example below is for a 20% refuge product.

START with the **TOTAL** number of corn acres you want to plant in an area. Multiply by the **PERCENT** of refuge required for the B.t. trait. This is your minimum **REFUGE ACRES**.

Example **A** 200 x **%** 20% = **B** 40 ✓

Your Field X =

Next, subtract your refuge acres from your total corn acres. This is your maximum **B.t. ACRES**.

Example **A** 200 - **B** 40 = **C** 160

Your Field - =

*Includes all corn acres that are in field or adjacent to each other and will be allocated to the B.t. product and its associated refuge.

Corn Rootworm (CRW) Best Management Practices

Monsanto has implemented a comprehensive program for management of corn rootworm, including a series of best management practices (BMPs), to better assist growers on every field where growers reported unexpected damage.



We encourage growers to follow recommended (IPM) practices, including cultural control tactics, scouting and the appropriate use of pest thresholds and sampling.

If you are not seeing high corn rootworm pressure in a field and you are planting a single mode of action product such as Genuity® VT Triple PRO® corn, we recommend updating your IPM program

to include regular scouting to assess if the addition of an insecticide or other IPM practice is necessary.

These BMPs provide practical solutions to reduce rootworm populations, limit rootworm damage and enable insect resistance management.

1 Plant the required refuge

2 Rotate crops

Rotate to a crop that is not a corn rootworm host, such as soybeans, at least every third year if any of the following apply:

- In long-term continuous corn system.
- CRW populations are high.
- Experiencing problems with CRW trait performance.

In areas where rotational-resistant CRW variants exist, such as extended diapause eggs or soybean, CRW management options may be needed the following year.

3 Rotate traits

- Use *B.t.* products with multiple modes of action for CRW control whenever possible.
- If using a product with multiple modes of action for CRW control is not an option, rotate to a different *B.t.*-traited product that controls CRW.
- Use a non-*B.t.*-traited product with insecticide.

4 Use non-*B.t.* or non-corn rootworm protected corn

5 Manage CRW with insecticides

Adult CRW Management Considerations

- Scout fields for CRW adults during silk stage (typically July and August) as adult CRW beetles feed on corn silks and may reduce yield.
- Foliar sprays may be an option if CRW beetle populations reach an economic threshold for damage (≈1 beetle per plant)¹.
- Follow university extension service or local crop consultant recommendations for products, rates and proper timing of adult spray applications for reducing CRW beetle populations
- Multiple sprays may be necessary.

Larval CRW Management Considerations

- The application of an insecticide to the soil surface, in furrows and/or incorporated into the soil (referred to as “soil applied insecticide,” “soil insecticide” or “SAI”) is not recommended for control of CRW in *B.t.*-traited corn except under limited circumstances.
- Consult with extension, crop consultants or other local experts for recommendations when considering a combination of CRW traits and soil applied insecticides.
- SAIs should not be necessary for CRW control with pyramided CRW-traited *B.t.* corn.

Acceleron® Offerings



The Acceleron® portfolio helps protect your seed investment against diseases, insects and nematodes, as well as moisture or nutrient stress.

Fungicides

Three key diseases cost growers 225M bushels of corn per year. Our exclusive combinations of fungicides protect against these top diseases, including *Fusarium*, *Pythium* and *Rhizoctonia solani*, as well as *Colletotrichum graminicola* in ELITE offerings.

Insecticides

Early season corn insects feed on seeds and seedlings, which can cause delayed emergence, stand loss, plant injury and stunting. Our insecticides control 15 early season pests that cause significant damage to corn crops across the U.S., including wireworm, seedcorn maggot, white grub, grape colaspis and black cutworm.

Nematicides

Nematodes cost an estimated 10.2% yield loss in corn¹. They pierce and infect roots, causing a loss of nutrients and water, while opening the door for secondary issues. NemaStrike™ Technology controls a wide range of nematodes, including lance and lesion nematodes, for up to 75 days.

Bio-Enhancers

Nutrient and moisture deficiencies can impair root growth, making it even harder for plants to get the nutrients and moisture they need. Bio-Enhancers for corn make nutrients available to plants, helping maximize yield potential. Some products can also enhance functional root volume and increase nutrient uptake, protecting plants from moisture or nutrient stress.

Acceleron® Seed Applied Solutions

The tiers of Acceleron® Seed Applied Solutions available on corn products in 2019 are shown below.

Additional Offerings

- Acceleron® NemaStrike™ ST can be added to the Acceleron® Seed Applied Solutions BASIC and ELITE offerings.
- Acceleron® B-300 SAT and Acceleron® B-360 ST will be available seamlessly on Class 2017, 2018 and 2019 base genetics.
- Additional Corn Offerings include products with QuickRoots® Technology.

For more information, talk to your local retailer or visit acceleronsas.com and nemastriketechology.com.

For important information related to stewardship and best management practices for seed treatments, refer to page 14 in the Stewardship Overview of this Technology Use Guide.

¹Nationwide estimated loss. Ferris, Howard. "Nematodes and Plant Damage." University of California, 1 Oct. 2015. Web.

2019 Corn Offerings

Products With SmartStax® Technology

<p>NEMATODE PROTECTION/INSECTICIDE Protection against damage from a wide range of nematode species, as well as clothianidin at 0.500 mg/seed rate, which provides protection from early season pests, such as wireworm, seedcorn maggot, white grub, grape colaspis, and black cutworm</p>		<p>ENHANCED DISEASE CONTROL OFFERING Enhanced early- to mid-season disease control due to the reduction of infections caused by <i>Fusarium</i>, <i>Rhizoctonia solani</i> and <i>Colletotrichum graminicola</i></p>	
<p>FUNGICIDES Protection against soil and seedborne diseases, including <i>Fusarium</i>, <i>Rhizoctonia solani</i> and <i>Pythium</i></p>		<p>FUNGICIDES Protection against soil and seedborne diseases, including <i>Fusarium</i>, <i>Rhizoctonia solani</i> and <i>Pythium</i></p>	
<p>BIORISE™ 2 CORN OFFERING*</p>			

*Class of 2017, 2018, 2019 base genetics are treated with the BioRise™ 2 Corn Offering, which contains Acceleron® B-300 SAT and Acceleron® B-360 ST.

Products Without SmartStax® Technology

<p>INSECTICIDE Clothianidin at 0.250 mg/seed rate: Protection from early season pests, such as wireworm, seedcorn maggot, white grub, grape colaspis, and black cutworm</p>		<p>ENHANCED DISEASE CONTROL OFFERING Enhanced early- to mid-season disease control due to the reduction of infections caused by <i>Fusarium</i>, <i>Rhizoctonia solani</i> and <i>Colletotrichum graminicola</i></p>	
<p>FUNGICIDES Protection against soil and seedborne diseases, including <i>Fusarium</i>, <i>Rhizoctonia solani</i> and <i>Pythium</i></p>		<p>FUNGICIDES Protection against soil and seedborne diseases, including <i>Fusarium</i>, <i>Rhizoctonia solani</i> and <i>Pythium</i></p>	
<p>BIORISE™ 2 CORN OFFERING*</p>			

*Class of 2017, 2018, 2019 base genetics are treated with the BioRise™ 2 Corn Offering, which contains Acceleron® B-300 SAT and Acceleron® B-360 ST.

¹Culy, Edwards & Cornelius. 1992. Journal of Economic Entomology 85: 2440-2446.

Cotton technologies



Bollgard® 3 XtendFlex® Cotton combines the proven performance of the insecticidal proteins Cry1Ac and Cry2Ab2 with Vip3Aa for greater protection against cotton bollworm, fall armyworm and beet armyworm, while further decreasing the chance of resistance. The increased insecticidal efficacy of Bollgard® 3 Cotton is combined with the triple herbicide tolerance to dicamba¹, glyphosate and glufosinate from XtendFlex® Technology to provide the highest available level of protection from yield robbing insects and weeds.²



Bollgard II® XtendFlex® Cotton is the first triple-stacked herbicide trait in cotton. Built on Genuity® Bollgard II® with Roundup Ready® Flex Technology, these varieties contain two distinct insecticidal proteins, Cry1Ac and Cry2Ab2, from *Bacillus thuringiensis* (*B.t.*) for control of tobacco budworm, pink bollworm and cotton bollworm, combined with tolerance to dicamba¹, glyphosate and glufosinate herbicides. Bollgard II® XtendFlex® Cotton varieties provide additional weed control options for use before, at and after planting.²



XtendFlex® Cotton varieties include tolerance to dicamba¹, glyphosate and glufosinate herbicides, providing additional weed control options for use before, at and after planting.



Genuity® Bollgard II® with Roundup Ready® Flex Cotton varieties offer growers the benefits of both insect protection and glyphosate tolerance combined in one crop. These varieties exhibit the same insect protection qualities as Genuity® Bollgard II® and are tolerant to in-crop applications of Roundup WeatherMAX®, Roundup PowerMAX® and Roundup PowerMAX® II Herbicides when used according to label directions.²



Genuity® Roundup Ready® Flex Cotton varieties possess improved tolerance to the active ingredient in Roundup® Agricultural Herbicides. This technology gives growers the opportunity to make in-crop broadcast applications of Roundup WeatherMAX®, Roundup PowerMAX® and Roundup PowerMAX® II Herbicides when used according to label directions.



Genuity® Bollgard II® Cotton varieties contain two distinct insecticidal proteins, Cry1Ac and Cry2Ab2, from *Bacillus thuringiensis* (*B.t.*) that increase the efficacy and spectrum of control and reduce the chance that resistance will develop to the *B.t.* insecticidal proteins. Bollgard II® Cotton controls tobacco budworm, pink bollworm and cotton bollworm. Bollgard II® Cotton also provides control against fall armyworm, beet armyworm, cabbage and soybean loopers and other secondary leaf- or fruit-feeding caterpillar pests of cotton. Applications of insecticides to control these pests are substantially reduced with Bollgard II®.²



The Acceleron® portfolio delivers coverage on four fronts — fungicides, insecticides, nematicides and bio-enhancers — to help protect your seed investment against diseases, insects and nematodes, as well as moisture or nutrient stress. For more information talk to your local retailer or visit acceleronsas.com.



NemaStrike™ Technology is offered as part of Acceleron® Seed Applied Solutions. It has a novel mode of action that stays in the root zone, providing broad spectrum control of plant parasitic nematodes. In cotton, controlled species include, but are not limited to: root knot, Columbia lance and reniform nematodes. For more information, talk to your local retailer or discover more at nemastriketechology.com.

¹ Monsanto will not authorize the use of dicamba herbicides containing dicamba acid or the dimethylamine (DMA) salt of dicamba for use in Bollgard® 3 XtendFlex®, Bollgard II® XtendFlex®, or XtendFlex® Cotton even if the EPA were to approve those herbicides for use with these products.

² If you are planting in an area requiring a structured refuge and did not receive a Bollgard® 3 XtendFlex® and Bollgard II® IRM Grower Guide or would like another, go to monsanto.com or genuity.com, or call 1-800-768-6387 to request a copy by mail.

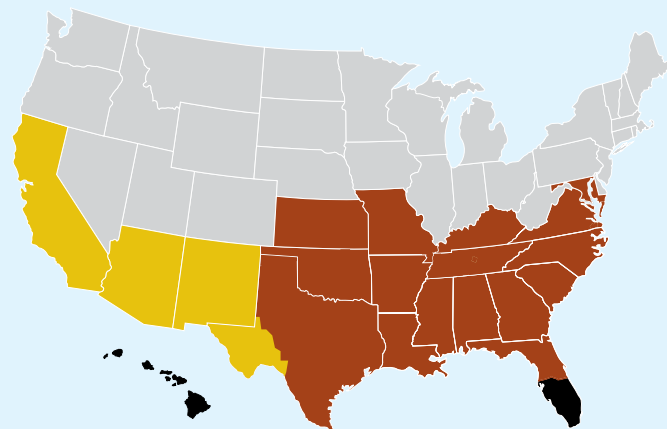
Cotton Technologies

Growers must read the Bollgard® 3 XtendFlex® and Bollgard II® IRM Grower Guide prior to planting for information on required IRM.

You may download a copy of the current Guide at monsanto.com or genuity.com, or you may call 1-800-768-6387 to request a copy by mail.

The map below depicts areas of the U.S. where Bollgard® 3 XtendFlex® and Bollgard II® cotton products can be grown. Also noted is the area where planted refuges are required.

- **Natural Refuge Area** In the natural refuge area, cotton growers are not required to plant non-*B.t.* cotton as a refuge for Bollgard® 3 XtendFlex® and Bollgard II® Cotton products. Natural refuge refers to cultivated non-*B.t.* crops as well as plants other than cotton that serve as hosts of susceptible target pests. Monsanto, in conjunction with USDA and university researchers, demonstrated that numbers of tobacco budworm and cotton bollworm moths produced from non-*B.t.* hosts other than cotton within this area are sufficient for fulfilling refuge requirements.
- **Planted Refuge Required Area*** In the planted refuge required area, growers must plant non-*B.t.* cotton that serves as a refuge for the tobacco budworm, cotton bollworm and/or pink bollworm moths. Options include an embedded, 5% external unsprayed or 20% external sprayed refuge. Confirm with local authorities (such as your state Department of Agriculture) if there are any county-specific exemptions from refuge requirements that may be allowed in accordance with state pink bollworm eradication programs. This may include counties in Arizona, New Mexico, California and west Texas.



- **Natural Refuge**
Alabama, Arkansas, Florida north of Route 60 (near Tampa), Georgia, Kansas, Kentucky, Louisiana, Maryland, Mississippi, Missouri, North Carolina, Oklahoma, South Carolina, Tennessee, Virginia and Texas, except for the counties of Brewster, Crane, Crockett, Culberson, El Paso, Hudspeth, Jeff Davis, Loving, Pecos, Presidio, Reeves, Terrell, Val Verde, Ward and Winkler.
- **Planted Refuge Required***
Includes all counties in Arizona, New Mexico, California and the Texas counties of Brewster, Crane, Crockett, Culberson, El Paso, Hudspeth, Jeff Davis, Loving, Pecos, Presidio, Reeves, Terrell, Val Verde, Ward and Winkler.
- **Sale Prohibited**
Sale or commercial planting of Bollgard® 3 XtendFlex® and Bollgard II® Cotton is prohibited in Hawaii, Puerto Rico and the U.S. Virgin Islands. Bollgard® 3 XtendFlex® and Bollgard II® cotton is not permitted south of Route 60 (near Tampa) in Florida.
- **Sale Not Allowed**
Sale or commercial planting of Bollgard® 3 XtendFlex® and Bollgard II® Cotton is not allowed in the following states: Alaska, Colorado, Connecticut, Delaware, Idaho, Illinois, Indiana, Iowa, Maine, Massachusetts, Michigan, Minnesota, Montana, Nebraska, Nevada, New Hampshire, New Jersey, New York, North Dakota, Ohio, Oregon, Pennsylvania, Rhode Island, South Dakota, Utah, Vermont, Washington, Washington D.C., West Virginia, Wisconsin and Wyoming.

*If you are planting in an area requiring a structured refuge and did not receive a Bollgard® 3 XtendFlex® and Bollgard II® IRM Grower Guide or would like another, go to monsanto.com or genuity.com, or call 1-800-768-6387 to request a copy by mail.

Bollgard® 3 XtendFlex® Cotton Bollgard II® XtendFlex® Cotton XtendFlex® Cotton



Cotton with XtendFlex Technology refers to Bollgard® 3 XtendFlex® Cotton, Bollgard II® XtendFlex® Cotton and XtendFlex® Cotton.

Growers should follow recommended weed management guidelines when managing Bollgard® 3 XtendFlex®, Bollgard II® XtendFlex® and XtendFlex® Cotton. Growers of Bollgard® 3 XtendFlex® and Bollgard II® XtendFlex® Cotton must follow the required refuge options, practicing IRM and managing target and non-target pests as described in the Bollgard® 3 XtendFlex® and Bollgard II® IRM Grower Guide.

Weed Management

Weed control in cotton is essential to help maximize both fiber yield and quality potential. Cotton is very sensitive to early season weed competition, which can result in unacceptable stands and/or reduced yield potential. With tolerance to dicamba, glufosinate and glyphosate, Bollgard® 3 XtendFlex®, Bollgard II® XtendFlex® and XtendFlex® Cotton will provide additional weed control options for use before, at and after planting.

Select timing of application based on the most difficult-to-control weed species in your field.

Post-direct or hooded sprayers can be used to achieve more thorough spray coverage on weeds, and can allow the use of other approved herbicides to control tough weeds.

Residual herbicide(s) may be applied as either a preemergence (including preplant incorporated), postemergence and/or layby application as allowed on the label of the specific product being used. Weeds growing at the time of the residual herbicide application will need to be controlled using a post-emergence herbicide.

Recommendations

Follow all pesticide product labeling. If there is any conflict between these recommendations and the applicable pesticide product labeling, the pesticide product labeling controls. Follow the

recommendations below to help minimize the risk of developing herbicide resistance in Bollgard® 3 XtendFlex®, Bollgard II® XtendFlex® and XtendFlex® Cotton:

- Scout fields before and after each burndown and in-crop application.
- Start with a clean field, using either a burndown herbicide application, residual herbicide or tillage, making sure weeds are controlled at planting.
- Add soil residual herbicide(s) and cultural practices as part of a Bollgard® 3 XtendFlex®, Bollgard II® XtendFlex® and XtendFlex® Cotton weed control program.
 - Soil residual herbicides are critical to control emerging glyphosate-resistant weeds, such as Palmer amaranth.
 - Residual herbicides should be used multiple times during the growing season if glyphosate-resistant weeds are expected.
- In-crop, apply Roundup WeatherMAX® Herbicide at a minimum of 22 oz/A when weeds are less than 3" in height and tank-mix with another approved herbicide, if necessary.
- An application of XtendiMax® herbicide with VaporGrip® Technology at 22 oz/A should be applied to weeds 4" or less (Refer to www.xtendimaxapplicationrequirements.com). Liberty® Herbicide may also be used at 29 to 44 oz/A when weeds are 3" or less. (Please refer to Liberty® Label.)
- It is not recommended that XtendiMax® with VaporGrip® Technology be applied more than twice in a season. Late-season control of emerged weeds with a diversity of control tools will reduce the potential of adding more seeds to the seedbank.
- Equipment should be cleaned before moving from field to field to minimize the spread of weed seed (as well as nematodes, insects and other cotton pests).
- Report any incidence of repeated non-performance of Roundup® agricultural herbicides, XtendiMax® with VaporGrip® Technology or other glyphosate or glufosinate products on a particular weed to the appropriate company representative, local retailer or county extension agent.

Bollgard® 3 XtendFlex® Cotton Bollgard II® XtendFlex® Cotton XtendFlex® Cotton *continued*

Herbicide Applications for Bollgard® 3 XtendFlex®, Bollgard II® XtendFlex® and XtendFlex® Cotton

Roundup WeatherMAX®, Roundup PowerMAX® and Roundup PowerMAX® II Herbicides

- May be applied in-crop up to mid-bloom stage or no more than 60 days after planting, whichever comes first.
- A maximum rate of 32 oz/A per application may be applied using ground application equipment while the maximum is 22 oz/A per application by air.
- There are no growth or timing restrictions for sequential applications.
- Four (4) quarts/A (128 oz/A) is the total in-crop volume allowed from emergence to 60% open bolls.
- A maximum total volume of 44 oz/A may be applied between layby and 60% open bolls.
- Post-directed application of Roundup WeatherMAX®, Roundup PowerMAX® or Roundup PowerMAX® II Herbicide, either alone or in a tank-mix with another herbicide labeled for post-directed application in cotton, may be used to achieve more thorough spray coverage of weeds.

Preharvest Application

- Up to 44 oz/A may be applied after cotton reaches 60% open bolls and before harvest, if needed.
- Application must be made at least 7 days prior to harvest.
- The maximum volume of Roundup WeatherMAX®, Roundup PowerMAX® or Roundup PowerMAX® II Herbicide that may be used in a single season is 5.3 quarts/A (169.6 oz/A).

Liberty® Herbicide

- Apply from emergence to early bloom growth stage.
- Sequential applications should be applied at least 10 days after the first application.
- Up to 87 oz/A of Liberty® Herbicide can be applied on cotton per growing season or up to 72 oz/A if more than 29 oz/A was used in a single application. See Liberty® label for guidelines on maximum seasonal use rates.
- A tank-mix of a Liberty® Herbicide and a Roundup® Agricultural Herbicide may result in reduced grass control.
- Do not apply within 70 days of harvest.
- Consult product label for full use directions and restrictions.

XtendiMax® Herbicide with VaporGrip® Technology

XtendiMax® with VaporGrip® Technology is a restricted use pesticide for retail sale and use only by Certified Applicators. The label for this product was updated in November 2018. All use of this product must be in accordance with the current label. This label supercedes any previously issued labeling for this product, including previous supplemental labeling. Check the registration status of XtendiMax® with VaporGrip® Technology in each state and mandatory dicamba applicator training requirement before using.

Refer to xtendimaxapplicationrequirements.com for a copy of the current label, including allowable tank mix partners, approved nozzles and pressure ranges, record keeping requirements and all other directions for proper use. Avoiding spray drift at the application site is the responsibility of the applicator. Use of the RRxTend Spray app is a helpful digital tool that provides location-specific weather forecasts, digital record-keeping capabilities and education resources related to the Roundup Ready® Xtend Crop System.

- May be applied in-crop up to mid-bloom stage or no more than 60 days after planting, whichever comes first.
- Up to 1.0 lb/A of dicamba (44 oz/A of XtendiMax® with VaporGrip® Technology) may be used preemergence.
- 0.5 lb/A of dicamba (22 oz/A XtendiMax® with VaporGrip® Technology) may be applied twice postemergence.
- Products must be applied in a minimum of 15 GPA carrier volume.
- Sequential applications postemergence may be made at least 7 days apart.
- No more than 2.0 lb/A of dicamba may be used, total, per growing season.
- For best results, dicamba-based weed management programs must include the use of residual herbicides preemergence as well as at least one postemergence application.
- Report any incidence of non-performance of XtendiMax® with VaporGrip® Technology against a particular weed species to your Monsanto retailer, representative or call **1-844-RRXTEND**.

Crop Safety of In-Crop Glyphosate Applications

Monsanto has determined that a combination of components in glyphosate formulations have the potential to cause leaf injury when applied during later stages of crop growth. Roundup WeatherMAX®, Roundup PowerMAX® and Roundup PowerMAX® II are the only Roundup® Agricultural Herbicides labeled and approved for use in Bollgard® 3 XtendFlex®, Bollgard II® XtendFlex® and XtendFlex® Cotton.

Leaf injury may occur if the products are not used according to the product label, used at rates higher than directed or if overlap of

spray occurs in the field. Growers must confirm that any glyphosate formulation to be used on Bollgard® 3 XtendFlex®, Bollgard II® XtendFlex® and XtendFlex® Cotton is labeled for use on Bollgard® 3 XtendFlex®, Bollgard II® XtendFlex® and XtendFlex® Cotton and has been tested to demonstrate crop safety.

Crop Safety of In-Crop Dicamba Applications

Postemergence applications of dicamba may cause a leaf response to Bollgard® 3 XtendFlex®, Bollgard II® XtendFlex® and XtendFlex® Cotton. The symptoms usually appear as necrotic spots on fully expanded leaves. Incidence of response can increase when dicamba is tank-mixed with other herbicides or insecticides. To reduce the incidence and severity of necrosis, consider increasing the spray volume to greater than 15 GPA or greater and lower adjuvant rates. Emulsifiable Concentrate (EC) based products that are tank mixed with products containing dicamba may increase the severity of the leaf damage.

Crop Safety of In-Crop Liberty® Herbicide Applications

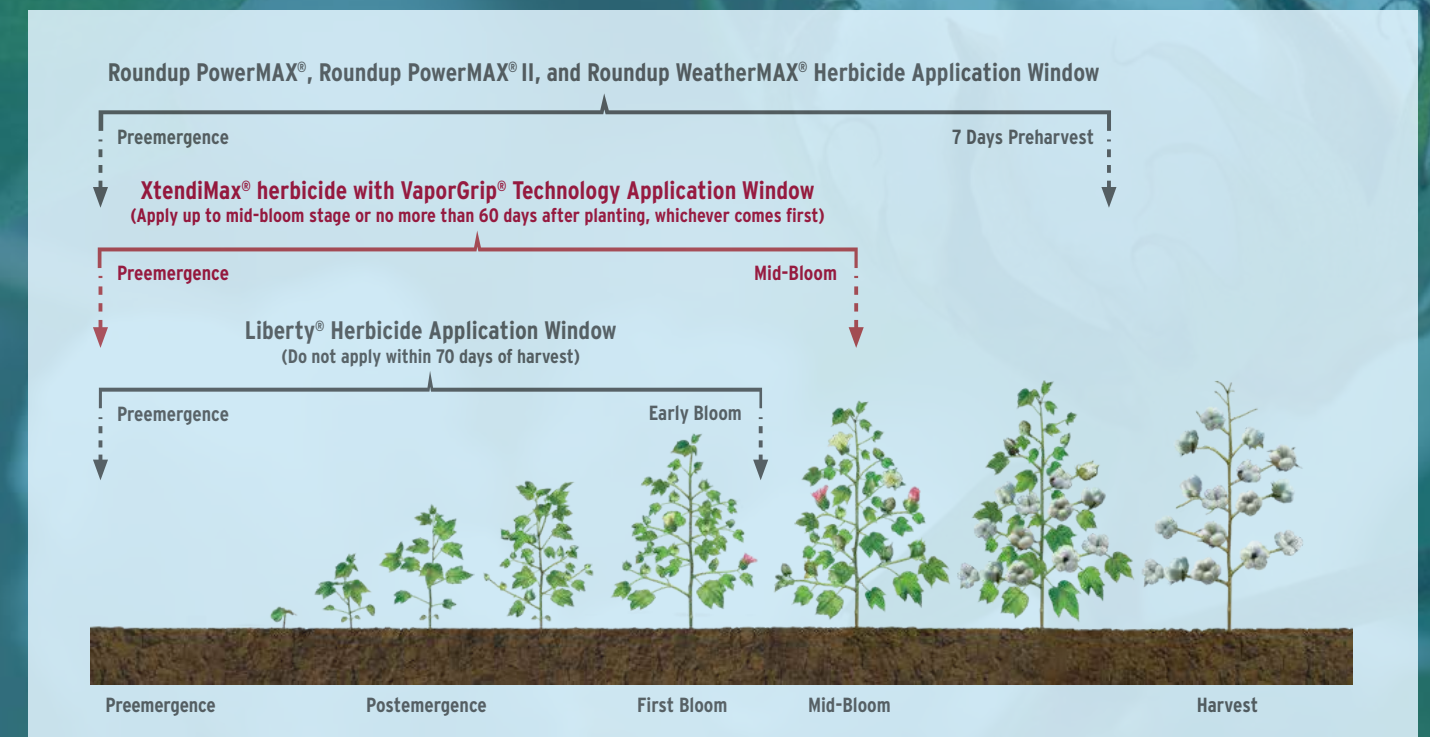
Postemergence applications of Liberty® herbicide may cause a leaf response in Bollgard® 3 XtendFlex®, Bollgard II® XtendFlex® and XtendFlex® Cotton. The symptoms usually appear as minor and temporary spotting on leaves. Crop injury may result from tank mix

applications with other registered herbicides, surfactants, crop oils or other tank mixes. Leaf injury may occur if Liberty® Herbicide is not used according to the product label.

Additional Information

Various weed biotypes are known to be resistant to dicamba and glyphosate. For the current weed control recommendations for herbicide-resistant weed biotypes, refer to RoundupReadyPLUS.com or call **1-800-768-6387**. A complete list of specimen labels can be located at monsanto.com/products/safety-information/msds/. Approved labels, including supplemental labeling, for Monsanto agricultural herbicides must be in the possession of the user at the time of pesticide application and can be obtained by calling 1-800-768-6387 or by contacting your State Pesticide Lead Agency for more information. Complete label information for these and all recommended products can be found at cdms.net. Additional stewardship, education and training resources on XtendiMax® with VaporGrip® Technology can be found at <http://www.roundupreadyxtend.com/stewardship/education/Pages/default.aspx>.

Herbicide Application Windows



Genuity® Bollgard II® with Roundup Ready® Flex Cotton

Genuity® Roundup Ready® Flex Cotton



Growers should follow recommended weed management guidelines when managing Genuity® Bollgard II® with Roundup Ready® Flex cotton and Genuity® Roundup Ready® Flex Cotton.

Growers of Genuity® Bollgard II® with Roundup Ready® Flex Cotton must follow the required refuge options, practicing IRM and managing target and non-target pests as described in the Bollgard® 3 XtendFlex® and Bollgard II® IRM Grower Guide.

Pima Cotton (*Gossypium barbadense*) Market Options

Genuity® Roundup Ready® Flex Pima Cotton does not have the same export approvals in place as Genuity® Roundup Ready® Flex Cotton. Genuity® Roundup Ready® Flex Pima Cotton is approved for cultivation in the U.S. and for export to Canada, Japan and Mexico. Do not market cottonseed, meal, linters or gin trash from Genuity® Roundup Ready® Flex Pima to a third party who may send such products or processed fractions outside of the approved countries. Growers should talk to their grain handler or product purchaser to confirm their buying position for this product.

Weed Management

Weed control in cotton is essential to help maximize both fiber yield and quality potential. Cotton is very sensitive to early season weed competition, which can result in unacceptable stands and/or reduced yield potential. The Genuity® Roundup Ready® Flex Cotton System, with improved tolerance to glyphosate, the active ingredient in Roundup® Agricultural Herbicides, provides growers with the right tools to control weeds.

Select timing of application based on the most difficult-to-control weed species in your field.

Post-direct or hooded sprayers can be used to achieve more thorough spray coverage on weeds, and can allow the use of other approved herbicides to control tough weeds.

Residual herbicide(s) may be applied as either a preemergence (including preplant incorporated), postemergence and/or layby application as allowed on the label of the specific product being used. Weeds growing at the time of the residual herbicide application will need to be controlled using a postemergence herbicide.

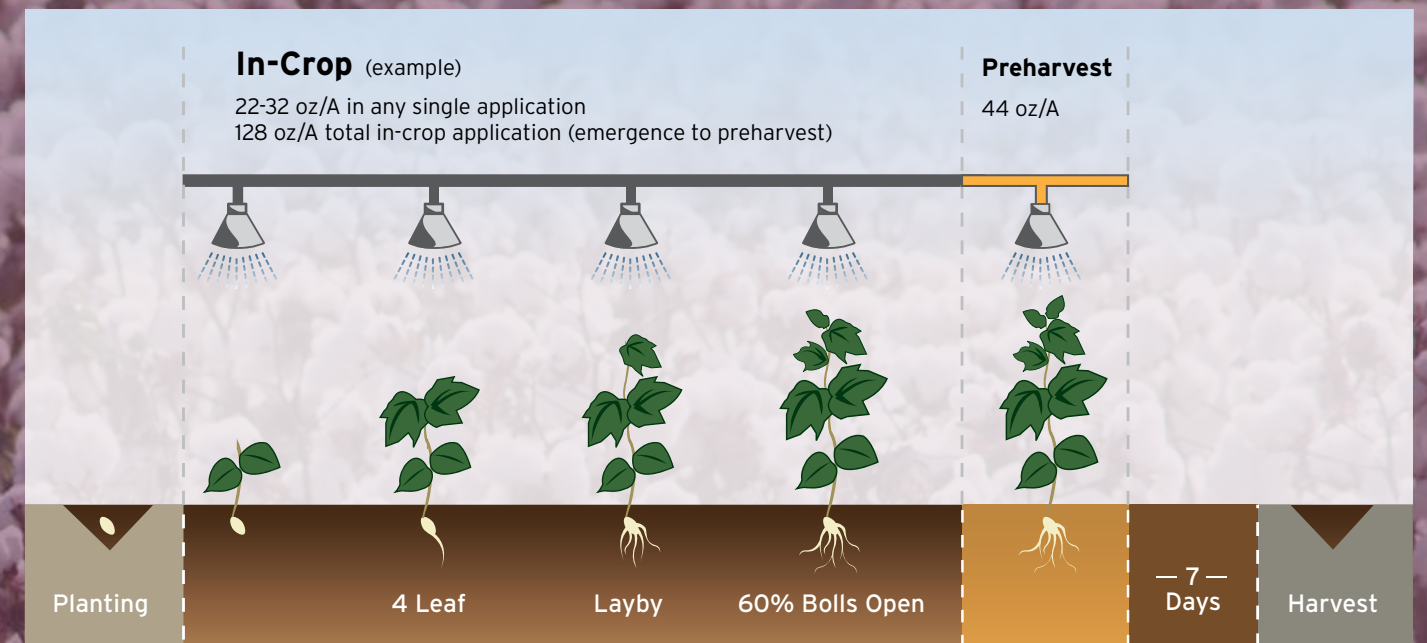
Various weed biotypes are known to be resistant to dicamba and glyphosate. For the current weed control recommendations for herbicide-resistant weed biotypes, refer to RoundupReadyPLUS.com or call **1-800-768-6387**. A complete list of specimen labels can be located at monsanto.com/products/safety-information/msds/. Approved labels, including supplemental labeling, for Monsanto agricultural herbicides must be in the possession of the user at the time of pesticide application and can be obtained by calling 1-800-768-6387 or by contacting your State Pesticide Lead Agency for more information.

Recommendations

Follow all pesticide product labeling. If there is any conflict between these recommendations and applicable pesticide product labeling, the pesticide product labeling controls. Follow the recommendations below to help minimize the risk of developing herbicide resistance in a Genuity® Roundup Ready® Flex Cotton System.

- Scout fields before and after each burndown and in-crop application.
- Start with a clean field, using either burndown herbicide(s) application, residual herbicide(s) and/or tillage, making sure weeds are controlled at planting.
- Add soil residual herbicide(s) such as Warrant® herbicide and cultural practices as part of a Genuity® Roundup Ready® Flex Cotton weed control program.
 - Soil residual herbicides are critical to control emerging glyphosate-resistant weeds, such as Palmer amaranth.
 - Residual herbicides should be used multiple times during the growing season if glyphosate-resistant weeds are expected.
- In-crop, apply Roundup WeatherMAX® Herbicide at a minimum of 22 oz/A when weeds are less than 3" in height and tank-mix with another approved herbicide, if necessary.
- Late-season control of emerged weeds with a diversity of control tools will reduce the potential of adding more seeds to the seedbank.

Herbicide Application Windows



- Equipment should be cleaned before moving from field to field to minimize the spread of weed seed (as well as nematodes, insects and other cotton pests).
- Report any incidence of repeated non-performance of Roundup® Agricultural Herbicides or other glyphosate products on a particular weed to the appropriate company representative, local retailer or county extension agent.

Application of Roundup WeatherMAX®, Roundup PowerMAX® and Roundup PowerMAX® II Herbicides

- May be applied in-crop, from crop emergence up to 7 days prior to harvest.
- A maximum rate of 32 oz/A per application may be applied using ground application equipment while the maximum is 22 oz/A per application by air.
- There are no growth or timing restrictions for sequential applications.
- Four (4) quarts/A (128 oz/A) is the total in-crop volume allowed from emergence to 60% open bolls.
- A maximum total volume of 44 oz/A may be applied between layby and 60% open bolls.
- Post-directed application of Roundup WeatherMAX®, Roundup PowerMAX® or Roundup PowerMAX® II Herbicide, either alone or in a tank-mix with another herbicide labeled for post-directed application in cotton, may be used to achieve more thorough spray coverage of weeds.

Preharvest Application

- Up to 44 oz/A may be applied after cotton reaches 60% open bolls and before harvest, if needed.
- Application must be made at least 7 days prior to harvest.
- The maximum volume of Roundup WeatherMAX®, Roundup PowerMAX® or Roundup PowerMAX® II that may be used in a single season is 5.3 quarts/A (169.6 oz/A).

Crop Safety of In-Crop Glyphosate Applications

Monsanto has determined that a combination of components in glyphosate formulations have the potential to cause leaf injury when applied during later stages of crop growth. Roundup WeatherMAX®, Roundup PowerMAX® and Roundup PowerMAX® II are the only Roundup® Agricultural Herbicides labeled and approved for use in Genuity® Roundup Ready® Flex Cotton.

Leaf injury may occur if the products are not used according to the product label, used at rates higher than directed or if overlap of spray occurs in the field. Growers must confirm that any glyphosate formulation to be used on Genuity® Roundup Ready® Flex Cotton is labeled for use on Genuity® Roundup Ready® Flex Cotton and has been tested to demonstrate crop safety.



Roundup Ready 2 Xtend® Soybeans are built on the Roundup Ready 2 Yield® Technology to help maximize yield potential and have tolerance to dicamba¹ and glyphosate herbicides, providing additional weed control options for use before, at and after planting.



Genuity® Roundup Ready 2 Yield® Soybeans combine in-plant tolerance to glyphosate herbicides with a high-yield potential product.



Vistive® Gold Soybeans with Roundup Ready 2 Yield® Technology combines in-plant tolerance to glyphosate herbicides with a high-yield potential product that produces a low-saturate, high-oleic soybean oil with broad applications.



The Acceleron® portfolio delivers coverage on four fronts — fungicides, insecticides, nematicides and bio-enhancers — to help protect your seed investment against diseases, insects and nematodes, as well as moisture or nutrient stress. For more information talk to your local retailer or visit acceleronsas.com.



NemaStrike™ Technology is offered as part of Acceleron® Seed Applied Solutions. It has a novel mode of action that stays in the root zone, providing broad spectrum control of plant parasitic nematodes. In soybean, controlled species include, but are not limited to: soybean cyst, root knot and reniform nematodes. For more information, talk to your local retailer or discover more at nemastriketechology.com.

¹ Monsanto will not authorize the use of dicamba herbicides containing dicamba acid or the dimethylamine (DMA) salt of dicamba for use in Roundup Ready 2 Xtend® Soybeans even if EPA were to approve those herbicides for use in Roundup Ready 2 Xtend® Soybeans.

Soybean technologies

Roundup Ready 2 Xtend® Soybeans



Roundup Ready 2 Xtend® Soybeans are built on the Roundup Ready 2 Yield® Technology

Growers can continue to help maximize their yield opportunity through planting the new, elite genetics on their farm, as well as by using the weed management recommendations and incentives provided by Roundup Ready PLUS® Crop Management Solutions. Roundup Ready 2 Xtend® Soybeans have tolerance to dicamba¹ and glyphosate herbicides.

Weed Management

Starting clean with a weed-free field and controlling subsequent weeds when they are small are critical steps to obtaining excellent weed control and maximum yield potential. The Roundup Ready® Xtend Crop System provides the flexibility to use the diversity of herbicide tools necessary to control weeds before planting, at planting and in-crop. Failure to control weeds with the right rate, at the right time and with the right product can lead to increased weed competition, the potential for selecting for herbicide resistance and possible decreased yield.

Spray XtendiMax® Herbicide with VaporGrip® Technology in-crop from emergence (cracking) up to beginning bloom (R1) growth stage or no more than 45 days after planting, whichever comes first, for unsurpassed weed control, proven crop safety and maximum yield potential.

Recommendations

Follow all pesticide product labeling. If there is any conflict between the recommendations in this guide and applicable pesticide product labeling, the pesticide product labeling controls. Follow the recommendations below to help minimize the risk of developing glyphosate- and/or dicamba-resistant weed populations in a Roundup Ready 2 Yield® or Roundup Ready 2 Xtend® Soybean System:

- Scout fields before and after each burndown and in-crop application.
- Start with a clean field, using either burndown herbicide(s) application, residual herbicide(s) and/or tillage, making sure weeds are controlled at planting. Roundup WeatherMAX® and XtendiMax® Herbicide with VaporGrip® Technology are products that can be used for a burndown application.

- Add soil residual herbicide(s) such as Warrant® Herbicide applied at an appropriate rate as listed on the label and cultural practices as part of a weed control program.
 - Soil residual herbicides are critical to control emerging glyphosate-resistant weeds, such as Palmer amaranth.
 - Residual herbicides should be used multiple times during the growing season if glyphosate-resistant weeds are expected.
- In-crop, apply Roundup WeatherMAX® Herbicide at a minimum of 22 oz/A and/or apply XtendiMax® with VaporGrip® Technology at 22 oz/A before weeds exceed 4" in height.
- If an additional flush of weeds occurs, apply a sequential application of Roundup WeatherMAX® and/or XtendiMax® with VaporGrip® Technology at 22 oz/A before weeds exceed 4" in height.
- If using another approved glyphosate agricultural herbicide or dicamba herbicide, you must refer to the label booklet or supplemental labeling for the use of that product on Roundup Ready 2 Xtend® Soybeans and follow the label directions.
- If using Roundup PowerMAX® or Roundup PowerMAX® II Herbicide, application rates are the same as for Roundup WeatherMAX® Herbicide.
- Equipment should be cleaned before moving from field to field to help minimize the spread of weed seed.
- Report any incidence of repeated non-performance of Roundup® agricultural herbicides, XtendiMax® with VaporGrip® Technology, or other glyphosate products on a particular weed to the appropriate company representative, local retailer or county extension agent.

XtendiMax® Herbicide with VaporGrip® Technology

XtendiMax® with VaporGrip® Technology is a restricted use pesticide for retail sale to and use only by Certified Applicators. The label for this product was updated in November 2018. All use of this product must be in accordance with the current label. This label supercedes any previously issued labeling for this product, including previous supplemental labeling. Check the registration status of XtendiMax®

with VaporGrip® Technology in each state and dicamba application training requirement before using.

Refer to xtendimaxapplicationrequirements.com for a copy of the current label, including allowable tank-mix partners, approved nozzles and pressure ranges, record keeping requirements and all other directions for proper use. Avoiding spray drift at the application site is the responsibility of the applicator.

- May be applied in-crop, from crop emergence up to beginning bloom (R1) growth stage or no more than 45 days after planting, whichever comes first.
- Two 0.5 lb/A applications of dicamba may be made postemergence.
- Products must be applied in a minimum of 15 GPA carrier volume.
- Sequential applications postemergence may be made at least 7 days apart.
- No more than 2.0 lb/A of dicamba may be used, total, per growing season.
- For best results, dicamba-based weed management programs must include the use of residual herbicides preemergence as well as at least one postemergence application.
- Report any incidence of non-performance of XtendiMax® with VaporGrip® Technology against a particular weed species to your Monsanto retailer, representative or call **1-844-RRXTEND**.

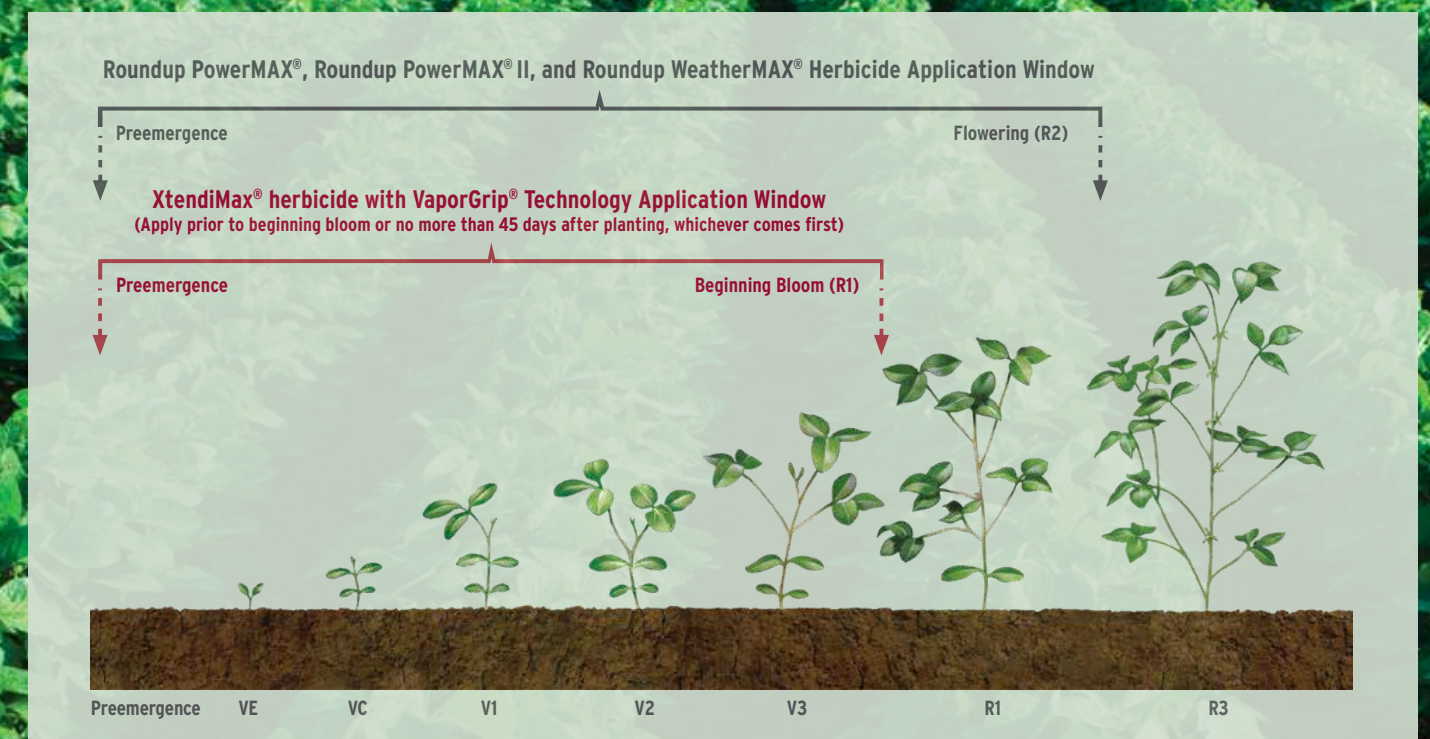
Additional Information

Weeds such as lambsquarters, waterhemp, pigweed and giant ragweed tend to emerge throughout the season. Sequential Roundup WeatherMAX® Herbicide or XtendiMax® Herbicide with VaporGrip® Technology applications or the addition of a soil residual herbicide may be required for control of subsequent weed flushes.

Various weed biotypes are known to be resistant to glyphosate and dicamba. For the current weed control recommendations for herbicide-resistant weed biotypes, refer to RoundupReadyPLUS.com or call **1-800-768-6387**. A complete list of specimen labels can be located at monsanto.com/products/safety-information/msds/. Approved labels, including supplemental labeling, for Monsanto agricultural herbicides must be in the possession of the user at the time of pesticide application and can be obtained by calling 1-800-768-6387 or by contacting your State Pesticide Lead Agency for more information.

Various weed biotypes are known to be resistant to other herbicides as well. Use herbicides and combinations of herbicides that will control the weed biotypes and species that are present on your farm.

Herbicide Application Windows



¹Monsanto will not authorize the use of dicamba herbicides containing dicamba acid or the dimethylamine (DMA) salt of dicamba for use in Roundup Ready 2 Xtend® Soybeans even if EPA were to approve those herbicides for use in Roundup Ready 2 Xtend® Soybeans.

Genuity® Roundup Ready 2 Yield® Soybeans



Genuity® Roundup Ready 2 Yield® Soybeans contain in-plant tolerance to glyphosate herbicides, such as Roundup WeatherMAX®, Roundup PowerMAX® or Roundup PowerMAX® II Herbicides, for application in-crop from emergence through flowering.

Weed Management

Starting clean with a weed-free field and controlling subsequent weeds when they are small are critical to obtaining excellent weed control and maximum yield potential. The Roundup Ready 2 Yield® Soybean System provides the flexibility to use the diversity of herbicide tools necessary to control weeds before planting, at planting and in-crop. Failure to control weeds with the right rate, at the right time and with the right herbicide product, can lead to increased weed competition, the potential for selecting for herbicide tolerant weeds and possible decreased yield.

Spray Roundup® Agricultural Herbicides in-crop from emergence (cracking) through flowering (R2 stage soybeans) for unsurpassed weed control, proven crop safety and maximum yield potential. R2 stage soybeans end when a pod 5 millimeters (3/16") long at one of the four uppermost nodes appears on the main stem along with a fully developed leaf (R3 stage).

Recommendations

Follow all pesticide product labeling. If there is any conflict between the recommendations in this guide and applicable pesticide product labeling, the pesticide product labeling controls. Follow the recommendations below to help minimize the risk of developing glyphosate-resistant weed populations in a Roundup Ready 2 Yield® Soybean System:

- Scout fields before and after each burndown and in-crop application.
- Start with a clean field, using either a burndown herbicide application, residual herbicide or tillage, making sure weeds are controlled at planting.
 - Add soil residual herbicide(s) such as Warrant® applied at an appropriate rate as listed on the label and cultural practices as part of a weed control program.
 - Soil residual herbicides are critical to control emerging glyphosate-resistant weeds, such as Palmer amaranth.
 - Residual herbicides should be used multiple times during the growing season if glyphosate-resistant weeds are expected.
- In-crop, apply Roundup WeatherMAX® Herbicide at a minimum of 22 oz/A before weeds exceed 4" in height. Warrant® Herbicide may be applied postemergence to soybeans, but prior to weed

emergence for residual control of small grasses and small-seeded broadleaf weeds.

- If an additional flush of weeds occurs, a sequential application of Roundup WeatherMAX® Herbicide at 22 oz/A before weeds exceed 4" in height may be needed.
- If using another approved glyphosate agricultural herbicide, you must refer to the label booklet or supplemental labeling for the use of that product on Genuity® Roundup Ready 2 Yield® Soybeans to determine appropriate use rates.
- If using Roundup PowerMAX® or Roundup PowerMAX® II herbicides, application rates are the same as for Roundup WeatherMAX® Herbicide.
- Refer to individual product labels for approved tank-mix partners.
- Equipment should be cleaned before moving from field to field to help minimize the spread of weed seed.
- Report any incidence of repeated non-performance of Roundup® Agricultural Herbicides or other glyphosate products on a particular weed to the appropriate company representative, local retailer or county extension agent.

Additional Information

Weeds such as pigweed, lambsquarters, waterhemp and giant ragweed tend to emerge throughout the season. Sequential Roundup WeatherMAX® Herbicide applications or the addition of a soil residual herbicide may be required for control of subsequent weed flushes.

Various weed biotypes are known to be resistant to glyphosate. For the current weed control recommendations for glyphosate-resistant weed biotypes, refer to RoundupReadyPLUS.com or call **1-800-768-6387**. A complete list of specimen labels can be located at monsanto.com/products/safety-information/msds/. Approved labels, including supplemental labeling, for Roundup® Agricultural Herbicides must be in the possession of the user at the time of pesticide application and can be obtained by calling 1-800-768-6387 or by contacting your State Pesticide Lead Agency for more information.

Vistive® Gold Soybeans with Roundup Ready 2 Yield® Technology



Vistive® Gold Soybeans with Roundup Ready 2 Yield® Technology combines in-plant tolerance to glyphosate herbicides with a high-yield potential product with two end-use applications that help demand higher prices per bushel.

Its use as a cooking oil also offers an improved nutritional profile and longer shelf life. In automotive and industrial lubricant uses, it can help to match or exceed the performance of other high-quality products and can contribute to fewer impacts on the environment.

A nutritionally improved cooking oil for consumers and food companies

- Developed with input from leading food companies.
- Provides food manufacturers with the ability to reduce saturated fat and trans fat.
- Has high stability and retains excellent flavor, even for fried foods.

An environment-friendly alternative for industrial use because it is a renewable source

- Used as a primary ingredient in high-performing, bio-based lubricants and synthetic motor oils.
- Industrial lubricants formulated with plant-based oils, such as soybean oil, biodegrade at significantly higher rates than their petroleum counterparts so you can feel good about the lower impact that biosynthetic lubricants have on the environment.
- Synthetic lubricants made from Vistive® Gold Soybean oil provide natural detergency for cleaner engines, less varnish and fewer deposits on metal surfaces than conventional petroleum oil products.

Processor-Paid Incentives

Vistive® Gold Soybeans with Roundup Ready 2 Yield® Technology will be managed as an identity preserved contracting program. Each participating processor will set their incentive level independently. Contract growers will receive a processor-paid incentive for producing and delivering high oleic identity preserved soybeans. Growers will need to identify which processors have a Vistive® Gold Program in 2019 and grow the soybeans under contract to be eligible for the incentive.

Process to Maintain High Oleic Specifications

- Clean seed hopper/boxes prior to planting Vistive® Gold Soybeans.
- Identify and mark fields that are planted with Vistive® Gold Soybeans.
- Completely empty the combine and other harvest equipment prior to and after harvesting Vistive® Gold Soybeans.
- Clean storage bins, trucks and wagons prior to handling Vistive® Gold Soybeans to maintain purity.



Weed Management

Starting clean with a weed-free field and controlling subsequent weeds when they are small are critical steps to obtaining excellent weed control and maximum yield potential. The Roundup Ready 2 Yield® Soybean System provides the flexibility to use the diversity of herbicide tools necessary to control weeds before planting, at planting and in-crop. Failure to control weeds with the right rate, at the right time and with the right herbicide product, can lead to increased weed competition, the potential for selecting herbicide tolerant weeds and possible decreased yield.

Spray labeled Roundup® Agricultural Herbicides in-crop from emergence (cracking) through flowering (R2 stage soybeans) for unsurpassed weed control, proven crop safety and maximum yield potential. R2 stage soybeans end when a pod 5 millimeters (3/16") long at one of the four uppermost nodes appears on the main stem along with a fully developed leaf (R3 stage).

Recommendations

Follow all pesticide label directions. If there is any conflict between the recommendations in this guide and applicable pesticide product labeling, the pesticide product labeling controls. Follow the guidelines below to help minimize the risk of developing glyphosate-resistant weed populations in a Roundup Ready® Soybean System:

- Scout fields before and after each burndown and in-crop application.
- Start with a clean field, using either a burndown herbicide application, residual herbicide or tillage, making sure weeds are controlled at planting.
 - Soil residual herbicides are critical to control emerging glyphosate-resistant weeds, such as Palmer amaranth.
 - Residual herbicides should be used multiple times during the growing season if glyphosate-resistant weeds are expected.
- In-crop, apply Roundup WeatherMAX® Herbicide at a minimum of 22 oz/A before weeds exceed 4" in height. Warrant® Herbicide or Warrant® Ultra Herbicide may be applied postemergence to soybeans for residual control of small grasses and small-seeded broadleaf weeds.
- If an additional flush of weeds occurs, a sequential application of Roundup WeatherMAX® Herbicide tank-mixed with additional herbicides before weeds exceed 4" in height may be needed.

- If using another approved glyphosate agricultural herbicide, you must refer to the label booklet or supplemental labeling for the use of that product on Genuity® Roundup Ready 2 Yield® Soybeans to determine appropriate use rates.
- If using Roundup PowerMAX® or Roundup PowerMAX® II Herbicide, application rates are the same as for Roundup WeatherMAX® Herbicide.
- Refer to individual product labels for approved tank-mix partners.
- Equipment should be cleaned before moving from field to field to help minimize the spread of weed seed.
- Report any incidence of repeated non-performance of Roundup® Agricultural Herbicides or other glyphosate products on a particular weed to the appropriate company representative, local retailer or county extension agent.

Additional Information

Weeds such as pigweed, lambsquarters, waterhemp and giant ragweed tend to emerge throughout the season. Sequential Roundup WeatherMAX® Herbicide applications or the addition of a soil residual herbicide may be required for control of subsequent weed flushes.

Various weed biotypes are known to be resistant to glyphosate. For the current weed control recommendations for glyphosate-resistant weed biotypes, refer to www.RoundupReadyPLUS.com or call **1-800-768-6387**. A complete list of specimen labels can be located at monsanto.com/products/safety-information/msds/. Approved labels, including supplemental labeling, for Roundup® Agricultural Herbicides must be in the possession of the user at the time of pesticide application and can be obtained by calling 1-800-768-6387 or by contacting your State Pesticide Lead Agency for more information. Various weed biotypes are known to be resistant to other herbicides as well. Use herbicides and combinations of herbicides that will control the weed biotypes and species that are present on your farm.

Planting Recommendation

Soybean fatty acid composition can be affected by temperatures during grain fill, with warmer temperatures having shown a positive impact on oleic acid levels. In research trials under normal planting timeframes, Vistive® Gold Soybeans have performed as expected. To minimize the risk of adverse temperatures during grain fill it is recommended that Vistive® Gold Soybeans are planted timely.

Acceleron® Offerings



The Acceleron® portfolio helps protect your seed investment against diseases, insects and nematodes, as well as moisture or nutrient stress.

Fungicides

Four key diseases cost soybean growers over 90M in bushels per year. Our exclusive combinations of fungicides protect against these top diseases, including *Fusarium*, *Pythium*, early season *Phytophthora* and *Rhizoctonia solani*.

Insecticides

Early season soybean insects feed on seeds and seedlings, which can cause delayed emergence, stand loss, plant injury and stunting. Our insecticides control 9 early season insects — including bean leaf beetles, early season soybean aphids and seedcorn maggot — that cause significant damage to soybean crops across the U.S.

Nematicides

Nematodes cost an estimated 10.6% yield loss in soybeans¹. They pierce and infect roots causing a loss of nutrients and water, while opening the door for secondary issues. NemaStrike™

Technology controls a wide range of nematodes, including SCN, for up to 75 days.

Bio-Enhancers

Nutrient and moisture deficiencies can impair root growth, making it even harder for plants to get the nutrients and moisture they need. Bio-Enhancers for soybeans make nutrients available to plants, helping maximize yield potential. While benefits vary by crop, some products can also enhance functional root volume and increase nutrient uptake, protecting plants from moisture or nutrient stress.

Acceleron® Seed Applied Solutions

The tiers of Acceleron® Seed Applied Solutions available on soybean products in 2019 are shown below.

Additional Offerings

Acceleron® E-007 SAT, Acceleron® B-200 SAT, ILeVO® and products with Optimize® XC, TagTeam® LCO XC and QuickRoots® Technologies.

For more information, talk to your local retailer or visit acceleronsas.com and nemastriketechnology.com.

For important information related to stewardship and best management practices for seed treatments, refer to page 14 in the Stewardship Overview of this Technology Use Guide.

¹ Nationwide estimated loss. Ferris, Howard. "Nematodes and Plant Damage." University of California, 1 Oct. 2015. Web.

2019 Soybean Offerings

The screenshot displays the 2019 Soybean Offerings website with four product tiers: BASIC, STANDARD, STANDARD FN, and ELITE. Each tier is represented by a card with a header, icons for Fungicides, Insecticides, Nematicides, and Bio-Enhancers, and a detailed description of the product's benefits.

- BASIC:** Includes Fungicides (Protection against *Pythium*, early season *Phytophthora*, *Rhizoctonia solani* and *Fusarium* from an exclusive combination of fungicides and more rapid and increased emergence of seedlings under certain cold conditions), Insecticide (Protection from pests including bean leaf beetles, early season soybean aphids, and seedcorn maggot), and Fungicides (Protection against *Pythium*, early season *Phytophthora*, *Rhizoctonia solani* and *Fusarium* from an exclusive combination of fungicides and more rapid and increased emergence of seedlings under certain cold conditions).
- STANDARD:** Includes Fungicides (Protection against *Pythium*, early season *Phytophthora*, *Rhizoctonia solani* and *Fusarium* from an exclusive combination of fungicides and more rapid and increased emergence of seedlings under certain cold conditions), Insecticide (Protection from pests including bean leaf beetles, early season soybean aphids, and seedcorn maggot), and Nematode Control (Up to 75 days of broad-spectrum control of plant-parasitic nematodes that includes, but is not limited to, SCN, Root-Knot, and Reniform).
- STANDARD FN:** Includes Fungicides (Protection against *Pythium*, early season *Phytophthora*, *Rhizoctonia solani* and *Fusarium* from an exclusive combination of fungicides and more rapid and increased emergence of seedlings under certain cold conditions), Insecticide (Protection from pests including bean leaf beetles, early season soybean aphids, and seedcorn maggot), and Nematode Control (Up to 75 days of broad-spectrum control of plant-parasitic nematodes that includes, but is not limited to, SCN, Root-Knot, and Reniform).
- ELITE:** Includes Fungicides (Protection against *Pythium*, early season *Phytophthora*, *Rhizoctonia solani* and *Fusarium* from an exclusive combination of fungicides and more rapid and increased emergence of seedlings under certain cold conditions), Insecticide (Protection from pests including bean leaf beetles, early season soybean aphids, and seedcorn maggot), and Nematode Control (Up to 75 days of broad-spectrum control of plant-parasitic nematodes that includes, but is not limited to, SCN, Root-Knot, and Reniform).

Canola technologies



Genuity® Roundup Ready® Spring Canola combines in-plant tolerance to glyphosate herbicides with a high-yield potential product.



Genuity® Roundup Ready® Winter Canola combines in-plant tolerance to glyphosate herbicides with a high-yield potential product developed for seeding in the fall and harvesting in the following spring/summer.



TruFlex canola with Roundup Ready® Technology is part of an improved system designed for a range of growing conditions, providing high-yield potential varieties that have tolerance to glyphosate herbicides while enabling a wider application window for grower flexibility and better weed control and crop safety.



DEKALB® LibertyLink® canola contains the LibertyLink® Trait combining in-plant tolerance to glufosinate herbicides with a high-yield potential product.



TruFlex™ canola with Roundup Ready® and LibertyLink® Technologies is part of an improved system designed for a range of growing conditions, providing high-yield potential varieties that have tolerance to glyphosate and glufosinate herbicides providing additional weed control options and enabling a wider application window for grower flexibility and better weed control and crop safety.



Acceleron® BioAg™ products provide microbial-based solutions designed to help growers produce more with less in a sustainable way that benefits agriculture, consumers and the environment. Acceleron® BioAg™ brand offerings for canola include products with Jumpstart® and QuickRoots® Technologies. For more information, talk to your local retailer or discover more at acceleronsas.com.

Genuity® Roundup Ready® Spring Canola



Genuity® Roundup Ready® Spring Canola products contain in-plant tolerance to glyphosate, the active ingredient in Roundup® Agricultural Herbicides.

You can spray Genuity® Roundup Ready® Spring Canola with Roundup® Agricultural Herbicides in-crop from emergence through the 6-leaf stage of development.

The introduction of the Roundup Ready® Trait into leading spring canola brands and varieties gives growers the opportunity for unsurpassed weed control, proven crop safety and maximum yield potential. With Genuity® Roundup Ready® Spring Canola, growers have the weed management tools necessary to help improve spring canola profitability, while providing a viable rotational crop to help break pest and disease cycles in cereal-growing areas.

Planting Limitation

Grower must not plant Genuity® Roundup Ready® Spring Canola in any wildlife feed plots.

Weed Management

Recommendations

Follow all pesticide product labeling. If there is any conflict between the recommendations in this guide and applicable pesticide product labeling, the pesticide product labeling controls. Follow the recommendations below to help minimize the risk of developing glyphosate-resistant weed populations in a Genuity® Roundup Ready® Spring Canola System:

- Scout fields before and after each burndown and in-crop application.
- Start with a clean field, using either a burndown herbicide application, residual herbicide or tillage, making sure weeds are controlled at planting.
- In-crop, apply Roundup WeatherMAX® Herbicide before weeds exceed 3" in height.
- A sequential application of Roundup WeatherMAX® Herbicide may be needed.
- Use mechanical weed control, cultivation and/or residual herbicides where appropriate in your Genuity® Roundup Ready® Spring Canola.
- In other Roundup Ready® crops rotated with Genuity® Roundup Ready® Spring Canola, it is important to use additional herbicide mechanisms of action, residual herbicides and/or mechanical weed control to minimize development of herbicide tolerant weeds. Equipment should be cleaned before moving from field to field to help minimize the spread of weed seed.

- There are several options for control of volunteer Genuity® Roundup Ready® Spring Canola in rotational crops, including Soybeans with Roundup Ready® Technology and Roundup Ready® Sugarbeets. Talk to your local seed representative or dealer for suggestions that fit your area.
- Report any incidence of repeated non-performance of Roundup® Agricultural Herbicides or other glyphosate products on a particular weed to the appropriate company representative, local retailer or county extension agent.

Application of Roundup® Agricultural Herbicide

- Spray canola from emergence to the 6-leaf stage of growth. To help maximize yield potential, spray Genuity® Roundup Ready® Spring Canola at the 1- to 3-leaf stage to eliminate competing weeds. Short-term yellowing may occur with later applications, with little effect on crop growth, maturity, or yield.
- Wait a minimum of 10 days between applications. Two applications of Roundup WeatherMAX® Herbicide can:
 - Control late flushes of annual weeds such as foxtail, pigweed and wild mustard.
 - Provide season-long suppression of Canada thistle, quackgrass and perennial sow thistle.
 - Provide better yield potential by eliminating competition from both annuals and hard-to-control perennials.
- If using another approved glyphosate agricultural herbicide, you must refer to the label booklet or supplemental labeling for the use of that product on Genuity® Roundup Ready® Spring Canola for appropriate use rates.
- If using Roundup PowerMAX® or Roundup PowerMAX® II Herbicide, application rates are the same as for Roundup WeatherMAX® Herbicide.
- Maximum use rates apply to the total amount applied of all glyphosate-containing products. See the Roundup WeatherMAX® Herbicide label for more information on maximum use rates.

Additional Information

Various weed biotypes are known to be resistant to glyphosate. For the current weed control recommendations for glyphosate-resistant weed biotypes, refer to RoundupReadyPLUS.com or call **1-800-768-6387**. Approved supplemental labeling for Monsanto herbicide products can be obtained by calling 1-800-768-6387. A complete list of specimen labels can be located at monsanto.com/products/safety-information/msds/. Approved labels, including supplemental labeling, for Roundup® Agricultural Herbicides must be in the possession of the user at the time of pesticide application and can be obtained by calling 1-800-768-6387 or by contacting your State Pesticide Lead Agency for more information.

Genuity® Roundup Ready® Winter Canola



Genuity® Roundup Ready® Winter Canola products have been developed for seeding in the fall and harvesting the following spring/summer.

Genuity® Roundup Ready® Winter Canola brands and varieties contain in-plant tolerance to the active ingredient glyphosate in Roundup® Agricultural Herbicides, so you can spray Genuity® Roundup Ready® Winter Canola with Roundup® Agricultural Herbicides in-crop from emergence to the pre-bolting stage.

The introduction of the Roundup Ready® Trait into winter canola products gives growers the opportunity of unsurpassed weed control, crop safety and maximum yield potential. Genuity® Roundup Ready® Winter Canola offers growers an important option as a rotational crop in traditional monoculture winter wheat production areas. Introducing crop rotation is an important factor in reducing pest cycles, including weed and disease problems.

Grazing

Monsanto recommends that Genuity® Roundup Ready® Winter Canola not be grazed. While Genuity® Roundup Ready® Winter Canola may in the future provide growers additional opportunity as a forage for grazing livestock, at the present time insufficient information exists to allow safe and proper grazing recommendations. Preliminary data suggest that excessive grazing can significantly reduce yield, and that careful nitrate management is critical in managing Genuity® Roundup Ready® Winter Canola as a forage to limit the risk of livestock nitrate poisoning. State universities are assessing that potential and the appropriate instructions for grazing Genuity® Roundup Ready® Winter Canola. They will provide grazing management guidelines when their research is completed.

Planting Limitation

Grower must not plant Genuity® Roundup Ready® Winter Canola in any wildlife feed plots.

Weed Management

Recommendations

Follow all pesticide product labeling. If there is any conflict between these recommendations and applicable pesticide product labeling, the pesticide product labeling controls. Follow the recommendations below to help minimize the risk of developing glyphosate-resistant weed populations in a Genuity® Roundup Ready® Winter Canola System:

- Scout fields before and after each burndown and in-crop application.
- Start with a clean field, using either a burndown herbicide, residual herbicide or tillage, making sure weeds are controlled at planting.
- In-crop, apply Roundup WeatherMAX® Herbicide before weeds exceed 3" in height.
- A sequential application of Roundup WeatherMAX® Herbicide may be needed.
- Use mechanical weed control, cultivation and/or residual herbicides where appropriate in your Genuity® Roundup Ready® Winter Canola.
- In other Roundup Ready® crops rotated with Genuity® Roundup Ready® Winter Canola, it is important to use additional herbicide mechanisms of action, residual herbicides and/or mechanical weed control.
- Equipment should be cleaned before moving from field to field to minimize the spread of weed seed.
- There are several options for control of volunteer Genuity® Roundup Ready® Winter Canola in rotational crops. Talk to your local seed representative or dealer for suggestions that fit your area.
- Report any incidence of repeated non-performance of Roundup® Agricultural Herbicides or other glyphosate products on a particular weed to the appropriate company representative, local retailer or county extension agent.
- Spray when Genuity® Roundup Ready® Winter Canola is at the 2–3 leaf stage of growth. Early applications can eliminate competing weeds and improve yield potential.
- Two applications of Roundup WeatherMAX® Herbicide can provide control of early emerging annual weeds and winter emerging weeds such as downy brome, cheat and jointed goatgrass.
- For sequential applications, spray Genuity® Roundup Ready® Winter Canola at the 2–3 leaf stage and when weeds are small and actively growing. Applications must be made prior to bolting. Use the higher rate in the range when weed densities are high, when weeds have overwintered or when weeds become large and well established.

- Application of greater than 16 oz/A prior to the 6-leaf stage could result in temporary yellowing and/or growth reduction.
- If using another approved glyphosate agricultural herbicide, you must refer to the label booklet or supplemental labeling for the use of that product on Genuity® Roundup Ready® Winter Canola for appropriate use rates.
- If using Roundup PowerMAX® or Roundup PowerMAX® II Herbicide, application rates are the same as for Roundup WeatherMAX® Herbicide.
- Maximum use rates apply to the total amount applied of all glyphosate-containing products. See the Roundup WeatherMAX® Herbicide label for more information on maximum use rates.

Additional Information

Various weed biotypes are known to be resistant to glyphosate. For the current weed control recommendations for glyphosate-resistant weed biotypes, refer to **RoundupReadyPLUS.com** or call **1-800-768-6387**. A complete list of specimen labels can be located at **monsanto.com/products/safety-information/msds/**.

Approved labels, including supplemental labeling, for Roundup® Agricultural Herbicides must be in the possession of the user at the time of pesticide application and can be obtained by calling 1-800-768-6387 or by contacting your State Pesticide Lead Agency for more information.



TruFlex™ Canola with Roundup Ready® Technology



TruFlex™ canola with Roundup Ready® Technology is part of an improved system designed for a range of growing conditions, providing high-yield potential varieties and improved tolerance to glyphosate herbicides, delivering better weed control and crop safety over current Roundup Ready® canola products.

The TruFlex™ Canola System enables a wider application window providing growers with up to 10-14 more spray days than our current technology. The TruFlex™ Canola System allows for the control of a broad spectrum of tough-to-control weeds including cleavers, foxtail barley and wild buckwheat. It will also help enable season-long dandelion control. TruFlex™ canola will also allow growers the option to apply Roundup WeatherMAX® Herbicide in-crop at a rate of 44 oz/A for a single application up to the 6-leaf stage with improved crop safety. And with the added benefit of a wider window of application that extends past the 6-leaf stage all the way to the first flower, growers will have more flexibility to manage in-crop applications.

TruFlex™ canola has received full approval for planting in the United States and is pending approval in certain export markets. Availability is subject to Monsanto's decision to commercialize, and product brand names may change. 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. As of November 1, 2018, this product has been approved for import in Canada, European Union, Japan, Korea, Mexico and Taiwan. 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. Growers should refer to biotradestatus.com for any updated information on import country approvals.

Planting Limitation

Grower must not plant products with TruFlex™ canola technology in any wildlife feed plots.

Weed Management

Recommendations

Follow all pesticide product labeling. If there is any conflict between these recommendations and applicable pesticide product labeling, the pesticide product labeling controls. Follow the recommendations below to help minimize the risk of developing glyphosate-resistant weed populations in a TruFlex™ Canola System:

- Scout fields before and after each burndown and in-crop application.
- Start with a clean field, using either a burndown herbicide application, residual herbicide or tillage, making sure weeds are controlled at planting.
- In-crop, apply Roundup WeatherMAX® Herbicide before weeds exceed 3" in height.
- A sequential application of Roundup WeatherMAX® Herbicide may be needed.
- If weather or a late flush of weeds occurs, you may spray up to first flower.
- Use mechanical weed control, cultivation and/or residual herbicides where appropriate in your TruFlex™ canola.
- Use additional herbicide mechanisms of action, residual herbicides and/or mechanical weed control in other Roundup Ready® Crops rotated with TruFlex™ canola.
- Equipment should be cleaned before moving from field to field to help minimize the spread of weed seed.
- There are several options for control of volunteer TruFlex™ canola in rotational crops, including Soybeans with Roundup Ready® Technology and Roundup Ready® Sugarbeets. Talk to your local seed representative or dealer for suggestions that fit your area.
- Report any incidence of repeated non-performance of Roundup® Agricultural Herbicides or other glyphosate products on a particular weed to the appropriate company representative, local retailer or county extension agent.



Application of Roundup® Agricultural Herbicide

- Spray when canola is at emergence to 6-leaf stage of growth. To help maximize yield potential, spray TruFlex™ canola at the 1- to 3-leaf stage to eliminate competing weeds. Short-term yellowing may occur with later applications, with little effect on crop growth, maturity, or yield.
- No more than two in-crop applications may be made from emergence through first flower, with a total in-crop application not exceeding 44 oz/A.
- No more than 22 oz/A may be applied in-crop after the 6-leaf stage.
- Wait a minimum of 10 days between applications. Two applications of Roundup WeatherMAX® Herbicide can:
 - Control late flushes of annual weeds such as foxtail, pigweed and wild mustard.
 - Provide season-long suppression of Canada thistle, quackgrass and perennial sow thistle.
 - Provide better yield potential by eliminating competition from both annuals and hard-to-control perennials.
- If using another approved glyphosate agricultural herbicide, you must refer to the label booklet or supplemental labeling for the use of that product on TruFlex™ canola for appropriate use rates.

- If using Roundup PowerMAX® or Roundup PowerMAX® II Herbicide, application rates are the same as for Roundup WeatherMAX® Herbicide.
- Maximum use rates apply to the total amount applied of all glyphosate-containing products. See the Roundup WeatherMAX® Herbicide label for more information on maximum use rates.

Additional Information

Various weed biotypes are known to be resistant to glyphosate. For the current weed control recommendations for glyphosate-resistant weed biotypes, refer to **RoundupReadyPLUS.com** or call **1-800-768-6387**. Approved supplemental labeling for Monsanto herbicide products can be obtained by calling 1-800-768-6387. A complete list of specimen labels can be located at **monsanto.com/products/safety-information/msds/**. Approved labels, including supplemental labeling, for Roundup® agricultural herbicides must be in the possession of the user at the time of pesticide application and can be obtained by calling 1-800-768-6387 or by contacting your State Pesticide Lead Agency for more information.

DEKALB® LibertyLink® Canola



DEKALB® LibertyLink® canola contains the LibertyLink® Trait, combining in-plant tolerance to glufosinate herbicides with a high-yield potential product. The LibertyLink® Trait allows growers to spray glufosinate in-crop for nonselective postemergence control of the toughest weeds, including Palmer amaranth, giant ragweed, waterhemp, kochia, wild buckwheat and marehail.



DEKALB® LibertyLink® canola has received full approval for planting in the United States and is pending approval in certain export markets. **Availability is subject to Monsanto's decision to commercialize, and product brand names may change.** For canola products containing the LibertyLink® trait, grower must hold a valid and current BASF Liberty® and Trait Agreement before Grower purchases such products. 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. As of November 1, 2018, this product has been approved for import in Canada, European Union, Japan, Korea, Mexico and Taiwan. 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. Growers should refer to biotradestatus.com for any updated information on import country approvals.

Weed Management

Recommendations

Follow all pesticide product labeling. If there is any conflict between the recommendations in this guide and applicable pesticide product labeling, the pesticide product labeling controls. Follow the recommendations below to help minimize the risk of developing glufosinate-resistant weed populations in a DEKALB® LibertyLink® Canola System:

- Scout fields before and after each burndown and in-crop application.
- Start with a clean field, using either a burndown herbicide application, residual herbicide or tillage, making sure weeds are controlled at planting.
- In-crop, apply glufosinate herbicide before weeds exceed 3" in height.
- A sequential application of glufosinate may be needed.
- Use mechanical weed control, cultivation and/or residual herbicides where appropriate in your DEKALB® LibertyLink® canola.
- Use additional herbicide mechanisms of action, residual herbicides and/or mechanical weed control in other LibertyLink® crops rotated with DEKALB® LibertyLink® canola.
- Equipment should be cleaned before moving from field to field to help minimize the spread of weed seed.
- There are several options for control of volunteer DEKALB® LibertyLink® canola in rotational crops, including soybeans with Roundup Ready® Technology and Roundup Ready® Sugarbeets. Talk to your local seed representative or dealer for suggestions that fit your area.
- Report any incidence of repeated non-performance of glufosinate agricultural herbicides on a particular weed to the appropriate company representative, local retailer or county extension agent.

Additional Information

- Spray when canola is at the cotyledon- to early-bolt stage of growth.
- Slight discoloration of the canola may be visible after application. This effect is temporary and will not influence the crop growth, maturity or yield.
- Wait a minimum of 10 days between applications. Two applications of glufosinate can:
 - Control late flushes of annual weeds such as foxtail, pigweed and wild mustard.
 - Provide season-long suppression of Canada thistle, quackgrass and perennial sow thistle.
 - Provide better yield potential by eliminating competition from both annuals and hard-to-control perennials.

- Do not apply glufosinate within 65 days of harvest.
- Do not graze the treated crop or cut for hay.
- If using another approved glufosinate agricultural herbicide, you must refer to the label booklet or supplemental labeling for the use of that product on DEKALB® LibertyLink® canola for appropriate use rates.

Various weed biotypes are known to be resistant to glufosinate. For the current weed control recommendations for glyphosate-resistant weed biotypes, refer to RoundupReadyPLUS.com or call **1-800-768-6387**. Approved supplemental labeling for Monsanto herbicide products can be obtained by calling 1-800-768-6387. A complete list of specimen labels can be located at monsanto.com/products/safety-information/msds/. Approved labels, including supplemental labeling, for Liberty® Herbicide must be in the possession of the user at the time of pesticide application and can be obtained by calling 1-800-768-6387 or by contacting your State Pesticide Lead Agency for more information.

Application of Liberty® Herbicide

Apply Liberty® Herbicide at 22-29 oz/A, plus graminicide, over the top of DEKALB® LibertyLink® canola from emergence to 10 days after crop emergence or when weeds are 3" or less.

Apply Liberty® Herbicide at 22-29 oz/A on an as-needed basis following the first application of 22-29 oz/A. If sequential applications are planned, apply the second application a minimum of 7 days after the first application.

Maximum seasonal use: up to 87 oz/A of Liberty® Herbicide can be applied on canola per growing season. This includes pre-plant burndown and in-season postemergence use.

Addition of ammonium sulfate is recommended at 1.5 to 3.0 lb/A to improve control of difficult-to-control weeds. Rates are dependent on tankmix partners, environmental conditions, temperatures and potential for leaf burn.

Refer to all federal, state and local herbicide labeling for planting restrictions.

Do not graze treated crop or cut for hay.

TruFlex™ Canola with Roundup Ready® and LibertyLink® Technologies



TruFlex™ canola with Roundup Ready® and LibertyLink® Technologies is part of an improved system designed for a range of growing conditions, providing high-yield potential varieties that have tolerance to glyphosate and glufosinate herbicides providing additional weed control options and enabling a wider application window for grower flexibility and better weed control and crop safety.

TruFlex™ canola with Roundup Ready® and LibertyLink® Technologies provides growers with up to 10-14 more spray days than our current technology. The TruFlex™ canola with Roundup Ready® and LibertyLink® Technologies System allows for the control of a broad spectrum of tough-to-control weeds including cleavers, foxtail barley and wild buckwheat. It will also help enable season-long dandelion control. TruFlex™ canola with Roundup Ready® and LibertyLink® Technologies will also allow growers the option to apply Roundup WeatherMAX® Herbicide in-crop at a rate of 44 oz/A for a single application or 22 oz/A for two applications, controlling 24 new weed species — all with improved crop safety. And with the added benefit of a wider window of application that extends past the 6-leaf stage all the way to the first flower, growers will have more flexibility to manage their in-crop applications.

TruFlex™ canola with Roundup Ready® and LibertyLink® Technologies also provides the added flexibility of the LibertyLink® Trait which allows growers to spray glufosinate in-crop for nonselective postemergence control of the toughest weeds, including Palmer amaranth, giant ragweed, waterhemp, kochia, wild buckwheat and marestalk.

TruFlex™ canola with Roundup Ready® and LibertyLink® Technologies has received full approval for planting in the United States and is pending approval in certain export markets. **Availability is subject**

to Monsanto's decision to commercialize, and product brand names may change. For canola products containing the LibertyLink® trait, grower must hold a valid and current BASF Liberty® and Trait Agreement before Grower purchases such products.

Planting Limitation

Grower must not plant TruFlex™ canola with Roundup Ready® and LibertyLink® Technologies in any wildlife feed plots.

Weed Management

Recommendations

Follow all pesticide product labeling. If there is any conflict between the recommendations in this guide and applicable pesticide product labeling, the pesticide product labeling controls. Follow the recommendations below to help minimize the risk of developing glyphosate-resistant weed populations in a TruFlex™ canola with Roundup Ready® and LibertyLink® Technologies System:

- Scout fields before and after each burndown and in-crop application.
- Start with a clean field, using either a burndown herbicide application, residual herbicide or tillage, making sure weeds are controlled at planting.

- In-crop, apply Roundup WeatherMAX® Herbicide before weeds exceed 3" in height.
- A sequential application of Roundup WeatherMAX® Herbicide may be needed.
- If weather or a late flush of weeds occurs, you may spray up to first flower.
- Use mechanical weed control, cultivation and/or residual herbicides where appropriate in your TruFlex™ canola with Roundup Ready® and LibertyLink® Technologies.
- Use additional herbicide mechanisms of action, residual herbicides and/or mechanical weed control in other Roundup Ready® Crops rotated with TruFlex™ canola with Roundup Ready® and LibertyLink® Technologies.
- Equipment should be cleaned before moving from field to field to help minimize the spread of weed seed.
- There are several options for control of volunteer TruFlex™ canola with Roundup Ready® and LibertyLink® Technologies in rotational crops, including Soybeans with Roundup Ready® Technology and Roundup Ready® Sugarbeets. Talk to your local seed representative or dealer for suggestions that fit your area.
- Report any incidence of repeated non-performance of Roundup® Agricultural Herbicides or other glyphosate products on a particular weed to the appropriate company representative, local retailer or county extension agent.

Application of Roundup Agricultural Herbicide

- Spray when canola is at the 0- to 6-leaf stage of growth. To help maximize yield potential, spray TruFlex™ canola with Roundup Ready® and LibertyLink® Technologies at the 1- to 3-leaf stage to eliminate competing weeds. Short-term yellowing may occur with later applications, with little effect on crop growth, maturity, or yield.
- No more than two in-crop applications may be made from emergence through first flower, with a total in-crop application not exceeding 44 oz/A.
- No more than 22 oz/A may be applied in-crop after the 6-leaf stage.
- Wait a minimum of 10 days between applications. Two applications of Roundup WeatherMAX® Herbicide can:
 - Control late flushes of annual weeds such as foxtail, pigweed and wild mustard.
 - Provide season-long suppression of Canada thistle, quackgrass and perennial sow thistle.
 - Provide better yield potential by eliminating competition from both annuals and hard-to-control perennials.
- If using another approved glyphosate agricultural herbicide, you must refer to the label booklet or supplemental labeling for the use of that product on TruFlex™ canola with Roundup Ready® and LibertyLink® Technologies for appropriate use rates.

- If using Roundup PowerMAX® or Roundup PowerMAX® II Herbicide, application rates are the same as for Roundup WeatherMAX® Herbicide.
- Maximum use rates apply to the total amount applied of all glyphosate-containing products. See the Roundup WeatherMAX® Herbicide label for more information on maximum use rates.

Additional Information

A tank mix of Roundup WeatherMAX® Herbicide and glufosinate may result in reduced weed control. An early application of Roundup WeatherMAX® Herbicide is recommended up to 3-leaf stage, followed by an application of Liberty® Herbicide (no later than 6-leaf stage).

Various weed biotypes are known to be resistant to glyphosate and glufosinate. For the current weed control recommendations for glyphosate-resistant weed biotypes, refer to **RoundupReadyPLUS.com** or call **1-800-768-6387**. Approved supplemental labeling for Monsanto herbicide products can be obtained by calling 1-800-768-6387. A complete list of specimen labels can be located at **monsanto.com/products/safety-information/msds/**. Approved labels, including supplemental labeling, for Liberty® and Roundup® Agricultural Herbicides must be in the possession of the user at the time of pesticide application and can be obtained by calling 1-800-768-6387 or by contacting your State Pesticide Lead Agency for more information.

Application of Liberty® Herbicide

Apply Liberty® Herbicide at 22-29 oz/A, plus graminicide, over the top of TruFlex™ canola with Roundup Ready® and LibertyLink® Technologies from emergence to 10 days after crop emergence or when weeds are 3" or less.

Apply Liberty® Herbicide at 22-29 oz/A on an as-needed basis following the first application of 22-29 oz/A. If sequential applications are planned, apply the second application a minimum of 10 days after the first application.

Maximum seasonal use: up to 87 oz/A of Liberty® Herbicide can be applied on canola per growing season. This includes pre-plant burndown and in-season postemergence use.

Do not apply glufosinate within 65 days of harvest.

Addition of ammonium sulfate is recommended at 1.5 to 3.0 lb/A to improve control of difficult-to-control weeds. Rates are dependent on tank mix partners, environmental conditions, temperatures and potential for leaf burn.

Refer to all federal, state and local herbicide labeling for planting restrictions.

Do not graze treated crop or cut for hay.

Crop or Material Handling Stewardship Statement

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. As of November 1, 2018, this product has been approved for import in Canada, European Union, Japan, Korea, Mexico and Taiwan. 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. Growers should refer to **biotradestatus.com** for any updated information on import country approvals.

Volunteer Canola Containing Roundup Ready® and/or LibertyLink® Technologies

Canola can present unique challenges as a volunteer plant due to the persistence of seeds in the soil; a small seed size that allows it to easily be moved by equipment, wind or water; pollen movement from flowering plants; and the ability for a single plant to produce large number of seeds.

The introduction of herbicide tolerance in canola did not change the fundamental reasons volunteer canola can occur, but does require that growers consider that Roundup Ready® and LibertyLink® Technologies (and other herbicide tolerance traits) may be present in volunteers when developing volunteer management plans for canola.



In addition to cultural control methods, there are numerous herbicide products that can be used to control volunteer canola containing Roundup Ready® Technology (or other herbicide tolerance traits) in cropping systems.

- If field scouting identifies volunteer canola prior to a burn down or pre-harvest application with a glyphosate herbicides, it is recommended to tank mix additional herbicides labeled for that use and that control volunteer canola (including other herbicide tolerant canola types) to ensure all volunteer canola, including any canola volunteers containing Roundup Ready® technology are controlled.
- If field scouting identifies volunteer canola in another crop containing Roundup Ready® and/or LibertyLink® Technology, it is recommended to tank mix additional herbicides labelled for use in that crop type that control volunteer canola, including other herbicide tolerant canola types, with Roundup WeatherMAX®, Liberty® or other labeled glyphosate herbicides to ensure all volunteer canola, including any canola volunteers containing Roundup Ready® and/or LibertyLink® Technology are controlled.
- Where conventional tillage is used, light cultivation provides effective control of all canola volunteers, including any containing Roundup Ready® and/or LibertyLink® Technology.

For additional information visit www.monsantocms.ca or call the Monsanto Technical Support Line at **1-800-667-4944**.



Alfalfa technologies



Roundup Ready® Alfalfa products have in-plant tolerance to the active ingredient glyphosate in Roundup® agricultural herbicides.



HarvXtra® Alfalfa with Roundup Ready® Technology products contain the biotechnology-derived trait developed to maximize alfalfa quality compared to commercially available alfalfa harvested at the same growth stage, by reducing the amount of lignin in the plant.

Roundup Ready® Alfalfa Technology



Roundup Ready® Alfalfa products have in-plant tolerance to the active ingredient glyphosate in Roundup® agricultural herbicides, enabling growers to apply Roundup® Agricultural Herbicides up to

5 days before cutting for unsurpassed weed control with excellent crop safety and improved forage quality potential.

Planting Limitation

Grower must not plant Roundup Ready® Alfalfa in any wildlife feed plots, and must not plant Roundup Ready® Alfalfa for the production of sprouts.

Fly-on planting: Growers that choose to fly-on Roundup Ready® Alfalfa seed must control any resulting feral alfalfa.

Hay and Forage Management Requirements

Roundup Ready® Alfalfa must be managed for high quality hay/forage production, including timely cutting to promote high forage quality (i.e., generally before 10% bloom) and to prevent seed development.

- In areas where conventional alfalfa seed production or adventitious presence (AP) sensitive seed production is intermingled with forage production, Roundup Ready® Alfalfa must be harvested at or before 10% bloom to help minimize potential pollen flow from Roundup Ready® Alfalfa to conventional alfalfa, and the grower is responsible to control any feral alfalfa resulting from Roundup Ready® Alfalfa use.
- In all other areas Roundup Ready® Alfalfa must be harvested no later than 50% bloom.

Growers who are unwilling to or who cannot make these commitments to stewardship should not grow Roundup Ready® Alfalfa.

Roundup Ready® Alfalfa Technology continued

An in-crop weed control program using Roundup WeatherMAX®, Roundup PowerMAX® or Roundup PowerMAX® II Herbicide can provide excellent weed control in most situations. A residual herbicide labeled for use in alfalfa may also be applied postemergence in alfalfa. Contact a Monsanto Representative, local crop advisor or extension specialist to determine the best option for your situation.

Alfalfa In-Crop Rotation

Avoid planting alfalfa in a field from which an alfalfa crop has recently been removed. Recommended rotational crop sequences fall into two categories — grass crops (e.g., corn and cereal crops) and broadleaf crops.

Roundup Ready® Alfalfa Stand Takeout

Use appropriate, commercially available herbicide treatments in reduced tillage systems, or in combination with tillage, to terminate a Roundup Ready® Alfalfa stand.

If necessary, use tillage and/or additional herbicide application(s) after stand takeout, and prior to planting of the subsequent rotational crop to manage any newly-emerged or surviving alfalfa.

Note: Roundup® Agricultural Herbicides are not effective for terminating Roundup Ready® Alfalfa stands.



Crop Product Export

Grower must lawfully plant Roundup Ready® Alfalfa, direct any product produced from Roundup Ready® Alfalfa seed or crops (including hay and hay products) only to those countries where regulatory approvals have been granted, and grow and manage Roundup Ready® Alfalfa in accordance with the information found in this TUG. In addition, due to the unique cropping practices, do not plant Roundup Ready® Alfalfa in Imperial County, California, until Forage Genetics International, LLC (FGI) grants express permission for such planting. It is a violation of national and international laws to move material containing biotech traits across boundaries into nations where import is not permitted.

For more information and the latest updates on Roundup Ready® Alfalfa, call **1-855-227-8917**.

Management of Roundup Ready® Alfalfa Volunteers in Rotational Crop Fields

- In a timely manner, use recommended and commercially available mechanical and/or herbicidal methods for managing volunteer Roundup Ready® Alfalfa in rotational crop fields.
- Implement treatments before volunteers become too large to control or begin to compete with the rotational crop.
- Herbicide alternatives are available for management of volunteer alfalfa in grass crops.
- Rotation with certain broadleaf crops is not advisable if the grower is not willing to implement recommended stand termination practices.
- In the event that no known mechanical or herbicidal options are available to manage volunteer Roundup Ready® Alfalfa in the desired rotational crop, you should change to a crop with established volunteer management practices for that rotation.

Note: Roundup agricultural herbicides are not effective for terminating Roundup Ready® Alfalfa volunteers.

Stewardship

All Roundup Ready® Alfalfa growers are required to sign the Monsanto Technology Stewardship Agreement (TSA) limited-use license which provides the terms and conditions for the authorized use of the product. The TSA must be signed and approved before purchase or use of seed.

The TSA explicitly prohibits all forms of commercial seed harvest on the stand. Every grower of Roundup Ready® Alfalfa agrees to only lawfully plant Roundup Ready® Alfalfa, and not to plant Roundup Ready® Alfalfa for the production of seed, unless under specific contract to produce seed.

HarvXtra® Alfalfa with Roundup Ready® Technology



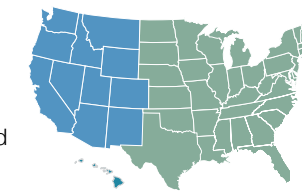
HarvXtra® Alfalfa with Roundup Ready® Technology products contain the biotechnology-

derived trait developed to maximize alfalfa quality compared to commercially available alfalfa harvested at the same growth stage, by reducing the amount of lignin in the plant.

This technology is designed to ease the yield versus quality trade-off currently faced by alfalfa producers by enabling them to maintain high-quality alfalfa longer. These products also have the same in-plant tolerance to glyphosate as Roundup Ready® Alfalfa, which enables growers to apply Roundup® Agricultural Herbicides up to 5 days before cutting for unsurpassed weed control with excellent crop safety.

Planting Limitation

Growers may plant HarvXtra® Alfalfa with Roundup Ready® Technology in the United States with the following states subject to execution of a Seed and Feed Use Agreement: Arizona, California, Colorado, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington and Wyoming.



All planting of HarvXtra® Alfalfa with Roundup Ready® Technology in the Western States shall include execution by the grower of a Seed and Feed Use Agreement noting that HarvXtra® with Roundup Ready® Technology can only be used on farm or otherwise only in the United States.

Grower must not plant HarvXtra® Alfalfa with Roundup Ready® Technology in any wildlife feed plots, and must not plant HarvXtra® Alfalfa with Roundup Ready® Technology for the production of sprouts.

Fly-on planting: Growers that choose to fly-on HarvXtra® Alfalfa with Roundup Ready® Technology seed must control any resulting feral alfalfa.

Stewarded Introduction for HarvXtra® Alfalfa with Roundup Ready® Technology

Growers must direct any product produced from HarvXtra® Alfalfa with Roundup Ready® Technology seed or crops (including hay and hay products) only to United States domestic use. In addition, due to the unique cropping practices do not plant HarvXtra® Alfalfa with Roundup Ready® Technology in Imperial County, California, until

Forage Genetics International, LLC (FGI) grants express permission for such planting. 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 product purchaser to confirm their buying position for this product. For more information and the latest updates on HarvXtra® Alfalfa with Roundup Ready® Technology, go to harvxtra.com or call **1-855-227-8917**.

Hay and Forage Management Requirements

HarvXtra® Alfalfa with Roundup Ready® Technology gives growers the options for managing for high quality hay/forage production, including timely cutting to promote high forage quality (i.e., generally before 10% bloom) or slightly delay harvest for higher tonnage without sacrificing acceptable forage quality, while still preventing seed.

- In areas where conventional alfalfa seed production or adventitious presence (AP) sensitive seed production is intermingled with forage production, HarvXtra® Alfalfa with Roundup Ready® Technology must be harvested at or before 10% bloom to help minimize potential pollen flow from HarvXtra® Alfalfa with Roundup Ready® Technology to conventional alfalfa, and grower is responsible to control any feral alfalfa resulting from HarvXtra® Alfalfa with Roundup Ready® Technology use.
- In all other areas HarvXtra® Alfalfa with Roundup Ready® Technology must be harvested at no later than 50% bloom.

Growers who are unwilling to or who cannot make these commitments to stewardship should not grow HarvXtra® Alfalfa with Roundup Ready® Technology.

An in-crop weed control program using Roundup WeatherMAX®, Roundup PowerMAX® or Roundup PowerMAX® II Herbicide can provide excellent weed control in most situations. A residual herbicide labeled for use in alfalfa may also be applied postemergence in alfalfa. Contact a Monsanto Representative, local crop advisor or extension specialist to determine the best option for your situation.

Alfalfa In-Crop Rotation

Avoid planting alfalfa in a field from which an alfalfa crop has recently been removed. Recommended rotational crop sequences fall into two categories—grass crops (e.g., corn and cereal crops) and broadleaf crops.

HarvXtra® Alfalfa with Roundup Ready® Technology continued

Crop Product Export

Grower must lawfully plant, grow and manage all HarvXtra® Alfalfa with Roundup Ready® Technology in accordance with the information found in this TUG. Grower must direct any product produced from HarvXtra® Alfalfa with Roundup Ready® Technology seed or crops (including hay and hay products) only to US domestic use. Do not export any product produced from HarvXtra® Alfalfa with Roundup Ready® Technology seed or crops (including hay and hay products).

It is a violation of national and international laws to move material containing biotech traits across boundaries into nations where import is not permitted.

For more information and the latest updates on HarvXtra® Alfalfa with Roundup Ready® Technology, go to the specialty tab at www.harvxtra.com.

HarvXtra® Alfalfa with Roundup Ready® Technology Stand Takeout

Use appropriate, commercially available herbicide treatments in reduced tillage systems, or in combination with tillage, to terminate a HarvXtra® Alfalfa with Roundup Ready® Technology stand.

If necessary, use tillage and/or additional herbicide application(s) after stand takeout, and prior to planting of the subsequent rotational crop to manage any newly emerged or surviving alfalfa.

Note: Roundup® agricultural herbicides are not effective for terminating HarvXtra® Alfalfa with Roundup Ready® Technology stands.

Management of HarvXtra® Alfalfa with Roundup Ready® Technology Volunteers in Rotational Crop Fields

In a timely manner, use recommended and commercially available mechanical and/or herbicidal methods for managing volunteer HarvXtra® Alfalfa with Roundup Ready® Technology in rotational crop fields.

- Implement treatments before volunteers become too large to control or begin to compete with the rotational crop.
- Herbicide alternatives are available for management of volunteer alfalfa in grass crops.
- Rotation with certain broadleaf crops is not advisable if the grower is not willing to implement recommended stand termination practices.
- In the event that no known mechanical or herbicidal options are available to manage volunteer HarvXtra® Alfalfa with Roundup Ready® Technology in the desired rotational crop, you should change to a crop with established volunteer management practices for that rotation.

Note: Roundup Agricultural Herbicides are not effective for terminating HarvXtra® Alfalfa with Roundup Ready® Technology volunteers.

Stewardship

All HarvXtra® Alfalfa with Roundup Ready® Technology growers are required to sign the Technology Stewardship Agreement (TSA) limited-use license which provides the terms and conditions for the authorized use of the product. The TSA must be signed and approved before purchase or use of seed.

For the 2019 growing season, growers must direct any product produced from HarvXtra® Alfalfa with Roundup Ready® Technology seed or crops (including hay and hay products) only to United States domestic use. All planting of HarvXtra® Alfalfa with Roundup Ready® Technology in the Western States shall include separate execution by the grower of a Seed and Feed Use Agreement (which is a term of the TSA) noting that HarvXtra® with Roundup Ready® Technology can only be used on farm or otherwise only in the United States.

The TSA explicitly prohibits all forms of commercial seed harvest on the stand. Every grower of HarvXtra® Alfalfa with Roundup Ready® Technology agrees to only lawfully plant HarvXtra® Alfalfa with Roundup Ready® Technology, and not to plant HarvXtra® Alfalfa with Roundup Ready® Technology for the production of seed, unless under specific contract to produce seed.

For more information and the latest updates on HarvXtra® Alfalfa with Roundup Ready® Technology, go to the specialty tab at harvxtra.com or call 1-855-227-8917.

Weed Management Recommendations

for Roundup Ready® Alfalfa and HarvXtra® Alfalfa with Roundup Ready® Technology

Recommendations

Subject to all pesticide label requirements, follow the recommendations below to help minimize the risk of developing glyphosate-resistant weed populations in HarvXtra® Alfalfa with Roundup Ready® Technology:

- Scout fields before and after each herbicide application.
- To help control flushes of weeds in established alfalfa, make applications of Roundup WeatherMAX®, Roundup PowerMAX® or Roundup PowerMAX® II Herbicide at 22 to 44 oz/A before weeds exceed 4" in height, up to 5 days before cutting.
- Use other approved herbicide products tank-mixed or in sequence with Roundup® agricultural herbicides as part of a HarvXtra® Alfalfa with Roundup Ready® Technology weed control program, if appropriate for the weed spectrum present.
- Report any incidence of repeated non-performance of Roundup® Agricultural Herbicides or other glyphosate products on a particular weed to the appropriate company representative, local retailer, or county extension agent.

To preserve the quality potential of forage and hay in established stands, apply Roundup WeatherMAX® Herbicide after weeds have emerged but before alfalfa re-growth interferes with application spray coverage of the target weeds.

Additional Recommendation

It has been reported that some growers of Roundup Ready® Alfalfa may have a limited, temporary crop response where glyphosate application is closely followed by freezing or near-freezing conditions or by large temperature swings.

Because glyphosate based herbicides are most effective in controlling actively growing weeds, application in these conditions is not recommended.

If freezing or near-freezing temperatures, or large temperature swings, are forecasted within 5 days after a planned glyphosate application to your Roundup Ready® Alfalfa and/or HarvXtra® Alfalfa with Roundup Ready® Technology, you should delay the application until those conditions are no longer forecasted.

Additional Information

Always start with a weed-free field. In no-till and reduced-till systems, apply a Roundup WeatherMAX® Herbicide burndown application to control existing weeds at least 1 to 2 weeks before planting.

An initial application of 22 to 44 oz/A of Roundup WeatherMAX® Herbicide should be applied at or before the 3 to 4 trifoliolate growth stage.

Note: Due to the genetic diversity of alfalfa, up to 10% of the seedlings are susceptible and will not survive the first application of Roundup® Agricultural Herbicides. The initial application is necessary to eliminate the effects of stand gaps created by loss of plants that are not Roundup Ready® and to ensure adequate spray coverage of emerging weeds before crop canopy interference.

- Applications between cuttings may be applied as a single application or in multiple applications (e.g., two applications of 22 oz/A). Sequential applications should be at least 7 days apart.
- If using another approved glyphosate agricultural herbicide, you must refer to the label booklet or supplemental labeling for the use of that product on HarvXtra® Alfalfa with Roundup Ready® Technology to determine appropriate use rates.
- Maximum use rates apply to the total amount applied of all glyphosate-containing products. See the Roundup WeatherMAX® Herbicide label for more information on maximum use rates.
- If using Roundup PowerMAX® or Roundup PowerMAX® II Herbicide, application rates are the same as for Roundup WeatherMAX® Herbicide.
- In addition to those weeds listed in the Roundup WeatherMAX® Herbicide label booklets, this product can suppress or control the parasitic weed, dodder (*Cuscuta spp.*) in HarvXtra® Alfalfa with Roundup Ready® Technology. Repeated applications might be necessary for complete control.
- For tough-to-control weeds or weeds not controlled by Roundup® Agricultural Herbicides, use labeled rates of other approved herbicides, alone or in tank-mixtures, with Roundup® Agricultural Herbicides.

Various weed biotypes are known to be resistant to glyphosate. For the current weed control recommendations for glyphosate-resistant weed biotypes, refer to RoundupReadyPLUS.com or call 1-800-768-6387. A complete list of specimen labels can be located at monsanto.com/products/safety-information/msds/. Approved labels, including supplemental labeling, for Roundup® Agricultural Herbicides must be in the possession of the user at the time of pesticide application and can be obtained by calling 1-800-768-6387 or by contacting your State Pesticide Lead Agency for more information.

Roundup Ready® Sugarbeets



Roundup Ready® Sugarbeet products have in-plant tolerance to the active ingredient glyphosate in Roundup® Agricultural Herbicides, enabling growers to apply labeled Roundup® Agricultural Herbicides from planting through 30 days prior to harvest for unsurpassed weed control, with excellent crop safety and preservation of yield potential.

Agronomic Principles in Sugarbeets

Roundup Ready® Sugarbeets provide a mechanism to control weeds at planting and after emergence of the crop.

Planting Limitation

Grower must not plant Roundup Ready® Sugarbeets in any wildlife feed plots.

Crop Product Export

Any product produced from a Roundup Ready® Sugarbeet crop or seed may only be used, exported to, processed or sold in countries where regulatory approvals have been granted. It is a violation of national and international laws to move material containing biotech traits across boundaries into nations where import is not permitted.

Stewardship

All Roundup Ready® Sugarbeet growers must sign the Monsanto Technology Stewardship Agreement (TSA) limited-use license which provides the terms and conditions for the authorized use of the product. The TSA must be signed and approved prior to purchase or use of seed.

Bolting sugarbeets must be rogued or topped in Roundup Ready® Sugarbeet fields.

The grower agrees to transport and plant Roundup Ready® Sugarbeets only for the production of a root crop, and not for seed production, unless under specific contract to produce seed.

Weed Management

Sugarbeets are extremely sensitive to weed competition for light, nutrients and soil moisture, and can lose yield potential rapidly if weeds are not controlled early. Sugarbeet weed control research suggests that sugarbeets need to be kept weed-free for the first eight weeks of growth to protect yield potential. Therefore, weeds must be controlled when they are small and before they compete with Roundup Ready® Sugarbeets (before weeds exceed crop height). More than one in-crop herbicide application will be required to help control weed infestations to protect yield potential as Roundup® agricultural herbicides have no soil residual activity.

A postemergence weed control program using Roundup WeatherMAX®, Roundup PowerMAX® or Roundup PowerMAX® II Herbicide can provide excellent weed control in most situations. A residual herbicide labeled for use in sugarbeets may also be applied preplant, preemergence or postemergence in Roundup Ready® Sugarbeets. Contact your sugarbeet seed representative, local crop advisor or extension specialist to determine the best option for your situation.

Recommendations

Follow all pesticide product labeling. If there is any conflict between these recommendations and applicable pesticide product labeling, the pesticide product labeling controls. Follow the recommendations below to help minimize the risk of developing glyphosate-resistant weed populations in Roundup Ready® Sugarbeets:

- Start with a clean field, using either a burndown herbicide application, residual herbicide or tillage, making sure weeds are controlled at planting.
- Early-season weed control is critical to protect sugarbeet yield potential. Apply the first in-crop application of Roundup WeatherMAX® Herbicide at a minimum of 22 oz/A while weeds are less than 2" in height.
- Follow with additional postemergence in-crop application of Roundup WeatherMAX® Herbicide at a minimum of 22 oz/A for additional weed flushes before weeds exceed 4" in height.

- Use mechanical weed control, cultivation and/or residual herbicides where appropriate.
- Use additional herbicide mechanisms of action, residual herbicides and/or mechanical weed control in other Roundup Ready® Crops you rotate with Roundup Ready® Sugarbeets.

Additional Information

- Add ammonium sulfate at a rate of 17 lbs/100 gallons of spray solution with Roundup® Agricultural Herbicides to help maximize product performance. Tank-mixtures of Monsanto brand labeled glyphosate herbicides with fungicides, insecticides, micronutrients or foliar fertilizers are not recommended. Sequential applications should be at least 10 days apart.
- For tough-to-control weeds or weeds not controlled by Monsanto brand labeled glyphosate herbicides, use labeled rates of other approved herbicides, alone or in tank-mixtures, with Monsanto brand labeled glyphosate herbicides.
- If using another approved glyphosate agricultural herbicide, you must refer to the label booklet or supplemental labeling for the use of that product on Roundup Ready® Sugarbeets for appropriate use rates.
- If using Roundup PowerMAX® or Roundup PowerMAX® II Herbicide, application rates are the same as for Roundup WeatherMAX® Herbicide.
- Maximum use rates apply to the total amount applied of all glyphosate-containing products. See the Roundup WeatherMAX® Herbicide label for more information on maximum use rates.
- Report any incidence of repeated non-performance of labeled glyphosate agricultural herbicides on a particular weed to the appropriate company representative, local retailer or county extension agent.

Various weed biotypes are known to be resistant to glyphosate. For the current weed control recommendations for glyphosate-resistant weed biotypes, refer to **RoundupReadyPLUS.com** or call **1-800-768-6387**. A complete list of specimen labels can be located at **monsanto.com/products/safety-information/msds/**. Approved labels, including supplemental labeling, for Roundup® Agricultural Herbicides must be in the possession of the user at the time of pesticide application and can be obtained by calling 1-800-768-6387 or by contacting your State Pesticide Lead Agency for more information.



Performance Series® Sweet Corn contains Cry1A.105, Cry2Ab2 and Cry3Bb1 proteins from *Bacillus thuringiensis* (B.t.) that together control European corn borer, southwestern corn borer, sugarcane borer, southern cornstalk borer, corn earworm¹, fall armyworm, stalk borer, lesser stalk borer, western corn rootworm, northern corn rootworm and Mexican corn rootworm.



Acceleron® BioAg products provide microbial-based solutions that offer a variety of real benefits, such as improving crop nutrient uptake, and ultimately helping to maximize yield potential. Acceleron® BioAg™ brand offerings for sweet corn include QuickRoots® Technologies. For more information, talk to your local retailer or discover more at acceleronsas.com.



This product also contains Roundup Ready® 2 Technology that provides crop safety to in-crop applications of labeled Roundup PowerMAX®, Roundup PowerMAX® II and Roundup WeatherMAX® Agricultural Herbicides when applied according to label directions.

Performance Series® Sweet Corn

Planting Requirements

Read and follow the IRM Guide on the bag tag prior to planting Performance Series® Sweet Corn.

- **Do not repackage seeds.** Each package of seeds includes important legal requirements on the label. Seeds must remain in their original packaging and must not be further subdivided.
- **Post-Harvest IRM Requirements:** Crop destruction must occur no later than 30 days following harvest, but preferably within 14 days. The allowed crop destruction methods are rotary mowing, discing, or plowing down.
- **Identity Preserved (IP) Production:** All harvested ears must be stored in areas where the identity of the ears can be preserved.

All growers in Idaho and Oregon who intend to plant Performance Series® Sweet Corn must contact Seminis Vegetable Seeds, Inc. at **866-334-1056** to order Performance Series® Sweet Corn Seed.

Performance Series® Sweet Corn may only be sold into the Treasure Valley area of Idaho and Oregon (which consists of Ada, Owyhee, Canyon, Gem, Payette and Washington counties in Idaho and Malheur County in Oregon) during the time period beginning on January 1 and ending on February 15 of each calendar year. Growers must inform Seminis Vegetable Seeds, Inc. of the location(s) of their Performance Series® Sweet Corn field(s) to ensure pinning prior to delivery of Performance Series® Sweet Corn seed.

¹Cry1A.105 and Cry2Ab2 from B.t. controls or suppresses corn earworm.

Compliance Monitoring Program

The EPA requires Monsanto to take corrective measures in response to a finding of grower IRM non-compliance. As mandated by the EPA, Monsanto or an approved agent of Monsanto must monitor IRM requirements. The Monsanto TSA signed by the grower requires that upon request by Monsanto or its approved agent, a grower must provide the location of all fields planted with Performance Series® Sweet Corn. The grower must cooperate fully with any field inspections, and allow Monsanto or an agent of Monsanto to inspect all fields to ensure post-harvest crop destruction. All inspections will be performed at a reasonable time and arranged in advance with the grower so that the grower can be present.

Product Marketing and Stewardship Requirements

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. It is the grower's responsibility to talk to their produce handler or purchaser to confirm their buying position for this produce so that the marketing requirements can be met.

Performance Series® Sweet Corn Insect Pest Control

Performance Series® Sweet Corn provides control of the most important above-ground insect pests of sweet corn, including corn earworm¹, fall armyworm, European corn borer, southwestern corn borer, sugarcane borer, stalk borer, lesser stalk borer and southern cornstalk borer. Monsanto recommends that you continue to scout your fields as usual, and if these insects are present, an appropriate insecticide should be used according to label recommendations.

Performance Series® Sweet Corn also provides control of below-ground feeding from western corn rootworm, northern corn rootworm and Mexican corn rootworm larvae, and the seed is treated for control of wireworms, white grubs, seed corn maggot, and black cutworm.

Performance Series® Sweet Corn does not control silk flies, adult corn rootworm beetles, sap beetles, western bean cutworm, stinkbugs and other insect pests not listed above. It is recommended that you scout and spray according to label recommendations to control these pests.

Performance Series® Sweet Corn provides growers with a dual mode of action for many above-ground insect pests, including corn earworm. Performance Series® Sweet Corn can control corn earworm under typical infestation levels, but supplemental insecticide applications may be required when corn earworm populations are above economic thresholds to ensure quality ears at harvest. Protection from corn earworm must be coupled with thorough scouting and spray programs to help maximize marketable yield potential.

If supplemental insecticide applications are necessary for control of high levels of corn earworm, rotating insecticide mode of action will help reduce the risk of insect pests developing chemical resistance.

- For target pests, no spray prior to silking.
- After silking, schedule sprays based on insect flight activity and follow state recommendations under high infestation ratings.
- Under heavy insect pressure, spray intervals may have to be reduced.
- Monitor for secondary pests: sap beetles, stink bugs, western bean cutworm, corn silk flies, etc.

Weed Management

The Roundup Ready® 2 Technology System enables flexibility, broad-spectrum weed control and proven crop safety. Growers can select the weed control program that best fits the way they farm and provides them the greatest benefit. Options include the use of a residual herbicide with Roundup® branded agricultural herbicides, tank-mixing other herbicides with Roundup® branded agricultural herbicides where appropriate and a total postemergence program.

Corn yield is very sensitive to early-season weed competition. Control weeds before they become competitive. The Roundup Ready® 2 Technology System provides a mechanism to control weeds at planting and once they emerge. Failure to control weeds

with the right rate, at the right time and with the right product, can lead to increased weed competition, weed escapes, the potential for selecting for herbicide resistance and possible decreased yields. Use diverse weed management tools, including multiple herbicide mechanisms of action if appropriate, alone or in tank mixes with Roundup® Branded Agricultural Herbicides, based on the weed spectrum in the field and according to label directions.

Recommendations

Follow all pesticide product labeling. If there is any conflict between these recommendations and applicable pesticide product labeling, the pesticide product labeling controls. Follow the recommendations below to help minimize the risk of developing glyphosate-resistant weed populations in a Roundup Ready® 2 Technology System:

- Start clean with a burndown herbicide or tillage. Early season weed control is critical to yield.
- Apply a preemergence residual herbicide at the appropriate application rate tank-mixed with 16 to 22 oz/A Roundup WeatherMAX® Herbicide before weeds exceed 4" in height.
- Follow with a postemergence in-crop application of Roundup WeatherMAX® Herbicide with 16 to 22 oz/A for additional weed flushes before they exceed 4" in height.
- Roundup WeatherMAX® Herbicide may be tank-mixed with other herbicides for postemergence weed control.
- Report any incidence of repeated non-performance of Roundup® Brand Agricultural Herbicides or other glyphosate products on a particular weed to the appropriate company representative, local retailer or county extension agent.

Additional Information

Make sure the intended use is approved in your state. Do not use this information as the basis for any glyphosate product other than Roundup® Brand Agricultural Herbicides.

Performance Series® Sweet Corn growers are required to destroy any stalks that remain in the field following harvest via rotary mowing, discing, or plow-down or (for home garden use) by chopping up the stalks using home garden tools such as a hoe within one month of harvest, but preferably within 14 days.

Various weed biotypes are known to be resistant to glyphosate. For the current weed control recommendations for glyphosate-resistant weed biotypes, refer to **RoundupReadyPLUS.com** or call **1-800-768-6387**. A complete list of specimen labels can be located at **monsanto.com/products/safety-information/msds/**. Approved labels, including supplemental labeling, for Roundup® Branded Agricultural Herbicides must be in the possession of the user at the time of pesticide application and can be obtained by calling 1-800-768-6387 or by contacting your State Pesticide Lead Agency for more information.

This Technology/Stewardship Agreement (“Agreement”) is entered into between you (“Grower”) and Monsanto Company, a subsidiary of Bayer AG, (“Monsanto”) and consists of the terms on this page and any applicable Riders.

This Agreement grants Grower a limited license to use the following technologies in accordance with the terms of this Agreement:

Canola Products

Genuity® Roundup Ready® Spring Canola
 Genuity® Roundup Ready® Winter Canola
 TruFlex™ Canola with Roundup Ready® Technology*
 TruFlex™ Canola with Roundup Ready® and LibertyLink® Technologies*
 DEKALB® LibertyLink® Canola*

DroughtGard® Hybrids with Genuity® VT Triple PRO® RIB Complete® Corn Blend
 Trecepta™ Corn
 Trecepta™ RIB Complete® Corn Blend
 SmartStax® Corn
 SmartStax® RIB Complete® Corn Blend
 Performance Series® Sweet Corn

Cotton Products

Corn Products
 Roundup Ready® Corn 2
 DroughtGard® Hybrids with Roundup Ready® Corn 2
 DroughtGard® Hybrids with VT Double PRO® Corn
 VT Double PRO® Corn
 VT Double PRO® RIB Complete® Corn Blend
 DroughtGard® Hybrids with VT Double PRO® RIB Complete® Corn Blend
 Genuity® VT Triple PRO® Corn
 DroughtGard® Hybrids with Genuity® VT Triple PRO® Corn
 Genuity® VT Triple PRO® RIB Complete® Corn Blend

Genuity® Bollgard II® Cotton
 Genuity® Bollgard II® with Roundup Ready® Flex Cotton
 Genuity® Roundup Ready® Flex Cotton
 Bollgard II® XtendFlex® Cotton
 Bollgard® 3 XtendFlex® Cotton
 XtendFlex® Cotton

Soybean Products

Roundup Ready 2 Xtend® Soybeans
 Genuity® Roundup Ready 2 Yield® Soybeans
 Vistive® Gold Soybeans with Roundup Ready 2 Yield® Technology

and Monsanto patented germplasm and Monsanto Plant Variety Protection rights and any future seed technologies developed, licensed or owned by Monsanto that are made available to Grower (“Monsanto Technologies”). Seed containing Monsanto Technologies are referred to herein as “Seed”. The licensed U.S. patents and/or Plant Variety Protection (PVP) certificates for Monsanto Technologies can be found at the following web page: www.monsantotechnology.com and/or on the product label.

This Agreement includes an Alfalfa Rider and a Sugarbeet Rider, attached hereto, which is between Grower and Forage Genetics International, LLC (“FGI”) and KWS SAAT SE (“KWS”), respectively. The Alfalfa Rider grants Grower a limited license to use Roundup Ready® Alfalfa and HarvXtra® Alfalfa with Roundup Ready® Technology. The Sugarbeet Rider grants Grower a limited license to use Roundup Ready® Sugarbeets.

This Agreement also contains Grower’s stewardship responsibilities and requirements associated with the use of Seed and Monsanto Technologies. **In addition, this Agreement provides that any Cotton-related claims by Grower are subject to binding arbitration, as described in Section 4e below.**

*This product has received full approval for planting in the United States and is pending approval in certain export markets. Availability is subject to Monsanto’s decision to commercialize, and product brand names may change. For canola products containing the LibertyLink® trait, grower must hold a valid and current BASF Liberty® and Trait Agreement before Grower purchases such products.

1. GROWER AGREES:

- a To acquire Seed only from authorized seed companies in the United States with technology license(s) from Monsanto for the applicable Monsanto Technology(ies) or from a licensed company’s dealer authorized to sell such licensed Seed in the United States.
- b To obtain and read before planting and strictly follow the applicable requirements of this Agreement, the Technology Use Guide (“TUG”) and, if applicable, the appropriate Insect Resistance Management Grower Guide (“IRM Grower Guide”), as each may be unilaterally amended by Monsanto from time to time, which TUG and IRM Grower Guide are incorporated into and are a part of this Agreement, and to read before planting and strictly follow the requirements of the applicable seed bag and/or tag; to implement an Insect Resistance Management (“IRM”) program, if applicable; and to cooperate and comply with these and any additional IRM/Integrated Pest Management (“IPM”) programs Monsanto communicates or makes available to Grower. Further, Grower acknowledges that compliance with the foregoing stewardship requirements is a fundamental term of this Agreement, and Grower may lose its limited use license to use these products if Grower fails to comply with this Agreement, including by failing to follow the IRM program required by this Agreement. Monsanto further advises Grower to follow the recommendations and best management practices provided in the TUG, IRM Grower Guide and seed bag and/or tag label. Grower may obtain additional copies of the TUG or IRM Grower Guide or IPM information by contacting Monsanto at 1-800-768-6387 or by going to tug.monsanto.com.
- c To pay all applicable royalties and technology fees for the use of the Monsanto Technologies and applicable fees due Monsanto that are part of, associated with the Seed purchase price or that are invoiced for the Seed. If Grower fails to pay Monsanto or any wholly owned Monsanto subsidiaries, for costs of Seed, Monsanto Technologies, and/or royalties, Grower agrees to pay Monsanto default late fees at the rate of 18% per annum (or the maximum allowed by law whichever is less) plus reasonable attorneys’ fees, court costs and all other costs of collection. Monsanto or any affiliate has the right of set-off.

- d To use Seed solely for a single planting of a commercial crop in the United States.
 - e Not to transfer any Seed to any other person or entity for planting, and not to export any Seed.
 - f Not to save or clean any crop produced from Seed for planting, and not to supply Seed produced from Seed to anyone for planting. Except to the extent specifically permitted by a valid TSA, the planting of any crop or Seed produced from Seed shall constitute infringement of Monsanto’s U.S. patents.
 - g Not to plant and/or clean Seed for seed production unless, and only if, Grower has entered into a valid, written Seed production agreement with a seed company that is licensed by Monsanto to produce Seed (a “Licensee”), which agreement requires Grower to either physically deliver to the Licensee, sell for non-seed purposes or use for non-seed purposes all of the Seed produced; and not to purchase or otherwise obtain from the Licensee any of the Seed produced unless, after physical delivery by Grower to the Licensee, that Seed has been conditioned, packaged and delivered by the Licensee to Grower in the same manner as Seed sold by the Licensee to growers who have not entered into a Seed production agreement.
 - h Not to plant any Seed, or any Seed produced from Seed, for crop breeding, research, or generation of herbicide or other registration data. Grower may not conduct research on Grower’s crop produced from Seed other than to make agronomic comparisons and conduct yield testing for Grower’s own use. Monsanto makes available separate license agreements to academic institutions for research.
 - i To use on crops containing Monsanto Technology only pesticides labeled for such use and follow current label directions. MONSANTO DOES NOT MAKE ANY REPRESENTATIONS, WARRANTIES OR RECOMMENDATIONS CONCERNING THE USE OF PRODUCTS MANUFACTURED OR MARKETED BY OTHER COMPANIES, INCLUDING BUT NOT LIMITED TO THOSE THAT ARE LABELED FOR USE IN CROP(S) CONTAINING MONSANTO TECHNOLOGY. MONSANTO SPECIFICALLY DISCLAIMS ALL RESPONSIBILITY FOR THE USE OF THESE PRODUCTS IN CROP(S) CONTAINING MONSANTO TECHNOLOGY. ALL QUESTIONS AND COMPLAINTS ARISING FROM THE USE OF PRODUCTS MANUFACTURED OR MARKETED BY OTHER COMPANIES, OR THE IMPACT TO MONSANTO TECHNOLOGY FROM THE USE OF SUCH PRODUCTS, SHOULD BE DIRECTED TO THOSE COMPANIES.
 - j To accept and continue the obligations of this Agreement on any new land purchased or leased by Grower that has Seed planted on it by a previous owner or possessor of the land; and to timely notify in writing purchasers or lessees of land owned by Grower that has Seed planted on it that the Monsanto Technology is subject to this Agreement and they must have or obtain their own Monsanto Technology Stewardship Agreement to harvest or use, transfer or sell the harvested crop.
 - k To keep and provide Monsanto and its representatives following Monsanto’s actual (or attempted) oral communication, and no later than seven (7) days after the date of its written or electronic request:
 1. copies of all records, receipts, or other documents that could be relevant to Grower’s performance of this Agreement, including but not limited to, Summary Acreage History Report, Producer Farm Data Report, Form 578 (producer print), Farm and Tract Detail Listing and corresponding aerial photographs, Risk Management Agency claim documentation, and grower/dealer/retailer/appliator records for seed and chemical purchases and applications and all documentation required on the chemistry product label or by government regulation; and
 2. the identity of, and access to, land farmed by or at the direction of Grower (including refuge areas) and bins, wagons, or seed storage containers used or under the control or direction of Grower, for purposes of examining and taking samples of crops, crop residue or seeds located therein.
 - l To allow Monsanto to obtain Grower’s internet service provider records to validate Grower’s electronic signature, if applicable.
 - m To promptly notify Monsanto should any Grower Information provided to Monsanto herein change.
 - n To only direct crops or material produced from Seed only to appropriate grain handlers and/or markets to prevent movement to markets where the grain has not yet received regulatory approval for import and to notify such grain handlers that its crop has not yet received that approval. Grower acknowledges that any crop or material produced from Seed can only be exported to, or used, processed or sold in countries where all necessary regulatory approvals have been granted, and Grower purchases the Seed with that knowledge.
- 2. GROWER RECEIVES:**
- a A limited use license to purchase and to plant Seed pursuant to the terms of this Agreement in the United States of America, comprised of the 50 states and the District of Columbia, except in any state or county where the products do not have all the necessary approvals and to apply labeled glyphosate, dicamba or glufosinate herbicides over the top of crops as applicable, unless otherwise restricted by law. Monsanto (or the respective licensor) retains ownership of the Monsanto Technologies owned by it, including the gene technologies and varieties. These licenses do not authorize Grower to plant Seed in the United States that has been purchased in another country or plant Seed in another country that has been purchased in the United States.
 - b A limited use license under applicable U.S. patents (other than the Dow AgroSciences Patent Rights), to use Monsanto Technologies subject to the conditions listed in this Agreement and with respect to alfalfa and/or sugarbeet Seed, the conditions listed in the Alfalfa Rider and/or Sugarbeet Rider. Dow AgroSciences LLC and Agrigenetics, Inc. (collectively “DowAgroSciences”) licenses Grower under its applicable U.S. patents (the

"Dow AgroSciences Patent Rights") to use Dow AgroSciences' Event TC 1507 and Event DAS 59122-7 to the extent either is present in any SmartStax® Seed obtained by Grower pursuant to this Agreement, with Monsanto being authorized to act on Dow AgroSciences' behalf for this Agreement, subject to the conditions listed in this Agreement.

- c Enrollment for participation in Roundup Ready PLUS® Crop Management Solutions.
- d A limited use license to prepare and apply on glyphosate-tolerant soybean, cotton, or canola crops (or have others prepare and apply) tank mixes of, or sequentially apply (or have others sequentially apply), glyphosate herbicides labeled for use on those crops with quizalofop, clethodim, sethoxydim, fluzafop, and/or fenoxaprop labeled for use on those crops to control volunteer corn with Roundup Ready® 2 Technology in Grower's crops for the 2019 growing season. However, neither Grower nor a third party may utilize any type of co-pack or premix of glyphosate plus one or more of the above-identified active ingredients in the preparation of a tank mix for use on glyphosate-tolerant soybean, cotton, or canola crops.

3. GENERAL TERMS:

- a **Term:** This Agreement will remain in effect until either Grower or Monsanto chooses to terminate the Agreement, as provided below.
- b **Modification:** Monsanto may unilaterally revise the terms and conditions of this Agreement, including the TUG, IRM Grower Guide, or seed bag, label and/or tag incorporated herein, from time to time. Grower shall verify the currently effective terms of this Agreement at least annually before February 1 at agcelerate.com. Monsanto will notify Grower of any amended terms, including information regarding new and existing Monsanto Technologies and any additions or deletions to the U.S. patents licensed under this Agreement. If Grower has provided Monsanto an e-mail address in conjunction with this Agreement, Monsanto may send Agreement amendments and new stewardship information to Grower by e-mail or mail. Grower's continued use of Monsanto Technologies after receipt of any amended terms and/or the posting of amended terms at agcelerate.com constitutes Grower's agreement to be bound by the amended terms of this Agreement.
- c **Transferability:** Grower may not transfer its rights or obligations to anyone else without the written consent of Monsanto. If Grower's rights or obligations are transferred with Monsanto's consent or by operation of law, this Agreement is binding on the person or entity receiving the transferred rights or obligations.
- d **Binding Effect:** If any provision of this Agreement is determined to be void or unenforceable, the remaining provisions shall remain in full force and effect.
- e **Termination:** Grower may terminate this Agreement effective immediately by delivering written notice to Monsanto. Grower must deliver the notice of termination to DRC Data Services, Attn: AgCelerate Agreements, PO Box 221679, Charlotte, NC 28222-1679. Monsanto may terminate this Agreement for any reason, in whole or in part, by delivering written notice to Grower.

Upon termination, Grower's responsibilities and the other terms herein shall survive (such as but not limited to Grower's obligation to use Seed for a single commercial crop) as to Seed previously purchased or used by Grower.

If Grower breaches the terms of this Agreement, Monsanto may terminate effective immediately Grower's rights under this Agreement. Grower will not be entitled to obtain a future limited-use license from Monsanto unless Monsanto provides Grower with specific written notice expressly recognizing the breach and termination of this Agreement and granting a new limited-use license. Grower expressly acknowledges that Grower's submission of a new Monsanto Technology Stewardship Agreement and Monsanto's issuance of a new license number shall not satisfy the specific written notice reference above and that any such action shall have no legal effect. If Grower is found by any court to have breached any term of this Agreement and/or to have infringed one or more of the U.S. patents, Grower agrees that, among other things, Monsanto and Dow AgroSciences, as appropriate, shall be entitled to preliminary and permanent injunctions enjoining Grower and any individual and/or entity acting on Grower's behalf or in concert therewith from making, using, selling, or offering Seed for sale. Additionally, Grower agrees that any such finding of infringement by Grower shall entitle Monsanto and Dow AgroSciences, as appropriate, to patent infringement damages to the full extent authorized by 35 U.S.C. § 271 et. seq. Grower will also be liable for all breach of contract damages.

- f **Attorneys' Fees: If Grower is found by any court to have infringed one or more of the U.S. patents covering Monsanto Technologies or otherwise to have breached this Agreement, Grower agrees to pay Monsanto and the licensed Monsanto Technology provider(s) and Dow AgroSciences, as appropriate, their attorneys' fees and costs related to the case plus any other expenses incurred in the investigation of the breach and/or infringement.**
- g **Governing Law:** This Agreement and the parties' relationship shall be governed by the laws of the State of Missouri and the United States (without regard to the choice of law rules).
- h **Waiver:** The failure of Monsanto or any owners of patents to exercise one or more of its rights under this Agreement on one or more occasions shall not be deemed a waiver on the part of Monsanto or such patent owner to exercise such right(s) on any subsequent occasion.
- i **Entire Agreement:** This Agreement, along with provisions in the TUG, IRM Grower Guide, and/or on seed bag and/or tag incorporated into this Agreement, encompass the entire agreement of the parties, and supersede all previous understandings and agreements between the parties, whether oral or written. Grower also agrees that such provisions (the terms, warranties, and disclaimers and limitations as to warranties, damages, and remedies) are terms and conditions of sale and cannot be modified or amended at any time except in writing signed by Monsanto.

4. GROWER CLAIMS AND REMEDIES:

- a **Notice requirement:** As a condition precedent to Grower or any other person with an interest in Grower's crop asserting any claim, action, or dispute against Monsanto and/or any seller of Seed regarding performance or non-performance of Monsanto Technologies or Seed, Grower must provide Monsanto a written, prompt, and timely notice (regarding performance or non-performance of the Monsanto Technologies) and to the seller of any Seed (regarding performance or non-performance of the Seed) within sufficient time to allow an in-field inspection of the crop(s) about which any controversy, claim, action, or dispute is being asserted. The notice will be timely only if it is delivered 15 days or less after Grower first observes the issue(s) regarding performance or non-performance of the Monsanto Technology and/or the Seed. The notice shall include a statement setting forth the nature of the claim, name of the Monsanto Technology, and Seed hybrid or variety. Grower must deliver the notice to DRC Data Services, Attn: AgCelerate Agreements, PO Box 221679, Charlotte, NC 28222-1679.
- b **Limited Warranty and Disclaimer of Warranties:** Monsanto warrants the Monsanto Technologies licensed hereunder only to the extent specifically set forth on the seed bag and/or tag, and warrants that the Monsanto Technologies licensed hereunder will perform only as specifically set forth in the TUG when used in accordance with directions. This warranty applies only to Monsanto Technologies contained in planting Seed that has been purchased from Monsanto and seed companies licensed by Monsanto or the seed company's authorized dealers or distributors. EXCEPT FOR THE EXPRESS WARRANTIES IN THE LIMITED WARRANTY SET FORTH ABOVE, MONSANTO MAKES NO OTHER WARRANTIES OF ANY KIND, AND DISCLAIMS ALL OTHER WARRANTIES, WHETHER ORAL OR WRITTEN, EXPRESSED OR IMPLIED INCLUDING THE IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR PARTICULAR PURPOSE, AND NON-INFRINGEMENT OF THIRD PARTY PATENTS. THIS WARRANTY IS VOID IF THE SEED IS REPACKAGED BY ANY PARTY OTHER THAN MONSANTO OR PARTIES AUTHORIZED BY MONSANTO.
- c **Grower's Exclusive Limited Remedy:** THE EXCLUSIVE REMEDY OF GROWER AND THE LIMIT OF THE LIABILITY OF MONSANTO OR ANY SELLER FOR ANY AND ALL LOSSES, INJURY OR DAMAGES RESULTING FROM THE USE OR HANDLING OF SEED (INCLUDING CLAIMS BASED IN CONTRACT, NEGLIGENCE, PRODUCT LIABILITY, STRICT LIABILITY, TORT, OR OTHERWISE) SHALL BE THE PRICE PAID BY GROWER FOR THE QUANTITY OF THE SEED INVOLVED OR, AT THE ELECTION OF MONSANTO OR THE SEED SELLER, THE REPLACEMENT OF THE SEED. IN NO EVENT SHALL MONSANTO OR ANY SELLER BE LIABLE FOR ANY INCIDENTAL, CONSEQUENTIAL, SPECIAL, OR PUNITIVE DAMAGES.
- d **Forum Selection for Non-Cotton-Related Claims Made by Grower and All Other Claims:** THE PARTIES CONSENT TO THE SOLE AND EXCLUSIVE JURISDICTION AND VENUE OF THE U.S. DISTRICT COURT FOR THE EASTERN DISTRICT OF MISSOURI, EASTERN DIVISION, AND THE CIRCUIT COURT OF THE COUNTY OF ST. LOUIS, MISSOURI, (ANY LAWSUIT MUST BE FILED, IF IN FEDERAL COURT IN ST. LOUIS, MO, OR, IF IN STATE COURT, IN ST. LOUIS COUNTY, MO) FOR ALL CLAIMS AND DISPUTES ARISING OUT OF OR CONNECTED IN ANY WAY WITH THIS AGREEMENT AND/OR THE USE OF THE SEED OR THE MONSANTO TECHNOLOGIES, EXCEPT FOR COTTON-RELATED CLAIMS MADE BY GROWER. THE PARTIES WAIVE ANY OBJECTION TO VENUE IN THE EASTERN DIVISION OF THE U.S. DISTRICT COURT FOR THE EASTERN DISTRICT OF MISSOURI, INCLUDING THOSE BASED, IN WHOLE OR IN PART, ON THE DIVISIONAL VENUE LOCAL RULE(S) OF THE U.S. DISTRICT COURT FOR THE EASTERN DISTRICT OF MISSOURI. THIS AGREEMENT CONTAINS A BINDING ARBITRATION PROVISION FOR COTTON-RELATED CLAIMS PURSUANT TO THE PROVISIONS OF THE FEDERAL ARBITRATION ACT, 9 U.S.C. §1 ET SEQ., WHICH MAY BE ENFORCED BY THE PARTIES. THE PARTIES SPECIFICALLY AGREE THAT THIS SECTION COVERS MONSANTO AND ANY CURRENT OR FUTURE U.S.-BASED WHOLLY-OWNED SUBSIDIARIES OR AFFILIATES OF MONSANTO.
- e **Binding Arbitration for Cotton-Related Claims Made By Grower:** Any claim, action or dispute made or asserted by a Grower (or any other person or entity claiming an interest in Grower's cotton crop, hereafter "Grower") against Monsanto, or any person or entity involved in the production, development, distribution, and/or sale of the Seed containing any Monsanto Technology ("seller"), arising out of and/or in connection with this Agreement or the sale or performance of cotton Seed containing Monsanto Technology must be resolved by binding arbitration. The foregoing requirement to arbitrate specifically excludes any claim, action or dispute involving the infringement, validity, or enforceability of a patent or that otherwise arises under the U.S. patent laws. As a condition precedent to asserting any claim, action, or dispute regarding the quality of Monsanto cotton Seed or the agronomic performance of any Monsanto Technology in cotton Seed, Grower must provide notice to Monsanto pursuant to Section 4a of this Agreement. In the event that a claim is not resolved within 30 days after notice is supplied, any party may initiate arbitration. The parties acknowledge that this transaction involves interstate commerce, and agree that arbitration shall be conducted pursuant to the provisions of the Federal Arbitration Act, 9 U.S.C. Sec 1 et seq. and administered under the Administered Arbitration Rules established by the International Institute for Conflict Prevention and Resolution, Inc. ("CPR"). GROWER MAY ONLY BRING A CLAIM IN ARBITRATION IN GROWER'S INDIVIDUAL CAPACITY AND GROWER WAIVES ANY RIGHT TO DO SO AS A REPRESENTATIVE OR MEMBER OF ANY CLASS OR PUTATIVE CLASS. The arbitration hearing shall be conducted in the capital city of the state of Grower's residence or in any other place as the parties decide by mutual agreement. Grower and Monsanto/sellers shall each pay one half of the CPR filing fee and one half of CPR's administrative and arbitrator fees and expenses as they are incurred. The arbitrator(s) shall have the power to apportion the ultimate responsibility for all CPR fees in the final award. The arbitration proceedings and results shall remain confidential and shall not be disclosed without the written agreement of all parties, except to the extent necessary to effectuate the decision or award or as otherwise required by law.

2019 ALFALFA RIDER

TERMS AND CONDITIONS

The following terms and conditions of the Alfalfa Rider (the "Rider") supplement the Monsanto Technology Stewardship Agreement ("TSA" or the "Agreement"), are enforceable under that Agreement as well as independently and separately enforceable from the Agreement, and are applicable to Grower's purchase or use of Roundup Ready® Alfalfa or HarvXtra® Alfalfa with Roundup Ready® Technology. This Rider is entered into between Grower and Forage Genetics International, LLC ("FGI") and consists of the terms and conditions set forth below. Capitalized terms used but not defined herein shall have the meanings ascribed to them in the Agreement.

This Rider grants Grower a limited license to use the following technologies in accordance with the terms of this Rider: Roundup Ready® Alfalfa and HarvXtra® Alfalfa with Roundup Ready® Technology, patented alfalfa germplasm and Plant Variety Protection rights owned or exclusively licensed to FGI and any future seed technologies developed, licensed or owned by FGI that are made available to Grower ("FGI Technologies"), with Monsanto Company, a subsidiary of Bayer AG, ("Monsanto") authorized to act on FGI's behalf. Seed containing FGI Technologies, are collectively referred to herein as ("Alfalfa Seed"). The licensed U.S. patents and/or PVP certificates for FGI Technologies can be found at the following web page: monsantotechnology.com and/or on the product label.

This Rider also contains Grower's stewardship responsibilities and requirements associated with the use of Alfalfa Seed and FGI Technologies.

1. GROWER AGREES:

- a To acquire Alfalfa Seed only from authorized seed companies in the United States with technology license(s) from FGI for the applicable FGI Technology(ies) or from a licensed company's dealer authorized to sell such licensed Alfalfa Seed in the United States.
 - b To obtain and read before planting and strictly follow the applicable requirements of the Technology Use Guide ("TUG") and, if applicable, the appropriate Insect Resistance Management Grower Guide ("IRM Grower Guide") and seed bag tag, as each may be amended from time to time, which TUG, IRM Grower Guide and seed bag tag are incorporated into and are a part of this Rider; to implement an Insect Resistance Management ("IRM") program, if applicable; and to cooperate and comply with these and any additional IRM/Integrated Pest Management ("IPM") programs FGI or Monsanto communicates or makes available to Grower. Further, Grower acknowledges that compliance with the foregoing stewardship requirements is a fundamental term of this Rider, and Grower may lose its limited use license to use these products if Grower fails to follow the IRM program required by this Rider. FGI further advises Grower to follow the recommendations provided in the TUG, IRM Grower Guide and seed bag tag. Grower may obtain additional copies of the TUG or IRM Grower Guide or IPM information by contacting Monsanto at 1-800-768-6387 or by going to www.tug.monsanto.com.
 - c To pay all applicable royalties and technology fees for the use of the FGI Technologies and applicable fees due FGI that are part of, associated with the Alfalfa Seed purchase price or that are invoiced, or the Alfalfa Seed. If Grower fails to pay FGI or any wholly owned FGI subsidiaries, for costs of Alfalfa Seed, FGI Technologies, and/or royalties, Grower agrees to pay FGI default late fees at the rate of 18% per annum (or the maximum allowed by law whichever is less) plus reasonable attorneys' fees, court costs and all other costs of collection. FGI or any affiliate has the right of set-off.
 - d To use Alfalfa Seed solely for a commercial crop in the United States as provided below. Grower may use a single planting of Roundup Ready® Alfalfa and HarvXtra® Alfalfa with Roundup Ready® Technology for multiple cuttings.
 - e Only to plant HarvXtra® Alfalfa with Roundup Ready® Technology in the United States, with the following states subject to execution of an additional FGI Seed and Feed Use Agreement: Arizona, California, Colorado, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington and Wyoming (collectively the "Western States").
 - f That all planting of HarvXtra® Alfalfa with Roundup Ready® Technology in the Western States is permissible only upon separate execution by the Grower of a HarvXtra® Alfalfa with Roundup Ready® Technology Seed and Feed Use Agreement ("FGI Seed and Feed Use Agreement") that includes provisions limiting HarvXtra® with Roundup Ready® Technology seed and crops or hay products produced from HarvXtra® Alfalfa with Roundup Ready® Technology to only United States domestic use.
 - g All terms of the FGI Seed and Feed Use Agreement are incorporated into and made enforceable under this Rider.
 - h Not to transfer any Alfalfa Seed to any other person or entity for planting, and not to export any Alfalfa Seed.
 - i Not to save or clean any crop produced from Alfalfa Seed for planting, and not to supply seed produced from Alfalfa Seed to anyone for planting. Except to the extent specifically permitted by a valid TSA, the planting of any crop or Seed produced from Seed shall constitute infringement of FGI's and/or Monsanto's U.S. patents.
- j Not to plant and/or clean Alfalfa Seed for seed production unless, and only if, Grower has entered into a valid, written Alfalfa Seed production agreement with a seed company that is licensed by FGI to produce Alfalfa Seed (a "Licensee"), which agreement requires Grower to either physically deliver to the Licensee, sell for non-seed purposes or use for non-seed purposes all of the Seed produced; and not to purchase or otherwise obtain from the Licensee any of the Seed produced unless, after physical delivery by Grower to the Licensee, that Seed has been conditioned, packaged and delivered by the Licensee to Grower in the same manner as Seed sold by the Licensee to growers who have not entered into a Seed production agreement.
 - k Not to plant any Alfalfa Seed, or any seed produced from Alfalfa Seed, for crop breeding, research, or generation of herbicide or other registration data. Grower may not conduct research on Grower's crop produced from Alfalfa Seed other than to make agronomic comparisons and conduct yield testing for Grower's own use. FGI makes available separate license agreements to academic institutions for research.
 - l To use on crops containing FGI Technology only pesticides labeled for such use and follow current label directions. FGI DOES NOT MAKE ANY REPRESENTATIONS, WARRANTIES OR RECOMMENDATIONS CONCERNING THE USE OF PRODUCTS MANUFACTURED OR MARKETED BY OTHER COMPANIES, INCLUDING BUT NOT LIMITED TO THOSE THAT ARE LABELED FOR USE IN CROPS CONTAINING FGI TECHNOLOGY. FGI SPECIFICALLY DISCLAIMS ALL RESPONSIBILITY FOR THE USE OF THESE PRODUCTS IN CROP(S) CONTAINING FGI TECHNOLOGY. ALL QUESTIONS AND COMPLAINTS ARISING FROM THE USE OF PRODUCTS MANUFACTURED OR MARKETED BY OTHER COMPANIES, OR THE IMPACT TO FGI TECHNOLOGY FROM THE USE OF SUCH PRODUCTS, SHOULD BE DIRECTED TO THOSE COMPANIES.
 - m To accept and continue the obligations of this Rider on any new land purchased or leased by Grower that has Alfalfa Seed planted on it by a previous owner or possessor of the land; and to timely notify in writing purchasers or lessees of land owned by Grower that has Alfalfa Seed planted on it that the FGI Technology is subject to this Rider and they must have or obtain their own Monsanto Technology Stewardship Agreement, Rider and FGI Seed and Feed Use Agreement, if applicable.
 - n To keep and provide to FGI and its representatives following FGI's actual (or attempted) oral communication, and no later than seven (7) days after the date of its written or electronic request:
 1. copies of all records, receipts, or other documents that could be relevant to Grower's performance of this Rider, including but not limited to, Summary Acreage History Report, Producer Farm Data Report, Form 578 (producer print), Farm and Tract Detail Listing and corresponding aerial photographs, Risk Management Agency claim documentation, grower/dealer/retailer/applcator records for seed and chemical purchases, and applications and all documentation required on the chemistry product label or by government regulation; and
 2. the identity of, and access to, land farmed by or at the direction of Grower (including refuge areas) and bins, wagons, or seed storage containers used or under the control or direction of Grower, for purposes of examining and taking samples of crops, crop residue or seeds located therein.
 - o To allow FGI to obtain Grower's internet service provider ("ISP") records to validate Grower's electronic signature, if applicable.
 - p To promptly notify FGI or Monsanto should any Grower Information provided herein change.
 - q To direct any crops or hay products produced from HarvXtra® Alfalfa with Roundup Ready® Technology only to United States domestic use, except where FGI expressly grants permission in writing. Grower further agrees that it will only sell or convey such crops or hay products to persons or entities that agree they will not ship such crops or hay products outside the United States, except where FGI expressly grants permission in writing.
 - r Grower acknowledges that any crop or hay product produced from Alfalfa Seed can only be exported to, or used, processed or sold in countries where all necessary regulatory approvals have been granted, and Grower purchases the Alfalfa Seed with that knowledge.
 - s Until FGI expressly grants permission in writing (which will be withheld pending necessary import approvals), not to export, or to sell or convey to any person or entity that intends to export, Roundup Ready® Alfalfa or HarvXtra® Alfalfa with Roundup Ready® Technology seed or crops or hay products produced from such seed to export countries where all necessary regulatory approvals have not been granted. In addition, due to the unique cropping practices Grower agrees not to plant Roundup Ready® Alfalfa or HarvXtra® Alfalfa with Roundup Ready® Technology in Imperial County, California, pending import approvals and until FGI grants express permission in writing for such planting. Roundup Ready® Alfalfa and HarvXtra® Alfalfa with Roundup Ready® Technology seed may not be planted for the production of sprouts.

2. GROWER RECEIVES FROM FGI:

- a** A limited use license to purchase and to plant Alfalfa Seed pursuant to the terms of this Rider in the United States of America, comprised of the 50 states and the District of Columbia, except in any state or county where the products do not have all the necessary approvals and to apply labeled glyphosate herbicides over the top of crops as applicable, unless otherwise restricted by law. FGI (or the respective licensor) retains ownership of the FGI Technologies owned by it, including the gene technologies and varieties. These licenses do not authorize Grower to plant Alfalfa Seed in the United States that has been purchased in another country or plant Alfalfa Seed in another country that has been purchased in the United States.
- b** A limited use license under applicable U.S. patents, to use FGI Technologies subject to the conditions listed in this Rider.
- c** Enrollment for participation in Roundup Ready PLUS® Crop Management Solutions.
- d** A limited use license to prepare and apply on glyphosate-tolerant alfalfa (or have others prepare and apply) tank mixes of, or sequentially apply (or have others sequentially apply), glyphosate herbicides labeled for use on those crops with quizalofop, clethodim, sethoxydim, fluzafifop, and/or fenoxaprop labeled for use on those crops to control volunteer corn with Roundup Ready® 2 Technology in Grower's crops for the 2019 growing season. However, neither Grower nor a third party may utilize any type of co-pack or premix of glyphosate plus one or more of the above-identified active ingredients in the preparation of a tank mix for use on glyphosate-tolerant alfalfa.

3. GENERAL TERMS:

- a Term:** This Rider will remain in effect until either Grower or FGI chooses to terminate the Rider, as provided below.
- b Modification:** FGI or Monsanto may unilaterally revise the terms and conditions of this Rider, including the Agreement and TUG incorporated herein, from time to time. Grower shall verify the currently effective terms of this Rider at least annually before February 1 at agcelerate.com. FGI or Monsanto will notify Grower of any amended terms, including information regarding new and existing FGI Technologies and any additions or deletions to the U.S. patents licensed under this Rider. If Grower has provided FGI or Monsanto an e-mail address in conjunction with the Agreement or this Rider, FGI or Monsanto may send Rider amendments and new stewardship information to Grower by e-mail or mail. Grower's continued use of FGI Technologies after receipt of any amended terms and/or the posting of amended terms at agcelerate.com constitutes Grower's agreement to be bound by the amended terms of this Rider.
- c Transferability:** Grower may not transfer its rights or obligations to anyone else without the written consent of FGI. If Grower's rights or obligations are transferred with FGI's consent or by operation of law, this Rider is binding on the person or entity receiving the transferred rights or obligations.
- d Binding Effect:** If any provision of this Rider is determined to be void or unenforceable, the remaining provisions shall remain in full force and effect.
- e Termination:** Grower may terminate this Rider effective immediately by delivering written notice to FGI. Grower must deliver the notice of termination to DRC Data Services, Attn: AgCelerate Agreements, PO Box 221679, Charlotte, NC 28222-1679. FGI may terminate this Rider for any reason, in whole or in part, by delivering written notice to Grower. Upon termination, Grower's responsibilities and the other terms herein shall survive (such as but not limited to Grower's obligation to use Alfalfa Seed for a single commercial crop) as to Alfalfa Seed previously purchased or used by Grower. If Grower breaches the terms of this Rider, FGI may terminate effective immediately Grower's rights under this Rider. Grower will not be entitled to obtain a future limited-use license from FGI unless FGI provides Grower with specific written notice expressly recognizing the breach and termination of this Rider and granting a new limited-use license. Grower expressly acknowledges that Grower's submission of a new Monsanto Technology Stewardship Agreement or Rider and FGI's or Monsanto's issuance of a new license number shall not satisfy the specific written notice reference above and that any such action shall have no legal effect. If Grower is found by any court to have breached any term of this Rider and/or to have infringed one or more of the Alfalfa Patent Rights, Grower agrees that, among other things, FGI, and Monsanto, as appropriate, shall be entitled to preliminary and permanent injunctions enjoining Grower and any individual and/or entity acting on Grower's behalf or in concert therewith from making, using, selling, or offering Alfalfa Seed for sale. Additionally, Grower agrees that any such finding of infringement by Grower shall entitle FGI, and Monsanto, as appropriate, to patent infringement damages to the full extent authorized by 35 U.S.C. § 271 et. seq. Grower will also be liable for all breach of contract damages.
- f Attorneys' Fees:** If Grower is found by any court to have infringed one or more of the Alfalfa Patent Rights or otherwise to have breached any term of this Rider, Grower agrees to pay FGI and Monsanto, as appropriate, their attorneys' fees and costs related to the case plus any other expenses incurred in the investigation of the breach and/or infringement.

g Governing Law: This Rider and the parties' relationship shall be governed by the laws of the State of Missouri and the United States (without regard to the choice of law rules).

h Waiver: The failure of FGI or Monsanto or any owners of patents to exercise one or more of its rights under this Agreement on one or more occasions shall not be deemed a waiver on the part of FGI or Monsanto or such patent owner to exercise such right(s) on any subsequent occasion.

i Entire Agreement: This Agreement and Rider, along with provisions in the TUG and/or on bag tags and the terms of the FGI Seed and Feed Use Agreement, if applicable, which are incorporated herein, encompass the entire agreement of the parties, and supersede all previous understandings and agreements between the parties, whether oral or written. Grower hereby acknowledges and represents that Grower has not relied on any representation, assertion, guarantee, warranty, collateral contract or other assurance, except those set out in this Agreement and Rider, made by or on behalf of any other party or any other person or entity whatsoever, prior to Grower's signing of this Agreement and Rider or purchasing Alfalfa Seed pursuant to the license granted hereunder. Grower also agrees that such provisions (the terms, warranties, and disclaimers and limitations as to warranties, damages, and remedies) are terms and conditions of sale and cannot be modified or amended at any time except in writing signed by FGI or Monsanto.

4. GROWER CLAIMS AND REMEDIES:

- a Notice requirement:** As a condition precedent to Grower or any other person with an interest in Grower's crop asserting any claim, action, or dispute against FGI and/or any seller of Alfalfa Seed regarding performance or non-performance of FGI Technologies or Alfalfa Seed, Grower must provide FGI a written, prompt, and timely notice (regarding performance or non-performance of the FGI Technologies) and to the seller of any Alfalfa Seed (regarding performance or non-performance of the Alfalfa Seed) within sufficient time to allow an in-field inspection of the crop(s) about which any controversy, claim, action, or dispute is being asserted. The notice will be timely only if it is delivered 15 days or less after Grower first observes the issue(s) regarding performance or non-performance of the FGI Technology and/or the Alfalfa Seed. The notice shall include a statement setting forth the nature of the claim, name of the FGI Technology, and Alfalfa Seed products. Grower must deliver the notice to DRC Data Services, Attn: AgCelerate Agreements, PO Box 221679, Charlotte, NC 28222-1679.
- b Limited Warranty and Disclaimer of Warranties:** FGI warrants the FGI Technology licensed hereunder as set forth on the seed bag and/or tag to the extent specifically warranted thereon, or, to the extent specifically warranted therein, that the FGI Technologies licensed hereunder will perform as set forth in the TUG when used in accordance with directions. This warranty applies only to Roundup Ready® Alfalfa or HarvXtra® Alfalfa with Roundup Ready® Technology contained in planting Alfalfa Seed that has been purchased from FGI and seed companies licensed by FGI or the seed company's authorized dealers or distributors. EXCEPT FOR THE EXPRESS WARRANTIES IN THE LIMITED WARRANTY SET FORTH ABOVE, FGI MAKES NO OTHER WARRANTIES OF ANY KIND, AND DISCLAIMS ALL OTHER WARRANTIES, WHETHER ORAL OR WRITTEN, EXPRESSED OR IMPLIED INCLUDING THE IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR PARTICULAR PURPOSE, AND NON-INFRINGEMENT OF THIRD PARTY PATENTS. THIS WARRANTY IS VOID IF THE SEED IS REPACKAGED BY ANY PARTY OTHER THAN FGI.
- c Grower's Exclusive Limited Remedy:** THE EXCLUSIVE REMEDY OF GROWER AND THE LIMIT OF THE LIABILITY OF FGI OR ANY SELLER FOR ANY AND ALL LOSSES, INJURY OR DAMAGES RESULTING FROM THE USE OR HANDLING OF ALFALFA SEED (INCLUDING CLAIMS BASED IN CONTRACT, NEGLIGENCE, PRODUCT LIABILITY, STRICT LIABILITY, TORT, OR OTHERWISE) SHALL BE THE PRICE PAID BY GROWER FOR THE QUANTITY OF THE ALFALFA SEED INVOLVED OR, AT THE ELECTION OF FGI OR THE SEED SELLER, THE REPLACEMENT OF THE ALFALFA SEED. IN NO EVENT SHALL FGI OR ANY SELLER BE LIABLE FOR ANY INCIDENTAL, CONSEQUENTIAL, SPECIAL, OR PUNITIVE DAMAGES.
- d FORUM SELECTION FOR CLAIMS MADE BY GROWER AND ALL OTHER CLAIMS:** THE PARTIES CONSENT TO THE SOLE AND EXCLUSIVE JURISDICTION AND VENUE OF THE U.S. DISTRICT COURT FOR THE EASTERN DISTRICT OF MISSOURI, EASTERN DIVISION, AND THE CIRCUIT COURT OF THE COUNTY OF ST. LOUIS, MISSOURI, (ANY LAWSUIT MUST BE FILED, IF IN FEDERAL COURT IN ST. LOUIS, MO, OR, IF IN STATE COURT, IN ST. LOUIS COUNTY, MO) FOR ALL CLAIMS AND DISPUTES ARISING OUT OF OR CONNECTED IN ANY WAY WITH THIS AGREEMENT AND/OR THE USE OF THE ALFALFA SEED OR THE FGI TECHNOLOGIES. THE PARTIES WAIVE ANY OBJECTION TO VENUE IN THE EASTERN DIVISION OF THE U.S. DISTRICT COURT FOR THE EASTERN DISTRICT OF MISSOURI, INCLUDING THOSE BASED, IN WHOLE OR IN PART, ON THE DIVISIONAL VENUE LOCAL RULE(S) OF THE U.S. DISTRICT COURT FOR THE EASTERN DISTRICT OF MISSOURI. THE PARTIES SPECIFICALLY AGREE THAT THIS SECTION COVERS FGI, ITS CURRENT OR FUTURE AFFILIATES AND ANY CURRENT OR FUTURE U.S.-BASED WHOLLY-OWNED SUBSIDIARIES OF FGI.

2019 SUGARBEET RIDER

TERMS AND CONDITIONS

The following terms and conditions of the Sugarbeet Rider (the "Rider") supplement the Monsanto Technology Stewardship Agreement ("TSA" or the "Agreement"), are enforceable under that Agreement as well as independently and separately enforceable from the Agreement, and are applicable to Grower's purchase or use of Roundup Ready® Sugarbeets. This Rider is entered into between Grower and KWS SAAT SE (KWS) and consists of the terms and conditions set forth below. Capitalized terms used but not defined herein shall have the meanings ascribed to them in the Agreement.

This Rider grants Grower a limited license to use Roundup Ready® Sugarbeets in accordance with the terms of this Rider ("KWS Technologies"), with respect to which KWS has authorized Monsanto Company, a subsidiary of Bayer AG, ("Monsanto") to act on KWS's behalf in accordance with the parties' commercial services agreement, that are made available to Grower. Seed containing KWS Technologies, are collectively referred to herein as ("Sugarbeet Seed"). Seed containing KWS Technologies, are collectively referred to herein as ("Sugarbeet Seed"). The licensed U.S. patents for KWS Technologies can be found at the following web page: monsantotechnology.com and/or on the product label.

This Rider also contains Grower's stewardship responsibilities and requirements associated with the use of Sugarbeet Seed and KWS Technologies.

1. GROWER AGREES:

- a** To acquire Sugarbeet Seed only from authorized seed companies in the United States with technology license(s) from KWS for the applicable KWS Technology(ies) or from a licensed company's representative authorized to sell such licensed Sugarbeet Seed in the United States.
- b** To obtain and read before planting and strictly follow the applicable requirements of the Technology Use Guide ("TUG") and seed package label, as each may be amended from time to time, which TUG and seed package label are incorporated into and are a part of this Rider; and to cooperate and comply with these and any additional stewardship programs KWS or Monsanto communicates or makes available to Grower. Further, Grower acknowledges that compliance with the foregoing stewardship requirements is a fundamental term of this Rider, and Grower may lose its limited use license to use these products if Grower fails to follow the stewardship guidelines required by this Rider. KWS further advises Grower to follow the recommendations provided in the TUG and seed package label. Grower may obtain additional copies of the TUG by contacting Monsanto at 1-800-768-6387 or by going to tug.monsanto.com.
- c** To use Sugarbeet Seed solely for a commercial crop in the United States as provided below. Grower may use a single planting of Roundup Ready® Sugarbeets to be processed for sugar, for energy production, or for animal feed.
- d** Not to transfer any Sugarbeet Seed to any other person or entity for planting, and not to export any Sugarbeet Seed.
- e** Not to plant any Sugarbeet Seed, or any seed produced from Sugarbeet Seed, for crop breeding, research, DNA analysis, generation of herbicide, or other registration data. Grower may not conduct research on Grower's crop produced from Sugarbeet Seed other than to make agronomic comparisons and conduct yield testing for Grower's own use.
- f** To use on crops containing KWS Technology only pesticides labeled for such use and follow current label directions. **KWS DOES NOT MAKE ANY REPRESENTATIONS, WARRANTIES OR RECOMMENDATIONS CONCERNING THE USE OF PRODUCTS MANUFACTURED OR MARKETED BY OTHER COMPANIES, INCLUDING BUT NOT LIMITED TO THOSE THAT ARE LABELED FOR USE IN CROPS CONTAINING KWS TECHNOLOGY. KWS SPECIFICALLY DISCLAIMS ALL RESPONSIBILITY FOR THE USE OF THESE PRODUCTS IN CROP(S) CONTAINING KWS TECHNOLOGY. ALL QUESTIONS AND COMPLAINTS ARISING FROM THE USE OF PRODUCTS MANUFACTURED OR MARKETED BY OTHER COMPANIES, OR THE IMPACT TO KWS TECHNOLOGY FROM THE USE OF SUCH PRODUCTS, SHOULD BE DIRECTED TO THOSE COMPANIES.**
- g** To keep and provide to KWS and its representatives following KWS's actual (or attempted) oral communication, and no later than seven (7) days after the date of its written or electronic request:
 1. copies of all records, receipts, or other documents that could be relevant to Grower's performance of this Rider, including but not limited to, Summary Acreage History Report, Producer Farm Data Report, Form 578 (producer print), Farm and Tract Detail Listing and corresponding aerial photographs, Risk Management Agency claim documentation, and grower/dealer/retailer/appliator records for seed and chemical purchases and applications and all documentation required on the chemistry product label or by government regulation; and
 2. the identity of, and access to, land farmed by or at the direction of Grower and bins, wagons, or seed storage containers used or under the control or direction of Grower, for purposes of examining and taking samples of crops, crop residue or seeds located therein.
- h** To promptly notify KWS and Monsanto should any Grower information provided herein change.

2. GROWER RECEIVES FROM KWS:

- a** A limited use license to purchase and to plant Sugarbeet Seed pursuant to the terms of this Rider in the United States of America, comprised of the 50 states and the District of Columbia, except in any state or county where the products do not have all the necessary approvals and to apply labeled glyphosate herbicides over the top of crops as applicable, unless otherwise restricted by law. KWS (or the respective licensor) retains ownership of the KWS Technologies owned by it, including the gene technologies. These licenses do not authorize Grower to plant Sugarbeet Seed in the United States that has been purchased in another country or plant Sugarbeet Seed in another country that has been purchased in the United States.
- b** A limited use license under applicable U.S. patents, to use KWS Technologies subject to the conditions listed in this Rider.

3. GENERAL TERMS:

- a Term:** This Rider will remain in effect until either Grower or KWS chooses to terminate the Rider, as provided below.
- b Modification:** KWS may unilaterally revise the terms and conditions of this Rider, including the Agreement and TUG incorporated herein, from time to time. Grower shall verify the currently effective terms of this Rider at least annually before February 1 at agcelerate.com. KWS or Monsanto will notify Grower of any amended terms, including information regarding new and existing KWS Technologies and any additions or deletions to the U.S. patents licensed under this Rider. If Grower has provided KWS or Monsanto an e-mail address in conjunction with the Agreement or this Rider, KWS or Monsanto may send Rider amendments and new stewardship information to Grower by e-mail or mail. Grower's continued use of KWS Technologies after receipt of any amended terms and/or the posting of amended terms at agcelerate.com constitutes Grower's agreement to be bound by the amended terms of this Rider.
- c Transferability:** Grower may not transfer its rights or obligations to anyone else without the written consent of KWS. If Grower's rights or obligations are transferred with KWS's consent or by operation of law, this Rider is binding on the person or entity receiving the transferred rights or obligations.
- d Binding Effect:** If any provision of this Rider is determined to be void or unenforceable, the remaining provisions shall remain in full force and effect.
- e Termination:** Grower may terminate this Rider effective immediately by delivering written notice to KWS. Grower must deliver the notice of termination to DRC Data Services, Attn: AgCelerate Agreements, PO Box 221679, Charlotte, NC 28222-1679. KWS may terminate this Rider for any reason, in whole or in part, by delivering written notice to Grower. Upon termination, Grower's responsibilities and the other terms herein shall survive (such as but not limited to Grower's obligation to use Sugarbeet Seed for a single commercial crop) as to Sugarbeet Seed previously purchased or used by Grower. If Grower breaches the terms of this Rider, KWS may terminate effective immediately Grower's rights under this Rider. Grower will not be entitled to obtain a future limited-use license from KWS unless KWS provides Grower with specific written notice expressly recognizing the breach and termination of this Rider and granting a new limited-use license. Grower expressly acknowledges that Grower's submission of a new Monsanto Technology Stewardship Agreement or Rider and KWS's or Monsanto's issuance of a new license number shall not satisfy the specific written notice reference above and that any such action shall have no legal effect. If Grower is found by any court to have breached any term of this Rider and/or to have infringed one or more of the Sugarbeet Patent Rights, Grower agrees that, among other things, KWS shall be entitled to preliminary and permanent injunctions enjoining Grower and any individual and/or entity acting on Grower's behalf or in concert therewith from making, using, selling, or offering Sugarbeet Seed for sale. Additionally, Grower agrees that any such finding of infringement by Grower shall entitle KWS to patent infringement damages to the full extent authorized by 35 U.S.C. § 271 et. seq. Grower will also be liable for all breach of contract damages.
- f Attorneys' Fees: If Grower is found by any court to have infringed one or more of the Sugarbeet Patent Rights or otherwise to have breached any term of this Rider, Grower agrees to pay KWS, their attorneys' fees and costs related to the case plus any other expenses incurred in the investigation of the breach and/or infringement.**
- g Governing Law and Forum:** This Rider and the parties' relationship shall be governed by the laws of the State of Minnesota and the United States (without regard to the choice of law rules). Any dispute arising out of or relating to this Rider, the parties' relationship, KWS technologies, or the Sugarbeet Seed shall be commenced and maintained exclusively in the state or federal courts of Minnesota. Grower waives any objection to venue or inconvenience of forum and voluntarily submits to the jurisdiction of these courts.
- h Waiver:** The failure of KWS or any owners of patents to exercise one or more of its rights under this Rider on one or more occasions shall not be deemed a waiver on the part of KWS or such patent owner to exercise such right(s) on any subsequent occasion.


i Entire Agreement: This Agreement and Rider, along with provisions in the TUG and/or on package labels and the terms of the KWS Seed and Feed Use Agreement, if applicable, which are incorporated herein, encompass the entire agreement of the parties, and supersede all previous understandings and agreements between the parties, whether oral or written. Grower hereby acknowledges and represents that Grower has not relied on any representation, assertion, guarantee, warranty, collateral contract or other assurance, except those set out in this Agreement and Rider, made by or on behalf of any other party or any other person or entity whatsoever, prior to Grower's signing of this Agreement and Rider or purchasing Sugarbeet Seed pursuant to the license granted hereunder. Grower also agrees that such provisions (the terms, warranties, and disclaimers and limitations as to warranties, damages, and remedies) are terms and conditions of sale and cannot be modified or amended at any time except in writing signed by KWS or Monsanto.

4. GROWER CLAIMS AND REMEDIES:

a Notice requirement: As a condition precedent to Grower or any other person with an interest in Grower's crop asserting any claim, action, or dispute against KWS and/or any seller of Sugarbeet Seed regarding performance or non-performance of KWS Technologies or Sugarbeet Seed, Grower must provide KWS a written, prompt, and timely notice (regarding performance or non-performance of the KWS Technologies) and to the seller of any Sugarbeet Seed (regarding performance or non-performance of the Sugarbeet Seed) within sufficient time to allow an in-field inspection of the crop(s) about which any controversy, claim, action, or dispute is being asserted. The notice will be timely only if it is delivered 15 days or less after Grower first observes the issue(s) regarding performance or non-performance of the KWS Technology and/or the Sugarbeet Seed. The notice shall include a statement setting forth the nature of the claim, name of the KWS Technology, and Sugarbeet Seed product. Grower must deliver the notice to DRC Data Services, Attn: AgCelerate Agreements, PO Box 221679, Charlotte, NC 28222-1679.

b Limited Warranty and Disclaimer of Warranties: KWS warrants the KWS Technology licensed hereunder only as specifically set forth on the seed container and/or package label and warrants that the KWS Technologies licensed hereunder will perform only as specifically set forth in the TUG when used in accordance with directions. This warranty applies only to Roundup Ready® Sugarbeets contained in planting Sugarbeet Seed that has been purchased from KWS and seed companies licensed by KWS or the seed company's authorized dealers or distributors. EXCEPT FOR THE EXPRESS WARRANTIES IN THE LIMITED WARRANTY SET FORTH ABOVE, KWS MAKES NO OTHER WARRANTIES OF ANY KIND, AND DISCLAIMS ALL OTHER WARRANTIES, WHETHER ORAL OR WRITTEN, EXPRESSED OR IMPLIED INCLUDING THE IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR PARTICULAR PURPOSE, AND NON-INFRINGEMENT OF THIRD PARTY PATENTS. THIS WARRANTY IS VOID IF THE SEED IS REPACKAGED BY ANY PARTY OTHER THAN KWS.

c Grower's Exclusive Limited Remedy: THE EXCLUSIVE REMEDY OF GROWER AND THE LIMIT OF THE LIABILITY OF KWS OR ANY SELLER FOR ANY AND ALL LOSSES, INJURY OR DAMAGES RESULTING FROM THE USE OR HANDLING OF SUGARBEET SEED (INCLUDING CLAIMS BASED IN CONTRACT, NEGLIGENCE, PRODUCT LIABILITY, STRICT LIABILITY, TORT, OR OTHERWISE) SHALL BE THE PRICE PAID BY GROWER FOR THE QUANTITY OF THE SUGARBEET SEED INVOLVED OR, AT THE ELECTION OF KWS OR THE SEED SELLER, THE REPLACEMENT OF THE SUGARBEET SEED. IN NO EVENT SHALL KWS OR ANY SELLER BE LIABLE FOR ANY INCIDENTAL, CONSEQUENTIAL, SPECIAL, OR PUNITIVE DAMAGES.

 Before 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 seed as set forth in the Monsanto Technology/Stewardship Agreement that you sign. By opening and using a bag of seed, you are reaffirming your obligation and agreement to comply with the most recent stewardship requirements.



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, **Roundup Ready 2 Xtend® soybeans** 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

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 Monsanto's Technology Use Guide for recommended weed control programs.

IMPORTANT IRM INFORMATION: RIB Complete® corn blend products do not require the planting of a structured refuge except in the Cotton-Growing Area where corn earworm is a significant pest. SmartStax® RIB Complete® corn blend is not allowed to be sold for planting in the Cotton-Growing Area. See the IRM/Grower Guide for additional information. Always read and follow IRM requirements. **Commercialization is dependent on multiple factors**, including successful conclusion of the regulatory process. **The information presented herein is provided for educational purposes only, and is not and shall not be construed as an offer to sell, or a recommendation to use, any unregistered pesticide for any purpose whatsoever.** It is a violation of federal law to promote or offer to sell an unregistered pesticide.

Do not export Genuity® Roundup Ready® Alfalfa seed or crop, including hay or hay products, to China pending import approval. In addition, due to the unique cropping practices **do not plant Genuity® Roundup Ready® Alfalfa in Imperial County, California**, pending import approvals and until Forage Genetics International, LLC (FGI) grants express permission for such planting.

Forage Genetics International, LLC ("FGI") is a member of Excellence Through Stewardship® (ETS). FGI products are commercialized in accordance with ETS Product Launch Stewardship Guidance, and in compliance with FGI's Policy for Commercialization of Biotechnology-Derived Plant Products in Commodity Crops. Certain 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. Growers should refer to <http://www.biotradestatus.com/> for any updated information on import country approvals. Excellence Through Stewardship® is a registered trademark of Excellence Through Stewardship.

Vistive® Gold with Roundup Ready 2 Yield® technology soybean seed is intended for use in the production of a crop for use in the production of high oleic soybean oil.

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.f. products may not yet be registered in all states. Check with your seed brand representative for the registration status in your state.

SmartStax® multi-event technology developed by Monsanto Company and Dow AgroSciences.

Insect control technology provided by Vip3A is utilized under license from Syngenta Crop Protection AG.

Roundup Technology® includes glyphosate-based herbicide technologies.

The RRXtend Spray App provides forecasts for locations within the contiguous United States. Do not use this app for forecasts outside the contiguous United States. Forecasts are for planning purposes only and are not a substitute for checking actual weather conditions at your location at the time of application and comply with the product label and other legal requirements.

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.

Warrant® Herbicide and Warrant® Ultra Herbicide are not registered in all states and may be subject to use restrictions.

IMPORTANT: Produce Marketing and Stewardship Requirements for Performance Series® sweet corn: 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. It is the growers' responsibility to talk to their produce handler or purchaser to confirm their buying position for this produce so that the marketing requirements can be met.

Herbicide Information for Performance Series® sweet corn: Roundup PowerMAX®, Roundup PowerMAX® II* and Roundup WeatherMAX® herbicides are approved for use on Performance Series® sweet corn (containing Roundup Ready® 2 Technology) in all U.S. states, the District of Columbia and Puerto Rico. If the directions for use on sweet corn with Roundup Ready® 2 Technology (which includes Performance Series® sweet corn) are not listed in the product label that is attached to the product you purchased, contact your Monsanto Company representative. *Roundup PowerMAX® and Roundup PowerMAX® II are only approved for use in the U.S.

Performance Series® sweet corn Insect Resistance Management (IRM) - Post-Harvest Requirements: Crop destruction must occur no later than 30 days following harvest, but preferably within 14 days. The allowed crop destruction methods are: rotary mowing, discing, or plowing down, or, for home garden use, by chopping up the stalks using home garden tools such as a hoe. Crop destruction methods should destroy any surviving resistant insects.

All growers in Idaho and Oregon who intend to plant Performance Series® sweet corn must contact Seminis Vegetable Seeds, Inc. at 866-334-1056 to order Performance Series® sweet corn seed. Performance Series® sweet corn may only be sold into the Treasure Valley area of Idaho and Oregon (which consists of Ada, Canyon, Gem, Owyhee, Payette and Washington counties in Idaho and Malheur County in Oregon) during the time period beginning on January 1 and ending on February 15 of each calendar year. Growers must inform Seminis Vegetable Seeds, Inc. if the location(s) of their Performance Series® sweet corn field(s) to ensure pinning prior to delivery of Performance Series® sweet corn seed.

ALWAYS READ AND FOLLOW PESTICIDE LABEL DIRECTIONS.

Acceleron®, BioRise™, Bollgard II®, Bollgard®, DEKALB®, DroughtGard®, Genuity Design®, Genuity®, NemaStrike™, Performance Series®, QuickRoots®, Respect the Refuge and Cotton Design®, RIB Complete and Design®, RIB Complete®, Roundup PowerMAX®, Roundup Ready 2 Xtend®, Roundup Ready 2 Yield®, Roundup Ready PLUS®, Roundup Ready®, Roundup Technology®, Roundup WeatherMAX and Design®, Roundup WeatherMAX®, Roundup®, SmartStax®, Transorb and Design®, Trecepta®, VaporGrip®, Vistive®, VT Double PRO®, VT Triple PRO®, Warrant®, XtendFlex®, XtendiMax® and YieldGard VT Triple® are trademarks of Monsanto Technology LLC. BAYER and BAYER CROSS are registered trademarks of Bayer Group. Hercules® is a registered trademark of Dow AgroSciences LLC. Agrisure Viptera® is a registered trademark of a Syngenta group company. Liberty® and LibertyLink® and the Water Droplet Design® are trademarks of BASF Corporation. Respect the Refuge and Corn Design® and Respect the Refuge® are registered trademarks of National Corn Growers Association. All other trademarks are the property of their respective owners. ©2018 Bayer Group All Rights Reserved. [18-00602pgd] 5A4N187980

