

U.S. Technology Use Guide

# 2020 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. The app is available from [climate.com](http://climate.com) and [itunes.apple.com](http://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®. The app is available from [climate.com](http://climate.com) and [itunes.apple.com](http://itunes.apple.com)



**RRXtend Spray** app helps you plan sprays more effectively by providing weather forecasts that include 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. The app is available from [itunes.apple.com](http://itunes.apple.com) and [play.google.com](http://play.google.com)



**Virtual Root Dig by Acceleron** app allows you to plant and "dig up" a virtual corn or soybean plant for a deeper look into unpredictable threats like nematodes, moisture or nutrient stress, disease and insects. See how the Acceleron® portfolio addresses these challenges with coverage on four fronts: nematicides, fungicides, insecticides and bio-enhancers. The app is available from [itunes.apple.com](http://itunes.apple.com)

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*This 2020 Technology Use Guide (TUG) provides a concise source of technical information about Monsanto Company's current portfolio of biotechnology-derived products, seed treatments and single-use wheat varieties. Monsanto is a member of the Bayer Group. This TUG sets forth requirements, recommendations and Best Management Practices (BMPs) for the use of these products. Growers planting corn or cotton insect-protection traits also must read and follow the applicable 2020 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 allowed by 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 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 biotechnology traits and/or seed treatments agree to implement the following stewardship requirements that include, but are not limited to, the following:

- 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, and complying with the applicable IRM requirements for specific biotechnology traits as mandated by the U.S. Environmental Protection Agency (EPA).
- Observing regional planting restrictions mandated by the EPA.
- Using seed containing Monsanto Technologies and Products 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 biotechnology traits only to grain handlers that confirm their acceptance or using those products on-farm.
- Not moving seed and material containing biotechnology 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 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, biotechnology trait technologies and other technologies, and provides limited warranties on Monsanto Technology performance.
- 2** Following IRM requirements guards against insect resistance to *Bacillus thuringiensis* (B.t.) technologies and enables the long-term durability of these technologies and meets EPA requirements.
- 3** Utilizing biotechnology seed for planting a single commercial crop encourages investment for future biotechnology innovations, which further improves farming technology and productivity.

## Intellectual Property Infringement

If Monsanto reasonably believes that a grower has planted saved seed containing a Monsanto biotechnology trait, variety-specific patents, Plant Variety Protection (PVP) and Certified Seed Only (CSO) single use varieties in violation of the terms of the grower license and/or Monsanto's patent rights, Monsanto 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 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 intellectual property or become aware of individuals who may be saving seed in violation of their TSA as noted above, please call 1-800-768-6387 (1-800-ROUNDUP). Alternatively, you may send a letter 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/](https://monsanto.com/products/product-stewardship/seed-patent/) or [monsanto.com/company/commitments/human-rights/articles/monsantos-commitment-farmers-patents/](https://monsanto.com/company/commitments/human-rights/articles/monsantos-commitment-farmers-patents/).

## 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, VT Triple PRO® Corn, DroughtGard® Hybrids with VT Triple PRO® Corn, VT Triple PRO® RIB Complete® Corn Blend, DroughtGard® Hybrids with VT Triple PRO® RIB Complete® Corn Blend, SmartStax® Corn, SmartStax® RIB Complete® Corn Blend, Trecepta® Corn, Trecepta® RIB Complete® Corn Blend, Bollgard II® Cotton, Bollgard II® with Roundup Ready® Flex Cotton, Bollgard II® XtendFlex® Cotton, Bollgard® 3 XtendFlex® Cotton, XtendFlex® Cotton, Roundup Ready® Flex Cotton, Roundup Ready® Spring Canola, Roundup Ready® Winter Canola, TruFlex™ Canola with Roundup Ready® Technology, TruFlex™ Canola with Roundup Ready® and LibertyLink® Technologies, DEKALB® LibertyLink® Canola, Performance Series® Sweet Corn, 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 biotechnology 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 only in countries where all necessary regulatory approvals have been granted. It is a violation of national and international law to move material containing biotechnology 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 [biotraderstatus.com](https://biotraderstatus.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 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 Innovation and Protection 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 [www.seedipalliance.com](https://www.seedipalliance.com).

Anyone may provide anonymous or confidential information as follows:

**“Anonymous”** reporting occurs 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 occurs 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.

## 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 become 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.
- Continuing multiyear, targeted monitoring of insect populations through the Agricultural Biotechnology Stewardship Technical Committee (ABSTC), a consortium 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 habitats for pollinators such as bees and monarch butterflies, you provide benefits to your farm by increasing the diversity of pollinators and other beneficial insects in your area. These benefits contribute to productive and sustainable farmscapes.

In addition, consider establishing diverse habitats that have 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 these habitats in non-cultivated areas such as conservation lands/buffers, ditches or roadsides. Follow label directions intended to minimize spray drift to non-target plants that provide habitat for pollinators and other non-target organisms.

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

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

# Insect Resistance Management Requirements

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

grower compliance with IRM and refuge requirements. The 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 collaboratively 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/](http://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 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 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® and Bollgard® 3 Cotton Technologies. 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, VT Triple PRO® RIB Complete® Corn Blend and DroughtGard® Hybrids with 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® Corn Blend, DroughtGard® Hybrids with VT Double PRO® RIB Complete® Corn Blend, VT Triple PRO® RIB Complete® Corn Blend and DroughtGard® Hybrids with VT Triple PRO® RIB Complete® Corn Blend. 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. Here are some additional suggestions:

- Use proper crop rotation practices and products to control pests, making 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 to ensure quality ears at harvest, supplemental insecticide applications may be required when corn earworm populations are above economic thresholds. 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 investment 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 the Weed Science Society of America (WSSA) at [wssa.net](http://wssa.net) and [www.iwilltakeaction.com](http://www.iwilltakeaction.com) to access herbicide resistance training lessons that provide in-depth educational information. Get rewarded for using Bayer products, including a wide range of herbicides. Visit [MyBayerPLUS.com](http://MyBayerPLUS.com) to sign up and learn more about this rewards program.



### 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® brand herbicides, is a Group 15 herbicide. To learn more about herbicide group classification, visit or download apps at [www.iwilltakeaction.com](http://www.iwilltakeaction.com) or [www.hracglobal.com](http://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 plants are resistant. They may be effectively managed utilizing another herbicide from a different mechanism of action group by mixing one 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 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, by 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 post-emergence 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.

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 that incorporates a diverse set of controls to manage herbicide-resistant weeds. To learn more, visit [www.iwilltakeaction.com/weeds](http://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, [weedsience.org](http://weedsience.org) (a website on herbicide-resistant weeds), supplemental labeling, this TUG, media and written communications, [MyBayerPLUS.com](http://MyBayerPLUS.com) and grower meetings. Monsanto will report any confirmed inability to control likely dicamba-resistant weeds at [weedsience.org](http://weedsience.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® herbicide 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 glufosinate, glyphosate and dicamba. For regional weed management recommendations in the Roundup Ready® Xtend Crop System, refer to <http://www.roundupreadyxtend.com/Pages/Regional-Recommendations.aspx>. A complete list of specimen labels is available at [monsanto.com/products/safety-information/msds](http://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.

## 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](http://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 croplands.

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 MARKETING BY COMPANIES OTHER THAN MONSANTO, 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 MARKETING BY OTHER COMPANIES, OR THE IMPACT TO MONSANTO TECHNOLOGY FROM THE USE OF SUCH PRODUCTS, SHOULD BE DIRECTED TO THOSE COMPANIES OTHER THAN MONSANTO.

## Weed Management *continued*

Growers making ground or air applications to cropland with a use rate of less than 3.5 lbs or 0.7 lbs of glyphosate a.e./acre, 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 herbicides are products sold for in-crop use in 2020.

Tank mixtures of Roundup WeatherMAX®, Roundup PowerMAX® and Roundup PowerMAX® II herbicides 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. Please 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 post-emergence (in-crop) or preharvest applications on these crops.

## Coexistence of Biotechnology Cropping Systems with Other Agricultural Production Systems

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

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 various 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 biotechnology crops generated renewed discussion focused on coexistence of biotechnology cropping systems with conventional cropping systems and organic production. These discussions have primarily focused on the potential marketing impact of the introduction of biotechnology products on other systems. The health and safety of biotechnology products are not issues 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 biotechnology crops has been the subject of several studies and reports. These studies and reports conclude that coexistence among biotechnology and

non-biotechnology crops is readily achievable and is occurring. They recommend that coexistence strategies be developed on a case-by-case basis while 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 generally 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 growers who are growing a crop to satisfy a particular market. These growers are inherently agreeing to employ practices that are appropriate to ensure the integrity and marketability of their crops. In each case, the growers are 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 neighbors to gauge the need for appropriate BMPs.



# 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-biotechnology specifications. An example of an IP crop 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, the growers should take steps to prevent mechanical mixing. Growers should make sure all seed storage areas, transportation vehicles and planter boxes are cleaned thoroughly both before and after 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 before and after their use during 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 from other crops to prevent mechanical mixing 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 concurrently 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.

Information that is more specific to the crop and area may be available from state extension offices.

**Growers should consider the following factors that can affect the occurrence and extent of cross-pollination to or from other fields:**

- **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, thereby restricting 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 minimize the impurities that could result from cross-pollination with nearby yellow dent corn. Furthermore, research has 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.
- **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 can be an effective tool to protect seeds for a strong, healthy start. Seed treatments can be precisely applied to help shield seeds from insects and diseases that exist in the soil during a seed's 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 long sleeves, 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 (e.g., when cleaning 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, that could attract pollinators.
  - Eliminate flowering plants and weeds in and around the field prior to planting.
  - Fill the planter at least 10 yards inside the field to be planted.
- Minimize dust by:
  - Using advanced seed flow lubricants that minimize dust, such as Fluency Agent Advanced. Learn more at [www.cropscience.bayer.us/seedgrowth/fluency-agent-advanced](http://www.cropscience.bayer.us/seedgrowth/fluency-agent-advanced).
  - 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 to reduce 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. For more information on treated seed stewardship and handling spills, please visit this site: <https://seed-treatment-guide.com/wp-content/uploads/2018/03/Treated-Seed-Stewardship-for-Handling-Spills.pdf>.
- 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 such remnant seed 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 they do not cumulatively exceed the maximum amount.

Planting may be an allowable option to dispose of left-over treated seeds. But when that 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 offerings, 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, please 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](http://seed-treatment-guide.com).



**Fluency Agent Advanced is a seed lubricant for corn and soybeans from Bayer. It is a replacement for talc, graphite and talc/graphite blended seed lubricants.**

Fluency Agent Advanced is an improved version of the original Fluency Agent. It has been optimized for easier handling, including enhanced uniformity and reduced residue buildup. These characteristics allow for improved measuring, pouring and mixing of product and less residue in the seed hopper.

Fluency Agent Advanced reduces the amount of insecticide active ingredient released in treated seed dust during planting by more than 88%<sup>1</sup> as compared to talc, therefore reducing the risk of exposure to non-target insects, including bees.

To ensure that grower practices help promote agricultural sustainability, we encourage growers to follow these tips:

- C** Communicate planting activities to neighboring beekeepers when practical and be aware of beehives adjacent to the planting area.
- A** Be aware of wind speed and direction during planting, particularly in areas with flowering crops.
- R** Reduce risk to pollinators by eliminating or reducing flowering weeds in fields when practical.
- E** Ensure that seed is planted correctly. To help protect the environment, clean planters and seed boxes to minimize dust release and ensure that treated seed is planted at the proper depth.

<sup>1</sup> When using a deflector and used in accordance with label directions.





## Honey Bee Health Information

From time to time, claims circulate that insect-protected biotechnology 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 biotechnology 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, poor nutrition, transportation stress and pesticides (including those used to control mites and diseases) 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 and 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 large, too significant and too complex for one company or group. We must work together. For more information, please visit the organization's website, [honeybeehealthcoalition.org](http://honeybeehealthcoalition.org).



# Corn technologies

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## **SmartStax**

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, fall armyworm, stalk borer, lesser corn stalk borer, sugarcane borer, black cutworm, western corn rootworm, northern corn rootworm and Mexican corn rootworm and control or suppress corn earworm. Routine applications of insecticides to control these insects under typical growing conditions and infestation levels are usually unnecessary when corn containing SmartStax® Technology is planted. Applications of soil-applied insecticides (i.e., application of an insecticide to the soil surface, in furrows and/or incorporated into the soil) are not recommended for control of corn rootworm except under limited circumstances and under consultation with an extension agent, crop consultant or other local experts. 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.

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## **Trecepta** CORN

Products with Trecepta® Technology contain Cry1A.105, Cry2Ab2 and Vip3Aa20 from *B.t.* that together control 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.

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## **VT Triple PRO**

Products with VT Triple PRO® Technology contain Cry1A.105, Cry2Ab2 and Cry3Bb1 from *B.t.* that together control European corn borer, southwestern corn borer, southern cornstalk borer, fall armyworm, stalk borer, lesser corn stalk borer, sugarcane borer, western corn rootworm, northern corn rootworm and Mexican corn rootworm and control or suppress corn earworm. Products with 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.

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## **VT Double PRO**

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, stalk borer, lesser stalk borer and fall armyworm and control or suppress corn earworm. 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.

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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® Corn, SmartStax® RIB Complete® Corn Blend, VT Double PRO® Corn, VT Double PRO® RIB Complete® Corn Blend, DroughtGard® Hybrids with VT Double PRO® Corn, DroughtGard® Hybrids with VT Double PRO® RIB Complete® Corn Blend, VT Triple PRO® Corn, VT Triple PRO® RIB Complete® Corn Blend, DroughtGard® Hybrids with VT Triple PRO® Corn, DroughtGard® Hybrids with VT Triple PRO® RIB Complete® Corn Blend, Trecepta® Corn, Trecepta RIB Complete® Corn Blend.



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® Corn, DroughtGard® Hybrids with VT Double PRO® RIB Complete® Corn Blend, DroughtGard® Hybrids with VT Triple PRO® Corn, DroughtGard® Hybrids with VT Triple PRO® RIB Complete® Corn Blend.



The Acceleron® portfolio delivers coverage on four fronts: fungicides, insecticides, nematicides and bio-enhancers to help protect your seed investment against diseases, insects, nematodes, as well as moisture or nutrient stress. For more information consult your local retailer or visit [www.acceleronsas.com](http://www.acceleronsas.com).



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

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

# 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 pre-emergence 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 pre-emergence residual herbicide at the appropriate application rate tank mixed with a minimum of 22 oz/acre Roundup WeatherMAX® herbicide in-crop before weeds exceed 4 inches in height.

Follow with a post-emergence in-crop application of Roundup WeatherMAX® herbicide at a minimum of 22 oz/acre for additional weed flushes before they exceed 4 inches in height.

Roundup WeatherMAX® herbicide may be tank mixed with other herbicides for post-emergence 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.

## Additional Information

Various weed biotypes are known to be resistant to glufosinate, glyphosate and dicamba. For the current weed control recommendations for herbicide-resistant weed biotypes, please call **1-800-768-6387**. A complete list of specimen labels can be found at [www.monsanto.com/products/safety-information/msds/](http://www.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.





# 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/treatments. 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.

# 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 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.

*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 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 requirements 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 and label 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.* corn seed 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.* corn seed to help ensure that plant 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 *B.t.* corn seed or vice versa.

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

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

## Requirements by Growing Area

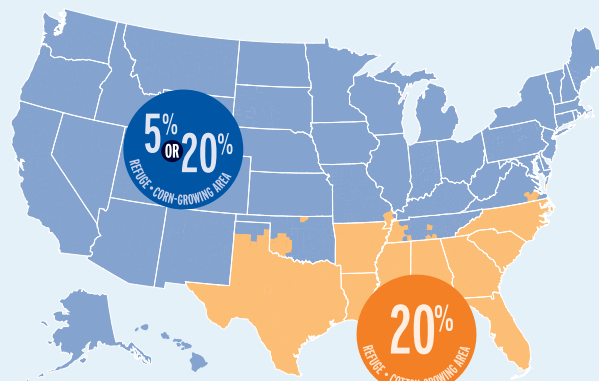


The following states and counties are within the **Corn-Growing Area**. The blue circle structured refuge requirements apply to non-refuge in a bag *B.t.* corn products grown in this area.

Alaska  
Arizona  
California  
Colorado  
Connecticut  
Delaware  
Hawaii  
Idaho  
Illinois  
Indiana  
Iowa  
Kansas  
Kentucky  
Maine  
Maryland  
Massachusetts  
Michigan  
Minnesota

Missouri—*all counties except Dunklin, New Madrid, Pemiscot, Scott & Stoddard*  
Montana  
Nebraska  
Nevada  
New Hampshire  
New Jersey  
New Mexico  
New York  
North Dakota  
Ohio  
Oklahoma—*all counties except Beckham, Caddo, Comanche, Custer, Greer, Harmon, Jackson, Kay, Kiowa, Tillman & Washita*  
Oregon  
Pennsylvania  
Rhode Island

South Dakota  
Tennessee—*all counties except Carroll, Chester, Crockett, Dyer, Fayette, Franklin, Gibson, Hardeman, Hardin, Haywood, Lake, Lauderdale, Lincoln, Madison, Obion, Rutherford, Shelby & Tipton*  
Texas—*only the counties of Carson, Dallam, Hansford, Hartley, Hutchinson, Lipscomb, Moore, Ochiltree, Roberts & Sherman*  
Utah  
Vermont  
Virginia—*all counties except Dinwiddie, Franklin City, Greenville, Isle of Wight, Northampton, Southampton, Suffolk City, Surrey & Sussex*  
Washington  
West Virginia  
Wisconsin  
Wyoming



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

Alabama  
Arkansas  
Florida  
Georgia  
Louisiana  
Mississippi  
Missouri—*only the counties of Dunklin, New Madrid, Pemiscot, Scott & Stoddard*  
North Carolina

Oklahoma—*only the counties of Beckham, Caddo, Comanche, Custer, Greer, Harmon, Jackson, Kay, Kiowa, Tillman & Washita*  
South Carolina  
Tennessee—*only the counties of Carroll, Chester, Crockett, Dyer, Fayette, Franklin, Gibson, Hardeman, Hardin, Haywood, Lake, Lauderdale, Lincoln, Madison, Obion, Rutherford, Shelby & Tipton*

Texas—*all counties except Carson, Dallam, Hansford, Hartley, Hutchinson, Lipscomb, Moore, Ochiltree, Roberts & Sherman*  
Virginia—*only the counties of Dinwiddie, Franklin City, Greenville, Isle of Wight, Northampton, Southampton, Suffolk City, Surrey & Sussex*



## Corn Technologies

# Corn Refuge Requirements

Follow all pesticide label directions. Please 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
<b>SmartStax<sup>®</sup></b>	5%	20%	●	●	*

Under typical growing conditions and infestation levels for products planted with SmartStax<sup>®</sup> 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.<sup>1</sup> 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 time frame to the SmartStax<sup>®</sup> Corn field. SmartStax<sup>®</sup> Technology contains Roundup Ready<sup>®</sup> 2 Technology and LibertyLink<sup>®</sup> herbicide-tolerance traits, but your refuge may or may not. Select an appropriate herbicide for your refuge to avoid crop damage.

<b>SmartStax<sup>®</sup></b> RIB COMPLETE <sup>®</sup>	NO structured refuge required	Not for use in the Cotton-Growing Area.	●	●	●
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<b>Trecepta<sup>®</sup></b> CORN	5%	20%	●	●	●
-------------------------------------	----	-----	---	---	---

The refuge can be treated with a non-*B.t.* foliar-applied insecticide for control of lepidopteran pests (e.g., corn borer), if pest pressure reaches an economic threshold for damage.<sup>1</sup> Microbial *B.t.* insecticides must not be applied to the refuge corn.

<b>Trecepta<sup>®</sup></b> RIB COMPLETE <sup>®</sup> CORN	NO structured refuge required	Not recommended for the Cotton-Growing Area. If planted, an additional 20% structured refuge is required.	●	●	●
---	----------------------------------	--	---	---	---

**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<sup>®</sup> RIB Complete<sup>®</sup> 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.

<b>VT Triple PRO<sup>®</sup></b> <b>DroughtGard<sup>®</sup></b> HYBRIDS VT Triple PRO <sup>®</sup>	20%	20%	●	●	**
--	-----	-----	---	---	----

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

<b>VT Triple PRO<sup>®</sup></b> <b>DroughtGard<sup>®</sup></b> RIB COMPLETE <sup>®</sup> HYBRIDS VT Triple PRO <sup>®</sup> RIB COMPLETE <sup>®</sup>	NO structured refuge required	Not recommended for the Cotton-Growing Area. If planted, an additional 20% structured refuge is required.	●	●	●
--	----------------------------------	--	---	---	---

**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<sup>®</sup> Corn Blend exceeds economic thresholds in the refuge.<sup>1</sup> In addition, refuge can be protected from corn rootworm damage by appropriate seed treatment or soil insecticide.

<b>VT Double PRO<sup>®</sup></b> <b>DroughtGard<sup>®</sup></b> HYBRIDS VT Double PRO <sup>®</sup>	5%	20%	●	●	●
--	----	-----	---	---	---

The refuge can be treated with a non-*B.t.* foliar-applied insecticide for control of lepidopteran pests (e.g., corn borer), if pest pressure reaches an economic threshold for damage.<sup>1</sup> Microbial *B.t.* insecticides must not be applied to the refuge corn.

<b>VT Double PRO<sup>®</sup></b> <b>DroughtGard<sup>®</sup></b> RIB COMPLETE <sup>®</sup> HYBRIDS VT Double PRO <sup>®</sup> RIB COMPLETE <sup>®</sup>	NO structured refuge required	Not recommended for the Cotton-Growing Area. If planted, an additional 20% structured refuge is required.	●	●	●
--	----------------------------------	--	---	---	---

**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<sup>®</sup> RIB Complete<sup>®</sup> Corn Blend exceeds economic thresholds in the refuge.<sup>1</sup> 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.




<sup>1</sup>1/2 mile option for SmartStax<sup>®</sup> Corn 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, WY, WY.

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

<sup>3</sup>Economic 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

-  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

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

### Within



Block



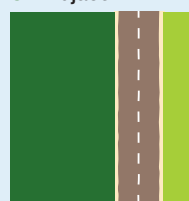
Perimeter



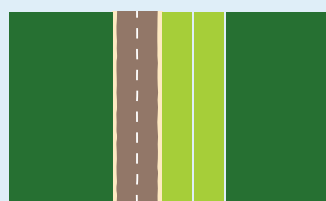
Strips

If perimeter or strips are used for the refuge, they must be at least 4 (four) contiguous rows wide.

### OR Adjacent



Adjacent



Within adjacent field

### OR 1/2 Mile Option



← ≤ 1/2 mile →

1/2 mile option available for limited products and in limited areas — see note on page 22 for details.

## 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 access an IRM corn refuge look-up tool at [www.iwilltakeaction.com/refuge-lookup](http://www.iwilltakeaction.com/refuge-lookup).

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	<b>A</b> 200	X	<b>%</b> 20%	=	<b>B</b> 40 ✓
Your Field		X		=	

Next, subtract your refuge acres from your total corn acres.

This is your maximum **B.t. ACRES.**

Example	<b>A</b> 200	-	<b>B</b> 40	=	<b>C</b> 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, to better assist growers on every field where they 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 VT Triple PRO® Corn, Monsanto recommends 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 CRW 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-CRW 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).<sup>1</sup>
- 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-protected traits and soil applied insecticides.
- SAI should not be necessary for CRW control with pyramided CRW-traited *B.t.* corn.

<sup>1</sup> Culy, Edwards & Cornelius. 1992. *Journal of Economic Entomology* 85: 2440-2446.



# 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*, *Rhizoctonia solani* and *Colletotrichum graminicola*.

## 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, seed corn maggot, white grub, grape colaspis and black cutworm.

## Nematicides

Nematodes cost an estimated 10.2% yield loss in corn.<sup>1</sup> They pierce and infect roots, causing a loss of nutrients and water while opening the door for secondary issues.

## 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.

## Additional Offerings












- The BioRise™ Corn Offerings complement our lineup of fungicides, insecticides and nematicides. Class 2017, 2018, 2019 and 2020 base genetics are treated with either BioRise™ 2 Corn Offering (the on-seed application of the separately registered products Acceleron® B-300 SAT and BioRise™ 360 ST) or BioRise™ 360 ST.
- Additional corn offerings include products with QuickRoots® Technology.

For more information, please consult your local retailer or visit [www.acceleronsas.com](http://www.acceleronsas.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.

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

## 2020 Corn Offerings

<div>ACCELERON<sup>®</sup></div> <div>SEED APPLIED SOLUTIONS</div>	FUNGICIDES 		INSECTICIDES <sup>[1]</sup> 	BIO-ENHANCERS 	NEMATICIDES <sup>[1]</sup> 
		Enhanced Disease Control Offering		BioRise™ Corn Offering <sup>[2]</sup>	
	Protection against soilborne and seedborne diseases, including <i>Fusarium</i> , <i>Rhizoctonia solani</i> and <i>Pythium</i> .	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> , the pathogen that leads to anthracnose stalk rot.	Controls over 15 corn insects and protects against damage from early season pests, such as wireworm, seedcorn maggot, white grub, grape colaspis and black cutworm.	Designed to increase functional root volume, as well as water and nutrient uptake through enhanced mycorrhizal colonization.	Protection against damage from a wide range of nematode species.
OFFERINGS					
<div>BASIC<sup>[1]</sup></div> <div>plus Poncho<sup>®</sup> /VOTIVO<sup>®</sup></div>					Available in SmartStax <sup>®</sup> Corn and SmartStax <sup>®</sup> RIB Complete <sup>®</sup> Corn Blend only
<div>ELITE<sup>[1]</sup></div> <div>plus Poncho<sup>®</sup> /VOTIVO<sup>®</sup></div>					
<div>+ ADDITIONAL OFFERINGS</div> <div>Bio-Enhancer: QuickRoots<sup>®</sup> Technology</div>					

[1] Insecticide and nematicide offerings will vary by trait and class. Refer to price card, bag tag or bag flap for details. Clothianidin at the 1.25 mg/seed rate available on select products.

[2] Class of 2017, 2018, 2019 and 2020 base genetics are treated with either BioRise™ 360 ST or BioRise™ 2 Corn Offering (the on-seed application of the separately registered products of Acceleron® B-300 SAT and BioRise™ 360 ST).



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 development. The increased insecticidal efficacy of Bollgard® 3 Cotton is combined with the triple herbicide tolerance to dicamba,<sup>1</sup> glyphosate and glufosinate from XtendFlex® Technology to provide our highest available level of protection from yield-robbing insects and weeds.<sup>2</sup>



Bollgard II® XtendFlex® Cotton is built on Bollgard II® with Roundup Ready® Flex Cotton 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. Bollgard II® XtendFlex® Cotton provides tolerance to three herbicides, dicamba,<sup>1</sup> glyphosate and glufosinate, allowing effective and sustainable weed control options for use before, at and after planting.<sup>2</sup>



XtendFlex® Cotton varieties include tolerance to dicamba,<sup>1</sup> glyphosate and glufosinate herbicides, providing effective weed control options for use before, at and after planting.



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 Bollgard II® Cotton and are tolerant to in-crop applications of Roundup WeatherMAX®, Roundup PowerMAX® and Roundup PowerMAX® II herbicides when used according to label directions.<sup>2</sup>



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.



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® Cotton.<sup>2</sup>



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, please consult your local retailer or visit [www.acceleronsas.com](http://www.acceleronsas.com).

<sup>1</sup> Monsanto will not authorize the use of dicamba herbicides containing 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 those products.

<sup>2</sup> If you are planting in an area requiring a structured refuge and did not receive a Bollgard® 3 XtendFlex® and Bollgard II® Cotton IRM Grower Guide or would like another, please visit [monsanto.com](http://monsanto.com) or [genuity.com](http://genuity.com), or call 1-800-768-6387 to request a copy by mail.



# *Cotton* technologies



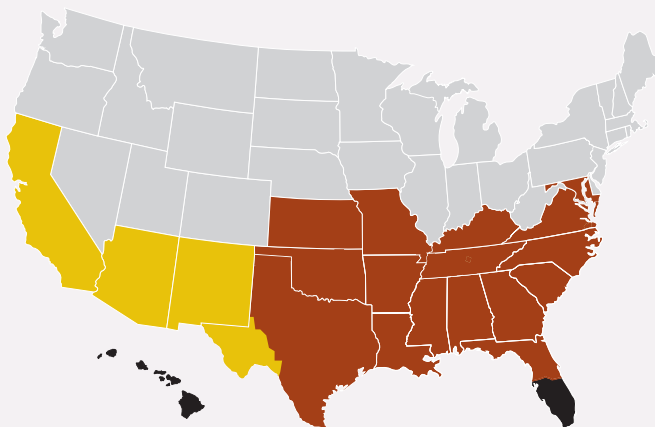
# Cotton Technologies

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

You may download a copy of the current guide at [monsanto.com](https://monsanto.com) or [genuity.com](https://genuity.com), or you may call 1-800-768-6387 to request a copy by mail.

The map below depicts areas of the United States 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 are 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: 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® Cotton IRM Grower Guide or would like another, please visit [monsanto.com](https://monsanto.com) or [genuity.com](https://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 Cotton Grower Guide.

## Weed Management

Weed control in cotton is essential to help maximize both fiber yield and quality potential. Cotton is especially 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 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 pre-emergence (including preplant incorporated), post-emergence 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 22 oz/acre when weeds are less than 3 inches in height and tank mix with another approved herbicide, if necessary.
- An application of XtendiMax® herbicide with VaporGrip® Technology at 22 oz/acre should be applied to weeds 4 inches or less in height. (Please refer to [www.xtendimaxapplicationrequirements.com](http://www.xtendimaxapplicationrequirements.com).)
- Liberty® herbicide may also be used at 29 to 44 oz/acre when weeds are 3 inches or less in height. (Please refer to the Liberty® herbicide label.)
- It is not recommended that XtendiMax® herbicide 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 non-performance of applied herbicides against a particular weed species to your appropriate company representative or local retailer. For Monsanto products please call **1-800-768-6387** or **1-844-779-8363**.

# 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 from crop emergence to seven days prior to harvest.
- A maximum rate of 32 oz/acre per application may be applied using ground application equipment while the maximum is 22 oz/acre per application by air.
- There are no growth or timing restrictions for sequential applications.
- Four (4) quarts/acre (128 oz/acre) is the total in-crop volume allowed from emergence to 60% open bolls.
- A maximum total volume of 44 oz/acre 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/acre may be applied after cotton reaches 60% open bolls and before harvest, if needed.
- Application must be made at least seven 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/acre (169.6 oz/acre).

##### 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/acre of Liberty® herbicide can be applied on cotton per growing season or up to 72 oz/acre if more than 29 oz/acre was used in a single application. See the Liberty® herbicide 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® herbicide with VaporGrip® Technology is a restricted use pesticide. 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 supersedes any previously issued labeling for this product, including previous supplemental labeling. Check the registration status of XtendiMax® herbicide with VaporGrip® Technology in each state and mandatory dicamba applicator training requirement before using.

Refer to [xtendimaxapplicationrequirements.com](http://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. The RRXtend Spray app is a helpful digital tool that provides location-specific weather forecasts, digital recordkeeping capabilities and education resources related to the Roundup Ready® Xtend Crop System.

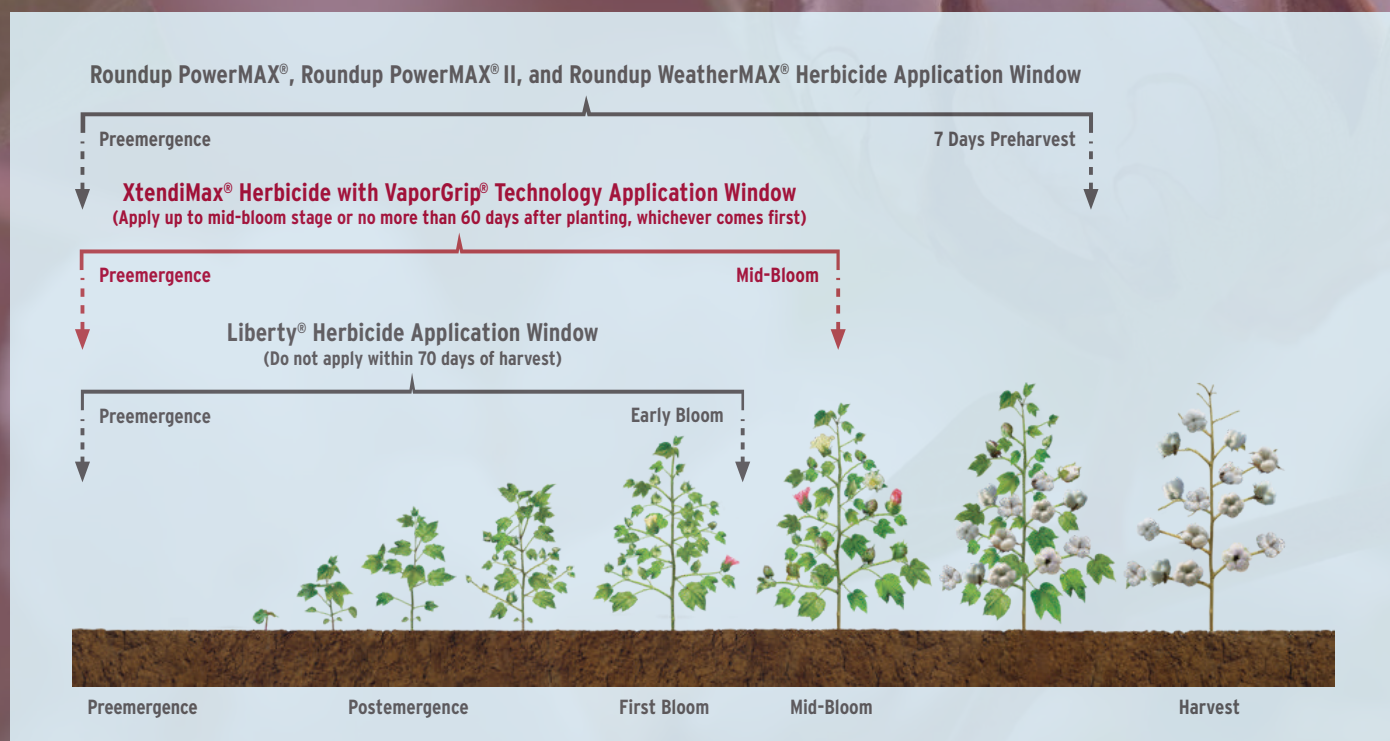
- May be applied in-crop up to mid-bloom stage or no more than 60 days after planting, whichever comes first.
- Up to 1.0 lb/acre of dicamba (44 oz/acre of XtendiMax® herbicide with VaporGrip® Technology) may be used pre-emergence.
- 0.5 lb/acre of dicamba (22 oz/acre XtendiMax® herbicide with VaporGrip® Technology) may be applied twice post-emergence.
- Products must be applied in a minimum of 15 GPA carrier volume to provide adequate coverage.
- Sequential applications post-emergence may be made at least seven days apart.
- No more than 2.0 lb/acre of dicamba may be used, total, per growing season.
- For best results, dicamba-based weed management programs must include the use of residual herbicides pre-emergence as well as at least one post-emergence application.

Report any incidence of non-performance of XtendiMax® herbicide with VaporGrip® Technology against a particular weed species to your Monsanto retailer or representative or call **1-844-RRXTEND (1-844-779-8363)**.

#### Crop Safety of In-Crop Glyphosate Applications

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

# Herbicide Application Windows



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

Post-emergence 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-based products (EC) that are tank mixed with products containing dicamba may increase the severity of the leaf damage.

## Crop Safety of In-Crop Liberty® Herbicide Applications

Post-emergence 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, glufosinate and glyphosate. For the current weed control recommendations for herbicide-resistant weed biotypes, please call **1-800-768-6387**. A complete list of specimen labels can be located at [monsanto.com/products/safety-information/msds/](https://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](https://cdms.net).



# Bollgard II® with Roundup Ready® Flex Cotton

## Roundup Ready® Flex Cotton



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

Growers of 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® Cotton IRM Grower Guide.

### **Pima Cotton (*Gossypium barbadense*) Market Options**

Roundup Ready® Flex Pima Cotton does not have the same export approvals in place as Roundup Ready® Flex Cotton. Roundup Ready® Flex Pima Cotton is approved for cultivation in the United States and for export to Canada, Japan and Mexico. Do not market cottonseed, meal, linters or gin trash from Roundup Ready® Flex Pima Cotton 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 especially sensitive to early season weed competition, which can result in unacceptable stands and/or reduced yield potential. The 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.

A residual herbicide(s) may be applied as either a pre-emergence (including preplant incorporated), post-emergence 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.

Various weed biotypes are known to be resistant to glyphosate. For the current weed control recommendations for herbicide-resistant weed biotypes, please call **1-800-768-6387**. A complete list of specimen labels can be located at [monsanto.com/products/safety-information/msds/](https://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 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 and make sure weeds are controlled at planting.
- Add soil residual herbicide(s) such as Warrant® herbicide and cultural practices as part of a 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/acre when weeds are less than 3 inches 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.

- 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 to seven days prior to harvest.
- A maximum rate of 32 oz/acre per application may be applied using ground application equipment while the maximum is 22 oz/acre per application by air.
- There are no growth or timing restrictions for sequential applications.
- Four (4) quarts/acre (128 oz/acre) is the total in-crop volume allowed from emergence to 60% open bolls.
- A maximum total volume of 44 oz/acre may be applied between layby and 60% open bolls.
- Post-directed application of Roundup WeatherMAX®, Roundup PowerMAX® or Roundup PowerMAX® II herbicides, 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

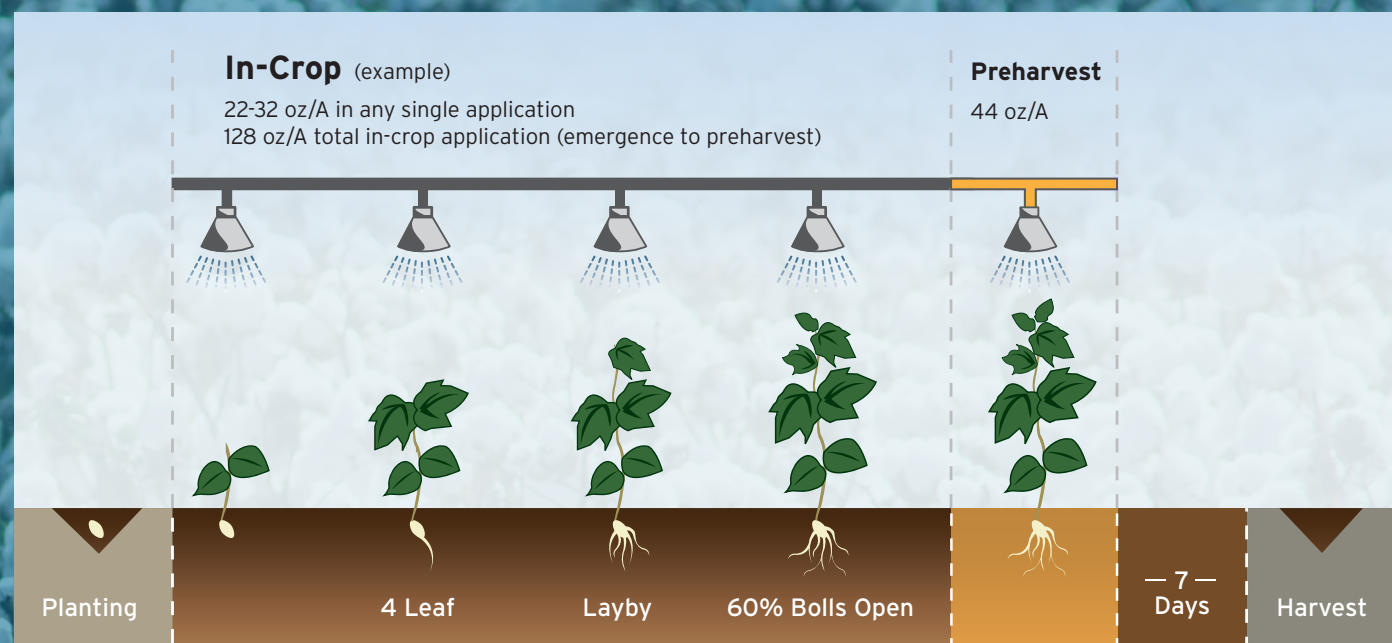
- Up to 44 oz/acre may be applied after cotton reaches 60% open bolls and before harvest, if needed.
- Application must be made at least seven days prior to harvest.
- The maximum volume of Roundup WeatherMAX®, Roundup PowerMAX® or Roundup PowerMAX® II herbicide that may be used in a single season is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

### 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 herbicides are the only Roundup® Agricultural Herbicides labeled and approved for use in 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 Roundup Ready® Flex Cotton is labeled for use on Roundup Ready® Flex Cotton and has been tested to demonstrate crop safety.

## Herbicide Application Windows



# Acceleron® Offerings



The Acceleron® portfolio helps protect your seed investment

against diseases, insects and nematodes as well as moisture or nutrient stress.

## Fungicides

Cotton seedling diseases cost cotton growers an average of 350M pounds per year. Our exclusive combinations of fungicides protect against these damaging diseases, including *Rhizoctonia solani*, *Pythium*, *Fusarium* and *Thielaviopsis basicola*.

## Insecticides

Early season cotton insects feed on seeds and seedlings, which can cause delayed emergence, stand loss, plant injury and stunting. Our insecticides protect against certain sucking insects—including thrips—that cause significant damage to cotton crops across the U.S. Cotton-Growing Area.

## Nematicides

Nematodes cost an estimated 10.7% yield loss in cotton.<sup>1</sup> They pierce and infect roots, causing a loss of nutrients and water while opening the door for secondary issues. Poncho®/VOTIVO® has been

shown to provide broad-spectrum protection against plant-parasitic nematodes for up to 60 days after planting.

## 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 cotton make nutrients available to plants, helping maximize yield potential.

## Acceleron® Seed Applied Solutions

The tiers of Acceleron® Seed Applied Solutions available on cotton products in 2020 are shown below.

## Additional Offerings

Additional Offerings from Acceleron®:





- Products containing QuickRoots® Technology

For more information, please consult your local retailer or visit [www.acceleronsas.com](http://www.acceleronsas.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.

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

## 2020 Cotton Offerings

 OFFERINGS	FUNGICIDES 	INSECTICIDES 	NEMATICIDES 
	Protection against <i>Rhizoctonia solani</i> , <i>Pythium</i> , <i>Fusarium</i> and <i>Thielaviopsis basicola</i> with an exclusive combination of fungicides and more rapid and increased emergence of seedlings under certain cold conditions.	Reduces damage to cotton caused by early season insect pests, including thrips and aphids.	Protection against damage from a wide range of nematode species.
BASIC	✓		
STANDARD	✓	✓	
ELITE plus Poncho®/VOTIVO®	✓	✓	✓

+ ADDITIONAL OFFERINGS Bio-Enhancer: QuickRoots® Technology



**This Technology Stewardship Agreement ("Agreement") is entered into between you ("Grower") and Monsanto Company and consists of the terms on this page and on the reverse side of this page and any applicable Riders.**

This Agreement grants Grower a limited license to use the following technologies and products 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\*

## 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  
VT Triple PRO® Corn  
DroughtGard® Hybrids with VT Triple PRO® Corn  
VT Triple PRO® RIB Complete® Corn Blend  
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

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  
Roundup Ready 2 Yield® Soybeans  
Vistive® Gold Soybeans with Roundup Ready 2 Yield® Technology  
XtendFlex® Soybeans\*\*

## Wheat Products

WestBred® Single Use Wheat Varieties

This Agreement also grants Grower a limited license to use 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 is referred to herein as "Seed". The licensed U.S. patents, and/or Plant Variety Protection (PVP) certificates and/or WestBred® single use wheat varieties for Monsanto Technologies can be found at the following web page: [www.monsantotechnology.com](http://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.**

\*For canola products containing the LibertyLink® trait, Grower must hold a valid and current BASF Liberty and Trait Agreement before Grower purchase such products. Product names may change.

\*\*This product has received full approval for planting in the United States and is pending approval for import into certain export markets. Availability is subject to Monsanto's decision to commercialize and the conditions of such commercialization.

## 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.bayer.com](http://tug.bayer.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, molecular analysis 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 MARKETING BY COMPANIES OTHER THAN MONSANTO, 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 MARKETING BY OTHER COMPANIES, OR THE IMPACT TO MONSANTO TECHNOLOGY FROM THE USE OF SUCH PRODUCTS, SHOULD BE DIRECTED TO THOSE COMPANIES OTHER THAN MONSANTO.
- 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 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 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 "Dow AgroSciences") licenses Grower under its applicable U.S. patents (the "Dow AgroSciences Patent Rights") to use Dow AgroSciences' Event TC1507 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 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, flazifop, and/or fenoxaprop labeled for use on those crops to control

volunteer corn with Roundup Ready® 2 Technology in Grower's crops for the 2020 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](http://agcelerate.com). Monsanto will notify Grower of any amended terms. 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](http://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. Monsanto may transfer its rights or obligations to any of its corporate affiliates without the consent of Grower.
- 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 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 or PVPs, 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. The parties agree that patent infringement damages are difficult to calculate, and agree that for cotton and soybean Seed that has been saved and planted, patent damages shall be reasonable royalties in the amount of \$250 per infringing unit of soybean Seed, \$1,000 per infringing unit of herbicide tolerant cotton Seed and \$2,000 per infringing unit of insect protected/herbicide tolerant cotton Seed. The parties agree that the royalty damage may, like other terms of this license, be modified (increased) in subsequent updates. Patent infringement damages for other infringing activities (including but not limited to patent infringement pertaining to Seed other than cotton or soybean Seed) may be separately calculated.

- f Attorneys' Fees:** If Grower is found by any court to have infringed one or more of the U.S. patents or PVPs 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 or PVPs 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 or PVP 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 the seed bag and/or tag, all of which are hereby incorporated into this Agreement, encompasses the entire agreement of the parties, and supersedes 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.

- j Privacy:** Monsanto and its affiliates may collect, use and disclose personal information, including the Grower Information provided on Page 1 and any information related to the performance of this Agreement, such as information about the use of Monsanto products and services, preferences and feedback, and any communications with Monsanto, to assist Monsanto in establishing and maintaining a business relationship with Grower, including, for example, to: (i) better understand Grower's needs and preferences; (ii) enable Monsanto to operate and manage its businesses and operations (including research and development of new and existing products and services and offering incentives to retailers to make products and services available); and (iii) periodically send marketing materials, news/updates, and

other information about certain products, services, events, and other matters that may be of interest to you. For more information about how Monsanto handles personal information, please read Monsanto's Privacy Statement, which may be updated from time to time in accordance with its terms, at <https://www.cropsscience.bayer.us/privacy-statement>.

### 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 a written, prompt, and timely notice to Monsanto (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 ANY WARRANTY OF THE NON-INFRINGEMENT OF THIRD PARTY PATENTS AND IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR PARTICULAR PURPOSE. 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.

# 2020 ALFALFA RIDER

## TERMS AND CONDITIONS

The following terms and conditions of the Alfalfa Rider (the "Rider") supplement the 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 member of the Bayer Group ("Monsanto"), authorized to act on FGI's behalf. Seed containing FGI Technologies is 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](http://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 [tug.bayer.com](http://tug.bayer.com).
- c To pay all applicable royalties and technology fees for the use of the FGI Technologies or the Alfalfa Seed, as well as applicable fees due FGI that are part of, associated with, or invoiced as part of the Alfalfa Seed purchase price. 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, molecular analysis 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 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/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.
- 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** 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, flazafop, and/or fenoxaprop labeled for use on those crops to control volunteer corn with Roundup Ready® 2 Technology in Grower's crops for the 2020 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](http://agcelerate.com). FGI or Monsanto will notify Grower of any amended terms. 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](http://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 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 U.S. patents or PVPs covering Monsanto Technologies or FGI Technologies, 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 U.S. patents or PVPs covering Monsanto Technologies or FGI Technologies, 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 or PVPs 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, all of which are hereby expressly 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 a written, prompt, and timely notice to FGI (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.

# 2020 SUGARBEET RIDER

## TERMS AND CONDITIONS

The following terms and conditions of the Sugarbeet Rider (the “Rider”) supplement the 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 member of the Bayer Group (“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 is 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](http://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.bayer.com](http://tug.bayer.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, molecular 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 MARKED 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 MARKED 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](http://agcelerate.com). KWS or Monsanto will notify Grower of any amended terms. 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](http://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 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, all of which are hereby expressly 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 a written, prompt, and timely notice to KWS (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 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.



**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 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.

**U.S. 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 Bayer representative.

\*Roundup PowerMAX® and Roundup PowerMAX® II are only approved for use in the U.S. Roundup PowerMAX® II is not registered in all states and may be subject to use restrictions. The distribution, sale, or use of an unregistered pesticide is a violation of federal and/or state law and is strictly prohibited. Check with your local dealer or representative for the product registration status in your state.

**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.

**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, disking, or plowing down, or, for home garden use only allowed in the U.S., 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. of the location(s) of their Performance Series® Sweet Corn field(s) to ensure pinning prior to delivery of Performance Series® Sweet Corn seed.

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

NOT ALL formulations of dicamba, glyphosate or glufosinate are approved for in-crop use with cotton with XtendFlex® Technology. 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 or cotton with XtendFlex® Technology.

**FOR COTTON, EACH ACCELERON® SEED APPLIED SOLUTIONS OFFERING** is a combination of separate individually registered products containing the active ingredients: **BASIC** Offering: metalaxyl, flupyrroxad, myclobutanil, and pyraclostrobin. **STANDARD** Offering: metalaxyl, flupyrroxad, pyraclostrobin, myclobutanil and imidacloprid. **ELITE plus** Poncho®/VOTiVO® Offering: metalaxyl, flupyrroxad, pyraclostrobin, myclobutanil, imidacloprid, clothianidin and *Bacillus firmus* I-1582.

**FOR CORN, EACH ACCELERON® SEED APPLIED SOLUTIONS OFFERING** is a combination of separate individually registered products containing the active ingredients: **BASIC plus** Poncho®/VOTiVO® Offering for corn: metalaxyl, prothioconazole, fluxastrobin, clothianidin, *Bacillus firmus* I-1582. **ELITE plus** Poncho®/VOTiVO® Offering for corn: metalaxyl, clothianidin, and *Bacillus firmus* I-1582; prothioconazole and fluxastrobin at rates that suppress additional diseases. **BASIC** Offering for corn: metalaxyl, prothioconazole, fluxastrobin, and clothianidin. **ELITE** Offering for corn: metalaxyl, and clothianidin; and prothioconazole and fluxastrobin at rates that suppress additional diseases. **BioRise™ Corn Offering** is the on-seed application of either BioRise™ 360 ST or the separately registered seed applied products Acceleron® B-300 SAT and BioRise™ 360 ST. BioRise™ Corn Offering is included seamlessly across offerings on all class of 2017, 2018, 2019 and 2020 products.

**FOR SOYBEANS, EACH ACCELERON® SEED APPLIED SOLUTIONS OFFERING** is a combination of separate individually registered products containing the active ingredients: **BASIC** Offering: metalaxyl, flupyrroxad, and pyraclostrobin. **STANDARD** Offering: metalaxyl, flupyrroxad, pyraclostrobin, and imidacloprid.

**The distribution, sale, or use of an unregistered pesticide is a violation of federal and/or state law and is strictly prohibited. Not all products are approved in all states.**

BioRise™ 2 Corn Offering is the on-seed application of the separately registered seed applied products Acceleron® B-300 SAT and Acceleron® B-360 ST.

**Commercialization of XtendFlex® soybeans 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. Soybeans with XtendFlex® Technology contain genes that confer tolerance to glyphosate, glufosinate and dicamba. Glyphosate** will kill crops that are not tolerant to glyphosate. **Dicamba** will kill crops that are not tolerant to dicamba. **Glufosinate** will kill crops that are not tolerant to glufosinate. Contact your seed brand dealer or refer to the Monsanto Technology Use Guide for recommended weed control programs.

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

**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. **See the IRM/Grower Guide for additional information. Always read and follow IRM requirements.**

**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.

**Roundup Ready® Technology** contains genes that confer tolerance to glyphosate. **Roundup Ready® 2 Technology** contains genes that confer tolerance to glyphosate. **Cotton with XtendFlex® Technology** contains genes that confer tolerance to glyphosate, glufosinate and dicamba. **LibertyLink® Technology** contains genes that confer tolerance to glufosinate. **Roundup Ready 2 Xtend® soybeans contain genes that confer tolerance to glyphosate and dicamba. Glyphosate** will kill crops that are not tolerant to glyphosate. **Dicamba** will kill crops that are not tolerant to dicamba. **Glufosinate** will kill crops that are not tolerant to glufosinate. Contact your seed brand dealer or refer to the Monsanto Technology Use Guide for recommended weed control programs.

Insect control technology provided by **Vip3A** is utilized under license from Syngenta Crop Protection AG. Degree Xtra® and Harness® Xtra are restricted use pesticides. Not all products are registered in all states and may be subject to use restrictions. The distribution, sale, or use of an unregistered pesticide is a violation of federal and/or state law and is strictly prohibited. Check with your local dealer or representative for the product registration status in your state. Herculex® is a registered trademark of Dow AgroSciences LLC. Agrisure Viptera® is a registered trademark of a Syngenta group company. JumpStart® and QuickRoots® are registered trademarks of Novozymes. Clearfield®, Liberty®, LibertyLink®, LibertyLink® and the Water Droplet Design®, Poncho® and VOTiVO® are trademarks of BASF Corporation. Respect the Refuge and Corn Design® and Respect the Refuge® are registered trademarks of National Corn Growers Association. Acceleron®, Bayer, Bayer Cross, BioRise™, Bollgard II®, Bollgard®, Degree Xtra®, DEKALB®, DroughtGard®, Evergol®, Harness®, Performance Series and Design®, Performance Series®, Raxil®, Respect the Refuge and Cotton Design®, RIB Complete and Design®, RIB Complete®, Roundup and Design®, Roundup PowerMAX®, Roundup Ready 2 Technology and Design™, Roundup Ready 2 Xtend®, Roundup Ready 2 Yield®, Roundup Ready®, Roundup Technology®, Roundup WeatherMAX and Design®, Roundup WeatherMAX®, Roundup®, SmartStax®, Trecepta®, TruFlex™, VaporGrip®, Vistive®, VT Double PRO®, VT Triple PRO®, Warrant®, XtendFlex® and XtendiMax® are trademarks of Bayer Group. All other trademarks are the property of their respective owners. For additional product information call toll-free 1-866-99-BAYER (1-866-992-2937) or visit our website at [www.BayerCropScience.us](http://www.BayerCropScience.us). Bayer CropScience LP, 800 North Lindbergh Boulevard, St. Louis, MO 63167. ©2019 Bayer Group. All rights reserved. 5A4NI99343

