Your pride
our passion

South Africa

TECHNOLOGY USER GUIDE (TUG)

2020

Science for a ***better life***

Index

Introduction

Introduction

This 2020 Technology User Guide (TUG) provides a concise source of technical information about Bayer's current portfolio of technology products in South Africa and sets forth requirements and recommendations.

The Genetically Modified Organisms (GMO) Act (Act 15 of 1997), the GMO Amendment Act (Act 26 of 2006), the Plant Improvement Act (Act 53 of 1976), the Plant Breeder's Rights Act (Act 15 of 1976), the South African Patents Act (Act 57 of 1978), and the South African Trade Marks Act (Act 194 of 1993), amongst others, all have a bearing on the use of:

YieldGard®,
Roundup Ready® MAIZE 2,
YieldGard® with Roundup Ready® MAIZE 2,
YieldGard® MAIZE 2,
YieldGard® MAIZE 2 with Roundup Ready® MAIZE 2,
Roundup Ready FLEX® COTTON,
Bollgard® 2 COTTON,
Bollgard® 2 COTTON with Roundup Ready FLEX® COTTON, and
Roundup Ready® SOYBEANS.

Consequently it is unlawful to:

- plant the above mentioined technologies, without a valid, signed Bayer Technology and Stewardship Agreement ('the agreement');
- breach or disregard the terms of the agreement;
- not comply with this User Guide; and
- breach the terms and conditions of the permits issued in respect of the above mentioined technologies.

In the premises, the user recognises, acknowledges and accepts that:

- the permits set strict conditions subject to which the seed has to be cultivated and planted;
- if the permit conditions are not adhered to, the permits may be withdrawn, which would result in significant irreparable harm to Bayer, other seed companies and the Agricultural Sector of South Africa;
- non-compliance with these conditions by users may cause the development of weed resistance against glyphosate and insect resistance against the technology;

- the user, Bayer and other seed companies are obliged to take all reasonable steps to limit the risk of weed resistance against glyphosate and insect resistance against the technologies as previously mentioned; and
- compliance with the Insect Resistance Management Programme (IRMP), Weed Resistance Management Programmes (WRMP) and User Guides is an essential and imperative requirement of the agreement. The user shall therefore strictly comply with the letter and spirit of the IRMP, WRMP and User Guides in respect of the seed of each type of crop, as provided for herein.

This technical guide is not a pesticide product label. It is intended to provide additional information and to highlight approved uses from certain product labels. Read and follow all precautions and directions in the label booklet and separately published supplemental labelling 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 labelling.

Stewardship Overview

1) A Message About Stewardship

Bayer 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 responsibilities for proper management of these products. Growers planting seed with biotech traits and/or seed treatments agree to implement the following stewardship requirements, including, but not limited to:

- Reading, signing and complying with the Bayer Technology/Stewardship Agreement (BTSA) and reading all annual license terms and updates before purchase or use of any seed containing a Bayer trait.
- Reading and following the directions for use on all product labels.
- Reading and following the IRM Grower Guide prior to planting; complying with the applicable IRM requirements for specific biotech traits as mandated by the DALRRD*.
- Using seed containing Bayer technologies solely for planting a single commercial crop.
- Complying with any additional stewardship requirements, such as grain or feed use agreements, product marketing requirements or geographical planting restrictions that Bayer deems appropriate or necessary to implement for proper stewardship or regulatory compliance.
- Selling crops or material containing biotech traits only to grain handlers that confirm their acceptance or using those products on-farm.
- Not moving seed and material containing biotech traits across international boundaries and into nations where import is not permitted.
- Not using, planting, applying, selling, promoting and/or distributing a product within a country where the product is not yet registered.

In addition, growers are encouraged to:

- Follow applicable stewardship recommendations as outlined in this Technology User Guide (TUG).
- Follow the Herbicide Resistance Management and Insect Resistance Management recommendations to help minimise the risk of resistance development.

2) Why is Stewardship Important?

Signing the germplasm and **Bayer's** biotech Agreement (BTSA) provides growers access to Bayer's germplasm and the biotech trait technologies therein, and provides limited warranties on Bayer Technology performance.

Following IRM requirements guard against insect resistance to *Bacillus thuringiensis* (*Bt*) technologies, enabling the long-term durability of these technologies and meeting DALRRD* requirements.

Utilising biotech seed only for planting a single commercial crop helps preserve the effectiveness of biotech traits, and encourages investment for future biotech innovations, which further improves farming technology and productivity.

**Department of Agriculture Land Reform and Rural Development (DALRRD)*

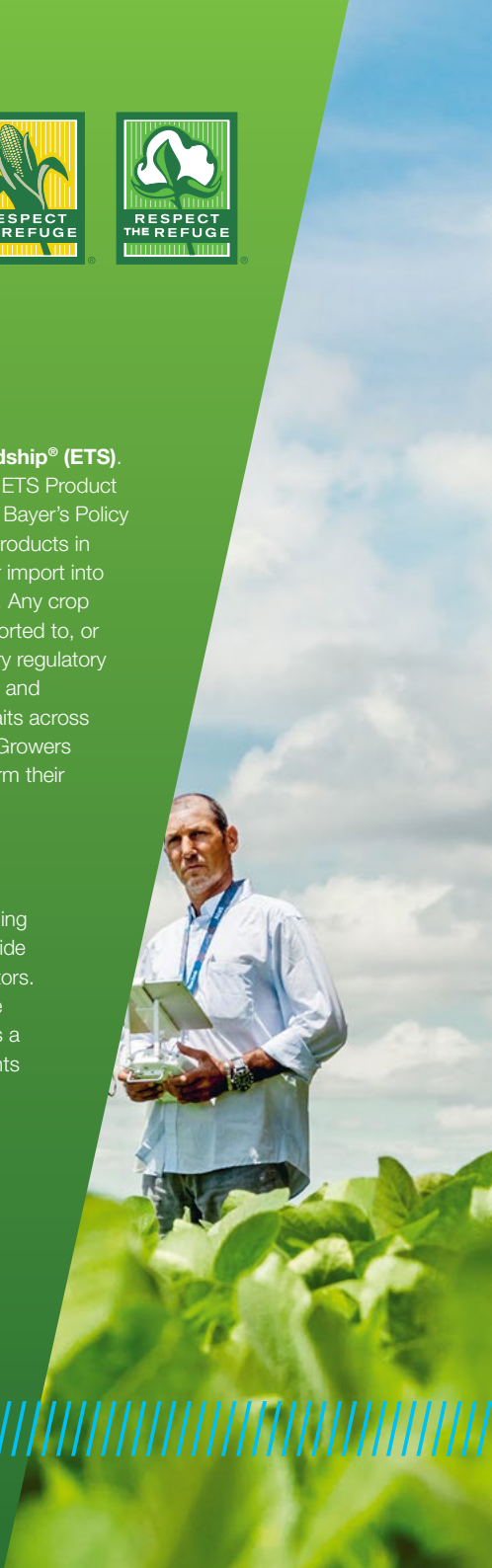
3) Excellence Through Stewardship®

The following Excellence Through Stewardship® statement applies to **YieldGard®**, **YieldGard® MAIZE 2**, **Roundup Ready® MAIZE 2**, **Roundup Ready FLEX® COTTON**, **Bollgard® 2 COTTON**, **Roundup Ready® SOYBEANS**:

Bayer is a member of Excellence Through Stewardship® (ETS). Bayer products are commercialised in accordance with ETS Product Launch Stewardship Guidance, and in compliance with Bayer's Policy for Commercialisation 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 grain trader to confirm their buying position for this product.

Establishing Healthy Pollinator Habitat

Pollinators are essential to agricultural systems. By providing high-quality habitat for pollinators such as bees, you provide benefits to your farm by increasing the diversity of pollinators. All of these benefits add up to productive and sustainable farming. Consider establishing a diverse habitat that has a mixture of wildflowers, grasses and other beneficial plants to supply nutrition and breeding areas for a variety of pollinators, including bees, butterflies and birds. Plant this habitat in sites such as field borders, pivot corners, conservation lands, ditches and buffers.



4) Insect Resistance Management (IRM) Requirements

An effective IRM programme is a vital part of responsible product stewardship for insect-protected biotech products. Bayer is committed to implementing an effective IRM programme for all of its insect-protected technologies in all countries where they are commercialised. Such programmes strike a balance among available knowledge, practicality, grower acceptance and implementation of the plan.

The government requires that Bayer implements, and that growers who purchase insect-protected products, follow an IRM plan. The IRM plan for *Bt* traits is based upon an assessment of the biology of the major target pests, grower needs and practices, and appropriate pest management practices.

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

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

Bayer is committed to the preservation of *Bt* technologies. Please do your part to preserve *Bt* technologies by implementing the correct IRM plan on your farm.

IRM Requirement

RESPECT THE REFUGE®

RESPECT THE REFUGE®

Agreement
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 Bayer 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.

Insect Resistance Management
Planting Refuges, Preserving Technology

Compliance Monitoring Programme

Bayer is required to take corrective measures in response to a finding of grower IRM non-compliance. Bayer or an approved agent of Bayer must monitor refuge management requirements. The Bayer Technology/Stewardship Agreement (BTSA) signed by the grower requires that upon request by Bayer or its approved agent, a grower must provide the location of all fields planted with Bayer *Bt* technologies and the locations of all associated refuge required areas. The grower must cooperate fully with any field inspections, and allow Bayer or an agent of Bayer to inspect all fields and refuge areas to ensure an approved insect resistance management programme 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.

Bayer works to develop and implement an IRM plan that balances available knowledge and practicality, with grower acceptance.

Growers must make sure that they comply with the required Refuge. (see pg 22). Please contact your seed representative or agent with any questions and/or call Bayer at tel: (011) 921 5000 *or* email to customercare.sa@bayer.com

5) Integrated Pest Management (IPM) Recommendations

IPM describes an effective and environmentally sustainable approach to pest management that relies on a combination of common-sense practices. IPM programmes 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 the best agronomic management practices, 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 specific crop and geographical area. As much as possible, manage the crop to avoid plant stress.

- Use proper crop rotation practices and products to control pests and make it more difficult for pests to adapt.
- 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 minimise 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 *Bt* 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.

6) Weed Resistance Management

Bayer believes product stewardship is a fundamental component of customer service and responsible business practices. Bayer is committed to the proper use and long-term effectiveness of its proprietary herbicide brands through a four-part stewardship programme: developing appropriate weed control recommendations, continuing research to refine and update recommendations, education on the importance of effective weed management and 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 and other products, Bayer invests significantly in research conducted in conjunction with academic scientists, extension specialists and crop consultants, that 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.

(For more information visit the Weed Science Society of America at wssa.net to access herbicide resistance training lessons that provide in-depth educational information).
For more information about glyphosate, please visit https://www.bayer.com/en/glyphosate-roundup.aspx

Herbicide Group

Glyphosate is the active ingredient in products such as **Roundup® TURBO** and **Roundup® PowerMAX** and is categorised as a group G herbicide within the CropLife classification system and in accordance with the Herbicide Resistance Action Committee (HRAC) classification. Any weed population may contain plants naturally resistant to any herbicide group. Such resistant weed plants may not be effectively managed when using a herbicide that the weed plant is resistant to, but may be effectively managed utilising another effective herbicide from a different mechanism of action group, or by herbicide mixtures with herbicides from different herbicide groups and/or by using cultural or mechanical weed control practices. Consult your local chemical representative, 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 minimise selection for weed populations resistant to one or more herbicides is recommended.
A diversified weed management programme 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 labelled rate of the herbicide and following label use directions are important steps that help delay the selection for herbicide resistancein weeds. Scouting after a herbicide application is important because it can facilitate the early identification of weed shifts and/or possible herbicide-resistant weeds and thus provide 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 limiting the spread of resistant weed seed.

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

In summary:

- 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.**

What to do when Glyphosate-Resistant Weeds are Suspected or Present

Bayer investigates and studies new claims of potential glyphosate-resistant weeds. Report any incidence of non-performance of Bayer branded glyphosate on a particular weed to the appropriate company representative, who will log the concern on the Product Performance Database. When glyphosate-resistant weed biotypes are confirmed, Bayer provides recommended control measures, which may include additional herbicides, tank-mixes (when not restricted on the label), mechanical, or cultural practices. Bayer actively communicates all of this information to growers through multiple channels, supplemental labelling, this TUG, media and written communications.
Users can also contact SAHRI at the Univeristy of Pretoria, at: The Bayer/UP Collaborative Research Programme
Department of Plant Production and Soil Science
University of Pretoria
Tel: +27 12 420-3224
Email: dr.charlie.reinhardt@gmail.com

Read and follow all product labeling before making in-crop or other applications of Bayer herbicides or using any other pesticides. Bayer does not restrict your ability to use any herbicide so long as the product is specifically registered and labelled for in-crop use on the applicable crop. Read the product label or contact the product manufacturer if you have questions about approvals for in-crop use. **Bayer 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 labelled for use in crop(s) containing Bayer Technology. Bayer specifically disclaims all responsibility for the use of these products in crops containing Bayer Technology. All questions and complaints arising from the use of products manufactured or marketed by other companies, or the impact to Bayer Technology from the use of such products, should be directed to those companies.**

Growers must be aware of, and proactively manage for glyphosate-resistant weeds in planning their weed control programme. If a weed is known to be resistant to glyphosate, then a resistant population of that weed is by definition no longer controlled with labelled rates of glyphosate herbicides. **Roundup® TURBO**, **Roundup® PowerMAX** and **Roundup®** herbicides are not warranted to control glyphosate-resistant weed populations.

Roundup® PowerMAX is used as a general spray over the top or directed on crops that contain the **Roundup Ready®** technology, i.e. maize, soya, cotton.

Roundup® PowerMAX

7) Employment of integrated pest management practices

Of all pest control measures, chemical controls have provided users and consumers with some of the greatest successes and biggest disappointments. This is largely due to an over-reliance of the user on a single, all-encompassing, control measure. Chemical control will continue to play a role in the cropping system to control excessive populations of key pests and other non-target pests, but it will be used more strategically since current IPM practices seek to de-emphasize chemical control and emphasize HPR and biological control.

Agronomic practices will remain an important component of an IPM-based IRM strategy. The major agronomic practice relevant to stalk borer resistance management is planting strategy. The user will decide which hybrids to plant, whether they are insect protected or not, and will be advised to implement the most effective refuge option. Other agronomic practices such as destruction of the overwintering habitat of the stalk borers and other insects by shredding of the stalks and ploughing will also continue to be important.

8) Isolation of fields planted with YieldGard®, YieldGard® Maize 2, YieldGard® Maize 2 with Roundup Ready® Maize 2 and YieldGard® with Roundup Ready® Maize 2

Maize pollen is known to move short distances and possibly between fields. This is, for example, visible in the case where a field of white maize is planted adjacent to a field of yellow maize.

Evidence of pollen movement can be seen in the few yellow kernels found in the white maize ears. In the case of maize containing Bayer technology, the flow of pollen may be problematic where it is planted adjacent to fields destined for marketing channels with restrictions on GM. If you are concerned that your neighbours may be planting maize destined for non-GM channels, including specific export markets, contact your seed sales representative for additional information.

To minimise the risk of cross-pollination of transgenic (GM) and non-transgenic maize specifically cultivated for non-transgenic contracts, the following practices are recommended:*

- Temporal isolation: Ensure at least three weeks between planting of transgenic and non-transgenic hybrids
- Spatial isolation: Ensure at least 400 m between transgenic and non-transgenic hybrids
- Combination of temporal and spatial isolation: combining both practices reduces the risk of cross-pollination more than by using just one of the practices.
- It is also recommended that you discuss with your neighbours what their plans are for the coming season, and whether they have any requirement to grow “Bt-free” or “GM-free” maize. This discussion should take place before planting begins, so that appropriate steps can be taken to avoid cross-pollination if necessary.

* (Full implementation of these steps cannot completely avoid the risk of cross-pollination).

9) Treated Seed Best Management Practices

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

Below are some recommended best management practices regarding 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.
- Avoid off-site movement of dust from treated seeds during planting or when opening seed containers by observing wind speed and direction.
- During planting, be aware of the presence of honey bee hives, or crops or weeds in the flowering stage within or adjacent to the field, which could attract pollinators. Fill the planter at least ten metres inside the field to be planted.
- Avoid shaking the bottom of the treated seed bag when filling the planter. This reduces the release of dust that could have accumulated during transport.
- For pneumatic planters, direct 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 minimise exposure to people, livestock, wildlife and the environment.
- Return leftover seed to its original containers if seed is intended for storage and use at a later date.
- Completely clean any equipment and containers that have held treated seed and dust before using for harvested grain. There is zero tolerance for treated seed kernels in the commodity grain channel.
- Refer to seed bags and/or tags for annual maximum amount of active ingredients that can be applied to each hectare. Consider all furrow, treated seed, plant back, rotational crop and seed disposal contributors that include the same active ingredient as application and ensure that they do not cumulatively exceed the maximum recommended amount.

Planting may be an allowable option to dispose of left-over treated seeds. However, when this option is chosen, a grower will need to follow the product guidelines to adhere to any annual maximum allowances, grazing and plant back restrictions found on the seed bag and/or tags. Additionally, if disposing of rinse water or applied foliar applications of the same active ingredient on the same hectarage intended for over-seeding, calculate the total load of active ingredient to ensure that the maximum amount applied per year is not exceeded.

10) Guide to Responsible Planting

Before Planting

- Buy only quality seeds treated with a high quality product and a polymer coating. This protects you, your crop and the environment.
- Read the label on the seed bag and follow the precautions.
- Discard empty seed bags, however save the label with lot number for future reference.
- Do not reuse empty seed bags.
- Regularly check and maintain your planting equipment. Calibrate your planter before planting.
- Handle seed packets carefully. Never throw or put them under pressure.
- Use gloves and a dust mask when handling seed.

Planting

- Do not plant treated seeds in strong winds (above 8 km/s).
- Plant at the recommended seeding rate.
- Do not sow the treated seeds when there is the risk of dust drift to neighbouring flowering plants.
- Remove all flowering plants before planting. This will reduce the hazard to bees.
- Avoid exposure to dust, when opening seed bags, during filling and emptying of the planter. Do not load dust from bottom of the seed bags into planter.
- When using a pneumatic vacuum planter, it must be equipped with a deflector to direct dust produced during planting onto the soil surface or into the soil.
- During sowing, treated seeds must be incorporated into the soil at the proper depth.

After Planting

- Avoid spillage of seeds. Cover any exposed seeds or spillages immediately after planting to protect seed eating birds and mammals. Spilled seeds should be buried or swept up immediately and returned to the original bag for disposal.
- Never dispose of unwanted treated seeds in field margins or non-crop areas. Never burn the empty bags in the field. Disposing of empty bags should be disposed of via the collection system for empty pesticide containers.
- Keep seed locked away.

11) Honey Bee Health Information

From time to time claims circulate that insect-protected GMO crops harm bees. The insecticidal proteins produced by the currently available insect protected crops are derived from a common soil bacterium and Bayer screens all of 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 GMO crops on honey bees.

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

Bayer has many efforts underway to improve honey bee health:

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

HONEY BEE HEALTH COALITION

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

Maize Technologies

YieldGard® This product contains *Cry1Ab* from *Bacillus thuringiensis* var. *kurstaki* and provides control of stalk borers, *Busseola fusca and Chilo partellus*.

Yieldgard® MAIZE 2 and **Roundup Ready® MAIZE 2.** These products contains genes *Cry1A.105* and *Cry2Ab2* from *Bacillus thuringiensis* var. *kurstaki* and *cp4 epsps* from *Agrobacterium* strain CP4. Cry1A.105, Cry2Ab2 and CP4 EPSPS proteins and the genetic material necessary for its production in maize, are approved as safe for human, animals and the environment in terms of the GMO Act (Act No 15 of 1997). This product is protected by one or more patent rights.

Yieldgard® MAIZE 2 technology provides effective control of stalk borers, *Busseola fusca*, *Chilo partellus* and fall armyworm, *Spodoptera frugiperda*.

Examples of these target pests, can be viewed using the following QR code.

Roundup Ready® MAIZE 2. provides tolerance to registered glyphosate formulations.

12) Weed Management

Products with **Roundup Ready®** technology enable flexibility, broad-spectrum weed control and proven crop safety. Growers can select the weed control programme 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.

Maize 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®** 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 product, can lead to increased weed competition, weed escapes, the potential for selecting for herbicide resistance and possible decreased yields. Use a diverse set of weed management tools, including multiple effective herbicides with different mechanisms of action if appropriate, alone or in tank mixes, with **Roundup®** agricultural herbicides, based on the weed spectrum in the field and according to label directions.

Recommendations

- Follow all herbicides product labelling. If there is any conflict between these recommendations and the applicable herbicides product labelling, the herbicides product labelling controls. Follow the recommendations below to help minimise the risk of developing glyphosate-resistant weed populations in a **Roundup Ready®** technology system.
- Start clean with a burndown herbicide or tillage. Early season weed control is critical to yield.
- Apply pre-emergence residual herbicides at the application rate specified on the product label.
- Or apply a pre-emergence residual herbicide at the appropriate application rate tank-mixed with a minimum of 1.3 ℓ/ha **Roundup® PowerMAX** in-crop before weeds exceed 100 mm in height.
- Follow with a post-emergence in-crop application of **Roundup® PowerMAX** at a minimum of 1.3 ℓ/ha for additional weed flushes before they exceed 100 mm in height.
- **Roundup® PowerMAX** may be tank-mixed with other herbicides for post-emergence weed control. (Refer to product label.)
- Report any incidence of repeated non-performance of **Roundup®** agricultural herbicides or other glyphosate products on a particular weed to the appropriate company representative, or via the Product Performance Database.
- Add soil residual herbicide(s) applied at an appropriate rate as listed on the label and cultural practices as part of a weed control programme.
- 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.
- If using another approved glyphosate agricultural herbicide, you must refer to the label booklet or supplemental labelling for the use of that product on **Roundup Ready®** maize to determine appropriate use rates.
- When **Roundup® TURBO** is applied as a pre-plant treatment or any residual herbicide is applied as a pre-emergent application or **Pantera®** is applied to control volunteer maize plants, follow the recommendations on the manufacturer's label.

13) Maize Refuge Requirements and Integrated Pest Management

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 *Bt* 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 *Bt* technology for controlling targeted insect pests.

The primary purpose of a refuge is to maintain a population of insect pests that are not exposed to *Bt* proteins. The lack of exposure to *Bt* proteins allows susceptible insects emerging from the refuge to mate with the rare resistant insects that may emerge from the *Bt* crop. Susceptibility to *Bt* technology would then be passed on to their offspring, helping to preserve the long-term effectiveness of *Bt* technologies. For any of the Bayer *Bt* maize products a refuge is required irrespective of what the target pest is. The same standard refuge works for all targeted insects.

Refuge Planting

- Grower mixing of non-*Bt* seed with *Bt* technologies is not permitted.
- Plant the structured refuge at the same time as the *Bt* technologies to help ensure that development is similar among products.
- To avoid inadvertent mixing of seed in the planting process, be sure to clean all seed out of hoppers when switching from non-*Bt* seed to traited seed, or *vice versa*.
- Adjacent and separate refuge fields must be planted and managed by the same grower.

As a condition of registration of *Bt* products by government, seed companies are required to conduct IRM compliance assessments during the growing season to ensure grower compliance. Do your part to ensure these technologies are preserved by fully cooperating in refuge management. Continued availability of *Bt* technologies depends on grower compliance with government registration conditions. With an effective IRM plan in place, growers will continue to benefit from effective and consistent insect protection and top-yield potential found in crops containing these technologies.

Sustainable Agriculture

Bayer *Bt* maize products are highly compatible with the goals of IPM and sustainable agriculture. Sustainability of maize 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-*Bt* refuge hectares, but are equally important for detecting and controlling non-target pests that exceed established thresholds on *Bt* crops.

Pests Not Controlled

Specific *Bt* maize products offer control against several of the key lepidopteran and coleopteran insect pests, but will not control all insect pests in maize. Therefore, it is important to understand that, in some cases, severe infestations of target and/or non-target insects may require additional

control measures/treatment. Fields should be scouted regularly, especially during periods of heavy or sustained pest presence. Consult 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.

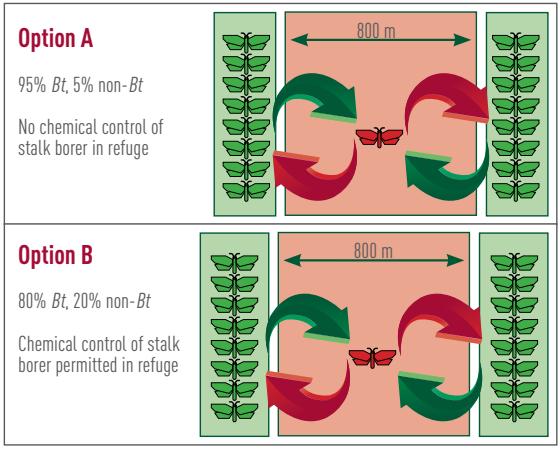
IPM Considerations

- Employ appropriate scouting techniques and treatment decisions.
- Select insecticide treatments that have minimal negative impact on beneficial insects whenever possible; these insects are conserved by *Bt*-protected crops and can contribute to insect pest control.
- Rotate insecticide mode of action to help reduce the risk of insect pests developing chemical resistance.
- 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 over-wintering; destroy crop promptly after harvest and use other soil management practices to reduce overwintering insects.

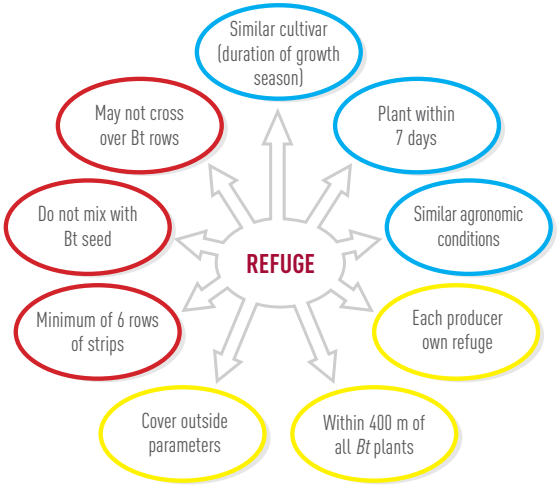
If Busseola fusca feeding damage on Yieldgard® maize exceeds the 10% threshold during the growing season, growers should contact their seed sales representative to report and follow the Bayer Product Performance Inquiry process.

Plant the correct refuge area for maize

Step 1: Choose the option best suited to your farm



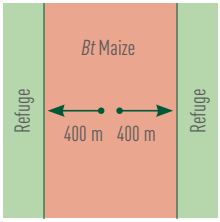
Step 2: Depending on the option chosen above, your refuge must be planted in the following manner:



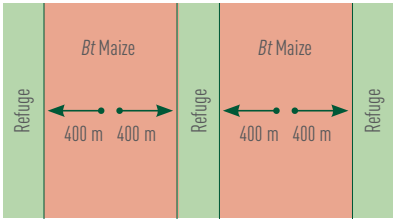
Step 3: Scout *Bt* planting regularly; if more than 10% stalk borer damage, contact your seed representative immediately.

Correct layout of the refuge area

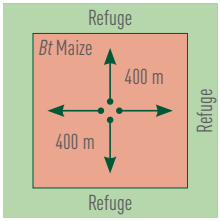
Block positioning



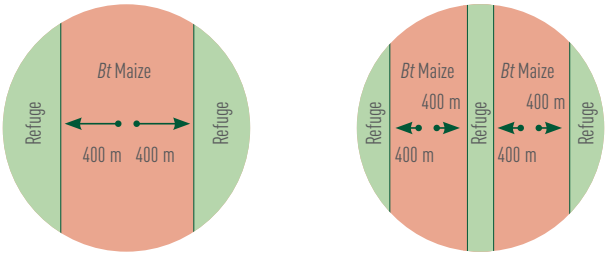
Strip positioning



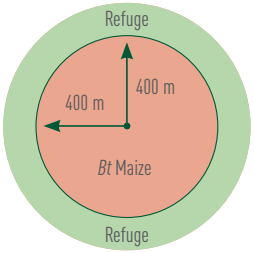
Perimeter positioning



Pivot positioning



Bordering of pivot



Pivot of size	Minimum number of rows required for planting 5% refuge		
ha	0,76 m row width	0,91 m row width	1,5 m row width
10	8	6	6
20	11	7	6
30	13	9	6
40	15	10	6
50*	17	11	7
60*	18	12	7
70*	20	13	8
80*	21	14	9
90*	23	15	9
100*	24	16	10
110*	25	16	10
120*	26	17	10

* User must plant at least 6 rows in the centre of the pivot, in addition to the rows on the outside.

RESPECT THE REFUGE®

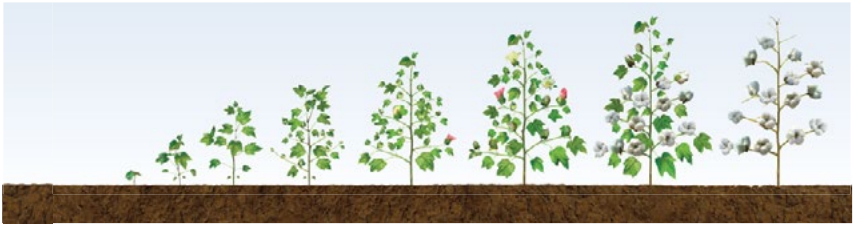
Cotton Technologies

Bollgard® 2 COTTON varieties contain two distinct insecticidal proteins, *Cry1Ac* and *Cry2Ab2*, from *Bacillus thuringiensis* (*Bt*) that increase the efficacy and spectrum of control and reduce the chance that resistance will develop to the *Bt* insecticidal proteins.

Bollgard® 2 COTTON controls the Bollworm complex of the African Bollworm (*Helicoverpa armigera*), Red Bollworm (*Diparopsis castanea*) and Spiny Bollworm Earias.

Bollgard® 2 COTTON 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® 2 COTTON** and are tolerant to in-crop applications of **Roundup® PowerMAX** herbicide when used according to label directions.

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 the **Roundup® PowerMAX** herbicide when used according to the label directions.



Roundup Ready FLEX® COTTON, Bollgard® 2 COTTON with Roundup Ready FLEX® COTTON

Growers should follow recommended weed management guidelines when managing **Bollgard® 2 COTTON** with **Roundup Ready FLEX® COTTON** and **Roundup Ready FLEX® COTTON**. Growers of **Bollgard® 2 COTTON** with **Roundup Ready FLEX® COTTON** must follow the required refuge options, practicing IRM and managing target and non-target pests.

14) Weed Management

Weed control in cotton is essential to help maximise both fibre yield and quality potential. Cotton is very sensitive to early season weed competition, which can result in unacceptable stands and/or reduced yield potential. The **Roundup Ready FLEX® COTTON** system, with improved tolerance to the active ingredient in **Roundup®** agricultural herbicides, provides growers with the right tools to control weeds.

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

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

Residual herbicide(s) may be applied as either a pre-emergence (including pre-plant 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 herbicide product labelling. If there is any conflict between these recommendations and applicable herbicide product labelling, the herbicide product labelling controls. Follow these recommendations to help minimise 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 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 **Roundup Ready FLEX® COTTON** weed control programme.
  - 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® PowerMAX** herbicide at the recommended label rate.
- 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 minimise 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, or via the Product Performance Database.
- Add soil residual herbicide(s) applied at an appropriate rate as listed on the label and cultural practices as part of a weed control programme.
- 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.
- If using another approved glyphosate agricultural herbicide, you must refer to the label booklet or supplemental labelling for the use of that product on **Roundup Ready®** cotton to determine appropriate use rates.

- When **Roundup® TURBO** is applied as a pre-plant treatment or any residual herbicide is applied as a pre-emergent application or **Pantera®** is applied to control volunteer maize plants, follow the recommendations on the manufacturer's label.

Bollgard® 2 COTTON with Roundup Ready FLEX® COTTON and Roundup Ready FLEX® COTTON

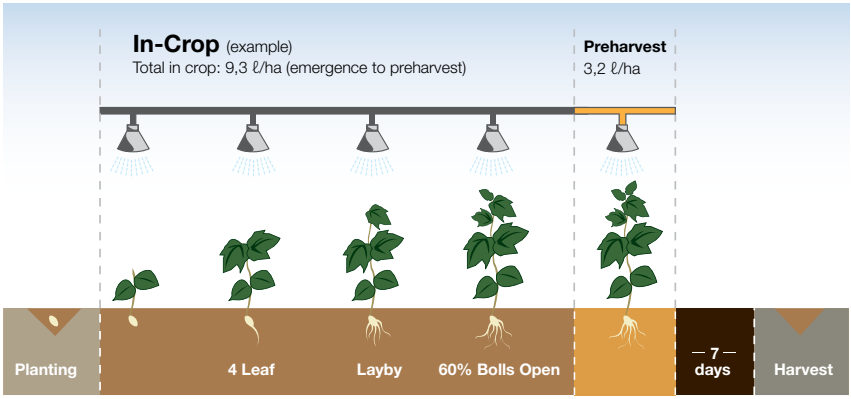
- May be applied in-crop, from crop emergence up to 7 days prior to harvest.
- There are no growth or timing restrictions for sequential applications.
- The total in-crop volume allowed from emergence to 60% open bolls is 9,3 ℓ/ha.
- Post-directed application of **Roundup® PowerMAX**, either alone or in a tank-mix with another herbicide labelled for post-directed application in cotton, may be used to achieve more thorough spray coverage of weeds.

Pre-harvest Application

- Up to 3,2 ℓ/ha may be applied after cotton reaches 60% open bolls and before harvest, if needed. Application must be made at least 7 days prior to harvest.
- The maximum volume of **Roundup® PowerMAX** that may be used in a single season is 12,4 ℓ/ha.

Bayer 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® PowerMAX** is the only **Roundup®** agricultural herbicide labelled 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 labelled for use on **Roundup Ready FLEX® COTTON** and has been tested to demonstrate crop safety.



15) Integrated Pest Management

1) User shall, whenever he plants cotton seed containing the *Bt* trait (Bollgard 2), in addition, plant non-*Bt* (RRF) cotton seed as a refuge area ('refuge') as follows:
   a) 5% non-*Bt* cotton seed, which shall not be treated with any insecticide/ bio-pesticides registered or effective specifically against the bollworm complex; **OR**
   b) 20% non-*Bt* cotton seed that may be sprayed with an insecticide/bio-pesticide registered or effective specifically against the bollworm complex, but not with insecticides/bio-pesticides that contain any *Bt* proteins.

2) The user shall ensure when planting the non-*Bt* seed in the refuge area that it is done:
   a) such that the germinated plants have a similar maturity as the *Bt*-seed;
   b within seven days from planting the *Bt*-seed;
   c) on the same farm as the *Bt*-seed (user plant his own refuge);
   d) under the same growing conditions applicable for the *Bt*-seed;
   e) in strips at least six (6) rows wide, except in smallholder farms where 6 rows would exceed a 5% refuge area;
   f) at least along two outside borders of the fields planted with *Bt*-seed;
   g) such that no *Bt*-plant is more than 800 m in from the non-*Bt* plant; and
   h) the area should be clearly marked.

3) Mixing of *Bt*-seed and non-*Bt* seed and crossing of *Bt* rows with non-*Bt* rows are not allowed.

4) The user shall monitor and scout his fields at least once a week and immediately contact its seed representative if more than 5 bollworm larvae of 8 mm and bigger across 24 plants are observed in the *Bt*-field.

In cotton, scouting should include a modified whole-plant inspection, including terminals and all stages of fruit. Larvae larger than 0.6 cm (3 to 4 days old) are generally recognised as survivors that may not be controlled by products with **Bollgard® 2 COTTON** technology.

Controlling Cotton Pests

Bayer 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® 2 COTTON**.

Although products with **Bollgard® 2 COTTON** technology can sustain less damage from some of the most troublesome lepidopteran pests, it 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.

Soybean Technologies

Roundup Ready® SOYBEANS use technology to maximise yield potential and have tolerance to glyphosate herbicides, providing weed control options for use before, at and after planting.

Roundup Ready® SOYBEANS contain in-plant tolerance to glyphosate herbicides, so you can spray with **Roundup® PowerMAX** herbicide in-crop according to label recommendations.

16) Weed Management

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

Roundup® PowerMAX may be applied post-emergent to **Roundup Ready® SOYBEANS** from the ground cracking stage throughout to flowering. Allow a minimum of 14 days between application and the harvest of soybeans.

- **Roundup® PowerMAX** herbicide treatments, as per label recommendations, may be applied in soybean varieties that are designated **Roundup Ready® SOYBEANS** cultivars.

Recommendations

Follow all pesticide product labelling. If there is any conflict between these recommendations and applicable pesticide product labelling, the pesticide product labelling applies and takes preference. Follow the recommendations below to help minimise the risk of developing glyphosate-resistant weed populations in a **Roundup Ready®** soybean system:

- Scout fields before and after each burndown and in-crop application.
- Start with a clean field, using either a burndown herbicide application, residual herbicide or tillage, making sure weeds are controlled at planting.
- Add soil residual herbicide(s) applied at an appropriate rate as listed on the label and cultural practices as part of a weed control programme.
- 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.
- If using another approved glyphosate agricultural herbicide, you must refer to the label booklet or supplemental labelling for the use of that product on **Roundup Ready®** soybeans to determine appropriate use rates.
- When **Roundup® TURBO** is applied as a pre-plant treatment or any residual herbicide is applied as a pre-emergent application or **Pantera®** is applied to control volunteer maize plants, follow the recommendations on the manufacturer's label.
- Refer to individual product labels for approved tank-mix partners.
- Equipment should be cleaned before moving from field to field to help minimise 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, or via the Product Performance Database.

Additional Information

Approved labels, for **Roundup®** agricultural herbicides must be in the possession of the user at the time of pesticide application and can be obtained by calling (011) 921 5000 for more information. Or contact your nearest Bayer Representative.

PRODUCT REGISTRATION

Roundup® contains 360 g glyphosate/ℓ. Caution.
Reg. No. L0407 (Act No. 36 of 1947).

Roundup® TURBO contains 450 g glyphosate/ℓ.
Reg. No. L7166 (Act No. 36 of 1947).

Roundup® PowerMAX contains 540 g glyphosate/ℓ. Caution.
Reg. No. L7769 (Act No. 36 of 1947).

The following are registered trademarks of Monsanto Technology LLC:

YieldGard®, Roundup Ready® MAIZE 2, YieldGard® with Roundup Ready® MAIZE 2, YieldGard® MAIZE 2, YieldGard® MAIZE 2 with Roundup Ready® MAIZE 2, Roundup Ready FLEX® COTTON, Bollgard® 2 COTTON, Bollgard® 2 COTTON with Roundup Ready FLEX® COTTON, Roundup Ready® SOYBEANS, Roundup® TURBO, Roundup® PowerMAX, Roundup® and **Roundup Ready®.**

The following product is a trademark of Arysta LifeScience SA:

Pantera® is a selective post-emergent emulsifiable concentrated systemic herbicide for the control of certain annual and perennial grasses as well as **Roundup Ready®** volunteer maize. Reg. No. L6451 (Act No. 36 of 1947). **Pantera®** contains Quizalofop-p-tefuryl (120 g/ℓ). Harmful.

2020 Bayer Technology/ Stewardship Agreement (Limited Use License)

BAYER TECHNOLOGY AND STEWARDSHIP AGREEMENT ("The Agreement")

TERMS AND CONDITIONS

1 The SEED ORDER/SALE TECHNOLOGY/STEWARDSHIP agreement and this document constitute the entire agreement between the parties in respect of any seed ("the seed") containing Bayer technology as defined below and delivered to or received on behalf of the user ("the agreement").

2 The words and definitions in the SEED ORDER/SALE/TECHNOLOGY/STEWARDSHIP agreement apply to the terms hereof.

3 The user and the individuals signing the SEED ORDER/SALE/TECHNOLOGY/STEWARDSHIP agreement and any document relating thereto warrant that they sign on behalf of the user and are duly authorised to do so.

4 In addition to the definitions set out in the SEED ORDER/SALE/TECHNOLOGY/STEWARDSHIP agreement, the following definitions shall apply:

4.1 "the rights" includes the permits, the intellectual property and any other rights relating to the technology and the use thereof.

4.2 "the permits" means conditional general release permits in the name of, or for the benefit of, Bayer from time to time in accordance with the Genetically Modified Organisms Act, Act 15 of 1997 ("the GMO Act") in respect of the release of the technology, and in particular the following permits and their respective events: 17/3(5/01/060) for GTS 40-3-2; 17/3(5/01/178) for MON 531; 17/3(5/00/012) for MON 1445; 17/3(5/05/148) for MON 531 x MON 1445; 17/3(5/03/225) for MON 15985; 17/3(5/07/013) for MON 88913; 17/3(5/07/340) for MON 15985 x MON 88913; 17/3(5/01/177) for MON 810; 17/3(5/02/157) for NK603; 17/3(5/07/012) for MON 810 x NK603; 39.4(5/10/304) for MON 89034 and 39.4(5/10/305) for MON 89034 x NK603.

4.3 "the technology" means the events listed in clause 4.2, which form the subject matter of the permits:

4.4 "intellectual property" includes registered and unregistered intellectual property of Bayer or licensed to Bayer in South Africa in respect of the technology and includes, without limitation, any patents, trade marks, copyright, know how, confidential information and designs directly or indirectly relating to the technology.

4.5 "patents" means valid and unexpired patent rights owned by, or licensed to, Bayer that claim priority to a Bayer-owned or licensed patent application filed on or before the effective date of this agreement that directly relate to the technology and any and all patents maturing from these applications or maturing from applications that are divisional applications and patents of addition, as well as valid and unexpired patent rights of a third party relating directly to the technology to which rights Bayer has obtained a license.

4.6 "trade marks" means any current or future South African trade mark applications and registrations granted or licensed to Bayer.

4.7 "authorisation" means the authorisation to plant the seed containing the technology in terms of the rights.
4.8 "technology fee" means the fee incorporated into the standard list price of the seed, payable to Bayer, in exchange for the authorisation.
4.9 "*Bt* event" means the expression of a trait imparting control of targeted insect pests, through the incorporation of a *Bacillus thuringiensis* gene(s) into the genome of a plant, limited to the *Bt* events listed in clause 4.2.
4.10 "RR event" means the expression of a trait imparting increased tolerance of the plant against glyphosate, through the incorporation of a cp4epsp gene into the genome of a plant, limited to the RR events listed in clause 4.2.
4.11 "BR event" means the expression of the traits provided by a *Bt* event and a RR event in the same plant, limited to the BR events listed in clause 4.2.
4.12 "Bt seed" means seed containing the *Bt* event.
4.13 "RR seed" means seed containing the RR event.
4.14 "BR seed" means seed containing both the *Bt* event and RR event.
4.15 "non-*Bt* seed" means seed which does not contain the *Bt* event, but which may or may not contain the RR event.
4.16 "Refuge" means non-*Bt* host plants that serve as sources of susceptible individuals of a particular target pest. The purpose of the refuge area is to prevent pests from developing resistance to the *Bt* technology.
4.17 "Insect Resistance Management Program" or "IRMP" is the crop cultivation program described in the User Guides which complies with the permit conditions and summarised at the end of this agreement.
4.18 "Weed Resistance Management Program" or "WRMP" is the glyphosate spraying and crop production programme described in the User Guides and summarised at the end of this agreement.
4.19 "User Guides" means the user guides (available from Bayer's head office, Bayer's official website www.Bayer.co.za, seed sale representatives, licensees and authorised seed distributors), describing in detail how the seed is to be planted, sprayed and cultivated in accordance with the IRMP and WRMP, and prescribing the conditions to which the user must adhere, and which are incorporated into and are a part of this agreement.

5 Bayer is the proprietor and/or authorised user or licensee of the rights with the right to grant sub-licences to other seed companies and to grant the authorisation to users.
6 Bayer either:
6.1 incorporates the technology into seed sold directly or indirectly to the user; or
6.2 licenses/sub-licenses and/or authorises use of the rights to other seed companies to incorporate the technology into their seed sold to the user, always subject to these terms and conditions being signed by the user whether purchased from Bayer or the other seed companies and subject to the payment of the technology fee by the user, and which is incorporated into the price for seed.
7 The user requires the authorisation from Bayer, which Bayer hereby grants subject to the terms and conditions set out herein and in exchange for the payment of the technology fee.
8 Notwithstanding the licenses/sub-licenses and authorisation, the user acknowledges that Bayer is and remains the owner or licensee of the rights.

9 The user recognises, acknowledges and accepts that:
- 9.1 the permits set strict conditions subject to which the seed containing the technology must be cultivated and planted;
- 9.2 if the permit conditions are not adhered to, the permits may be withdrawn, which would result in significant irreparable harm to Bayer, other seed companies and the Agricultural Sector of South Africa;
- 9.3 non-compliance with these conditions by users may cause the development of weed resistance against glyphosate and insect resistance against the technology;
- 9.4 the user, Bayer and other seed companies are obliged to take all reasonable steps to limit the risk of weed resistance against glyphosate and insect resistance against the technology developing; and
- 9.5 compliance with the IRMP, WRMP and User Guides is an essential and imperative requirement of this agreement.

10 The user shall therefore strictly comply with the agreement and the IRMP, WRMP and User Guides in respect of the seed of each type of crop containing the technology, as summarised at the end of this agreement.

11 The user further agrees and undertakes to:
- 11.1 use the seed only to plant a commercial crop in a single season/growing cycle; and to not:
- 11.1.1 sell or otherwise make available the seed directly or indirectly as propagating material contrary to the permit conditions;
- 11.1.2 use the seed for crop breeding, research or seed production; and
- 11.1.3 export the seed to any other country without first complying with all prescribed regulatory approvals of South Africa and of such other country and, where applicable, only after an export permit has been obtained in terms of the GMO Act and an import permit has been obtained from such other country,
- 11.2 permit, allow and assist Bayer and/or its representatives, within normal business hours subject to at least 48 hours prior arrangement for the purpose to monitor compliance with this agreement, the IRMP, WRMP and the User Guides, to:
- 11.2.1 inspect land farmed by or under the control or the direction of the user (including refuge areas);
- 11.2.2 examine, take and analyse samples of crops, crop residue or seed of any nature located therein;
- 11.2.3 take photographs and video material, GPS readings, and make copies of relevant documentation under the control or direction of the user; and
- 11.2.4 complete a compliance report.
- 11.3 apply and implement the obligations of this agreement on any new land purchased or leased by the user that has seed planted on it by a previous owner or possessor of the land and notify in writing purchasers or lessees of land owned by the user that seed planted on it is subject to this agreement and that they are subject to the terms of this agreement and obliged to enter into the same agreement;
- 11.4 acquire the seed only from Bayer or a duly authorised licensed/sub-licensed seed company or from a dealer duly authorised to sell the seed, all subject to the terms;

11.5 provide Bayer within 7 (seven) days after a written request by Bayer, copies of any records, receipts, or other documents that could be relevant to the user's compliance with this agreement.

11.6 ensure that any grain or material produced from the seed only be used or processed in or sold or exported to countries where all necessary regulatory approvals have been granted and, where applicable, after an export permit has been obtained in terms of the GMO Act; and

11.7 only use non-selective herbicides registered for application on the respective crop, for example a labelled Roundup® agricultural herbicide on crops produced from RR seed.

12 Should the User wish to conduct research on the seed, the User shall first seek approval and enter into a Research License Agreement with Bayer. Failure to obtain the necessary approval and agreement, any research conducted by the User shall be in breach of this Agreement.

13 If partial compliance or non-compliance by user of any term of the Agreement, IRMP, WRMP or User Guides comes to light, the user will be notified in writing of the partial compliance or non-compliance and obliged to take corrective steps to comply. The user shall in addition be instructed to attend a compulsory meeting and training session with Bayer or the licensee/sub-licensee and the user hereby undertakes to attend such meeting in person as instructed.

14 In the event that Bayer finds that the user is partially compliant for four growing seasons or non-compliant for two growing seasons, the user might be refused supply of the seed containing the technology until such time as the user has completed a full training and rehabilitation program, which the user undertakes to attend in person.

15 Should it be required for whatever reason that the crop planted with the seed be replanted within 30 days, the user shall destroy the existing crop completely, by either ploughing it into the ground or chemical eradication, in which event the user shall not be obliged to pay the technology fee in respect of the seed used for replanting.

16 The user shall not infringe the intellectual property and shall also not assist anybody else in doing so. The user undertakes to advise Bayer immediately if the user becomes aware of any other party dealing with any of the technology in a manner which is in contravention with the terms of this agreement and/or infringes any of the intellectual property.

17 The user shall familiarise himself and comply with all statutory provisions applicable to the handling of the seed containing the technology and plant material produced from it.

18 Bayer shall ensure that the technology complies with the permit requirements. Except for this obligation, and subject to the terms of the Consumer Protection Act 68 of 2008, the technology is contained in seed, being a natural product exposed to unlimited factors, and is thus supplied "voetstoots", and free of any representations or inducement other than recorded in this agreement, and without any express, implied, tacit or common law warranty of whatsoever nature of the performance of the technology, which warranties the user expressly waives by his signature of this agreement. The user expressly confirms that the above voetstoots provisions and waiver of rights clause is fair and reasonable considering the type of product that is being provided to the user.

19 The user confirms that he has familiarised himself with all relevant characteristics of the technology, the IRMP, WRMP and User Guides and which description being deemed sufficient disclosure of all patent and latent characteristics of the technology.

20 The user waives all remedies against Bayer or any licensee/sub-licensee pursuant to this agreement in respect of any breach of any term of this agreement or failure of the technology save for the refund of the technology fee, by Bayer to the user, provided the technology fee has been paid in full and further provided that Bayer has been notified in writing within 10 (ten) days of any alleged breach or failure of the technology coming to the attention of the user

21 Except for the remedy in clause 19 above, the user shall not have any claim of whatever nature against Bayer or any licensee/sub-licensee pursuant to this agreement or for any other cause or reason, be it for damages or otherwise, for failure of the technology.

22 The user waives all other existing or future claims of whatsoever nature against Bayer or any licensee/sub-licensee not expressly recorded herein, in particular, but without any limitation, Bayer or any licensee/sub-licensee shall not be liable to the user for any direct or indirect claims or consequential damages which may arise as a result of this agreement or failure of the technology.

23 Bayer is the proprietor and/or rightful titleholder, and/or authorised user/licensee of the intellectual property and no licenses are hereby granted to the user by virtue of this agreement. The user may not use any events or genes isolated from seed containing the technology or progeny thereof in breach of the intellectual property or any statutory obligations.

24 If any clause or term of this agreement should be invalid, unenforceable, defective or illegal for any reason whatsoever, then the remaining terms and provisions of this agreement shall be deemed to be severable therefrom and shall continue to be of force and effect.

25 This agreement records the entire agreement between the parties. No representation, warranty, disclosures, prior oral agreement or expressions of opinion which are not contained herein shall be valid and binding. No variation, amendment, addition or consensual cancellation of this agreement or any provision or term hereof or any other document issued or executed pursuant to or in terms of this agreement, shall be binding or have any force or effect, unless reduced to writing and signed by or on behalf of the parties.

26 No indulgence, extension of time, relaxation or latitude which Bayer may permit at any time in regard to the carrying out of any of the user's obligations shall prejudice Bayer in any manner whatsoever or be a waiver by Bayer of any of its rights against the user nor is such relaxation or indulgence a novation (renewal or replacement) of any of the terms and conditions of this agreement.

27 Bayer is entitled to cancel this agreement summarily if any judgement is granted against the user or if the user commits any statutory act of insolvency.

28 Without derogating from any specific term herein, should either party ("the defaulting party") commit any other breach of any of the provisions hereof, then the other party ("the aggrieved party") shall be entitled to require the defaulting party to remedy the breach within a period of 10 (ten) days from receipt of the written notice to do so. Such written notice may be sent by post, fax or email.

29 If the defaulting party, after 10 (ten) calendar days from receipt of a written demand from the aggrieved party to rectify any breach, fails to remedy the breach, then the aggrieved party shall be entitled to claim immediate payment and/or performance by the defaulting party of all the defaulting party's obligations in terms of this agreement, whether or not the due date for payment and/or performance has arisen, in either event, without prejudice to aggrieved party's rights to claim damages.

30 The user consents to the jurisdiction of the Magistrate's Court in respect of litigation resulting from this agreement. However, Bayer shall be entitled to refer any dispute emanating from this agreement to the High Court, and in this regard the user consents to the jurisdiction of the South Gauteng High Court, Johannesburg.

31 The user is obliged to pay Bayer's legal costs at the attorney own-client-scale, including tracing and collection costs.

32 The user may not cede or assign any of his rights or obligations hereunder without the written consent of Bayer.

33 No representative, agent, broker or salesman has any authority to waive or vary any of these conditions or make any representations whatsoever on behalf of Bayer.

34 If the user transfers his rights with Bayer's prior written consent or by operation of law, the user must also transfer this agreement, so that it is binding on the person or entity receiving the transferred rights, and the terms "the user" in this agreement will then refer to such person or entity.

35 This agreement shall be valid for 1 (one) season/growing cycle only. Should the user intend to plant the seed during a subsequent growing cycle, the user must enter into a new agreement with Bayer.

IRMP : MAIZE & COTTON

36 User shall, whenever he plants maize and/or cotton seed containing the *Bt* trait, in addition, plant non-*Bt* seed of the respective crop as a refuge area ("refuge") as follows:

- 36.1 5% non-Bt seed, which shall not be treated with any insecticide/bio-pesticides registered or effective specifically against stalk borers or the bollworm complex; or
- 36.2 20% non-Bt seed that may be sprayed with an insecticide/bio-pesticide registered or effective specifically against stalk borers or the bollworm complex, but not with insecticides/bio-pesticides that contain any Bt proteins.

37 The user shall ensure when planting the non-*Bt* seed in the refuge area that it is done:

- 37.1 such that the germinated plants have a similar maturity as the Bt seed;
- 37.2 within seven days from planting the Bt seed;
- 37.3 on the same farm as the Bt seed (user to plant his own refuge);
- 37.4 under the same growing conditions applicable for the Bt seed;
- 37.5 in strips at least six (6) rows wide, except in smallholder farms where 6 rows would exceed a 5% refuge area;
- 37.6 at least along two outside borders of the fields planted with Bt seed;
- 37.7 such that no Bt-plant is more than 400 m (for MAIZE) and 800 m (for COTTON) away from a non-Bt plant; and
- 37.8 the area should be clearly marked.

38 Mixing of *Bt* seed and non-*Bt* seed and crossing of *Bt* rows with non-*Bt* rows are not allowed;

39 The user shall monitor and scout his fields at least once a week and immediately contact its seed representative if 10% or more leaf damage due to stalk borers is detected in the *Bt*-field (for MAIZE) and if more than 5 bollworm larvae of 8 mm and bigger across 24 plants are observed in the *Bt*-field (for COTTON).

40 The user shall minimise the risk of cross-pollination of *Bt* seed and non-*Bt* seed by implementing the steps stipulated in the User Guides.

WRMP : MAIZE, COTTON & SOYBEANS

41 The user recognised and hereby acknowledges and agrees to the following:

- 41.1 glyphosate is categorised as a group G herbicide in accordance with the Herbicide Resistance Action Committee (HRAC) classification;
- 41.2 any weed population may contain individuals naturally resistant to glyphosate and other group G herbicides;
- 41.3 these resistant individuals can eventually dominate the weed population if these herbicides are applied repeatedly to these resistant individuals; and
- 41.4 these resistant weeds may not be controlled by glyphosate or any other group code G herbicide.

42 In order to counter herbicide resistance the user undertakes to:

- 42.1 start with a clean field and control weeds early by applying a pre-plant treatment to the field or using tillage in combination with applying a pre-emergence residual herbicide to the field;
- 42.2 use cultural practices such as cultivation and crop rotation, where appropriate;
- 42.3 use good agronomic principles that enhance crop competitiveness;
- 42.4 use only registered products;
- 42.5 apply integrated weed management practices;
- 42.6 use multiple herbicide modes-of-action with overlapping weed spectrums in rotation, sequences, or mixtures;
- 42.7 use the full recommended herbicide concentration and proper application timing for the hardest to control weed species present in the field;
- 42.8 scout fields after herbicide application to ensure control has been achieved;
- 42.9 prevent weeds to reproduce by seed or to proliferate vegetatively;
- 42.10 monitor sites and clean equipment between sites; and
- 42.11 contact Bayer immediately if weeds normally controlled by glyphosate are not controlled any more i.e. resistance has developed.

Signature:

Name: _____

Date: _____

Your pride
our passion

Let's talk ...

@Bayer4Crops
@DEKALBSA

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