



MONSANTO

YieldGard[®]

2008 IRM GUIDE

Insect Resistance Management

R E V I S E D 02/08

The Corn Grower's Guide to Preserving Technology for Future Generations by Protecting Against Insect Resistance.



Introduction

Combat Resistance with a Refuge

Resistance has developed in nature to some pest control tactics. The risk of insect resistance is real, but may be minimized with proper planning. The best way to preserve the benefits and insect protection of YieldGard® corn products is to develop and implement an Insect Resistance Management (IRM) plan.

The key component of any YieldGard IRM plan is a corn refuge. A refuge is simply a block or strip of corn that does not contain a *Bacillus thuringiensis*, (B.t.) technology, for controlling targeted corn insect pests. The primary purpose of a refuge is to maintain a population of corn insect pests that are not exposed to the *B.t.* proteins found in YieldGard technologies. The lack of exposure to *B.t.* proteins allows susceptible insects nearby to mate with any rare resistant insects that may emerge from *B.t.* corn. Susceptibility to *B.t.* technology would then be passed on to their offspring, helping to preserve the long-term effectiveness of YieldGard technologies.

The refuge should be planted with a similar hybrid, as close as possible to, and at the same time as, the YieldGard corn technologies to help reduce the risk of corn borer and/or corn rootworm developing resistance. With an effective IRM plan in place, growers will continue to benefit from the effective and consistent corn borer and rootworm protection and top yield potential found in YieldGard corn. Please do your part to ensure these technologies are preserved by fully cooperating and incorporating a refuge management plan.

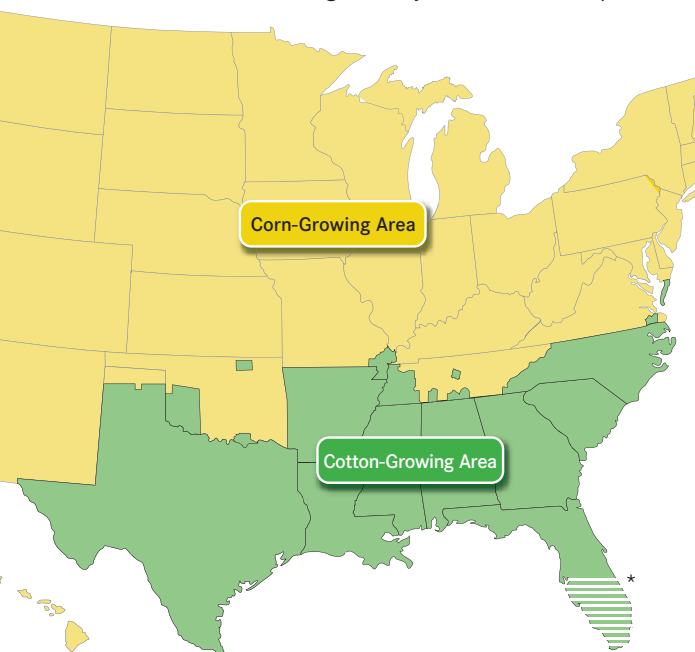
To preserve the benefits and insect protection of the YieldGard family of corn technologies, an IRM plan must be part of every grower's short-term and long-term production strategies. IRM plans are mandated by the U.S. Environmental Protection Agency (EPA), and Insect Resistance Management is a requirement for purchasing YieldGard Corn Borer, YieldGard Rootworm, YieldGard Plus, YieldGard VT Rootworm/RR2™ and YieldGard VT Triple™ corn. Continued use of the YieldGard products in this guide depends on compliance with EPA registration conditions.



Refer to the back of this guide for the key requirements for the YieldGard family of products.

Growing Areas

Corn-growing areas must adhere to corn-growing refuge requirements. Cotton-growing areas must adhere to cotton-growing refuge requirements. Cotton-growing areas are listed below, along with any additions or exceptions.



Cotton-Growing Areas

ALABAMA

All Counties

ARKANSAS

All Counties

FLORIDA

All Counties

GEORGIA

All Counties

LOUISIANA

All Counties

MISSISSIPPI

All Counties

MISSOURI

COUNTIES:

Dunedin

New Madrid

Pemiscot

Scott

Stoddard

NORTH CAROLINA

All Counties

OKLAHOMA

COUNTIES:

Beckham

Caddo

Comanche

Custer

Greer

Harmon

Jackson

Key

Kiowa

Tillman

Washita

SOUTH CAROLINA

All Counties

TENNESSEE

COUNTIES:

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

COUNTIES:

Dinwiddie

Franklin City

Greensville

Isle of Wight

Northampton

Southampton

Suffolk City

Surrey

Sussex

* No planting or sale for commercial planting of Bollgard® or Bollgard II® cotton is permitted south of Route 60 (near Tampa) in Florida, in Hawaii, Puerto Rico, and the U.S. Virgin Islands, or in the following counties in the Texas panhandle: Carson, Dallam, Hansford, Hartley, Hutchinson, Lipscomb, Moore, Ochiltree, Roberts, and Sherman.

A Message About Stewardship

Monsanto Company is committed to enhancing grower productivity and profitability through the introduction of new seed technologies to market. Growers planting seed with biotech traits must implement good stewardship.

Good Stewardship Means:

- Reading and signing a Monsanto Technology Stewardship Agreement (growers must sign their own Stewardship Agreement).
- Complying with all the Insect Resistance Management (IRM) practices for specific biotech traits as mandated by the Environmental Protection Agency (EPA).
- Utilizing all seed with biotech traits for planting a single crop.
- Selling harvested corn with biotech traits not yet approved by the European Union to grain handlers that confirm their acceptance or using that grain as on-farm feed.

Questions?

The several refuge configurations depicted in this Guide are offered merely as examples to growers and are not necessarily to scale. As detailed in this Guide, refuge requirements vary by the type of product being planted and the location of planting. Growers should always plant the amount of refuge acres for a product that is required for their growing region. Please contact your seed dealer with any questions and/or visit www.monsanto.com.

If you have questions about seed stewardship or become aware of individuals utilizing biotech traits in a manner other than as noted above, please call 1-800-768-6387. Letters to report unacceptable or unauthorized behavior of individuals using biotech traits may be sent to:

Monsanto Trait Stewardship
800 N. Lindbergh Boulevard C3ND
St. Louis, MO 63167

Growers should monitor their fields and contact their seed dealer or Monsanto at 1-800-951-9511 if performance problems are observed.

**A seed-applied insecticide can protect seed, roots, and seedlings from insects such as black cutworm, wireworm, white grubs, seed corn maggots, chinch bug, and early flea beetles.



YieldGard VT Triple™ • Pages 3–7

YieldGard VT Triple™ corn technology combines YieldGard® Corn Borer and YieldGard VT Rootworm/RR2™ technologies into a single plant. YieldGard VT Triple corn hybrids control European and southwestern corn borer, sugarcane borer, southern corn stalk borer, western corn rootworm, northern corn rootworm, and Mexican corn rootworm. YieldGard VT Triple hybrids also provide intermediate protection against corn earworm, fall armyworm, and stalk borer. By providing in-plant protection against the above insect pests, the genetic yield potential of YieldGard VT Triple corn hybrids is preserved.

YieldGard VT Triple corn hybrids also include Roundup Ready® 2 technology. This trait allows a grower to experience the benefits of utilizing Roundup® agricultural herbicides in a weed control system that provides the broadest weed control spectrum available, along with better application flexibility and superior crop safety. YieldGard VT Triple seed is treated with seed-applied insecticides.**



YieldGard Plus • Pages 3–7

YieldGard Plus insect-protected corn combines the insect protection spectrum of YieldGard Corn Borer and YieldGard Rootworm technologies, and provides effective and consistent control of corn borer and rootworm throughout the larval feeding periods. YieldGard Plus seed is treated with seed-applied insecticides.**



YieldGard VT Rootworm/RR2 • Pages 8 & 9

YieldGard VT Rootworm/RR2 technology provides the next generation of YieldGard stacked-trait products that provides better insect control and improved consistency of control of western corn rootworm, northern corn rootworm, and Mexican corn rootworm. Protecting the root of the corn plant from feeding by corn rootworm larvae decreases lodging and protects the genetic yield potential of YieldGard VT Rootworm/RR2 corn hybrids.

Roundup Ready 2 technology allows a grower to experience the benefits of utilizing Roundup agricultural herbicides in a weed control system that provides the broadest weed control spectrum, better application flexibility, and superior crop safety.

Seed-applied insecticide is required on YieldGard VT Rootworm/RR2 corn.**



YieldGard Rootworm • Pages 8 & 9

YieldGard Rootworm insect-protected corn provides effective and consistent, in-plant control of western corn rootworm, northern corn rootworm, and Mexican corn rootworm throughout the larval feeding period. Seed-applied insecticide is required on YieldGard Rootworm corn.**



YieldGard Corn Borer • Pages 10 & 11

YieldGard Corn Borer insect-protected corn provides whole-season, in-plant protection against European corn borer, southwestern corn borer, sugarcane borer, and southern corn stalk borer. YieldGard Corn Borer also suppresses corn earworm, fall armyworm, and stalk borer.

YieldGard® Plus • YieldGard VT Triple™

Refuge Planting Requirements

As a condition of registration of YieldGard products by the EPA, seed companies are required to conduct IRM compliance assessments during the growing season to ensure grower compliance. Failure to follow IRM guidelines and properly plant a refuge may result in the loss of access to YieldGard technologies. Please do your part to ensure these technologies are preserved by fully cooperating in refuge management.

YieldGard VT Triple



Refuge Planting Requirements

Any corn hybrid that does not contain a *B.t.* technology for control of western, northern, and Mexican corn rootworm and is planted within or adjacent to the YieldGard Plus or YieldGard VT Triple field can serve as a refuge for corn rootworm. Any corn hybrid that does not contain a *B.t.* technology for control of European and southwestern corn borer and is planted within **1/2 mile** (1/4 mile preferred) of the YieldGard Plus or YieldGard VT Triple field can serve as a refuge for corn borer.

- Plant a refuge on every farm where YieldGard Plus or YieldGard VT Triple corn hybrids are planted.
- Plant the refuge at the same time as YieldGard Plus or YieldGard VT Triple corn.
- Mixing non-*B.t.* seed with YieldGard Plus or YieldGard VT Triple seed for use in the refuge is **not permitted**.
- If the refuge is planted on rotated ground, then YieldGard Plus or YieldGard VT Triple corn must also be planted on rotated ground.
- If the refuge is planted in continuous corn, then the YieldGard Plus or YieldGard VT Triple field can be planted on either continuous or rotated ground.
- **Adjacent and separate refuge fields must be owned or managed by the same grower planting YieldGard Plus or YieldGard VT Triple.**

Multiple Phase Approach

For the most effective results, researchers recommend a multiple phase approach.

- Plant corn hybrids with YieldGard Plus or YieldGard VT Triple to provide effective and consistent protection of corn fields from corn borer and corn rootworm throughout the larval feeding periods.
- Plant a corn refuge block or strips close to the YieldGard Plus or YieldGard VT Triple corn.
- Refuge patterns, including blocks and strips, will serve as a refuge to support survival of susceptible corn borer and corn rootworm.
- YieldGard Plus or YieldGard VT Triple insect protection aids Integrated Pest Management (IPM) because it affects only target insects and allows beneficial insects to thrive. Practice IPM to preserve the natural enemies of corn borer, corn rootworm, and other insect pests.

INSECTICIDE TREATMENT

Common Refuge

The common refuge can be treated with a soil-applied, seed-applied, or foliar-applied insecticide to control rootworm larvae and other soil pests. The refuge can also be treated with a non-*B.t.* foliar insecticide for control of late-season pests (i.e. corn borer), if pest pressure reaches an economic threshold for damage. However, if rootworm adults are present at the time of foliar application, then the YieldGard Plus or YieldGard VT Triple field must be treated in a similar manner.

Separate Refuge

The **corn rootworm** refuge can be treated with a soil-applied, seed-applied, or foliar-applied insecticide to control rootworm larvae and other soil pests. The refuge can also be treated with a non-*B.t.* foliar insecticide for control of late-season pests (i.e., corn borer), if pest pressure reaches an economic threshold for damage. However, if rootworm adults are present at the time of foliar applications, then the YieldGard Plus or YieldGard VT Triple field must be treated in a similar manner.

The **corn borer** refuge can be treated with a soil-applied, seed-applied, or foliar-applied insecticide for corn rootworm larval control, or a non-*B.t.* foliar-applied insecticide for corn borer control if pest pressure reaches an economic threshold.





YieldGard® Plus • YieldGard VT Triple™

Refuge Requirements – Corn-Growing Areas



Two different refuge planting options can be implemented to meet IRM requirements for YieldGard® Plus and YieldGard VT Triple™ in **corn-growing areas**. These options are as follows:

COMMON REFUGE

The first option is to plant a **common refuge** that will serve as the refuge for both corn borer and corn rootworm. The common refuge must be planted with corn hybrids that do not contain *B.t.* technologies for the control of corn borer or corn rootworm.

Common Refuge Requirements

On each farm, up to 80 percent of corn acres can be planted with YieldGard Plus or YieldGard VT Triple corn. The refuge area must represent at least **20 percent of the grower's corn acres** (YieldGard Plus or YieldGard VT Triple plus any non-*B.t.* acres) as shown below. The refuge can be within or adjacent to the YieldGard Plus or YieldGard VT Triple field and can be planted as a block, strips within the field, or as a perimeter around the field. If perimeter or strips are used for the refuge, the strips must be at least four consecutive rows wide.



Corn refuge minimum
20% non-*B.t.* refuge

SEPARATE REFUGE

For selected farms and corn-growing regions that typically have high levels of corn borer infestation, there could be significant yield risk associated with planting a common refuge for YieldGard Plus or YieldGard VT Triple. Therefore a second option is available to growers: planting a separate refuge for corn borer and corn rootworm. Under this option, the corn borer refuge can be treated with a (non-*B.t.*) foliar insecticide if economic thresholds are met; the YieldGard Plus or YieldGard VT Triple field would **not** have to be treated in a similar manner under this option. The corn rootworm refuge can be protected from corn borer damage by planting a *B.t.* corn borer-protected hybrid (e.g., YieldGard Corn Borer). This separate refuge option provides flexibility to manage corn borer.

Corn Rootworm Refuge Requirements

The corn rootworm refuge must be planted with a hybrid that does not contain a *B.t.* technology for control of western, northern, and Mexican corn rootworm, but can be planted with *B.t.* hybrids that control corn borer (e.g., YieldGard Corn Borer). The corn rootworm refuge must represent at least **20 percent of the grower's corn acres** (YieldGard Plus or YieldGard VT Triple and YieldGard Corn Borer) and must be planted within or adjacent to the YieldGard Plus or YieldGard VT Triple field as a block, strips within the field, or as a perimeter around the field. If perimeter or in-field strips are used for the refuge, the strips must be at least four consecutive rows wide.

Corn Borer Refuge Requirements

The corn borer refuge must represent at least **20 percent of the grower's total corn acres** (YieldGard Plus or YieldGard VT Triple, YieldGard Corn Borer plus any non-*B.t.* acres). The corn borer refuge must be planted with a hybrid that does not contain a *B.t.* technology for control of European and southwestern corn borer and must be planted within **1/2 mile** (1/4 mile preferred) of the YieldGard Plus or YieldGard VT Triple field.

Refuge Calculator for Corn-Growing Areas

COMMON REFUGE CALCULATOR			SEPARATE REFUGE CALCULATOR					
Field Size (in acres)	Max. <i>B.t.</i> to Plant	Corn Rootworm & Corn Borer Refuge Acres of Field Needed for 20% Minimum Refuge	Field Size (in acres)	Max. Corn Rootworm <i>B.t.</i> to Plant	Corn Rootworm* Refuge Acres Needed for 20% Minimum Refuge	Max. Corn Borer <i>B.t.</i> to Plant	Corn Borer** Refuge Acres in Additional Separate Field for 20% Minimum Refuge	Both Fields = Total Acres
40	32	8	40	32	8	40	10	50
80	64	16	80	64	16	80	20	100
120	96	24	120	96	24	120	30	150
160	128	32	160	128	32	160	40	200
200	160	40	200	160	40	200	50	250
240	192	48	240	192	48	240	60	300
260	208	52	260	208	52	260	65	325
300	240	60	300	240	60	300	75	375
Refuge placement: Within or adjacent			* Corn Rootworm Refuge must be planted within or adjacent to YieldGard Plus or YieldGard VT Triple field and can be planted as a block, strips within the field, or as a perimeter around the field.					
			** Corn Borer Refuge 20% formula: field size/4 = separate field . Assumes separate field refuge is within 1/2 mile of YieldGard Plus or YieldGard VT Triple Field. Must add these acres to total corn acres. These acres are in addition to total field size.					

Refuge Requirements – Cotton-Growing Areas



Two different refuge planting options can be implemented to meet IRM requirements for YieldGard Plus and YieldGard VT Triple in **cotton-growing areas** (see listing of cotton-growing areas on the cover flap map). These options are as follows:

COMMON REFUGE

The first option is to plant a **common refuge** that will serve as the refuge for both corn borer and corn rootworm. The common refuge must be planted with corn hybrids that do not contain *B.t.* technologies for the control of corn borer or corn rootworm.

Common Refuge Requirements

On each farm, up to 50 percent of corn acres can be planted with YieldGard Plus or YieldGard VT Triple corn. The refuge area must represent at least **50 percent of the grower's corn acres** (YieldGard Plus or YieldGard VT Triple plus any non-*B.t.* acres) as shown below. The refuge can be within or adjacent to the YieldGard Plus or YieldGard VT Triple field and can be planted as a block, strips within the field, or as a perimeter around the field. If perimeter or strips are used for the refuge, the strips must be at least four consecutive rows wide.



Corn refuge minimum
50% non-*B.t.* refuge

SEPARATE REFUGE

The second option is to plant **separate refuge areas** for corn borer and corn rootworm.

Corn Rootworm Refuge Requirements

The corn rootworm refuge must be planted with a hybrid that does not contain a *B.t.* technology for control of western, northern, and Mexican corn rootworm but can be planted with *B.t.* hybrids that control corn borer (i.e. YieldGard Corn Borer). The corn rootworm refuge must represent at least **20 percent of the grower's corn acres** (YieldGard Plus or YieldGard VT Triple and YieldGard Corn Borer) and must be planted within or adjacent to the YieldGard Plus or YieldGard VT Triple field and can be planted as a block, strips within the field, or as a perimeter around the field. If perimeter or in-field strips are used for the refuge, the strips must be at least four consecutive rows wide.

Corn Borer Refuge Requirements

The corn borer refuge must represent at **least 50 percent of the grower's total acres** (YieldGard Plus or YieldGard VT Triple, YieldGard Corn Borer plus any non-*B.t.* acres). The corn borer refuge must be planted with a hybrid that does not contain a *B.t.* technology for control of European and southwestern corn borer and must be planted within **1/2 mile** (1/4 mile preferred) of the YieldGard Plus or YieldGard VT Triple field.

Refuge Calculators for Cotton-Growing Areas

COMMON REFUGE CALCULATOR

Field Size (in acres)	Max. <i>B.t.</i> to Plant	Corn Rootworm & Corn Borer Refuge Acres of Field Needed for 50% Minimum Refuge
40	20	20
80	40	40
120	60	60
160	80	80
200	100	100
240	120	120
260	130	130
300	150	150

Refuge placement: Within or adjacent

SEPARATE REFUGE CALCULATOR

Field Size (in acres)	Max. Corn Rootworm <i>B.t.</i> to Plant	Corn Rootworm* Refuge Acres of Field Needed for 20% Minimum Refuge	Max. Corn Borer <i>B.t.</i> to Plant	Corn Borer** Refuge Acres in Additional Separate Field for 50% Minimum Refuge	Both Fields = Total Acres
40	32	8	40	40	80
80	64	16	80	80	120
120	96	24	120	120	240
160	128	32	160	160	320
200	160	40	200	200	400
240	192	48	240	240	480
260	208	52	260	260	520
300	240	60	300	300	600

* Corn Rootworm Refuge must be planted within or adjacent to YieldGard Plus or YieldGard VT Triple field and can be planted as a block, strips within the field, or as a perimeter around the field.

** Corn Borer Refuge **50% formula: refuge field size = field size**. Assumes separate field refuge is within 1/2 mile of YieldGard Plus or YieldGard VT Triple Field. Must add these acres to total corn acres. These acres are in addition to total field size.



YieldGard® Plus • YieldGard VT Triple™

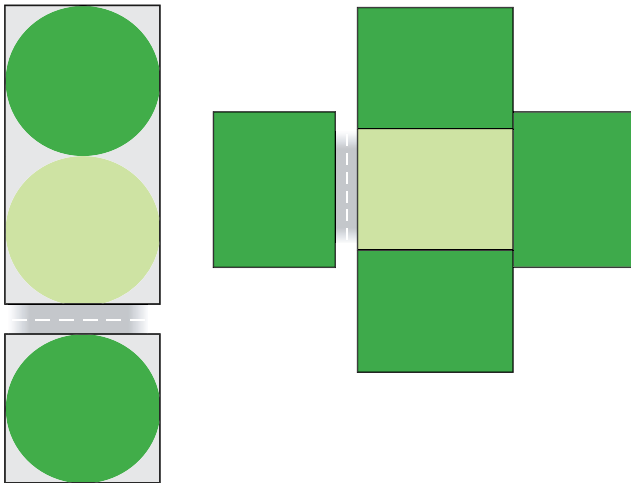
Common Refuge Configuration Options



The refuge can be planted with Roundup Ready® Corn 2 or conventional corn, but not with a hybrid containing B.t. technology. **In corn-growing areas, the non-B.t. common refuge minimum is 20 percent of the grower's corn acres. In cotton-growing areas, the non-B.t. common refuge must represent at least 50 percent of the corn acres.** The common refuge option offers flexibility on each farm by combining the corn borer and corn rootworm refuges into one effective corn refuge that incorporates IRM into farm operations. Options include:

ADJACENT COMMON REFUGE

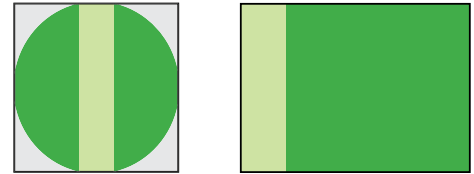
Plant a corn refuge **adjacent** to each YieldGard® Plus or YieldGard VT Triple™ corn field. Separate by a road, path, ditch, etc., but not by another field.



WITHIN-FIELD COMMON REFUGE

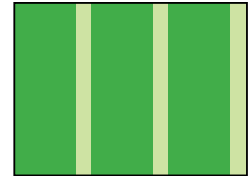
Block

Plant a corn refuge as **blocks** within a YieldGard Plus or YieldGard VT Triple field.



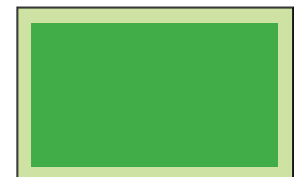
Split Planter (Strips)



Split the planter to alternate at least four consecutive rows of corn refuge with YieldGard Plus or YieldGard VT Triple corn.



Perimeter

Plant field perimeters or **end rows** to a corn refuge.



-  Refuge (i.e. Roundup Ready Corn 2 or conventional corn)
-  YieldGard Plus or YieldGard VT Triple

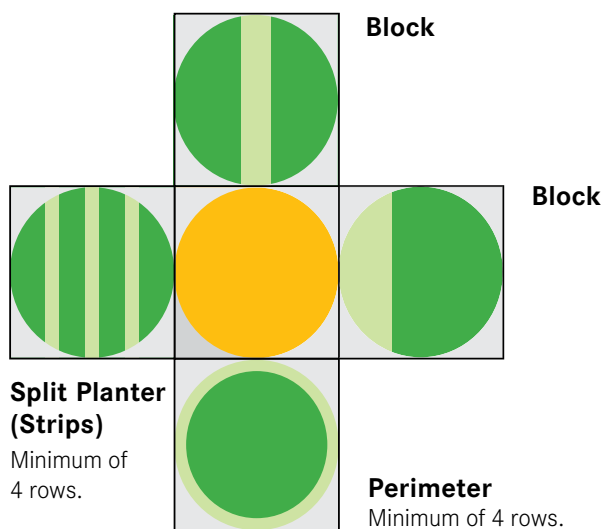





Separate Refuge Configuration Options*

The corn rootworm refuge can be planted with YieldGard Corn Borer or YieldGard Corn Borer with Roundup Ready Corn 2. The corn borer refuge can be planted with Roundup Ready Corn 2 or conventional corn, allowing the option to spray for corn borer with a non-B.t. insecticide. This refuge planting option offers growers the flexibility of controlling corn borer in both the corn rootworm and corn borer refuge areas without the need to also spray the YieldGard Plus or YieldGard VT Triple field. Options include:

CORN BORER REFUGE*

Plant a corn borer refuge within **1/2 mile** (1/4 mile preferred) of each YieldGard Plus or YieldGard VT Triple corn field. Spray for corn borer control if economic thresholds are reached.

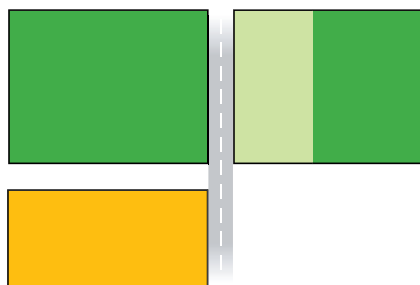


-  Corn Rootworm Refuge (i.e. YieldGard Corn Borer, YieldGard Corn Borer with Roundup Ready Corn 2)
-  YieldGard Plus or YieldGard VT Triple
-  Corn Borer Refuge (i.e. Roundup Ready Corn 2 or conventional corn)

CORN ROOTWORM REFUGE*

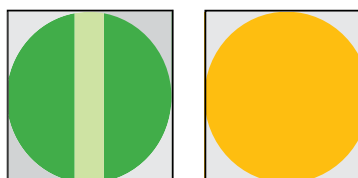
Adjacent

Plant a corn rootworm refuge **adjacent** to each YieldGard Plus or YieldGard VT Triple corn field.



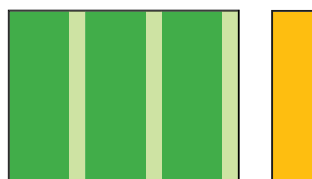
Block

Plant a corn rootworm refuge as large strips or blocks within a YieldGard Plus or YieldGard VT Triple field.



Split Planter (Strips)

Split the planter to alternate at least four consecutive rows of corn rootworm refuge with YieldGard Plus or YieldGard VT Triple corn. If only using 4 rows, must have proper percentage of planter's rows.



* When using a separate refuge configuration in cotton-growing areas, the corn rootworm refuge must represent at least 20 percent of the grower's total corn acres (YieldGard Plus, YieldGard VT Triple, and YieldGard Corn Borer) and the corn borer refuge must represent at least 50 percent of the grower's total corn acres (YieldGard Plus, YieldGard VT Triple, YieldGard Corn Borer and any non-B.t. corn).



YieldGard® Rootworm YieldGard VT Rootworm/RR2™ Refuge Requirements



How Refuges Must be Established

On each farm, plant up to 80 percent of the corn acres with YieldGard® Rootworm or YieldGard VT Rootworm/RR2™ corn. Plant at least **20 percent of the corn acres to a corn refuge** that does not contain a *B.t.* technology for control of western, northern, and Mexican corn rootworm. Unlike products containing YieldGard Corn Borer traits, YieldGard Rootworm and YieldGard VT Rootworm/RR2 have the same refuge requirements in both corn- and cotton-growing areas. The corn refuge can be treated for control of corn rootworm larvae and other soil pests with soil-applied, seed-applied, or foliar-applied insecticides. The corn refuge can be treated with a non-*B.t.* insecticide to control late-season pests such as corn borer, however the YieldGard Rootworm or YieldGard VT Rootworm/RR2 corn must also be treated if sprayed at a time when rootworm beetles are present. Corn refuge options include YieldGard Corn Borer, YieldGard Corn Borer with Roundup Ready® Corn 2, Roundup Ready Corn 2, and conventional corn, but no *B.t.* product for corn rootworm management.

Plant the refuge within or adjacent to YieldGard Rootworm or YieldGard VT Rootworm/RR2 corn fields. Separate by a road, path, ditch, etc., but not by another field. Adjacent refuge fields must be owned by or managed by the grower.



Minimum 20% non-*B.t.* refuge

Corn- and Cotton-Growing Areas Refuge Planting Requirements

Any corn hybrid that does not contain a *B.t.* technology for control of western, northern, and Mexican corn rootworm and is planted at approximately the same time within or adjacent to the YieldGard Rootworm or YieldGard VT Rootworm/RR2 field corn can serve as a refuge. The refuge can be YieldGard Corn Borer, YieldGard Corn Borer with Roundup Ready Corn 2, Roundup Ready Corn 2, or conventional corn.

- Plant a refuge on every farm where YieldGard Rootworm or YieldGard VT Rootworm/RR2 corn hybrids are planted.
- Plant the refuge at the same time as YieldGard Rootworm or YieldGard VT Rootworm/RR2 corn.
- Mixing non-*B.t.* seed with YieldGard Rootworm or YieldGard VT Rootworm/RR2 seed for use in the refuge is not permitted.
- If the refuge is planted on rotated ground, then YieldGard Rootworm or YieldGard VT Rootworm/RR2 corn must also be planted on rotated ground.
- If the refuge is planted in continuous corn, then the YieldGard Rootworm or YieldGard VT Rootworm/RR2 field can be planted on either continuous or rotated ground.
- **Adjacent refuge field must be owned or managed by the same grower planting YieldGard Rootworm or YieldGard VT Rootworm/RR2 technology.**



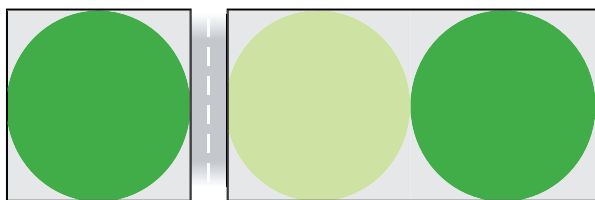
Refuge Configuration Options

The refuge on each farm may be arranged in a number of configurations. These options offer the flexibility to easily incorporate an effective corn refuge into farm operations. Options include:

ADJACENT COMMON REFUGE

Plant a corn refuge **adjacent** to each YieldGard Rootworm or YieldGard VT Rootworm/RR2 corn field.

Adjacent



Adjacent

Separate by a road, path, ditch, etc., but not by another field.

Multiple Phase Approach

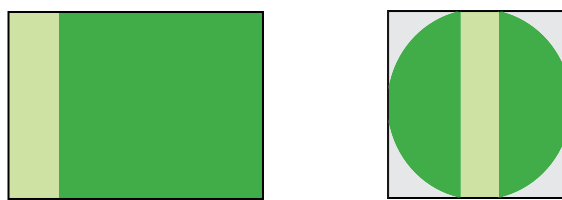
For the most effective results, researchers recommend a multiple phase approach.

- Plant corn hybrids with YieldGard Rootworm or YieldGard VT Rootworm/RR2 to provide effective and consistent protection of corn roots from western, northern, and Mexican corn rootworm larvae throughout the larval feeding period.
- Plant a corn refuge block close to the YieldGard Rootworm or YieldGard VT Rootworm/RR2 corn. The block will serve as a refuge to support the survival of susceptible corn rootworm.
- YieldGard Rootworm or YieldGard VT Rootworm/RR2 insect protection aids Integrated Pest Management (IPM) because it affects only target insects and allows beneficial insects to thrive. Practice IPM to preserve the natural enemies of corn rootworm and other insect pests. Natural predators, such as ground beetles and ants, can help reduce corn rootworm larval populations.

WITHIN-FIELD COMMON REFUGE

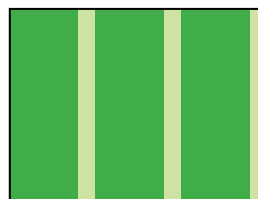
Plant a corn refuge as large **blocks** within a YieldGard Rootworm or YieldGard VT Rootworm/RR2 field.

Block



Split Planter (Strips)


Split the planter to alternate at **least four rows** of corn refuge with YieldGard Rootworm or YieldGard VT Rootworm/RR2 corn.




Perimeter

Plant field perimeters or **end rows** to a corn refuge.



 Refuge (i.e. YieldGard Corn Borer, YieldGard Corn Borer with Roundup Ready Corn 2, Roundup Ready Corn 2 or conventional corn)

 YieldGard Rootworm or YieldGard VT Rootworm/RR2



YieldGard[®] Corn Borer

Refuge Requirements

Corn-Growing Areas Refuge Requirements

In this area, refuges must be established as follows:

- On each farm, plant up to 80 percent of the corn acres with YieldGard[®] Corn Borer corn. Plant at least **20 percent of the corn acres to a corn refuge** that does not contain a *B.t.* technology for control of European or southwestern corn borer. The refuge corn can be treated with insecticides only when the level of pest pressure meets or exceeds economic thresholds. Sprayable *B.t.* insecticides must not be applied to the refuge corn. Corn refuge options include YieldGard Rootworm, YieldGard Rootworm with Roundup Ready[®] Corn 2, Roundup Ready Corn 2, YieldGard VT Rootworm/RR2[™], and conventional corn but no other *B.t.* product for corn borer management.



Corn refuge minimum 20% non-B.t. refuge

- Plant the corn refuge within, adjacent to, or near YieldGard Corn Borer corn fields.
- The refuge must be placed within **1/2 mile** of the YieldGard Corn Borer field (1/4 mile or closer preferred).

Cotton-Growing Areas Refuge Requirements

In the cotton-growing areas shown on the cover flap map, there are special refuge requirements for YieldGard Corn Borer corn, as follows:

- On each farm, plant up to 50 percent of the corn acres with YieldGard Corn Borer corn. Plant a minimum of **50 percent of the corn acres to a corn refuge** that does not contain a *B.t.* technology for control of European or southwestern corn borer. The refuge corn can be treated with insecticides only when the level of pest pressure meets or exceeds economic thresholds. Sprayable *B.t.* insecticides must not be applied to the refuge corn.



Corn refuge minimum 50% non-B.t. refuge

- Plant the corn refuge within, adjacent to, or near the YieldGard Corn Borer corn fields.
- The refuge must be placed within **1/2 mile** of the YieldGard Corn Borer field (1/4 mile or closer preferred).

Refuge-Planting/Configuration Options



Refuge-Planting Details

Any corn hybrid that does not contain a *B.t.* technology for control of European or southwestern corn borer and is planted on the same grower's farm within **1/2 mile** of YieldGard Corn Borer corn can serve as a refuge.

- Plant a refuge on every farm where YieldGard Corn Borer corn hybrids are planted.
- Plant the refuge within **1/2 mile** of (1/4 mile preferred), and at approximately the same time as YieldGard Corn Borer corn.
- Manage the refuge the same as YieldGard Corn Borer corn is managed. Reducing inputs or putting the refuge on marginal land reduces the effectiveness of the refuge.
- Plant the refuge only with corn that does not contain a *B.t.* technology for control of European or southwestern corn borer.
- Mixing non-*B.t.* seed with YieldGard Corn Borer seed for use in the refuge is not permitted.
- Refuge acres must be owned or managed by the same grower planting YieldGard Corn Borer technology.

Multiple Phase Approach

For the most effective results, researchers recommend a multiple phase approach.

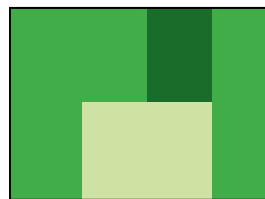
- Plant corn hybrids with YieldGard Corn Borer to ensure that an "effective dose" of *B.t.* is available for corn borer control throughout the plant, throughout the season. This will control nearly all susceptible corn borer.
- Plant a corn refuge block close to the YieldGard Corn Borer corn. The block will serve as a refuge to support the survival of susceptible corn borer.
- YieldGard Corn Borer insect protection aids Integrated Pest Management (IPM) because it affects only target insects and allows beneficial insects to thrive. Practice IPM to preserve natural corn borer enemies and other pests. Natural predators, such as lacewings, wasps, ladybugs, spiders, and minute pirate bugs, can help reduce corn borer populations.

REFUGE CONFIGURATION OPTIONS

The refuge on each farm may be arranged in a number of configurations that offer flexibility to easily incorporate an effective corn refuge into farm operations. Options include:

Separate Field

Plant a separate corn refuge within **1/2 mile** of each *B.t.* corn field (1/4 mile preferred).



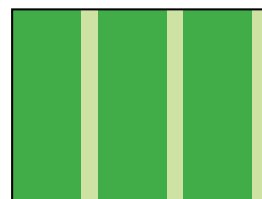
Block

Plant a corn refuge as blocks within a *B.t.* field.



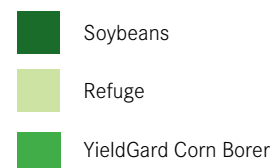
Split Planter (Strips)

Split the planter to alternate **four or more rows** (six or more preferred) of corn refuge with *B.t.* corn.



Perimeter

Plant field perimeters or **end rows** to a corn refuge.



Comparison of Key Refuge Requirements

CORN Growing Areas

Refuge Type

Control Target

% non-B.t. Corn Refuge

Refuge Location

Refuge Configuration Options

Strip or Perimeter Width



See page 10



See page 8



See page 4



Common, adjacent or separate
European or southwestern corn borer
20% of corn acres
Within, adjacent, or separate. If separate, refuge within 1/2 mile of field (1/4 mile preferred)
Separate, block, strips or perimeter
At least four consecutive rows wide (six or more preferred)

Common or adjacent
Western, northern, and Mexican corn rootworm
20% of corn acres
Within or adjacent to field
Block, strips or perimeter
At least four consecutive rows wide

Common refuge
Corn borer and corn rootworm
20% of corn acres
Within or adjacent to field
Block, strips or perimeter
At least four consecutive rows wide

Separate refuge
Corn rootworm
Corn borer
20% of total corn acres
Within 1/2 mile of field (1/4 mile preferred)
Block, strips or perimeter
At least four consecutive rows wide

COTTON Growing Areas

Refuge Type

Control Target

% non-B.t. Corn Refuge

Refuge Location

Refuge Configuration Options

Strip or Perimeter Width



See page 10



See page 8



See page 5



Common, adjacent or separate
European or southwestern corn borer
50% of corn acres
If separate, refuge within 1/2 mile of field (1/4 mile preferred)
Separate, block, strip or perimeter
At least four consecutive rows wide (six or more preferred)

Common or adjacent
Western, northern, and Mexican corn rootworm
20% of corn acres
Within or adjacent to field
Block, strip or perimeter
At least four consecutive rows wide

Common refuge
Corn borer and corn rootworm
50% of corn acres
Within or adjacent to field
Block, strip or perimeter
At least four consecutive rows wide

Separate refuge
Corn rootworm
Corn borer
20% of total acres
Within 1/2 mile of field (1/4 mile preferred)
Block, strip or perimeter
At least four consecutive rows wide



Before opening a bag of seed, be sure to read and understand the stewardship requirements, including applicable refuge requirements for insect resistance management, for the biotechnology traits expressed in the seed as set forth in the Monsanto Technology Agreement that you sign. By opening and using a bag of seed, you are reaffirming your obligation to comply with those stewardship requirements.



Grain harvested from products that bear this mark is fully approved for food and feed use in the United States and Japan, but is not approved in the European Union. You must find a market for this crop that will not ship this grain or its processed products to Europe. Appropriate markets for this grain include: domestic feed use or grain handlers that specifically agree to accept this grain and handle it appropriately. For more information on your grain market options, go to the American Seed Trade Association's website at www.amseed.org or call your seed supplier.

MARKET CHOICES is a registered certification mark used under license from ASTA. Know Before You Grow, an information service provided by National Corn Growers Association at www.ncga.com.

Growers should refer to Monsanto's Technology Use Guide for information on crop stewardship regarding the potential movement of pollen to neighboring crops. Know Before You Grow is a registered service mark of National Corn Growers Association. For more information call 1-866-SELL CORN.

IMPORTANT: The following information is current as of 01/08/2008: YieldGuard Plus and YieldGuard Rootworm with Roundup Ready Corn 2 are grandfathered for import and use in processed feed in the E.U. YieldGuard Plus with Roundup Ready Corn 2, YieldGuard VT Rootworm/RR2 and YieldGuard VT Triple are neither approved nor grandfathered and there is zero tolerance for these traits in processed feed imported in the E.U. Growers of all products bearing the Market Choices mark must talk to their grain handler to confirm the handler's buying position for grain from these products. It is a violation of national and international law to move material containing biotech traits across boundaries into nations where import is not permitted.

YieldGuard corn products are not yet registered in all states. Check with your Monsanto representative for the registration status in your state.

YieldGuard VT Triple™; EPA Registration Numbers: 524-552. Active Ingredients: Cry3Bb1 [Bacillus thuringiensis Cry3Bb1 protein and the genetic material necessary for its production (Vector ZMIR39) in MON 88017 corn (OECD Unique Identifier: MON-88017-3)] X Cry1Ab [Bacillus thuringiensis Cry1Ab delta-endotoxin and the genetic material necessary for its production in corn] corn for use in field corn. This product controls European corn borer (*Ostrinia nubilalis*), southwestern corn borer (*Diatraea grandiosella*), sugarcane borer (*Diatraea saccharalis*), southern corn stalk borer (*Diatraea crambidoides*), western corn rootworm (*Diabrotica virgifera virgifera*), northern corn rootworm, (*Diabrotica barberi*), and Mexican corn rootworm (*Diabrotica virgifera zea*) and suppresses corn earworm (*Helicoverpa zea*), stalk borer (*Papaipema nebris*), and fall armyworm (*Spodoptera frugiperda*).

YieldGuard® Plus; EPA Registration Numbers: 524-545; Active ingredients: Bacillus thuringiensis Cry IA(b) and Cry3Bb1 delta endotoxins and the genetic material necessary for their production in corn. This product controls European corn borer (*Ostrinia nubilalis*), southwestern corn borer (*Diatraea grandiosella*), sugarcane borer (*Diatraea saccharalis*), southern corn stalk borer (*Diatraea crambidoides*), western corn rootworm (*Diabrotica virgifera virgifera*), northern corn rootworm, (*Diabrotica barberi*), and Mexican corn rootworm (*Diabrotica virgifera zea*) and suppresses corn earworm (*Helicoverpa zea*), stalk borer (*Papaipema nebris*), and fall armyworm (*Spodoptera frugiperda*).

Routine applications of insecticides to control the larval stages of these insects are usually unnecessary when corn containing YieldGuard® Corn Borer, YieldGuard® Rootworm or YieldGuard® Plus insect protection is planted. YieldGuard® Corn Borer, YieldGuard® Rootworm and YieldGuard® Plus are available in corn hybrids offered by a variety of seed producers. Growers must read and follow the limitations and requirements in the appropriate Product Notice or Technology Use Guide.

YieldGuard VT Rootworm/RR2™; EPA Registration Numbers: 524-551. Active Ingredients: Bacillus thuringiensis Cry3Bb1 protein and the genetic material necessary for its production (Vector ZMIR39) in MON 88017 corn. This product controls western corn rootworm (*Diabrotica virgifera virgifera* LeConte), northern corn rootworm, (*Diabrotica barberi* Smith & Lawrence), and Mexican corn rootworm (*Diabrotica virgifera zea* Krysan & Smith). Routine applications of insecticides to control the larval stages of these insects are usually unnecessary when corn containing YieldGuard Rootworm insect protection is planted.

YieldGuard® Rootworm; EPA Registration Numbers: 524-528; Active ingredient: Bacillus thuringiensis Cry3Bb1 delta endotoxin and the genetic material necessary for their production in corn. This product controls western corn rootworm (*Diabrotica virgifera virgifera* LeConte), northern corn rootworm, (*Diabrotica barberi* Smith & Lawrence), and Mexican corn rootworm (*Diabrotica virgifera zea* Krysan & Smith). Routine applications of insecticides to control the larval stages of these insects are usually unnecessary when corn containing YieldGuard Rootworm insect protection is planted.

YieldGuard® Corn Borer; EPA Registration Numbers: 524-489; Active ingredients: Bacillus thuringiensis CryIA(b) delta endotoxin and the genetic material necessary for their production in corn. This product controls European corn borer (*Ostrinia nubilalis*), southwestern corn borer (*Diatraea grandiosella*), and southern corn stalk borer (*Diatraea crambidoides*); and suppresses corn earworm (*Helicoverpa zea*), stalk borer (*Papaipema nebris*), and fall armyworm (*Spodoptera frugiperda*). Routine applications of insecticides to control these insects are usually unnecessary when corn containing YieldGuard Corn Borer insect protection is planted.

Always Read and Follow Pesticide Label Directions. Roundup Ready® crops contain genes that confer tolerance to glyphosate, the active ingredient in Roundup® agricultural herbicides. Roundup® agricultural herbicides will kill crops that are not tolerant to glyphosate. Bollgard II®, Respect the Refuge™, Respect the Refuge™ and Design, Roundup®, Roundup Ready®, YieldGuard®, YieldGuard VT™ and Design, YieldGuard VT Rootworm/RR2™, and YieldGuard VT Triple™ are trademarks of Monsanto Technology LLC. ©2008 Monsanto Company. [17104Apgd] 5C-9Y-07-2645Rev 0208