INSECT RESISTANCE MANAGEMENT STEWARDSHIP GUIDE

U.S. CORN AND COTTON-GROWING AREAS

syngenta®

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SYNGENTA OVERVIEW

CORN

Updated 04/2025

SYNGENTA OVERVIEW

A strong stewardship program is essential for protecting and preserving the long-term value of insect-protected trait technology. Syngenta provides responsible agriculture programs and information regarding the safe handling and storage of product.

INDUSTRY-LEADING PROTECTION FOR ABOVE- AND BELOW-GROUND PESTS

The corn traits portfolio from Syngenta offers a range of technologies that help manage production challenges and protect genetic yield potential.

DuracadeViptera™

Plant the Trusted Solution for Insect Control

- **Combines the power** of Duracade® and Viptera® trait technology to control 16 damaging above-and below-ground pests - no competitive stack controls more insects.
- **Alternate modes of action** to help preserve trait durability and delay insect adaptation for long-term field health.
- **Higher Yield Potential** — 4.1 Bu/A advantage over products without Duracade trait stacks.[1]

Viptera®

Give Every Seed the Chance to Reach Full Potential

- **The most effective above-ground insect control** in the industry for controlling major leaf-, stalk- and ear-feeding corn insects, including western bean cutworm.
- **Results** in reduced insect-feeding damage, better crop stand and higher grain quality due to lower incidences of mold and mycotoxin development.

Artesian®

Maximize Yield When It Rains; Increase Yield Potential When It Doesn't

- **Season-long drought protection** through advanced genetics.
- **Healthier plants** with genetics that allow plants to manage gaps in rainfall season-long and potentially yield exceptionally well in good conditions.
- **Strong yield potential,** delivering nearly 12% higher yields compared with other hybrids in severe and extreme drought.[2]

Durastak™

DurastakViptera™

AVAILABLE FOR THE 2027 SEASON

Next-Level Corn Rootworm Control

- **Three Modes of Action:** Hybrids with Durastak™ trait technology feature three powerful modes of action against CRW.
- **Improved Standability:** Features **2x** more root node protection for increased standability under moderately heavy CRW pressure.[3]
- **Top Yield Potential: +9.7 Bu/A** average advantage over hybrids with the Duracade® trait stack under moderately heavy CRW pressure.[3]

[1] Data is based on 390 Syngenta Field Evaluation Trials and external field trials across the Corn Belt, 2018.
[2] Data is based on 7,613 Syngenta Field Evaluation Trials across the Corn Belt, 2010-2014. Syngenta defines a yield environment of 50-99 Bu/A as severe and fewer than 50 Bu/A as extreme.
[3] Data is based on 5 internal Syngenta trials; 2023-2024. Trial Locations: IL, IA and NE.

More information about Syngenta corn products is available at http://www.biotradestatus.com.

GROWER STEWARDSHIP AGREEMENT

A strong stewardship program is essential for protecting and preserving the long-term value of insect-protected trait technology. Syngenta provides responsible agriculture programs and information regarding the safe handling and storage of product.

Stewardship Requirements

Prior to planting corn hybrids with Syngenta traits, you are required to sign a Syngenta Seeds, LLC Stewardship Agreement. This agreement outlines the terms and conditions of growing hybrids with Syngenta traits, including the terms of a limited license under Syngenta's intellectual property, compliance with Environmental Protection Agency (EPA)-mandated programs and grain channeling requirements. The deadline to send all completed agreements to Syngenta is August 15, annually.

Agreements can be sent using the following four methods:

ONLINE

agcelerate.com

Register for an account or log in to an existing account and then electronically sign the agreements that are necessary to use your seed. *For support using the AgCelerate tool, please call AgCelerate Customer Service at 1-866-784-4630.*

Electronic signatures will be accepted only through agcelerate.com. Any other forms of electronic signatures will be rejected.

EMAIL

GLG@KonnerthConsulting.com

FAX

800-643-8350

MAIL

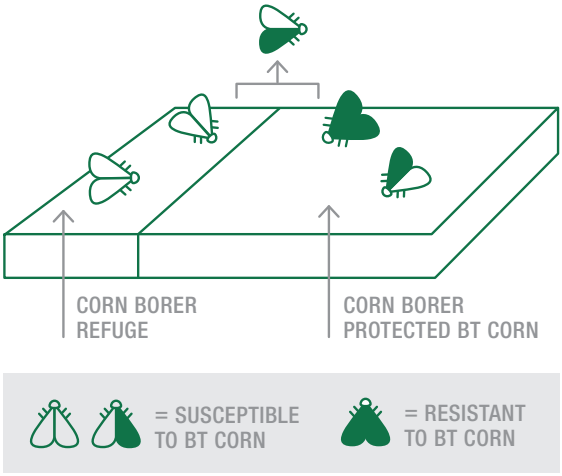
Your Local Supplier or
Konnerth Consulting — Attn: Stewardship
P.O. Box 316
New Melle, MO 63365

Use only one method; originals are not required. It is important that you keep a copy of the Syngenta Seeds, LLC Stewardship Agreement for your records. If you have questions regarding the Stewardship Agreement or how to submit the form, please call 877-GRO-CORN (877-476-2676).

WHY PLANT A REFUGE?

Bacillus thuringiensis (*Bt*) proteins are toxic to specific pests such as the European corn borer (ECB or CB) and the corn rootworm (CRW or RW). As the number of acres exposed to these *Bt* products increases, so does the potential for target insect pests to develop a resistance to *Bt* traits. Therefore, in order to preserve this technology now and into the future, an Insect Resistance Management (IRM) plan was developed.

A major component of an IRM plan is to plant a refuge. The EPA requires a refuge on every farm that plants *Bt* corn hybrids. The EPA requires companies that market *Bt* corn hybrids to have refuge requirements and conduct a grower compliance program. IRM education and compliance are uniform across the U.S. corn industry to ensure a consistent IRM message.



REFUGE STRATEGY – HOW IT WORKS

The refuge maintains a population of insect pests susceptible to the *Bt* proteins produced in insect-protected *Bt* corn. These susceptible pests mate with any insect pests that are resistant to the *Bt* proteins. Susceptibility is then passed on to offspring, helping preserve the long-term effectiveness of insect-protected *Bt* corn products.

Insect Resistance Management
Planting Refuges, Preserving Technology

The U.S. Environmental Protection Agency (EPA) requires a refuge on every farm that plants insect-protected corn hybrids. Failure to plant the appropriate refuge jeopardizes your continued access to Syngenta corn traits technology.

INSECT RESISTANCE MANAGEMENT (IRM)

IRM COMPLIANCE ASSURANCE PROGRAM (CAP)

Syngenta and other industry registrants have cooperatively developed the EPA-mandated IRM CAP. This program requires corn seed companies to evaluate the extent to which growers are adhering to the IRM requirements and ensure that those who do not are brought back into compliance. Growers who do not meet IRM requirements for two years within a five-year period may be denied access to hybrids with Syngenta insect-protected traits in the third year as mandated by the EPA.

ON-FARM ASSESSMENTS

As part of the product registration with the EPA, Syngenta and other seed companies are required to conduct on-farm assessments as part of the CAP to assess whether growers are following the IRM requirements. These on-farm assessments are conducted by an independent third party and directed toward areas at high risk of insect resistance based on pest pressure, Bt corn market penetration, or insufficient refuge seed purchase.

The CAP also outlines consistent standards developed by the EPA and Bt corn registrants for responding to growers who have not followed the IRM requirements to bring them into full compliance.

Growers found to be out of compliance with the refuge requirements jeopardize their access to *Bt* corn products. They will receive a letter informing them of their compliance infraction, reminding them of their compliance obligations and the consequences of not adhering to the requirements. Included in each letter will be further information on how to develop and implement a suitable IRM program for their farm. Additionally, any grower found to be out of compliance will receive a follow-up IRM assessment the next growing season, and another follow up check within a five-year period.

IRM TIP LINE

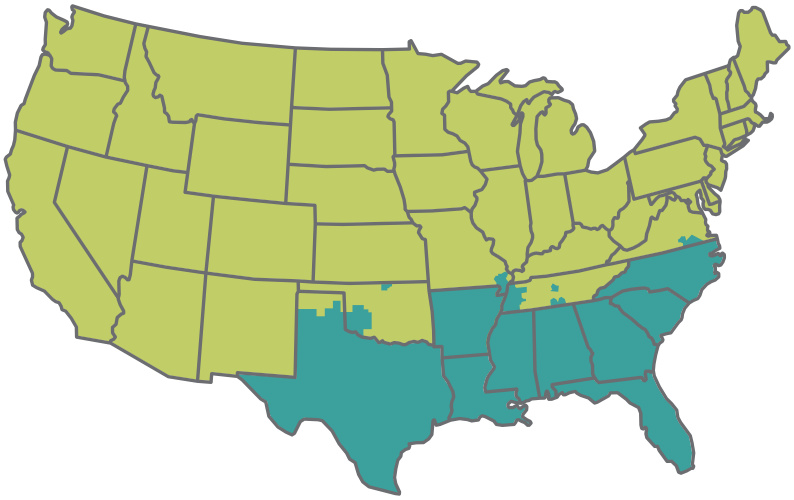
If you have any seed stewardship questions or become aware of individuals not following proper IRM practices as noted in this guide, please call the tips and complaints toll-free phone line at 1-877-GRO-CORN (1-877-476-2676).

Growers are encouraged to scout their fields. If unexpected damage is observed, please contact your seed reseller or company representative.

SIZE REQUIREMENTS ARE BASED ON GEOGRAPHY AND PRODUCT

5% OR 20% REFUGE - CORN GROWING AREAS

20% OR 50% REFUGE - COTTON GROWING AREAS



THE FOLLOWING STATES AND COUNTIES ARE CONSIDERED CORN-GROWING AREAS. REPRESENTED BY LIGHT GREEN SHADING.

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

THE FOLLOWING STATES AND COUNTIES ARE CONSIDERED COTTON-GROWING AREAS. REPRESENTED BY BLUE SHADING.

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

CORN REFUGE REQUIREMENTS

*Only required for non E-Z Refuge® products

SINGLE PEST REFUGE

A single pest refuge is a field that serves solely as a refuge for above-ground pests (e.g., European corn borer) or below-ground pests (e.g., corn rootworm), but not both. The single pest refuge approach can be used for both single *Bt* corn products and stacked *Bt* corn products (also known as the Separate Refuge option).

KEY

INSECT-PROTECTED BT CORN

BELOW-GROUND PEST REFUGE (RW)
OR
ABOVE-GROUND PEST REFUGE (CB)

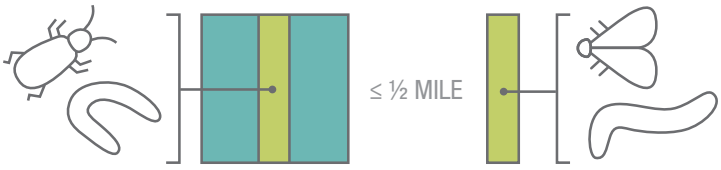
BELOW-GROUND AND ABOVE-GROUND PEST REFUGE (RW/CB)

SINGLE BT CORN PRODUCTS

ABOVE-GROUND PESTS

ABOVE-GROUND PESTS

STACKED BT CORN PRODUCTS



BELOW-GROUND PESTS

ABOVE-GROUND PESTS

COMMON REFUGE

A common refuge is a field or area of corn that serves as a refuge for both above-ground pests (e.g., European corn borer) and below-ground pests (e.g., corn rootworm) at the same time. The refuge can be within the *Bt* field or immediately adjacent to it.

STACKED BT CORN PRODUCTS

BELOW-GROUND PESTS

ABOVE-GROUND PESTS

CORN REFUGE REQUIREMENTS

It is important to recognize that different hybrid or trait packages may have different IRM requirements. On-farm mixing of any seed is not an approved method to comply with stewardship requirements.

	TRAIT STACK	SIZE REQUIREMENT (CORN-GROWING REGION)[1]	SIZE REQUIREMENT (COTTON-GROWING REGION)[1]
ABOVE- AND BELOW-GROUND TRAIT STACKS	DurastakViptera	5% in the bag E-Z Refuge® E-Z Refuge 5% in field/adjacent if Refuge Renew	20% supplemental refuge[2]
	Durastak		
	DuracadeViptera		
	DuracadeViptera Z3		
	Duracade		
	Agrisure Total		
ABOVE-GROUND TRAIT STACKS	Viptera	5% in the bag E-Z Refuge E-Z Refuge 5% in field/adjacent if Refuge Renew	20% supplemental refuge[2]
	Viptera Z3		
	Agrisure Above		
	Agrisure Viptera 3110	20% within, adjacent or up to ½ mile away	20% within, adjacent or up to ½ mile away
	Agrisure 3010	20% within, adjacent or up to ½ mile away	50% within, adjacent or up to ½ mile away

[1] THE FOLLOWING STATES AND COUNTIES ARE CONSIDERED CORN-GROWING AREAS: AK, AZ, CA, CO, CT, DE, HI, ID, IL, IN, IA, KS, KY, ME, MD, MA, MI, MN, MO (all counties except Dunklin, New Madrid, Pemiscot, Scott and Stoddard), MT, NE, NV, NH, NJ, NM, NY, ND, OH, OK (all counties except Beckham, Caddo, Comanche, Custer, Greer, Harmon, Jackson, Kay, Kiowa, Tillman and Washita), OR, PA, RI, SD, TN (all counties except Carroll, Chester, Crockett, Dyer, Fayette, Franklin, Gibson, Hardeman, Hardin, Haywood, Lake, Lauderdale, Lincoln, Madison, Obion, Rutherford, Shelby and Tipton), TX (only the counties of Carson, Dallam, Hanford, Hartley, Hutchinson, Lipscomb, Moore, Ochiltree, Roberts and Sherman), UT, VT, VA (all counties except Dinwiddie, Franklin City, Greensville, Isle of Wight, Northampton, Southampton, Suffolk City, Surrey and Sussex), WA, WV, WI and WY. THE FOLLOWING STATES AND COUNTIES ARE CONSIDERED COTTON-GROWING AREAS: AL, AR, FL, GA, LA, MO (only the counties of Dunklin, New Madrid, Pemiscot, Scott and Stoddard), MS, NC, OK (only the counties of Beckham, Caddo, Comanche, Custer, Greer, Harmon, Jackson, Kay, Kiowa, Tillman and Washita), SC, TN (only the counties of Carroll, Chester, Crockett, Dyer, Fayette, Franklin, Gibson, Hardeman, Hardin, Haywood, Lake Lauderdale, Lincoln, Madison, Obion, Rutherford, Shelby and Tipton), TX (all counties except Carson, Dallam, Hanford, Hartley, Hutchinson, Lipscomb, Moore, Ochiltree, Roberts and Sherman) and VA (only the counties of Dinwiddie, Franklin City, Greensville, Isle of Wight, Northampton, Southampton, Suffolk City, Surrey and Sussex).

[2] Assumes a common corn borer and rootworm refuge. Alternatively, a separate rootworm refuge within or adjacent to the field and a corn borer refuge up to a half mile away could be planted.

More information about Syngenta corn products is available at http://www.biotradestatus.com.

CORN REFUGE REQUIREMENTS

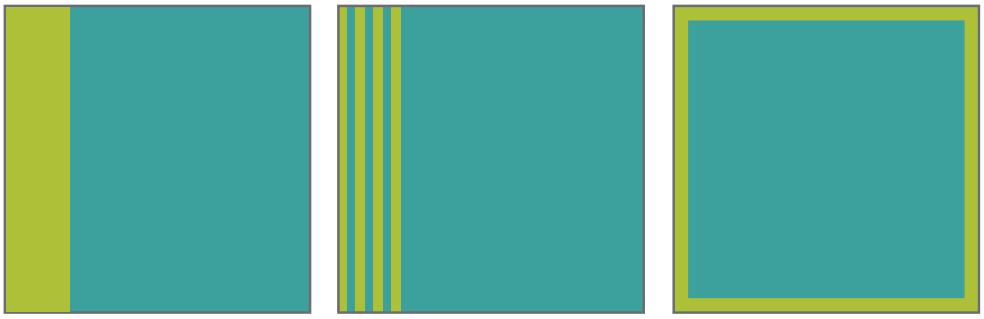
*Only required for non E-Z Refuge® products

REFUGE PLANTING OPTIONS

Refuge can be planted as a block, strips within the field, perimeter around the field, adjacent or a separate block within 1/2 mile of the field.

- 1/2 mile option may only be used for corn borer refuge
- A neighbor's field does NOT meet the refuge requirements

WITHIN



BLOCK | STRIPS (SPLIT PLANTER) | PERIMETER

ADJACENT

CAN BE SEPARATED BY A ROAD, PATH, DITCH, ETC., BUT NOT BY ANOTHER FIELD

1/2 MILE OPTION

CORN BORER REFUGE OPTION ONLY

Reminder: When calculating a refuge, the calculation must be based on total corn acres.

CORN REFUGE REQUIREMENTS

STRIP REFUGE

Four Row Minimum – Strips, blocks, or perimeter refuges must be a minimum of four contiguous rows wide to provide ample space for bug mating.

TREATMENT

Corn Borer Treatment – Non-*Bt* foliar insecticide treatments for corn borer control may be applied only if economic thresholds are reached for one or more pests. Economic thresholds will be determined using methods recommended by local or regional professionals (e.g., Extension Service agents, crop consultants).

Corn Rootworm Treatment – Insecticide treatments for control of corn rootworm larvae may be applied. If rootworm adults are present at time of foliar applications, then corn fields with the Syngenta corn trait must be treated in a similar manner as the refuge.

REFUGE MANAGEMENT

Refuge should be planted with a hybrid that is agronomically similar to and managed similar to your corn with Syngenta corn traits.

If a rootworm refuge is planted in a field that is in a crop rotation system, the corn hybrids with Syngenta corn traits must also be planted in a field that is in a crop rotation system.

If the rootworm refuge is planted on continuous corn, the corn hybrids with Syngenta corn traits may be planted on either continuous or in a crop rotation system.

BAG TAG LABELING

Before filling your planter, always check the bag tag to ensure you know the refuge size requirement.

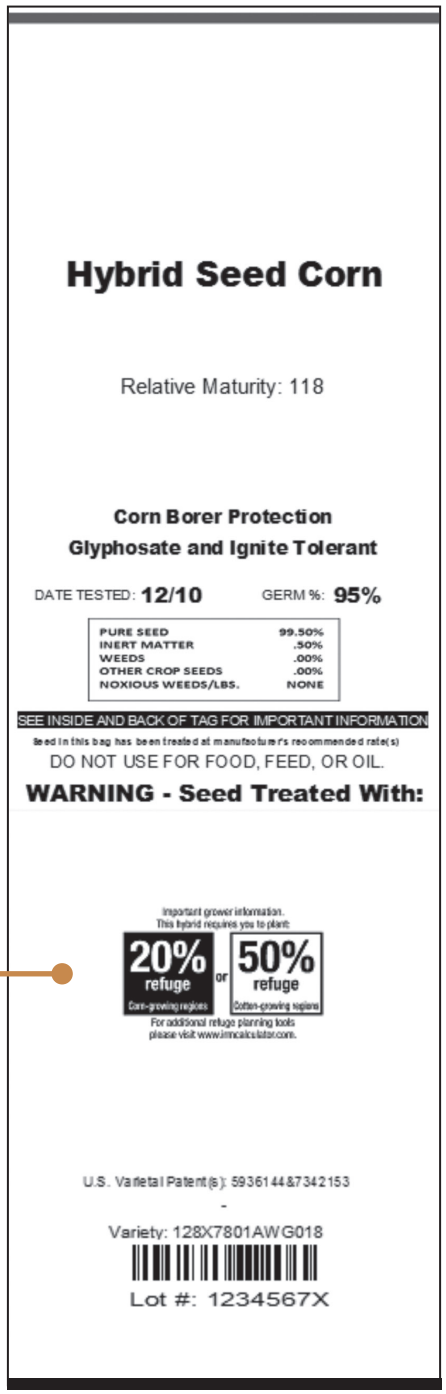
Important grower information.
This hybrid requires you to plant:

20% refuge Corn-growing regions

or

50% refuge Cotton-growing regions

For additional refuge planning tools
please visit www.irmcalculator.com.



TAKE ACTION PROGRAM AND REFUGE LOOKUP

Take Action Insect-Resistance Management is a **farmer-focused educational platform** designed to help farmers implement stewardship practices.

Take Action is an industry-wide partnership of university scientists, seed biotech companies — including Syngenta — commodity organizations and the National Corn Growers Association to **create resources and tools to help farmers plan** how to meet the minimum refuge requirements and how to implement **best management practices** on their farms.

To find out more about how you can take action, visit **iwilltakeaction.com/insects**.

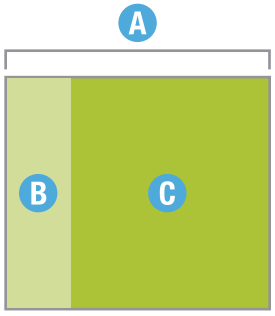
TakeACTION
Insect-Resistance Management

The Agricultural Biotechnology Stewardship Technical Committee, National Corn Growers Association and all other Take Action partners neither recommend nor discourage the implementation of any advice contained herein, and are not liable for the use or misuse of the information provided.

CALCULATING YOUR CORN REFUGE

Reminder: when calculating a refuge, the calculation must be based on total corn acres. This section outlines the right and wrong way to calculate a refuge.

Refer to this diagram for the examples provided on below.



- **A** Total Corn Acres*
- **B** Refuge Acres
- **C** *Bt* Acres
- **%** Percent of Required Refuge (Based on total corn acres)

**Includes all corn acres that are infield or adjacent to each other and will be allocated to the Bt product and its associated refuge*

THE WRONG WAY TO CALCULATE

(Example shown is for a 20% refuge product where the grower plans to plant 160 acres of Bt corn)

Do **NOT** multiply the amount of *Bt* acres or seed by the percent of refuge required.

This is **NOT** the correct minimum refuge size.

Example	C 160	X	% 20%	=	B ~~32~~

THE CORRECT WAY TO CALCULATE

(Example shown is for a 20% refuge product where the grower plans to plant 200 acres of total corn)

START with the **TOTAL** number of corn acres you want to plant in an area.

Multiply by the **PERCENT** of refuge required for the *Bt* trait.

This is your minimum **REFUGE ACRES.**

Example	A 200	X	% 20%	=	B 40
Your Field		X		=	

NEXT subtract your refuge acres from your total corn acres.

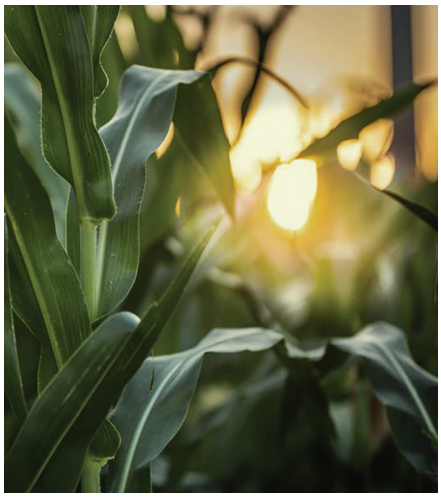
This is your maximum ***Bt* ACRES.**

Example	A 200	-	B 40	=	C 160
Your Field		-		=	

CORN ROOTWORM BEST MANAGEMENT PRACTICES

To effectively manage corn rootworm (CRW), implement a multiyear plan that includes a variety of tactics.

CROP ROTATION



PRODUCTS WITH MULTIPLE CRW BT TRAITS

SEED, SOIL OR FOLIAR-APPLIED INSECTICIDES

ASSESS RISK

- Did you plant the same CRW traits for consecutive years in the same fields?
- Did you notice large populations of CRW beetles?
- Did you observe root injury from CRW larvae?
- Are your fields planted to continuous corn?

CORN ROOTWORM BEST MANAGEMENT PRACTICES

1. PLANT THE REQUIRED REFUGE

2. ROTATE CROPS

Rotate at least every third year if any of the following apply:

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

Corn rootworm management options may be needed the year following corn in areas where northern CRW extended diapause or western CRW variant are present.

3. ROTATE TRAITS

Use *Bt* hybrids with multiple modes of action for CRW control whenever possible.

If using a hybrid with multiple modes of action for CRW control is not an option, rotate to a different *Bt*-traited hybrid that controls CRW.

Use a non-*Bt*-traited hybrid with insecticide.

MANAGE CRW WITH INSECTICIDES

Adult CRW Management Considerations

Scout fields for CRW adults during silking stage (typically July and August) as adult CRW beetles feed on corn silks and may reduce yield.

Foliar sprays may be an option if CRW beetle populations reach an economic threshold for damage (~1 beetle per plant).[1]

Follow university extension service or local crop consultant recommendations for products, rates and proper timing of adult spray applications for reducing CRW beetle populations.

Multiple sprays may be necessary.

Larval CRW Management Considerations

The application of an insecticide to the soil surface, in furrows, and/or incorporated into the soil (referred to as “soil-applied insecticide,” “soil insecticide” or “SAI”) is not recommended for control of CRW in *Bt*-traited corn hybrids except under limited circumstances.

Consult with extension, consultants or other local experts for recommendations when considering a combination of CRW traits and soil-applied insecticides.

SAIs should not be necessary for CRW control with pyramided CRW-traited *Bt* corn hybrids.

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

FURTHER ASSISTANCE

Stewardship Information
www.syngentastewardship.com

Stewardship Support and IRM Tips Line
1-877-GRO-CORN (1-877-476-2676)

Stewardship Support
syngenta.stewardship@syngenta.com

Regulatory and Market Status of Agricultural Biotechnology Products
www.biotradestatus.com

Take Action Education Platform
www.IWillTakeAction.com

Agreement Submission
GLG@KonnerthConsulting.com

Agrisure® Above Agrisure® Total Artesian® Duracade® Durastak® DuracadeViptera® DuracadeViptera® Z3 DurastakViptera® Viptera® Viptera® Z3

LIBERTY LINK® YieldGard VT PRO®