

Structured insect refuge overview - corn belt

Management of above and below ground pests using corn products that contain specific *Bacillus thuringiensis* (*B.t.*) technologies requires the use of a refuge consisting of corn products that DO NOT contain *B.t.* technologies. Corn products that contain refuge within the bag (RIB Complete® corn blend products) already contain the non-*B.t.* technology corn products mixed at the appropriate ratio in the seed bag. If RIB Complete corn blend products are not available, the producer must plant the appropriate structured refuge.

// What products from Bayer require a structured refuge?

Any corn product that does not contain a RIB Complete® corn blend requires a structured refuge, including SmartStax® corn, SmartStax® PRO Technology corn, VT Triple PRO® corn, Trecepta® corn, and VT Double PRO® corn.

// What is the required size of the structured refuge?

In the Corn Growing Region, SmartStax corn, SmartStax PRO Technology corn, VT Double PRO corn, and Trecepta corn all require a 5% structured refuge while VT Triple PRO corn requires a 20% structured refuge. This means that a non-*B.t.* technology corn product must be planted in a separate block and must not contain any corn products containing *B.t.* corn technologies. Depending on the specific *B.t.* technologies in the corn product, there are three options for developing a structured refuge: it can be within the field, adjacent to the field, or located within a ½ mile of the field containing the *B.t.* technologies (Figure 1). The ½ mile option only applies to corn products that DO NOT have rootworm protection, such as VT Double PRO corn and Trecepta corn. Products that have corn rootworm protection, such as SmartStax corn, SmartStax PRO Technology, and VT Triple PRO corn, must have their structured refuge be within or adjacent to the field (no ½ mile option).

For example, if a 200-acre field is to be planted to SmartStax corn, SmartStax PRO Technology corn, VT Double PRO corn, or Trecepta corn product, only 190 acres of the field needs to be planted to corn products containing those technologies with 10 acres planted to a corn product that does not contain any *B.t.* corn technologies either within the field or within ½ mile depending on the trait package (Figure 2). If the field is to be planted to VT Triple PRO corn product, 160 acres of the field needs to be planted to the corn products containing that product with 40 acres planted to a corn product that does not contain any *B.t.* corn technologies.

// What are the requirements for the refuge?

- Grower mixing of non-*B.t.* seed with *B.t.* corn seed is not permitted. However, non-*B.t.* seed can be included in an EPA approved seed blend product (e.g., RIB Complete® corn blend) if provided by a qualified seed producer/conditioner licensed by Bayer.
- Plant the structured refuge at the same time as the *B.t.* corn seed to help ensure that plant development is similar among products.
- To avoid inadvertent mixing of seed in the planting process, the grower must be sure to clean all seed out of hoppers when switching from non-*B.t.* seed to *B.t.* corn seed or vice versa.

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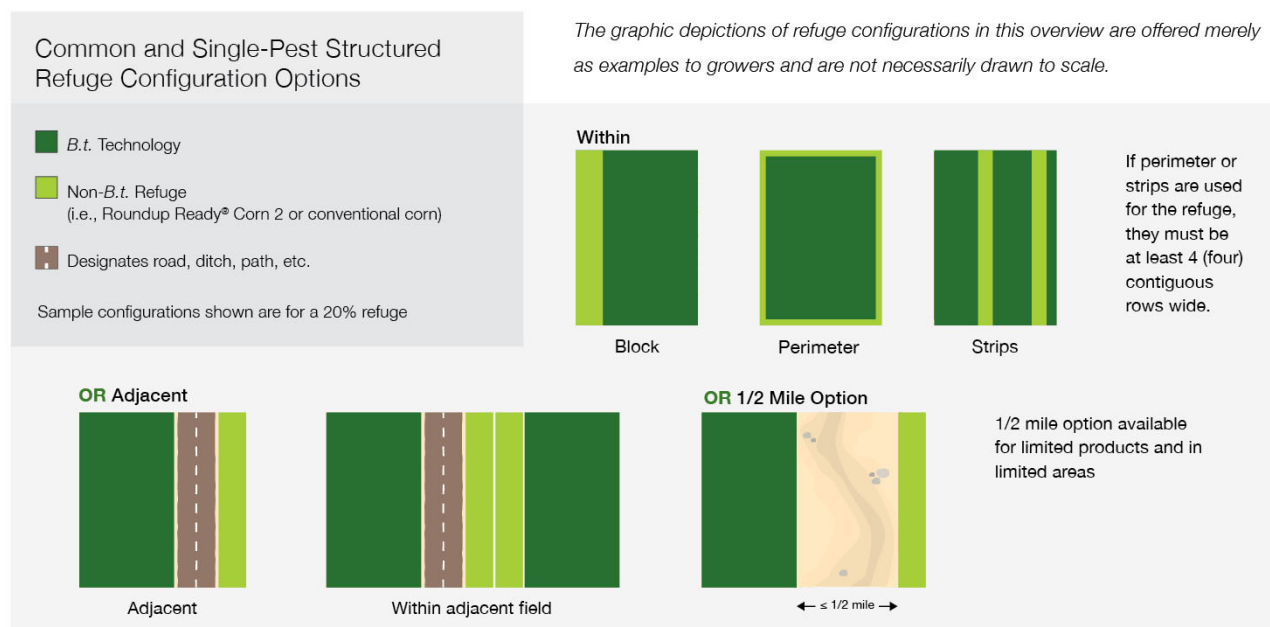


Figure 1. In the Corn Growing Area where a structured refuge is required. The 1/2 mile option only applies to corn products that DO NOT have rootworm protection, such as VT Double PRO and Trecepta. Products that have CRW protection, such as SmartStax, SmartStax PRO, and VT Triple PRO, must have their structured refuge be within or adjacent to the field (no 1/2 mile option).



Refer to this diagram for the example below.

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

As part of our commitment to enhancing grower productivity and profitability, growers can access an IRM corn refuge look-up tool at iwilltakeaction.com/refuge-lookup.

Example below is for a 20% refuge product.

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

Multiply by the **PERCENT** of refuge required for the B.t. trait.

This is your minimum **REFUGE ACRES**.

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

Your Field x =

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

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

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

Your Field - =

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

Figure 2. How to calculate a separate structured refuge.

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- Adjacent and separate refuge fields must be planted and managed by the same grower.
- If *B.t.* corn seeds are planted on rotated ground, then the corn refuge can be planted on either continuous corn ground or on rotated ground.
- If *B.t.* corn seeds are planted on continuous corn ground, then the corn refuge also must be planted on continuous corn ground.

// Can the non-*B.t.* technology corn refuge be protected against insect injury?

Yes, but options are dependent on what *B.t.* technologies are used.

For SmartStax® Corn Products

The refuge can be protected from lepidopteran (caterpillar) pests by use of non-*B.t.* insecticides if the population of one or more target lepidopteran pests in the refuge exceeds economic thresholds. The refuge can also be protected from corn rootworm damage by an appropriate seed treatment or soil insecticide; but insecticides labeled for adult corn rootworm control must be avoided in the refuge during the period of corn rootworm adult emergence. If insecticides are applied to the refuge for control of corn rootworm adults, the same treatment must also be applied in the same time frame to the SmartStax® corn or SmartStax PRO® Technology corn. Consult local professionals (crop consultants, extension specialists) for information on thresholds.

For Trecepta® Corn and VT Double PRO® Corn Products

The refuge can be treated with a non-*B.t.* foliar-applied insecticide for control of lepidopteran pests (e.g., corn borer), if pest pressure reaches an economic threshold for damage. Microbial *B.t.* insecticides must not be applied to the refuge corn. Consult local professionals (crop consultants, extension specialists) for information on thresholds.

For VT Triple Pro® Corn Products

The refuge can be treated with a soil-applied or seed-applied insecticide to control corn rootworm larvae and other soil pests. The refuge can also be treated with a non-*B.t.* foliar applied insecticide for control of late-season pests (e.g., corn borer), if pest pressure reaches an economic threshold for damage. However, if corn rootworm adults are present at the time of foliar application, then the VT Triple PRO® corn field must be treated in a similar manner. Consult local professionals (crop consultants, extension specialists) for information on thresholds.

Legal Statements

Bayer is a member of Excellence Through Stewardship® (ETS). Bayer products are commercialized in accordance with ETS Product Launch Stewardship Guidance, and in compliance with Bayer's Policy for Commercialization of Biotechnology-Derived Plant Products in Commodity Crops. Commercialized products have been approved for import into key export markets with functioning regulatory systems. Any crop or material produced from this product can only be exported to, or used, processed or sold in countries where all necessary regulatory approvals have been granted. It is a violation of national and international law to move material containing biotech traits across boundaries into nations where import is not permitted. Growers should talk to their grain handler or product purchaser to confirm their buying position for this product. Excellence Through Stewardship® is a registered trademark of Excellence Through Stewardship.

ALWAYS READ AND FOLLOW PESTICIDE LABEL DIRECTIONS. *B.t.* products may not yet be registered in all states. Check with your seed brand representative for the registration status in your state.

SmartStax® PRO corn products will be commercially available for the 2022 growing season.

IMPORTANT IRM INFORMATION: RIB Complete® corn blend products do not require the planting of a structured refuge except in the Cotton-Growing Area where corn earworm is a significant pest. See the IRM/Grower Guide for additional information. Always read and follow IRM requirements.

Performance may vary, from location to location and from year to year, as local growing, soil and weather conditions may vary. Growers should evaluate data from multiple locations and years whenever possible and should consider the impacts of these conditions on the grower's fields.

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

