

2010 HERCULEX® XTRA (HXX) PRODUCT USE GUIDE

INSECT RESISTANCE MANAGEMENT (IRM) REQUIREMENTS

IMPORTANT: READ PRIOR TO PLANTING!

WHAT IS HERCULEX® XTRA TECHNOLOGY? Pioneer® brand hybrids that contain Herculex XTRA (HXX) have two insect protection traits: the Herculex I (HX1) trait and the Herculex RW (HXRW) trait. Hybrids that contain HXX traits provide protection against European corn borer, southwestern corn borer, black cutworm, fall armyworm, western bean cutworm, lesser corn stalk borer, southern corn stalk borer, and sugarcane borer; suppresses corn earworm; and also provide protection from larval injury caused by western corn rootworm, northern corn rootworm and Mexican corn rootworms.



NOTE: YOU MUST HAVE A SIGNED PIONEER TECHNOLOGY AGREEMENT ON FILE AND AGREE TO ITS TERMS IN ORDER TO USE PIONEER HYBRIDS WITH THE HXX TRAITS.

IMPORTANCE OF INSECT RESISTANCE MANAGEMENT (IRM) — Properly managing hybrids with the HXX traits is important to preserving their effectiveness and value in the future. Preserving this technology, as well as other corn borer and corn rootworm protection technologies, places individual responsibility on everyone in the seed distribution system, from the seed supplier to the grower planting the seed. This Product Use Guide contains important information on how to implement a proper IRM plan. If you have questions after reviewing this document or if you wish to register a tip or complaint about a grower who may not be following the IRM refuge requirements, please contact your Pioneer sales professional or call toll-free 1-800-323-6103.

WHAT IS A REFUGE? Depending on whether it is a common or separate refuge, a refuge for HXX is a block or strip of corn that does not contain a Bt trait that controls corn borer and/or corn rootworm. The primary purpose of a refuge is to maintain a population of corn borer and corn rootworm larvae that is susceptible to the Bt proteins contained in hybrids with the HXX traits. Potentially resistant insects emerging from fields with the HXX traits can mate with susceptible insects from the refuge, resulting in offspring that are susceptible to hybrids with the HXX traits. **Planting a proper refuge is an IRM requirement and is mandated by the Environmental Protection Agency (EPA).**

HXX REFUGE OPTIONS

- **Common Refuge for HXX** — a common refuge is designed to address both corn borers and corn rootworms. The HX1 and HXRW traits in HXX are managed as one component for refuge purposes. The common refuge must be planted with corn hybrids that do not contain Bt genes for the control of corn borers or corn rootworms. This option is the simplest and easiest to implement.
- **Separate Refuges for HXX** — a separate refuge is designed to work independently for each insect (i.e., corn borers and corn rootworms). The HX1 and HXRW components in HXX are managed separately for refuge purposes. This option offers more flexibility than the common refuge.

IRM REQUIREMENTS — IRM programs for HXX have four main requirements outlined in detail below. These requirements address (1) the management of the refuge, (2) the amount of refuge, (3) the required proximity of hybrids with HXX traits to the refuge, and (4) the use of insecticides in the refuge. Growers who plant hybrids with HXX traits are contractually obligated to follow these IRM requirements. Failure to do so may result in the grower losing the right to purchase these hybrids for at least one year. In addition, as a condition of registration, seed companies are required by the EPA to conduct IRM compliance assessments with growers during each growing season.

IRM REFUGE REQUIREMENTS

REFUGE MANAGEMENT

Applies to Both Common and Separate Refuges:

- Plant a refuge for every field where hybrids with the HXX traits are planted.
- Plant the refuge hybrid(s) at the same time, or as close as possible to the same time, as the hybrid(s) with the HXX traits.
- Manage refuge hybrid(s) and hybrid(s) with the HXX traits in a similar fashion.
- If the rootworm refuge is planted on rotated ground, then the corn with the HXX traits must also be planted on rotated ground.
- If the rootworm refuge is planted on continuous corn ground, the corn with the HXX traits may be planted on either continuous corn ground or rotated ground. It is also recommended that growers planting continuous corn plant the refuge in the same location each year.
- Mixing refuge seed with HXX seed is not permitted.
- Practice Integrated Pest Management (IPM) to preserve the natural enemies of corn borer, corn rootworm and other insect pests. Natural predators such as ground beetles and ants can help reduce corn rootworm larvae populations. HXX technology aids IPM because it affects only target insects and allows beneficial insects to thrive.
- Growers should monitor their fields planted to hybrids with the HXX traits and contact their Pioneer sales professional if performance problems are observed.

COMMON REFUGE

SEPARATE REFUGE

REFUGE PERCENTAGE Non-Cotton Growing Areas

On each farm, plant up to 80 percent of your corn acres with hybrids that contain the HXX traits. Plant a minimum of 20 percent of your corn acres to a common refuge with hybrids that do not contain Bt traits for control of corn borer and corn rootworm.

For corn borers — On each farm, plant up to 80 percent of your corn acres with hybrids that contain Bt protection for corn borer such as the HXX or HX1 traits. Plant a minimum of 20 percent of your corn acres to a corn borer refuge that does not contain a Bt trait for control of corn borer.

For corn rootworms — On each farm, plant up to 80 percent of your corn acres with hybrids that contain Bt protection for corn rootworm such as the HXX or HXRW traits. Plant at least 20 percent of your corn acres to a corn rootworm refuge that does not contain a Bt trait for control of corn rootworm.

REFUGE PERCENTAGE Southern Corn/Cotton Growing Areas

On each farm, plant up to 50 percent of your corn acres with hybrids that contain the HXX traits. Plant a minimum of 50 percent of your corn acres to a common refuge with hybrids that do not contain Bt traits for control of corn borer and corn rootworm. Cotton-growing regions with the 50 percent refuge requirement include the counties listed below:

For corn borers — On each farm, plant up to 50 percent of your corn acres with hybrids that contain Bt protection for corn borer such as the HXX or HX1 traits. Plant a minimum of 50 percent of your corn acres to a corn borer refuge that does not contain a Bt trait for control of corn borer. Cotton-growing regions with the 50 percent refuge requirement include the counties listed below.

For corn rootworms — On each farm, plant up to 80 percent of your corn acres with hybrids that contain Bt protection for corn rootworm such as the HXX or HXRW traits (can only plant a maximum of 50 percent HXX). Plant at least 20 percent of your corn acres to a corn rootworm refuge that does not contain a Bt trait for control of corn rootworm.

Southern Corn/Cotton Growing Counties

Alabama <i>All Counties</i>	Mississippi <i>All Counties</i>	Oklahoma <i>Counties of:</i> Beckham Caddo Comanche Custer Greer Harmon Jackson Kay Kiowa	Tillman Washita	Franklin Gibson Hardeman Hardin Haywood Lake Lauderdale Lincoln Madison Obion Rutherford	Shelby Tipton	Moore Ochiltree Roberts Sherman	Southampton Suffolk City Surry Sussex
Arkansas <i>All Counties</i>	Missouri <i>Counties of:</i> Dunklin New Madrid Pemiscot Scott Stoddard		South Carolina <i>All Counties</i>		Texas <i>All Counties</i> <i>Except:</i> Carson Dallam Hansford Hartley Hutchinson Lipscomb		
Florida <i>All Counties</i>			Tennessee <i>Counties of:</i> Carroll Chester Crockett Dyer Fayette			Virginia <i>Counties of:</i> Dinwiddie Franklin City Greensville Isle of Wight Northampton	
Georgia <i>All Counties</i>							
Louisiana <i>All Counties</i>	North Carolina <i>All Counties</i>						

DISTANCE REQUIREMENT (see graphics on following page)

Plant the refuge within or adjacent to fields containing hybrids with HXX traits. The common refuge can be separated by a ditch or a road but not by another field. The refuge must be owned or managed by the same grower. A neighbor's field cannot be used as the refuge.

For corn borers — Plant the corn borer refuge within, adjacent to, or near the fields that contain hybrids with Bt corn borer protection such as the HXX or HX1 traits. The corn borer refuge must be placed within 1/2 mile of these fields. The refuge must be owned or managed by the same grower. A neighbor's field cannot be used as the refuge.

For corn rootworms — Plant the corn rootworm refuge within or adjacent to fields that contain hybrids with Bt corn rootworm protection such as the HXX or HXRW traits. The corn refuge can be separated by a ditch or a road but not by another field. The refuge must be owned or managed by the same grower. A neighbor's field cannot be used as the refuge.

INSECTICIDE USE

The common refuge can be treated for corn rootworm larvae and other soil pests with soil-applied, seed-applied or foliar-applied insecticides. The refuge can also be treated with a non-Bt foliar insecticide to control pests (such as corn borer) if pest pressure reaches an economic threshold for damage. Pests other than adult corn rootworms can be treated on the combined refuge acres, without treating the HXX acres, only if treatment occurs when adult corn rootworms are not present or if a pesticide without activity against adult corn rootworms is used. If aerial insecticides are applied to the combined refuge for control of corn rootworm adults, the same treatment must also be applied in the same timeframe to HXX acres. Pests on the HXX acres can be treated as needed without having to treat the common refuge.

For corn borers — The corn borer refuge can be treated with a soil-applied, seed-applied, or foliar-applied insecticide for corn rootworm larval control. The corn borer refuge can be protected from corn rootworm damage by planting a hybrid with corn rootworm protection technology (such as HXRW). The refuge can also be treated with a non-Bt foliar insecticide to control pests such as corn borer, if pest pressure reaches an economic threshold for damage. Under this option, the HXX area of the field does not have to be treated in a similar manner.

For corn rootworms — The corn rootworm refuge can be treated with a soil-applied, seed-applied, or foliar-applied insecticide for corn rootworm larval control. The corn rootworm refuge can be protected from corn borer damage by planting a hybrid with corn borer protection technology (such as HX1). Pests other than adult corn rootworms can be treated on the rootworm refuge acres, without treating the HXX acres, only if treatment occurs when adult corn rootworms are not present or if a pesticide without activity against adult corn rootworms is used. If aerial insecticides are applied to the rootworm refuge for control of CRW adults, the same treatment must also be applied in the same timeframe to HXX acres. Pests on the HXX acres can be treated as needed without having to treat the rootworm refuge.

COMMON REFUGE

SEPARATE REFUGE

REFUGE DESIGN

Refuge Configuration Options (see graphics below)

The refuge on each farm may be arranged in a number of different configurations that allow growers to easily incorporate an effective common refuge into their farm operations.

- Plant the refuge within or adjacent to each field containing hybrids with the HXX traits.
- Plant the refuge as strips or blocks within the field containing hybrids with the HXX traits.
- Split the planter to alternate at least four consecutive rows of refuge hybrids with hybrids that contain the HXX traits.
- Plant field perimeters or end rows, at least four rows wide, to a refuge.

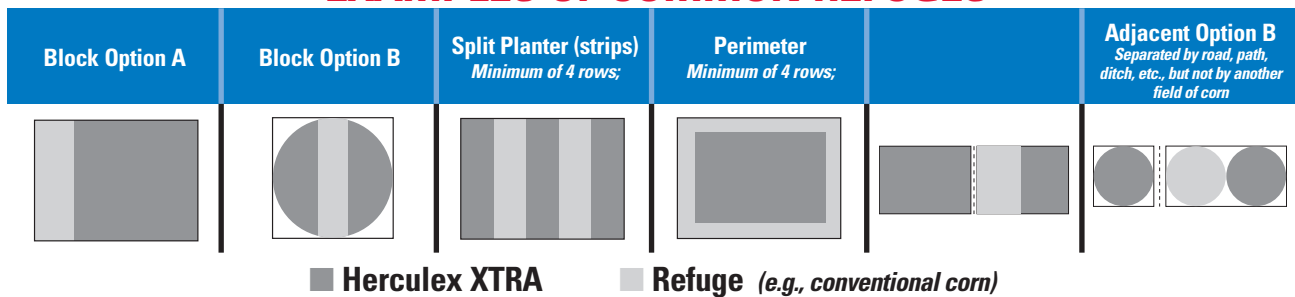
For corn borers — The corn borer refuge on each farm may be arranged in a number of configurations that allow the grower to easily incorporate an effective corn refuge into farm operations. Options include:

- Plant the refuge field within ½ mile of each field containing hybrids with Bt corn borer protection such as HXX or HX1 insect protection.
- Plant the refuge as strips or blocks within the field containing hybrids with Bt corn borer protection.
- Split the planter to alternate at least four consecutive rows of refuge hybrids with hybrids containing Bt corn borer protection.
- Plant field perimeters or end rows, at least four rows wide, to a refuge.

For corn rootworms — The corn rootworm refuge on each farm may be arranged in a number of configurations that allow the grower to easily incorporate an effective corn refuge into farm operations. Options include:

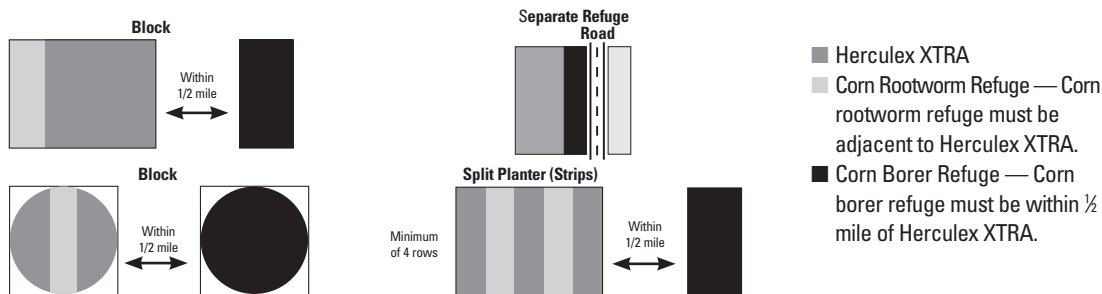
- Plant the refuge within or adjacent to each field containing hybrids with Bt corn rootworm protection such as HXX or HXRW insect protection.
- Plant the refuge as strips or blocks within the field containing hybrids with Bt corn rootworm protection.
- Split the planter to alternate at least four consecutive rows of refuge hybrids with hybrids containing the HXX traits.
- Plant field perimeters or end rows, at least four rows wide, to a refuge.

EXAMPLES OF COMMON REFUGES



EXAMPLES OF SEPARATE REFUGE CONFIGURATIONS

Assumes a Bt corn borer protected hybrid is planted as the corn rootworm refuge (light shade) within field or adjacent.



SALES AND PLANTING RESTRICTIONS

CALIFORNIA RESTRICTION: The planting of hybrids with the HXX traits is prohibited in certain California counties. Contact your Pioneer Sales Professional for additional details.

PUERTO RICO RESTRICTION: The sales, distribution, and planting of hybrids with the HXX trait is prohibited in Puerto Rico.

READ THE HERCULEX XTRA PRODUCT USE GUIDE PRIOR TO PLANTING.

EPA Registration Number: 29964-5

Active ingredients: *Bacillus thuringiensis* CryIF delta endotoxin, *Bacillus thuringiensis* Cry34Ab1 and Cry35Ab1 delta endotoxins and the genetic materials necessary for their production in corn.

This product provides protection against European corn borer (*Ostrinia nubilalis*), southwestern corn borer (*Diatraea grandiosella*), black cutworm (*Agrotis ipsilon*), fall armyworm (*Spodoptera frugiperda*), western bean cutworm (*Striacosta albicosta*), sugarcane borer (*Diatraea saccharalis*), lesser corn stalk borer (*Elasmopalpus lignosellus*), southern corn stalk borer (*Diatraea crambidoides*), western corn rootworm (*Diabrotica viginifera*), northern corn rootworm (*Diabrotica barberi*), Mexican corn rootworm (*Diabrotica virgifera zea*), and suppresses corn earworm (*Helicoverpa zea*). Routine applications of insecticides to control the larval stages of these insects are usually unnecessary when corn containing Herculex XTRA insect protection is planted.

EXPORT APPROVAL NOTICE

Although fully approved in the United States, Canada and Japan, grain and certain grain by-products from THESE HYBRIDS MAY NOT BE APPROVED for all markets. Pioneer customers are advised to discuss trait acceptance policies with their local grain handler prior to delivering grain containing biotech traits.

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To protect the usefulness and availability of these technologies for the future, growers must implement an Insect Resistance Management (IRM) program as specified in product use guides for the following traits available in Pioneer corn hybrids: Herculex® I, Herculex RW, Herculex XTRA and YieldGard® Corn Borer. For detailed IRM requirements for hybrids with in-plant insect resistance, refer to the appropriate product use guide, available from your Pioneer sales professional or on the web at: www.pioneer.com/IRM.

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