

CORN WITH Bt TRAITS

Corn with Bt genes for corn borer and/or corn rootworm protection help corn growers protect their crops from corn insect pests. Bt corn products allow corn growers to produce higher yields with better quality grain in an environmentally friendly way.

Pioneer offers several types of corn hybrids with Bt traits:

- **For corn borer control** – Hybrids with the Herculex® I (HX1) or YieldGard® Corn Borer (YGCB) trait
- **For corn rootworm control** – Hybrids with the Herculex® RW (HXRW) trait
- **Controlling corn borer and corn rootworm within the same plant** – Hybrids with **stacked** Bt traits of HX1 and HXRW (called Herculex® XTRA[^] or HXX)

INSECT RESISTANCE MANAGEMENT (IRM)

As a condition of growing Bt corn products, growers must implement an Insect Resistance Management (IRM) program designed to preserve the many benefits of these technologies.

Compliance with IRM requirements is a legal and stewardship obligation critical to maintaining the longevity and effectiveness of corn borer and corn rootworm resistant Bt products.

In addition, the EPA requires that registrants of corn borer and corn rootworm resistant Bt seed products assess compliance with IRM requirements as part of a comprehensive Compliance Assurance Program (CAP). The CAP also stipulates a series of actions to correct non-compliance, including notification, follow-up assessments, and ultimately, in cases of repeat violations, loss of access to Bt corn products for at least one year.

IRM REQUIREMENTS

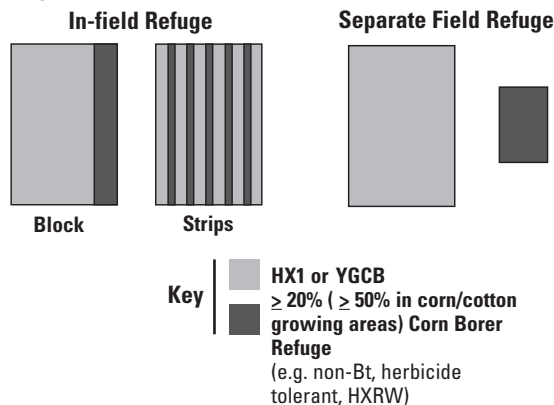
FOR ALL TECHNOLOGIES:

- Plant a refuge. A refuge is a field, block or strip of corn that, depending on the technology, does not contain a Bt trait for controlling corn borers, corn rootworms, or does not contain either of the Bt traits
- Select Bt trait and refuge hybrids with similar growth and development characteristics
- Manage the refuge similar to the way hybrids with Bt insect protection are managed
- A neighbor's corn field can not be used as your refuge
- Seed mixtures are not permitted
- See the specific Bt trait Product Use Guide for complete details

CORN BORER (HX1 or YGCB) REFUGE:

- Refuge must be at least 20% (50% in corn/cotton growing areas) and must be planted within 1/2 mile of the Bt corn borer resistant hybrid and preferably within 1/4 mile
- Refuge block or strips must be ≥ 4 rows
- Refuge hybrid must not express a Bt protein active against corn borer
- Refuge may be treated with a non-Bt insecticide only if the economic threshold for targeted pests have been reached

Examples:

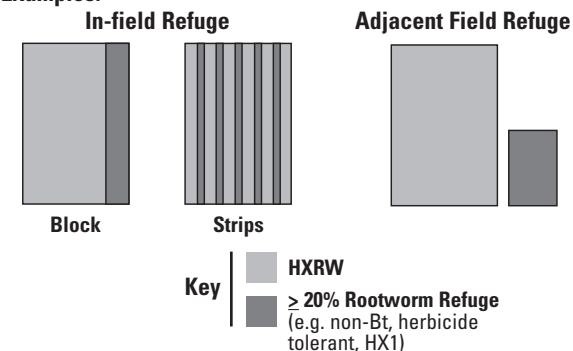


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CORN ROOTWORM (HXRW) REFUGE:

- Refuge must be at least 20% and must be planted in-field or adjacent to the Bt corn rootworm hybrid
- Refuge block or strips must be ≥ 4 rows
- Refuge hybrids must not express a Bt protein active against corn rootworm
- Refuge may be treated with soil insecticides or seed treatments; foliar insecticide use is restricted

Examples:

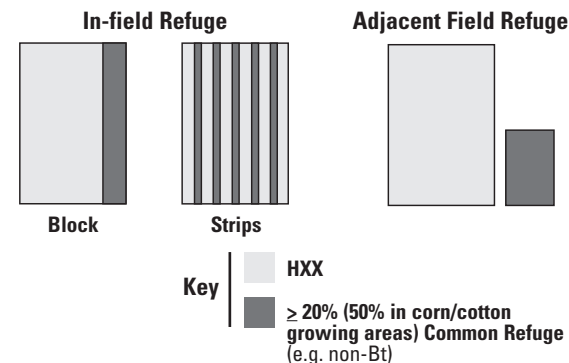


STACKED TRAIT (HXX) COMMON REFUGE:

A **common refuge** is designed to address both corn borers and corn rootworms with one refuge:

- Plant at least a 20% (50% in corn/cotton growing areas) refuge in-field or adjacent to the stacked trait field
- Refuge block or strips must be ≥ 4 rows
- Refuge hybrids must not express a Bt protein active against either corn rootworm or corn borer
- Refuge may be treated with soil insecticide or seed treatments; foliar insecticide use is restricted

Examples:



IRM REQUIREMENTS

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STACKED TRAIT (HXX) SEPARATE REFUGE:

A **separate refuge** is designed to work independently for each insect, thus a refuge exists for corn borers and another refuge exists for corn rootworms:

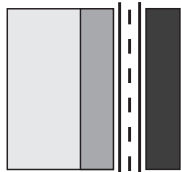
- Plant at least a 20% corn rootworm refuge in-field or adjacent to the stacked trait field
- Refuge block or strips must be ≥ 4 rows
- Refuge hybrids must not express a Bt protein active against corn rootworm
- Refuge may be treated with soil insecticides or seed treatments; foliar insecticide use is restricted

And:

- Plant at least a 20% (50% in corn/cotton growing areas) corn borer refuge within 1/2 mile, and preferably within 1/4 mile, of the stacked trait field
- Refuge block or strips must be ≥ 4 rows
- Refuge hybrids must not express a Bt protein active against corn borer
- Refuge may be treated with a non-Bt insecticide only if the economic threshold for targeted pests have been reached

Examples:

Separate Refuge Road



Key

- Herculex XTRA
- $\geq 20\%$ CRW Refuge (e.g. HX1)
- $\geq 20\%$ ($\geq 50\%$ in corn/cotton growing areas) CB Refuge (e.g. HXRW)

IRM COMPLIANCE CONCERNS

If you wish to register a tip or complaint about a grower who may not be following the IRM refuge requirements, or if you have any questions or concerns about complying with IRM requirements on your farm, please call 1-800-348-1827 or contact your Pioneer Sales Professional.



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HX1 = Contains the Herculex® I gene.
HXRW = Contains the Herculex® RW Rootworm gene.
HXX (Herculex® XTRA) = Contains both the Herculex® I and the Herculex® RW Rootworm genes.

Herculex® insect protection technology by Dow AgroSciences and Pioneer Hi-Bred.

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YGCB = Contains the YieldGard® Corn Borer gene.

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IRM SUMMARY

Growers who plant Bt corn borer and corn rootworm resistant hybrids are contractually obligated to follow the IRM requirements. Preserving the technology requires responsible action by everyone in the seed distribution system, from the seed supplier to the grower planting the seed.



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INSECT RESISTANCE MANAGEMENT FOR Bt CORN BORER AND CORN ROOTWORM RESISTANT PRODUCTS



Planting Refuges, Preserving Technology



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