

## Corn IRM - The Importance of Planting a Refuge

A corn refuge is the key component of an Insect Resistance Management (IRM) plan. Proper implementation of an IRM plan is important and mandatory with corn products that contain *B.t.* (*Bacillus thuringiensis*) technology or insect protection traits. Grower compliance is critical to the success of an IRM plan, and new requirements will be incorporated in refuge assurance programs for the 2011 growing season.

### Importance of IRM and a Corn Refuge

The purpose of an IRM plan is to preserve the benefits and insect protection of corn products that contain *B.t.* technology (*B.t.* corn). All *B.t.* corn products require planting a refuge as part of an IRM plan. A refuge is a block or strip of corn planted near a *B.t.* corn product that does not contain the same *B.t.* technology. The reason for planting a refuge is to maintain a population of *B.t.* susceptible insects that are not exposed to the *B.t.* protein or toxin. The lack of exposure to *B.t.* proteins allows susceptible insects that are 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 reduce selection pressure on the insect and preserve the effectiveness of the technologies.

Following the approved refuge plan for each type of *B.t.* corn technology is the only strategy to prevent pest resistance. Using refuges with *B.t.* corn is a requirement and benefits all growers directly. It helps to preserve the long-term effectiveness of *B.t.* technologies. Adherence to refuge requirements gives growers continued access to the technology, and is also important for the commercialization of next generation biotech traits. Given the benefits of *B.t.* corn products, growers and trait providers have a responsibility to ensure proper stewardship to keep the technology viable and on the market.

### Refuge Compliance Requirements

Growers now have more *B.t.* corn product choices offering unique IRM requirements, which can add complexity to refuge planting. Compliance means correctly meeting all of the refuge requirements, which can vary by product. Always planting the refuge in the same field or in a field adjacent to the *B.t.* corn product field can simplify refuge planting options.

In an effort to improve *B.t.* corn refuge compliance, the EPA (U.S. Environmental Protection Agency) mandated new requirements as part of the *B.t.* corn re-registration process.

Seed providers incorporated the new requirements into their Compliance Assurance Programs for the 2011 growing season. The new requirements are as follows:

- It is now mandated that all technology providers use an independent third party to conduct on-farm refuge compliance assessments, no longer having the option of doing the assessment internally. Assessments will focus on areas of highest risk of insect pest resistance development, and on growers who did not buy sufficient refuge seed for the amount of *B.t.* corn grown. However, assessments will still be conducted in areas not considered to be high risk or high-pressure insect areas.
- Grower compliance will be checked more frequently by the *B.t.* corn providers. Growers found to be out of compliance with the refuge requirements now have a higher probability of losing access to *B.t.* corn if compliance is not established and maintained.
- Seed bag tags will better depict refuge size requirements. It will now be more of a standardized tag, and should be much easier for growers to understand what refuge requirements there are for a particular *B.t.* corn product.

Growers planting *B.t.* corn need to develop an IRM plan for their farm, and keep good records for compliance purposes. The National Corn Growers Association (NCGA) recently launched a new IRM calculator to help growers plan how to meet the minimum refuge requirements for each of the *B.t.* corn products. The IRM calculator can be used to help clarify refuge system options and show growers how to execute the requirements properly. The calculator can be downloaded at [www.irmcalculator.com](http://www.irmcalculator.com).

**Source:** *New requirements aim to improve Bt corn refuge compliance. 2/7/2011. National Corn Growers Association. <http://www.ncga.com>*

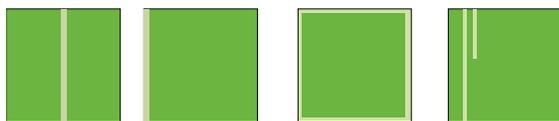
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## Quick Compliance Guidelines

- Plant required refuge within each field that contains *B.t.* insect-protected corn. There are other options, but an in-field refuge is always accepted.

Within



Block Perimeter Strips

Adjacent



Adjacent within Adjacent field

- In each field, plant your refuge first before planting any insect-protected corn. This will ensure that the minimum refuge size requirement is met should unforeseen circumstances (i.e. adverse weather) alter your planting schedule and strategy. To ensure effectiveness, the refuge and insect-protected corn should be planted at about the same time and have similar maturity.
- Plant the correct size refuge for the area and corn product.
  - Corn-growing areas
    - 20% required for most *B.t.* insect-protected corn products (Genuity® VT Triple PRO™, YieldGard VT Triple®, YieldGard® Corn Borer)
    - 5% only for Genuity® SmartStax® and Genuity® VT Double PRO™
  - Cotton-growing areas
    - 50% required for most *B.t.* insect-protected corn products (YieldGard VT Triple® and YieldGard® Corn Borer)
    - 20% only for Genuity® SmartStax®, Genuity® VT Triple PRO™ and Genuity® VT Double PRO™
- Refuge should always be a minimum of four rows wide. A refuge less than four rows would be out of compliance with the product registration.
- Use a refuge product that contains no *B.t.* insect-protected traits (i.e. Roundup Ready® or conventional corn are acceptable). Other options may exist, but they entail additional complexity.
- If you need to treat your refuge with a non-*B.t.* foliar insecticide, you may need to treat the *B.t.* technology in a similar manner. Grower must read the IRM/Grower Guide for complete treatment options.

The above is provided as a summary only. Growers must read the IRM/Grower Guide prior to planting for important information on planting and insect resistance management.



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.

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*B.t.* products may not yet be registered in all states. Check with your Monsanto representative for the registration status in your state.

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