

### *Product Selection for Above Ground Insect Larvae*

Insect larvae that feed on above ground corn tissue (stalks, leaves, ears) have the potential to decrease yield potential. Larvae that feed on stalks include European corn borer, southwestern corn borer, common stalk borer, and black cutworm (seedling plants). Foliage feeding larvae include European corn borer, fall armyworms, and black cutworm (seedlings). Ear feeding larvae include European corn borer, western bean cutworm, and corn earworm.

European corn borer has shown to reduce yield potential ranging from 6% loss/borer/plant in pre-tassel corn to 3% loss/borer/plant post pollination.<sup>1</sup> Weakened stalks and ear shanks from European corn borer tunneling can cause lodging and ear drop (Figures 1 and 2). More common in southern states, southwestern corn borers tunnel into the stalk and girdle corn plants near the brace roots (Figure 2).

Corn earworm larvae feed on corn silks and developing kernels in the ear. Potential yield losses can be from a combination of direct kernel damage and reduced grain quality (Figure 3). Holes in husks resulting from earworm feeding can potentially be entry points for pathogens like *Fusarium* and *Gibberella*, which can produce mycotoxins.<sup>2</sup>

Insecticides are one way to help protect plants from insect feeding; however, application timing is critical to successful management. Corn products with *Bacillus thuringiensis* (B.t.) traits that control specific Lepidopteran pests offer long-lasting plant protection against crop injury. Several B.t. protection options are available including VT Double PRO<sup>®</sup> Technology which provides dual modes of action against specific above-ground larvae and Trecepta<sup>®</sup> Technology provides three modes of action to protect against key above-ground pests. (Table 1).

VT Double PRO<sup>®</sup> Technology provides protection against corn borers (European and southwestern), fall armyworm and corn earworm. Trecepta<sup>®</sup> Technology, which includes VT Double PRO<sup>®</sup> Technology and Vip3A, provides control for corn borers (European and southwestern), fall armyworm, corn earworm, western bean cutworm, and black cutworm.



**Figure 1. Tunnels in stalks from European corn borer larval feeding.**



**Figure 2. European corn borer feeding in ear shank (left) and southwestern corn borer damage at base of corn plant (right).**



**Figure 3. Corn earworm, feeding damage, and mold.**

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**Table 1. Modes of Action Against Specific Larvae for VT Double PRO® and Trecepta® Technologies.**

	VT Double PRO® corn (Cry1A.105/Cry2Ab2)	Trecepta® corn (Cry1A.105/Cry2Ab2) + Vip3A
European corn borer	2	2
Southwestern corn borer	2	3
Corn earworm	2*	3
Fall armyworm	2	3
True armyworm	0	1
Western bean cutworm	0	1
Black cutworm	0	1
Stalk borer	2	3
Sugarcane borer	2	3

\*Cry1A.105/Cry2Ab2 from B.t. controls or suppresses corn earworm.

## Selecting Products

Corn products should be selected for a particular field based on a combination of agronomic characteristics that include disease tolerance, standability, adaptability to soil type, drought tolerance, yield potential, end use, and a trait package that helps protect yield potential. VT Double PRO® corn products and Trecepta® corn products are available to help protect corn plants from key above-ground pests; however, they do not have B.t. protection for corn rootworm (CRW). Therefore, these products should be used where CRW pressure is not a concern. In areas with CRW pressure, products with SmartStax® or SmartStax® PRO Technologies should be selected.

## Sources

<sup>1</sup>Potter, B. 2020. European corn borer in Minnesota field corn. University of Minnesota Extension. <https://extension.umn.edu/corn-pest-management/european-corn-borer-minnesota-field-corn/>.

<sup>2</sup>Tilmon, K., Paul, P., and Michel, A. 2018. Corn earworm making an unpleasant late-season appearance; watch for molds. C.O.R.N. Newsletter. 2018-32. Agronomic Crops Network. The Ohio State University Extension. <https://agcrops.osu.edu/newsletter/corn-newsletter/2018-32/corn-earworm-making-unpleasant-late-season-appearance-watch-for-molds/>.

Websites verified 9/9/22.



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.



## 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.

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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