Insect protection trait advantages with PowerCore® Enlist® corn

If your customers have planted PowerCore® Enlist® corn—or plan to this season—you're probably hearing a lot of excitement about this trait package available in top-notch genetics. And while pairing these traits with one of the deepest corn germplasm pools on the planet is most certainly a boon to growers, there are plenty of other reasons why PowerCore Enlist corn makes a smart addition to your customers' fields. In a new series of articles, *Groundwork* is taking a deeper dive into what's driving growing interest in this technology and how it can contribute to a great season as well as long-term farm management goals. In this issue, we'll start with the benefits of insect protection with PowerCore® trait technology.

Next-gen protection against above-ground pests

PowerCore Enlist corn is designed specifically to combat above-ground insect pressures with an additional mode of action against European corn borer, southwestern corn borer and fall armyworm versus VT Double PRO® corn. For some of your customers, however, VT Double PRO may be providing adequate control today and insect pressures are not a primary worry. So why bother with the additional modes of action in PowerCore Enlist corn? Clint Pilcher, Global Technical Education Team Lead at Corteva Agriscience, explains that it's about taking a longer view. "By diversifying your insect trait portfolio, you're knocking off resistant insects and giving yourself more time against pests," he says. "PowerCore traits really represent a next generation of *Bt* advancement."

First-generation *Bt* traits were developed to protect corn against stalk-boring insects. These single traits required large, structured refuges of 20-50 percent. Next-gen *Bt* traits, such as those found in PowerCore Enlist corn, provide a broader spectrum of control for protection not only against stalk borers, but black cutworm, fall armyworm and some protection against corn earworm as well, which is becoming an increasingly challenging pest. The traits are integrated in a "pyramid," which results in multiple unique *Bt* proteins in a hybrid for redundant control of the same insect pest. This increases product durability and also allows refuge to be reduced down to as little as 5-10 percent.

Pest	Efficacy
European corn borer	+++
Sugarcane borer	+++
Southwestern corn borer	+++
Stalk borer (common)	+
Corn earworm	+
Fall armyworm	++
Black cutworm	++
Western bean cutworm	-

+++ Excellent protection | ++ Good protection
+ Some protection | - No activity/not labeled

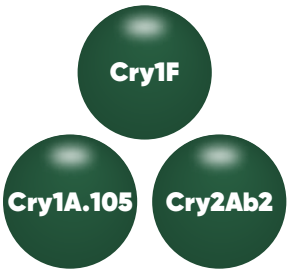
PowerCore Enlist corn provides excellent protection against stalk-boring insects and good protection against other above-ground species, including fall armyworm and black cutworm.

More above-ground MOAs, less resistance risk

Trait durability is vital when looking at long-term management of pests on the farm. PowerCore Enlist corn includes three proteins, which can generally be thought of as "modes of action": Cry1A.105, Cry2Ab, Cry1F. Some insects are showing resistance to Cry1 traits, common to many above-ground technologies. In this case, PowerCore Enlist corn brings an additional mode of action (Cry2Ab), which slows down developing resistance. Insects that might not seem problematic in the field today could evolve to become a bigger issue in the future. Farmers can proactively address this by incorporating more modes of action now.

Pyramid of traits in PowerCore Enlist corn

Pilcher also points out that the additional modes of action can be useful protection for variable insect pressures. "In some years, fall armyworm and black cutworm pressures are worse than others," he says. "For many American farmers, these are secondary pests, but when they do appear, they are picked up by the Cry1F protein." PowerCore Enlist corn also protects against pests that are problematic in specific regions, including sugarcane and southwestern corn borers.



- **Each protein offers a unique mode of action**
- **Multiple modes of action delay insect populations developing resistance to *Bt* proteins**

Trait durability is also important as we look ahead to a refuge-in-the bag version of PowerCore Enlist corn that's coming in the future. "The convenience of integrated refuge makes it hard for farmers to ever want to go back to planting block refuge," Pilcher says. "The more durable traits in PowerCore Enlist corn help maintain our ability to integrate refuge and enable the traits to still be effective."

It's all part of the package

Finally, as customers express excitement around PowerCore Enlist corn genetics, it's a good time to remember that traits and genetics work together. Pilcher says, "What do traits do? They protect those genetics and allow them to maximize production levels." With PowerCore Enlist corn, that means multiple modes of action against yield-robbing above-ground insects and highly effective weed control—a topic we'll cover in our next installment.

PowerCore® Enlist® Refuge Advanced corn will not be offered for sale or distribution until completion of field testing and applicable regulatory reviews.