

KEEPING PACE WITH Bt CORN: FROM STACKED TRAITS TO BLENDED REFUGES

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Since the release of the first Bt corn hybrids targeting rootworms in 2003-04, the technology has undergone numerous changes, including novel traits, stacking of traits with other Bt toxins and herbicide tolerance, and alterations to the refuge structure. Although Bt hybrids generally provide excellent control of larvae, there is consistent adult emergence from these plants meaning that a refuge is critical to delay resistance development. In fact, full resistance to these toxins has been generated in just a few generations of rearing Western corn rootworm in laboratory studies. Once it has developed, this resistance is fixed, meaning that the beetles will not revert to the susceptible type once that type of Bt corn is no longer planted.

Preserving the efficacy of existing Bt toxins is critical. We do not fully understand how insects survive, but they do albeit in relatively low numbers currently. The risk of resistance is real and there are several possible paths for widespread resistance to develop, including sub-lethal exposure. This type of exposure may be favored by a number of scenarios including exposure to low-toxin level plants (volunteer corn) and/or exposure to Bt hybrids late in larval life, when the larvae are able to withstand a greater dose of toxin.

Data will be presented on the risk factors that may help explain how stacking traits and altering refuge structure may affect the potential for resistance, both positively and negatively, and the best practices that producers and consultants can employ to maximize the durability of these traits will be discussed.

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