

# Corn Rootworm Damage To Bt Corn: Should We Expect More Reports Next Year?

DR. MIKE GRAY

URBANA, ILL.

**B**y now, most corn producers throughout Illinois and many areas of the Corn Belt are familiar with the paper published by an Iowa State entomologist who reported the development of field resistance to the Cry3Bb1 protein expressed in some Bt hybrids that are designed to prevent excessive damage by corn rootworm larvae. Examples of Bt hybrids that express this protein include YGRW, YieldGard Plus, YieldGard VTRW, and YieldGard VT Triple.

In August and September I also reported on fields in Henry, LaSalle, and Whiteside counties that had been planted to Bt hybrids (expressing the Cry3Bb1 protein) that had severe root pruning and lodging. More recently, I have received reports of similar damage in Carroll County. Should we expect more reports of this type of severe damage to Bt hybrids expressing this specific protein in 2012?

Overall densities of western corn rootworm adults were low to moderate throughout Illinois in 2011. Densities were greatest in northwestern Illinois, the area where most of our attention has been focused on Bt failures this past summer. However, even in this area of the state, the population of western corn rootworms was not alarmingly high. In fact, our statewide survey of western corn rootworm adults in late July and early August revealed averages of 0.64 and 0.81 beetle per plant for Lee and McLean counties, the two highest averages among the 47 counties surveyed. Densities for most counties were well below these averages.

Historically, an average of 0.75 to 1.0 beetle per plant may lead to economic levels of larvae the following season in non-Bt cornfields. Key factors that will influence the potential for larval damage next season include planting date (early planting favors larval establishment) and soil moisture during larval hatch (which occurs in late May and early June). Heavy precipitation that leads to saturated soils at the time of larval hatch will suppress establishment.

If you experienced significant root pruning (several nodes destroyed) and lodging in 2011 in a field planted to a Bt hybrid, consider the following management recommendations:

Rotate to soybeans or another nonhost crop.

- Use a corn rootworm soil insecticide at planting.

- Use a Bt hybrid that expresses a different corn rootworm Cry protein than one that may have performed poorly in your fields in 2011.

- Use a pyramided Bt hybrid that expresses multiple Cry proteins targeted against corn rootworms.

- Most importantly, consider a long-term integrated management approach that includes multiple tactics.

I believe there are some important points to make about these recommendations: An integration of these tactics is encouraged across multiple growing seasons, not all at once. Using multiple tactics should not imply that a Bt corn rootworm hybrid plus a soil insecticide should be a standard and routine practice in a single growing season. Nor does it mean that using a Bt corn rootworm hybrid in a field sprayed the previous season for western corn rootworm adults (beetle management program) should be standard and routine. A corn rootworm soil insecticide properly applied should provide acceptable root protection in most producers' fields. Similarly, a beetle management program that is professionally conducted should provide satisfactory root protection the following season. What we need to avoid is throwing everything including the kitchen sink at western corn rootworms in a single growing season: a Bt hybrid (also containing an insecticidal seed treatment), a soil insecticide at planting, and a beetle suppression program the previous summer. Not only is this approach expensive, but ultimately it may select for resistance more rapidly and lead to unwanted environmental consequences.

In October, extension entomologists Chris DiFonzo of Michigan State University and Eileen Cullen of the University of Wisconsin published a Bt trait table (Adobe PDF). It provides a good reference to the types of Bt proteins expressed by various hybrids, the insects targeted, the type of herbicide tolerance offered, and the specific refuge that can be used. With the introduction of pyramided hybrids and seed blends into the marketplace, this table should provide a nice tool for growers as the use of Bt hybrids increases-along with refuge compliance confusion. I offer my thanks to these entomologists for sharing this useful resource. Δ

*DR. MIKE GRAY: Crop Sciences Extension Coordinator, University of Illinois*