

# Injury To Bt Corn Observed: Western Corn Rootworm Adults Have Emerged

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The western corn rootworm "season" is underway at a pace earlier than I have experienced since I began studying this versatile insect as a graduate student in the late 1970s. In response to a request by a seed industry representative, I traveled

to western Cass County on June 7 to verify a report of severe injury to Bt corn that expresses the Cry3Bb1 protein targeted against corn rootworms.

Last year I observed severe root injury to some producers' fields in northwestern Illinois (Henry and Whiteside counties; and north-central Illinois (La Salle County; that had been planted to Bt hybrids expressing the Cry3Bb1 protein. In 2011, similar reports of injury to Bt hybrids expressing this protein surfaced in some other north-central states, most notably Iowa, where

After removing roots randomly from the first field, we traveled to a nearby field that also had been planted to a Bt hybrid expressing the Cry3Bb1 protein. Not as many beetles were seen in the second field. Again, we removed roots at random for inspection. Roots from both fields exhibited feeding injury, but the second field had much more injury. Because adults were not as noticeable in the second field, and emergence was just beginning in the first field, I believe more root feeding will continue in both places. Because the plants were short and the soil was hard and dry, there was no lodging. However, as root feeding continues and plants become taller, lodging should be expected, especially if storms with rain and winds materialize.

On June 8, plants that had been dug and evaluated for root injury were checked for the expression of the Cry3Bb1 protein at our University of Illinois laboratory. All plants tested positive for the Cry3Bb1 protein. This does not mean that a resistant western corn rootworm population has been confirmed in Illinois. The



Western corn rootworm adult feeding on corn leaves, Cass County, June 7, 2012.



Severe root pruning to Bt plants (expressing the Cry3Bb1 protein) removed from a producer's field in Cass County, Illinois, June 7, 2012.

Dr. Aaron Gassmann, an Iowa State entomologist, published a journal article confirming the development of resistance to the Cry3Bb1 protein in some areas of the state by western corn rootworms. Thus far, we have not confirmed resistance to this protein in Illinois. We are cooperating with Dr. Gassmann's laboratory to determine if the Illinois fields in 2011 were infested with a resistant population. Results should be forthcoming in August of this year.

In light of the problems that began to surface last season in Illinois and some other midwestern states, the report concerning performance issues with a Bt hybrid in Cass County warranted attention. On arriving at the first field, I was amazed at the number of western corn rootworm adults in the whorls of plants. The seed industry representatives indicated that beetles had been observed earlier in the week.

This is the earliest that I have observed adult western corn rootworms, nearly one full month ahead of when I typically begin to receive reports – around the 4th of July. The plants were under intense moisture stress, and the leaves were tightly rolled. In addition, beetles were feeding on the epidermis of corn leaves. This type of injury often occurs when beetle emergence is early and plants have not yet begun to shed pollen or produce silks. The plants in the fields that I visited were not at this reproductive stage of development, even though planting had occurred between March 30 and April 2.

registrant of this technology has been notified and will conduct some follow-up investigations in these fields. So, at this point, precise reasons for the continuing performance challenges of some Bt hybrids expressing this protein remain elusive. However, producers should remain vigilant and report any performance issues that surface with their Bt hybrids regarding corn rootworm injury this growing season.

Similar to the affected fields with Bt performance issues last year, the fields in Cass County had been in continuous corn for many years (at least 10 consecutive years). In addition, the same trait (Cry3Bb1) had been used since 2007 (6 growing seasons). Under these conditions, the selection pressure for resistance development is markedly increased. It remains to be seen how the rest of this growing season will play out. For now, it makes sense to monitor this unfolding situation carefully and to pay attention to the performance of your chosen Bt hybrid this season. Longer term, it will be increasingly important to integrate management practices such as rotating corn with other crops, rotating Bt traits from season to season, considering the use of a non-Bt hybrid along with a soil insecticide at planting, and not neglecting the use of a refuge if a Bt hybrid is planted. Δ

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