

# Borer recession

By JOSH FLINT

**B**T traits work extremely well on European corn borer. In fact, the University of Illinois entomology team thinks they may work a little too well.

U of I's fall corn borer survey revealed 16 counties without a single corn borer. "That's 160 fields without a single borer," says U of I entomologist Kevin Steffey.

Steffey thinks two things contributed to the lowest corn borer instances since 1943. First, he says a good portion of the first-generation corn borer population faced inclement weather when attempting to lay eggs, causing a drop in the second generation's numbers. However, Steffey says *Bt* hybrids are the broader reason populations are at historic lows.

If YieldGard and Herculex are working this well, U of I entomologist Mike Gray is afraid of two words: selection pressure. "My concern isn't that we're using *Bt*; it's that we aren't integrating *Bt* with anything else," Gray explains.

## A history lesson

For years, the European corn borer devastated yields. According to Gray, scientists think European corn borer arrived on the U.S. East Coast in the early 1900s in an infested broom corn shipment, most likely from Italy. In 1939, it arrived in Illinois.

In the 1940s, corn borers frequently devastated the Illinois corn crop. Gray still points to a 1942 flier that tells farmers how to minimize their borer risk. The flier includes tips such as delaying planting to the latest possible date (first-generation moths choose the tallest corn plants for reproduction from late May to early June) and plowing the field clean after harvest (borers overwinter in corn stubble).

For years, the prescribed control method was intensive scouting and application of a rescue insecticide if needed. In 1996, along came *Bt*. The new hybrids work so well, many universities, including Purdue, no longer continue their annual surveys for corn borer.

"With the introduction of *Bt*, we have pushed corn borer populations to such low levels that many would agree it's not an economic concern anymore," Gray adds.

## Key Points

- The corn borer population is at historic lows.
- *Bt* traits have worked extremely well against borers.
- A *Bt*-resistant corn borer could become a reality.

Many contend the 20% refuge planting is sufficient to maintain a small corn borer population and, therefore, *Bt*'s effectiveness. However, with borer numbers at zero in so many counties, Gray is concerned about the level of compliance regarding the 20% refuge.

If refuge plantings are ignored, Gray fears selection

pressure will push the corn borer to the point of resistance development through evolution. "If you take a piece of clay and continue to squeeze it harder and harder, eventually some of it will squeeze between your fingers," he says.

In the corn borer's case, a *Bt*-resistant insect will slip through.

## Along the same lines

Though there have been no confirmed cases of corn borer *Bt* resistance yet, Gray wonders how long it will take. For those who scoff at the notion, Gray tells a story about the western corn rootworm.

He remembers 1995 as a landmark year in the evolution

of the western corn rootworm.

Since corn rootworms invaded Illinois in 1964, Gray says they were controlled by rotating corn with soybeans.

The adult females would feed on pollen and fresh silks and lay eggs in the soil of the cornfield. Under normal crop rotation practices, when the larvae hatched the following year, they found themselves in the midst of a soybean field with no food source.

Corn rootworm larvae cannot survive on soybean roots.

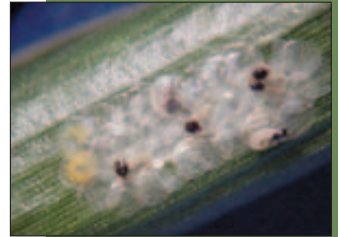
In 1995, farmers in parts of eastern Illinois started seeing extreme corn rootworm damage, despite the recommended crop rotations. Gray explains how a variant western corn rootworm adapted through natural selection and began laying eggs in the soil of soybean fields, thereby ensuring a food source (corn roots) in next year's corn crop.

Through natural selection, it took the variant rootworm more than two decades to develop, and three decades to cause significant production problems.

In the same way, Gray worries an overuse of *Bt* traits could force the corn borer to develop resistance.



**BUGABOO:** European corn borers tunnel into the stalk, causing yield loss. In some cases, the borer gnaws the entire ear of the plant.



**FINICKY EGG-LAYERS:** The European corn borer typically deposits egg masses on the underside of corn leaves. Stormy conditions can hinder egg-laying success.

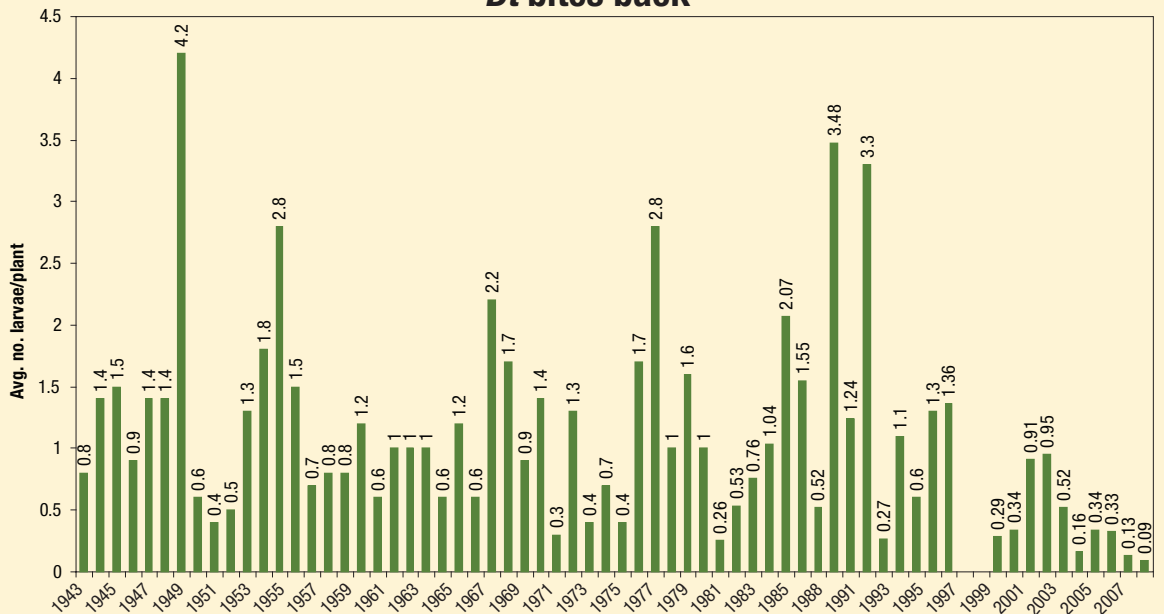


**WINDSHIELD FODDER:** Adult moths tend to show up on windshields near dusk. Mike Gray says some people have noticed borer numbers are down because their windshields aren't as dirty.



**SURVEY METHOD:** U of I researchers walk past border rows and check 25 consecutive plants for damage. They then split open two infested plants and count insects.

## *Bt* bites back



**TOO MUCH:** Entomologists worry farmers are relying too much on *Bt* to control European corn borer. After *Bt* was released in 1996, the University of Illinois did not conduct the survey in 1997 and 1998. Once this year's results were tabulated, researchers realized it was the lowest year on record for the borer.