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BT CORN

Genetically modified corn lowered growth rate of butterfly larvae

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CHAMPAIGN, Ill. — Pollen from a Bt corn variety carrying a since-phased-out genetically inserted pesticide known as event 176 dramatically reduced growth rates among black swallowtail caterpillars in University of Illinois field tests, researchers report. Because of rainfall during the test period, researchers noted that the results are conservative.

The UI findings were part of a six-paper package that targeted Bt corn. The papers – all edited by entomologist May Berenbaum, who led the UI study – were published in the Proceedings of the National Academy of Sciences.

The UI findings suggested that pollen from Bt corn varieties engineered with the 176 event may have sublethal effects on black swallowtails (*Papilio polyxenes*) feeding on host plants situated outside cornfields. The researchers also tried to study the effects on monarch butterflies (*Danaus plexippus*), but a high death rate was believed to be the result of predation rather than proximity to pollen.

Bt corn is genetically modified to resist the

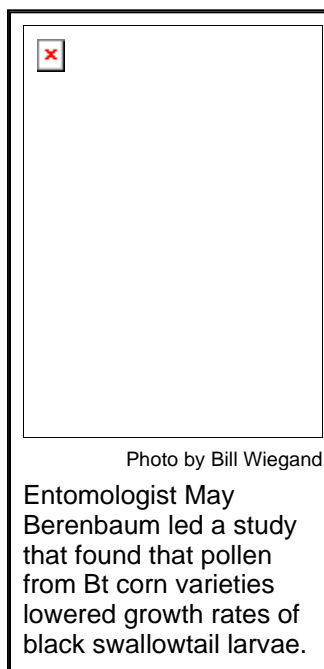


Photo by Bill Wiegand

Entomologist May Berenbaum led a study that found that pollen from Bt corn varieties lowered growth rates of black swallowtail larvae.

European corn borer (*Ostrinia nubilalis*). Bt is short for the soil organism *Bacillus thuringiensis* that produces toxic proteins that kill the borers. Scientists can control when and in what part of the plant the toxin is produced by combining gene sequences with specific promoters. Successful transformations with genetically engineered sequences are called events.

The UI team planted Novartis Max 454 Bt corn, which contains Novartis event 176, in a 30-by-30 meter tract northeast of the UI campus in late May 2000. This variety was used for less than 1 percent of U.S. corn acreage that year.

Researchers put 20 potted parsnip plants and 25 potted milkweeds at intervals ranging from one-half meter to seven meters from the corn when it began shedding pollen in late July. Black swallowtails were released to feed on the parsnip and the monarchs on the milkweed, which attracted more predators.

The disappearance of monarch larvae was rapid for six days, but it was not affected by proximity to the crop, said UI entomologist Arthur Zangerl. The death rate was lower among black swallowtails and again unaffected by proximity. However, the swallowtails' growth rate varied dramatically; larvae seven meters from the corn were three times as large as the larvae one-half meter away from corn.

UI researchers last year reported high death rates of black swallowtail larvae fed high concentrations of event 176-containing corn pollen in laboratory tests. The new study says lower levels affect mortality. "Our findings suggest that more research is needed on each new Bt variety to make sure non-target species will not be adversely affected once it is planted in the field," Berenbaum said.

Co-authors with Berenbaum and Zangerl were graduate students Duane McKenna and Mark Carrol and undergraduates C. Lydia Wraight, Peter Ficarello and Rita Warner. The UI Foundation and Center for Advanced Study funded the research.

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