

Kansas Agricultural Experiment Station Research Reports

Volume 0
Issue 12 *Keeping up with Research*

Article 114

2000

Response of BT Corn to Simulated Hail Damage

Merle D. Witt

Lawrent L. Buschman

Follow this and additional works at: <https://newprairiepress.org/kaesrr>

Recommended Citation

Witt, Merle D. and Buschman, Lawrent L. (2000) "Response of BT Corn to Simulated Hail Damage," *Kansas Agricultural Experiment Station Research Reports*: Vol. 0: Iss. 12. <https://doi.org/10.4148/2378-5977.7351>

This report is brought to you for free and open access by New Prairie Press. It has been accepted for inclusion in Kansas Agricultural Experiment Station Research Reports by an authorized administrator of New Prairie Press. Copyright 2000 the Author(s). Contents of this publication may be freely reproduced for educational purposes. All other rights reserved. Brand names appearing in this publication are for product identification purposes only. No endorsement is intended, nor is criticism implied of similar products not mentioned. K-State Research and Extension is an equal opportunity provider and employer.





127

RESPONSE OF BT CORN TO SIMULATED HAIL DAMAGE

Merle Witt and Lawrent Buschman*

Hybrid corn is grown annually on approximately 3.1 million acres in Kansas and is an important part of agricultural production under both dryland and irrigated conditions. This corn acreage is subjected to hail damage of various degrees each year. Numerous studies have examined the effect of hail damage on the grain production of conventional corn hybrids. However, data have not been published regarding the effect of hailstorm defoliation on the new genetically modified corns resistant to European corn borer. Thus, we undertook to evaluate the influence of simulated hail defoliation on conventional corn hybrids versus Bt-corn hybrids, which have the *Bacillus thuringiensis* (Bt) gene added.

Procedures

Paired corn hybrids with or without a Bt event were grown with flood irrigation at 30,000 plants/a in 30-inch rows at Garden City in 1997 and 1998. Individual plots were four rows wide X 25 feet long. To simulate a hailstorm, 80% of the leaf area was removed manually at the 15-leaf growth stage. The paired hybrids included: Cargill 7997 and 8021 Bt, Golden Harvest 2530 and 2530 Bt, and Novartis 7590 and 7590 Bt. The Cargill and Golden Harvest transgenic hybrids utilized the Mon 810 event. The Novartis transgenic hybrid utilized the Bt 11 event. All three hybrids have the trade name Yieldgard Bt.

Kansas State University Agricultural Experiment Station and
Cooperative Extension Service, Manhattan, Kansas 66506

SRL127

August 2000

It is the policy of Kansas State University Agricultural Experiment Station and Cooperative Extension Service that all persons shall have equal opportunity and access to its educational programs, services, activities, and materials without regard to race, color, religion, national origin, sex, age, or disability. Kansas State University is an equal opportunity organization. These materials may be available in alternative formats.

18745-8/00-500

Kansas State University
Agricultural Experiment Station and
Cooperative Extension Service

Results

The simulated hail damage caused average reductions in grain yield of 81 bu/a in 1997 and 63 bu/a in 1998. Yield losses were not significantly different for conventional and Bt hybrids. However, corn borer stalk tunneling was lacking in the Bt hybrids, whereas their conventional hybrid counterparts had 42% of stalks infested in 1997 and 55% of stalks in 1998. Because of the elimination of insect tunneling damage, the Bt hybrids averaged 11% higher yield in 1997 and 8% higher yield in 1998. Resulting grain yields are shown in Table 1.

Conclusions

Essentially all dry matter in the corn plant is produced by photosynthesis in the leaves. Therefore the potential grain yield is determined by the amount of leaf area present to produce dry matter. A hailstorm that reduces the leaf area will result in reduced growth rate and grain production. Genetically modified hybrids with a Bt gene addition had no European corn borer damage, but the Bt gene did not have a significant influence on grain yield loss following simulated hail defoliation. Grain yield was reduced by 37% when 80% of the leaf area was removed at the 15-leaf growth stage.

Table 1. Harvest results of conventional and Bt corn following simulated hail damage at the 15-leaf stage, Southwest Research-Extension Center, Garden City, KS

	Grain Yield (bu/a)				% Yield
	1997		1998		
Hybrid	Control	Defol	Control	Defol	Loss
Conventional	219	134	164	103	38.5
Genetically Modified (Bt)	230	152	180	115	36.0
LSD (5%)	n.s.		11	14	12

Defol = defoliated

Yield corrected to 15.5% moisture; n.s. = not significant.

Acknowledgement

Funding for this study was provided by the National Crop Insurance Services.

* Associate Professor, KSU Southwest Research-Extension Center and Professor, Department of Entomology (located at SWREC).

Contribution no. 00-432-S from the Kansas Agricultural Experiment Station.

Note: Trade names are used to identify products. No endorsement is intended, nor is any criticism implied of similar products not mentioned.

Contents of this publication may be freely reproduced for educational purposes. All other rights reserved. In each case, give credit to the author(s), name of work, Kansas State University, and the date the work was published.