2006

Sweet Corn Variety and Pest Management Trial—Neely-Kinyon Farm, 2005

Kathleen Delate
Iowa State University, kdelate@iastate.edu

Andrea McKern
Iowa State University

Robert Burcham
Iowa State University

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Abstract
Because of our agricultural resources and extensive experience with field corn production, organic sweet corn can be very successfully grown in Iowa. With the continuing growth of organic food consumption in the United States, organic sweet corn from Iowa can obtain premium prices. Potential major markets across the United States have been identified, so research on production, harvesting, and processing protocols is needed to meet this future demand. One of the key pests in organic sweet corn production is the corn earworm. Earworm control was improved through the addition of a certified organic spreader-sticker in preliminary tests in 2001. This project investigated variety selection for early markets and the efficacy of the naturally occurring soil bacterium, Bt (*Bacillus thuringiensis*), for improved pest management of the corn earworm at the Neely-Kinyon Farm.

Keywords
Horticulture, Agronomy

Disciplines
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Kathleen Delate, associate professor
Andrea McKern, research associate
Departments of Horticulture and Agronomy
Bob Burcham, ag specialist

Introduction

Because of our agricultural resources and extensive experience with field corn production, organic sweet corn can be very successfully grown in Iowa. With the continuing growth of organic food consumption in the United States, organic sweet corn from Iowa can obtain premium prices. Potential major markets across the United States have been identified, so research on production, harvesting, and processing protocols is needed to meet this future demand. One of the key pests in organic sweet corn production is the corn earworm. Earworm control was improved through the addition of a certified organic spreader-sticker in preliminary tests in 2001. This project investigated variety selection for early markets and the efficacy of the naturally occurring soil bacterium, *Bt* (*Bacillus thuringiensis*), for improved pest management of the corn earworm at the Neely-Kinyon Farm.

Materials and Methods

Chicken litter compost (4 tons/acre) was applied to the field site on March 18, 2005. Two varieties of sweet corn, Ambrosia (Crookham Seeds, Caldwell, ID) and Merlin (Mesa Maize, Inc., Olathe, CO), were planted on May16, 2005, and a certified organic variety, Luscious (Mesa Maize, Inc., Olathe, CO), was planted on June 7. All varieties were planted at 26,000 seeds/acre in 30-in. rows. The sampled area for each variety was 30 in. (1 row) by 230 ft. Weed management included one rotary hoeing on June 2 and cultivations on June 7, June 22, and July 1. Plant population counts were taken for the Merlin and Ambrosia varieties on June 13.

Corn earworm treatments were as follows: control (no spray); Dipel® (*Bt*); and Dipel® (*Bt*) plus vegetable oil (to act as a surfactant). Dipel® was applied using a backpack sprayer to the corn ears at silking and approximately four days later. The Dipel® treatment consisted of 4 oz Dipel® to 3 gallons of water, while the Dipel® and oil was 4 oz Dipel® plus 1/4 cup of vegetable oil to 3 gallons of water. Merlin ears were sprayed on July 21 and 25. Ambrosia ears were sprayed on July 25 and 28. Luscious corn was not sprayed to evaluate pest resistance under a no-spray condition. Ambrosia was harvested on August 4, and Merlin was harvested on August 2 and 4. Luscious was harvested on August 9 and 11. Ten ears per plot were collected and inspected/rated for earworm numbers and earworm damage.

Results and Discussion

First Sweet Corn Planting. Organic sweet corn quality was excellent in 2005. A significantly higher plant population (9,562 plants/acre) was found in the Merlin plots compared with Ambrosia (Table 1). A total of 10,319 ears/acre were harvested from Merlin plots over two harvests.

Earworm populations at the time of this experiment were low overall, ranging from 0 to 3% damaged ears (Tables 1, 2, and 3). As a result, there were no significant differences in earworm damage among treatments or varieties (Tables 1, 2, and 3). There was a trend toward higher numbers of earworms in the Merlin ears, however (Table 1).

Second Sweet Corn Planting. There were no significant differences among varieties at the second harvest date, with Ambrosia producing 3,561 ears/acre and Merlin at 3,009 ears/acre. Because of late seed arrival, Luscious was not

planted until four weeks later than Merlin and Ambrosia. There was a notable difference (Table 4) in earworm damage in Luscious ears (27%), but it is unknown if planting date was more critical than variety in pest attack. In addition, there was a notable difference in yield between the Luscious (3,851 ears/acre) and Merlin varieties, but it is suspected that the late planting date had a large influence on this data. Future experiments in 2006 will examine planting date × variety interactions.

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Table 1. Sweet corn performance by variety, first planting, Neely-Kinyon, 2005.

Variety	Stand (plants/acre)	Yield (ears/acre)		Earworm damage (%)
		August 2, 2005	August 4, 2005	
Ambrosia	5,062b	0.0	3,560.6	0.83
Merlin	9,562a	7,310.5	3,008.6	2.19
LSD 0.05	2,539	NA[1]	NS[2]	NS

Table 2. Sweet corn data by pest management treatment, first planting, Neely-Kinyon, 2005.

Treatment	Stand (plants/acre)	Yield (ears/acre)		Earworm damage (%)
		August 2, 2005	August 4, 2005	
Control	7,833	7,424.1	3,181.8	1.91
Dipel®	6,000	7,159.0	3,428.0	1.18
Dipel® and oil	8,000	7,348.4	3,198.6	1.67
LSD 0.05	NS	NA	NS	NS

Table 3. Sweet corn performance by variety and treatment, first planting, Neely-Kinyon, 2005.

Variety and Treatment	Stand (plants/acre)	Yield (ears/acre)		Earworm damage (%)
		August 2, 2005	August 4, 2005	
Ambrosia, Control	5,167	0.0	3,825.7	1.11
Ambrosia, Dipel®	5,000	0.0	2,935.6	1.43
Ambrosia, Dipel ® and oil	5,000	0.0	3,920.4	0.00
Merlin, Control	10,500	7,424.1	2,666.6	2.50
Merlin, Dipel®	7,000	7,159.0	3,920.4	1.00
Merlin, Dipel and oil	11,000	7,348.4	2,621.2	3.00
LSD 0.05	NS	NA	NS	NS

Table 4. Sweet corn performance, second planting, Neely-Kinyon, 2005.

Variety	Yield (ears/acre)		Earworm damage (%)
	August 9, 2005	August 11, 2005	
Luscious	2,575.7	1,275.2	26.67
LSD 0.05	NA	NA	NA

[1] NA=not available.
[2] NS=nonsignificant difference.