2005

Sweet Corn Variety and Pest Management Trial—Neely-Kinyon Farm, 2004

Kathleen Delate
Iowa State University, kdelate@iastate.edu

Andrea McKern
Iowa State University

Robert Burcham
Iowa State University

Sweet Corn Variety and Pest Management Trial—Neely-Kinyon Farm, 2004

Abstract
Organic sweet corn can be successfully grown in Iowa, based on our agricultural resources and our extensive experience with field corn production. With the continuing growth of organic food consumers in the United States, premium prices can be obtained for organic sweet corn from Iowa. With the potential for major markets across the United States identified, research on production, harvesting, and processing protocols is needed to meet this 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
Agricultural Science | Agriculture | Agronomy and Crop Sciences | Horticulture

Sweet Corn Variety and Pest Management Trial—Neely-Kinyon Farm, 2004

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

Introduction

Organic sweet corn can be successfully grown in Iowa, based on our agricultural resources and our extensive experience with field corn production. With the continuing growth of organic food consumers in the United States, premium prices can be obtained for organic sweet corn from Iowa. With the potential for major markets across the United States identified, research on production, harvesting, and processing protocols is needed to meet this 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

A mixture of half hoop-house swine and half chicken litter compost (7 tons/acre) was applied to the field site on March 26, 2004. Two varieties of sweet corn, Ambrosia (Crookham Seeds, Caldwell, ID), and Merlin (Mesa Maize, Inc., Olathe, CO) were planted in 30-in. rows on May 17, 2004, at 30,000 plants/acre. The sampled area for each variety was 30 in. (1 row) × 250 feet. Weed management included two rotary hoeings on May 26 and June 2, cultivations on June 16 and June 28, and hand weeding on July 7. 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 4 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. Ambrosia ears were sprayed on July 19 and 23. Merlin ears were sprayed on July 23 and 26. Ambrosia was harvested on August 5, and Merlin was harvested on August 10, 12, and 17. Ten ears per plot were collected, and each ear was inspected and rated for earworms and earworm damage.

Results and Discussion

Organic sweet corn quality was excellent in 2004. Plant populations were decreased from low emergence in wet weather, however. A significantly higher plant population (11,333 plants/acre) was found in the Ambrosia plots compared with Merlin (Table 1). Subsequently, higher yields (6,673 ears/acre) were harvested from Ambrosia plots compared with Merlin (4,861 ears/acre). Broadleaf weeds became a concern in areas of low plant populations. There was a significantly lower population of broadleaf weeds on June 15 in the Dipel® and oil plots compared with the control plots, but there were no significant differences in broadleaf weeds on the same date in the other comparisons (Tables 1–3). There were no significant differences in grass weeds among treatments or varieties on June 15 and June 28, and in broadleaf weeds on June 28, 2004.

Earworm populations at the time of this experiment were low overall, ranging from 0 to 10% damaged ears (Tables 1–3). As a result, there were no significant differences in earworm damage among treatments or varieties (Tables 1–3). There was a trend towards higher numbers of earworms in the Merlin ears, however (Table

1). This experiment will be repeated in 2005 in anticipation of higher earworm numbers in the event of a mild winter.

Acknowledgments

We would like to thank the Leopold Center for Sustainable Agriculture for its support of the Neely-Kinyon LTAR site. We thank the Neely-Kinyon Farm Association for their input and support. Thanks also go to Matt Rohrig, David Rosmann, Miriam Perozo Mur, Kristin Brown, Greg Shepherd, Vanessa Salvador-Ferrer, and Mark Rosmann for their help on production, data collection, and analytical aspects of this project. We also thank Mesa Maize, Inc. (Olathe, CO) and Crookham Seeds, Inc. (Caldwell, ID) for their support and seed trade.

Table 1. Sweet corn data by variety, Neely-Kinyon, 2004.

Variety	Stand (plants/ acre)	Weeds/m^2 June 15, 2004		Weeds/m^2 June 28, 2004		Yield (ears/A)	Earworm damage (%)
		Grasses	Broadleaves	Grasses	Broadleaves		
Ambrosia	11,333a	0.13	10.33	0.31	1.19	6,672.97	0.67
Merlin	6,067b	0.27	6.87	0.06	2.00	4,860.91	5.33
LSD 0.05	2,814	NS	NS	NS	NS	N/A	NS

Table 2. Sweet corn data by treatment, Neely-Kinyon, 2004.

Treatment	Stand (plants/A)	Weeds/m^2 June 15, 2004		Weeds/m^2 June 28, 2004		Earworm damage (%)
		Grasses	Broadleaves	Grasses	Broadleaves	
Control	9,800	0.20	11.30b	0.17	1.50	3.00
Dipel®	7,800	0.20	10.30ab	0.30	2.10	0.00
Dipel® and oil	8,500	0.20	4.20a	0.10	1.20	6.00
LSD 0.05	NS	NS	6.74	NS	NS	NS

Table 3. Sweet corn data by treatment and variety, Neely-Kinyon, 2004.

Variety and Treatment	Stand (plants/A)	Weeds/m^2 June 15, 2004		Weeds/m^2 June 28, 2004		Earworm damage (%)
		Grasses	Broadleaves	Grasses	Broadleaves	
Ambrosia, Control	12,800	0.20	12.80	0.17	0.83	0.00
Ambrosia, Dipel®	10,600	0.00	13.40	0.60	1.80	0.00
Ambrosia, Dipel ® and oil	10,600	0.20	4.80	0.20	1.00	2.00
Merlin, Control	6,800	0.20	9.80	0.17	2.17	6.00
Merlin, Dipel®	5,000	0.40	7.20	0.00	2.40	0.00
Merlin, Dipel and oil	6,400	0.20	3.60	0.00	1.40	10.00
LSD 0.05	NS	NS	NS	NS	NS	NS