

Sweet Corn Variety and Pest Management Trial

Neely-Kinyon Farm, 2007

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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 consumers in the U.S., premium prices can be obtained for organic sweet corn from Iowa. With the potential for major markets across the U.S. 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

Compost (17.9 tons ha⁻¹) was applied to the field site on 5 April 2007. Three varieties of sweet corn, 'Ambrosia' (Crookham Seeds, Caldwell, ID), 'Merlin' (Mesa Maize, Inc., Olathe, CO), and a certified organic variety, 'Luscious' (Mesa Maize, Inc., Olathe, CO), were planted on 14 May at 87 932 seeds ha⁻¹ in 30 in. rows. The unit area sampled was 30 in. (1 row) by 50 feet. Four replications of each variety/treatment were planted. Weed management included one rotary hoeing on May 3, and two row cultivations on June 5 and July 2, 2007. Plant population counts were taken on June 5.

Corn earworm treatments were as follows: control (no spray); Dipel® (*Bt*); and Dipel® (*Bt*) plus vegetable oil (to act as a surfactant). Treatments consisted of 1) 4 oz Dipel® to 3 gallons of water, and 2) 4 oz Dipel® plus 2 oz of vegetable oil to 3 gallons of water. Treatments were applied using a backpack CO₂ sprayer to the corn ears when 50% were silking, and 2 to 4 days later. 'Ambrosia' and 'Luscious' ears were sprayed on July 12 and 17, and 'Merlin' ears were sprayed on July 17 and 19, 2007. Sweet corn was harvested on July 26-30, and August 2 and 8, 2007. Ten ears per plot were collected from randomly selected plants and rated for total earworm number, and percentage of ears exhibiting earworm damage. Corn aphid ratings were given in 2007, due to potential damage from this pest. Ratings were based on 0=no damage; 1=<10% of ear covered in aphids; 2=11 to 25% aphid-covered; and 3=26 to 50% aphid-covered.

Results and Discussion

Organic sweet corn yields were excellent in 2007, ranging from 11,353 to 15,648 ears/acre (Table 1). 'Ambrosia' and 'Merlin' yielded a significantly greater number of ears compared to and 'Luscious.' The organic seed, 'Luscious,' produced an average yield that was 74% of the conventional seed average of 15,257 ears/acre (Table 1). Much of the yield reduction was associated with poor emergence. Emergence was reduced in 'Luscious' seed in 2007, with a plant population only 43% of the 'Ambrosia' stand (Table 1).

Earworm damage was much lower in 2007 compared to 2006, ranging from 0.83% to 3% damaged ears in previous years (Tables 1–3). There were higher numbers of earworm-damaged ears in 'Ambrosia' than 'Luscious'

plants, but damaged ears were equivalent in ‘Merlin’ and ‘Luscious’ (Table 1). Corn aphid damage ratings averaged 1.5 with no significant differences among cultivars (Table 1). Over all varieties, there was a trend toward less earworm damage in the Dipel® and Dipel® plus oil treatments (Table 2), but the damage was not significantly less than the control (no spray). As expected, there was no effect of the Dipel® treatment on the corn aphids. When combining cultivar and treatment effects, there was an overall trend towards a lower percentage of damage in the ‘Luscious’ variety treated with

Dipel® and Dipel® plus oil (Table 3). This experiment will be repeated in 2008.

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Table 1. Sweet corn performance by variety, Neely-Kinyon, 2007.

Variety	Stand (plants/ acre)	Yield (ears/ acre)	Earworm damage (%)	Aphids (rating/ plant)
Ambrosia	20,636a	15,648a	2.91a	2.00
Luscious	8,917c	11,353b	0.83b	1.42
Merlin	12,667b	14,866a	1.75ab	1.08
LSD 0.05	3,294	1,850	1.15	NS

Table 2. Sweet corn data by pest management treatment, Neely-Kinyon, 2007.

Treatment	Stand (plants/ acre)	Yield (ears/ acre)	Earworm damage (%)	Aphids (rating/ plant)
Dipel®	15,083	13,240	1.50	1.25
Dipel® and oil	12,364	14,191	1.64	1.18
Control	14,083	14,315	2.25	2.00
LSD 0.05	NS	NS	NS	NS

Table 3. Sweet corn performance by variety and treatment, Neely-Kinyon, 2007.

Variety and Treatment	Stand (plants/ acre)	Yield (ears/ acre)	Earworm damage (%)	Aphids (rating/ plant)
Ambrosia, Dipel®	23,500a	14,199bcd	2.25bc	1.25bc
Ambrosia, Dipel® and oil	17,000bc	17,886a	2.00bc	1.67bc
Ambrosia, Control	20,500ab	15,418ab	4.25a	3.00a
Luscious, Dipel®	10,500de	11,324de	0.75bc	1.50bc
Luscious, Dipel® and oil	8,750de	10,540e	0.50c	0.75c
Luscious, Control	7,500e	12,195cde	1.25bc	2.00ab
Merlin, Dipel®	11,250cde	14,199bcd	1.50bc	1.00bc
Merlin, Dipel and oil	12,500cde	15,070abc	2.50ab	1.25bc
Merlin, Control	14,250cd	15,331abc	1.25bc	1.00bc
LSD 0.05	5,653	3,205	1.91	1.21