

# Sweet Corn Variety and Pest Management Trial– Neely-Kinyon Farm, 2009

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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 was applied on May 21 at a rate of 8 tons an acre. Three varieties of sweet corn, ‘Ambrosia’ (Mesa Maize, Inc., Olathe, CO), ‘Brocade’ (Mesa Maize, Inc., Olathe, CO), and a certified organic variety, ‘Luscious’ (Mesa Maize, Inc., Olathe, CO), were planted on May 29 at 32,000 seeds/acre in rows 30 in. wide by 25 ft. long. The unit area sampled for insects and yield was 30 in. by 17 feet 4 inches of row. Three replications of each variety/treatment were planted. Weed management included one rotary hoeing on June 11, and three row cultivations on June 26 and 30 and July 13. Plant population counts were taken on June 30.

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) 0.08 oz Dipel® to 1 gallon of water; and 2) 0.08 oz Dipel® plus 2 oz of vegetable oil to 1 gallon of water. Treatments were applied using a backpack CO<sub>2</sub> sprayer to the corn ears when 50% were silking, and 2 to 4 days later. Sweet corn was sprayed on July 30, and August 3, 2009. Sweet corn was harvested on August 18, 2009.

## Results and Discussion

Organic sweet corn plant populations were highest in ‘Brocade,’ which averaged 33,741 plants/acre on June 30. ‘Luscious’ and ‘Ambrosia’ were significantly lower, averaging 20,074 and 16,037 plants/acre (Tables 1 and 2). Broadleaf weed populations were low across all varieties on the June 30 sampling date, with fewer than 3 broadleaf weeds/sq. meter. Grass weed populations were also minimal across all varieties, with fewer than 2 grass weeds/sq. meter (Table 2). Yields were excellent in 2009: ‘Brocade’ yielded a significantly greater number of ears compared to ‘Ambrosia’ and ‘Luscious’ at 20,824 ears/acre while ‘Ambrosia’ and ‘Luscious’ yielded 17,320 and 16,926 ears/acre, respectively (Tables 1 and 2). Ear weight was highest in ‘Brocade’ averaging 336 g/ear while ‘Luscious’ and ‘Ambrosia’ averaged 306 g/ear and 262 g/ear, respectively. Ear weights averaged 302 g/ear in 2009, which was lower than the 2008 average of 391 g/ear across all varieties.

Earworm damage was lower in 2009 compared to 2008, averaging 3% across all varieties and treatments (Table 1). When evaluating treatments effects, Dipel®-treated ears had significantly lower damage than the control

(5.3%), and Dipel® and oil-treated ears had numerically lower (3.1%) but statistically equal damage as the control (Table 3). In comparing varieties, earworm damage was similar (Tables 1 and 2). Overall, the addition of oil to the *Bt* treatment provided no increase in plant protection as determined by earworm damage or presence. Corn aphids were present in 2009, but on less than 4% of the sweet corn sampled. This experiment will be repeated in 2010 at the ISU Horticulture Farm.

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**Table 1. Sweet corn performance by variety and treatment, Neely-Kinyon, 2009**

Variety and Treatment	Stand (plants/acre)	Yield (ears/acre)	Ear weight (g)	Earworm damage (%)	Aphids (% presence)
Ambrosia, Dipel®	17,778c	15,899c	287.91	0.0	0.00
Ambrosia, Dipel® and oil	16,333c	16,666c	263.48	2.2	4.30
Ambrosia, Control	14,000c	18,904b	249.56	3.7	0.00
Luscious, Dipel®	20,889bc	14,474c	301.46	0.0	0.00
Luscious, Dipel® and oil	20,778bc	19,056b	299.74	5.6	0.00
Luscious, Control	18,556c	16,537c	315.32	2.7	0.00
Brocade, Dipel®	36,667a	21,653a	331.27	0.0	0.00
Brocade, Dipel and oil	29,222ab	20,532ab	337.10	1.7	3.33
Brocade, Control	35,333a	20,237ab	340.65	8.5	0.00
LSD 0.05	3,049	1,211	NS	NS	NS

**Table 2. Sweet corn performance by variety, Neely-Kinyon, 2009**

Variety	Stand (plants/acre)	Yield (ears/acre)	Ear weight (g)	Earworm damage (%)	Aphids (% presence)	Broadleaf weeds (plants m <sup>-2</sup> )	Grass weeds (plants m <sup>-2</sup> )
Ambrosia	16,037c	17,320b	262.30c	2.2	1.40	2.00	1.40
Luscious	20,074b	16,926b	306.31b	3.3	1.10	2.23	1.03
Brocade	33,741a	20,824a	336.20a	3.0	0.00	1.74	.85
LSD 0.05	3,161	804.022	22.34	NS	NS	NS	NS

**Table 3. Sweet corn performance by treatment, Neely-Kinyon, 2009**

Treatment	Stand (plants/acre)	Yield (ears/acre)	Ear weight (g)	Earworm damage (%)	Aphids (% presence)
Dipel®	25,111	18,025	311.52	0.0b	0.00b
Dipel® and oil	22,111	18,922	303.25	3.1ab	2.52a
Control	22,630	18,844	294.97	5.3a	0.00b
LSD 0.05	NS	NS	NS	3.8	2.10