

2015 *Bt sh2* Sweet Corn Variety Trial

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A *Bt sh2* sweet corn variety trial was planted at the Forgotten Harvest Ore Creek Farm (9153 Major Road, Fenton, MI 48430). As a volunteer-driven food bank farm, any spray reductions are a decrease in liability. Commercial vegetable farms value similar qualities in a crop where regular sprays are expensive. Seminis and Syngenta generously donated publicly available *sh2* bicolor sweet corn seeds SV9010SA (SM), Obsession II (SM), EX08767143 (SM), and BSS0761 (SY) for this trial. All seeds contained Bt protein, except EX08767143, which served as a non-*Bt sh2* control.

On May 21, 2015, the four varieties were machine-planted side-by-side with a four-row John Deere 7000 planter in eight 1,150-foot passes. Each pass was considered a replicate for the purposes of this study. Seeds had 30-inch between row spacing and 8.5-inch in-row spacing. The soil type was a Miami loam with a 2-6% grade.

A granular 36-0-13 fertilizer was broadcast pre-plant (240 lb/ac), and a granular 30-20-15 fertilizer was injected 2 inches below and 2 inches to the side of seeds at planting (100 lb/ac). Also on May 21 2015, Prowl (1 qt/ac) and Dual Magnum (2 pt/ac) were applied for pre-emergent weed control.

Seminis seeds were coated in a chemical treatment consisting of metalaxyl-M, azoxystrobin, clothianidin, difenoconazole, fludioxonil, thiram, and carboxin. Syngenta seeds were coated in a chemical treatment consisting of metalaxyl-M, carbozin, thiamethoxam, difenoconazole, fludioxonil, and safecoat (Blue). No further pesticide treatments were applied.

On August 21, 20-foot harvest transects were established in each row of five replicate passes in the center of the field. The number of plants, number of ears, disease presence (1-3 severity ranking), relative height (3 levels: short, medium, tall), and deer damage (number of plants clipped off) was assessed within each transect. On August 25, ears were harvested (day 97), and five were randomly chosen and measured for length, diameter, worminess (number of ears containing insects), tip-fill (number of ears with a full tip), and number of kernel rows. Bushels per acre assumed 12 ears in a bushel.

One ear of each variety was cut in half transversally, and half was cooked in a microwave. Two participants measured the sweetness (1-9 scale: 1=not sweet, 9=very sweet) and texture (1-9 scale: 1=not tender, 9=very tender) of the raw and cooked halves of each variety.

Results

Overall, the non-*Bt sh2* EX08767143 had the highest yield, and the most ears per plant, despite experiencing the heaviest deer browse, though it did not perform statistically better (Table 1). It also cooked well (Table 2). The least yielding variety was Obsession II, though it maintained the best tip fill (Table 1). Moth pressure was not very heavy, and Halo traps never indicated a treatment threshold for European corn borer or corn earworm.

A majority of the storm systems we experienced this summer were cold fronts from the northwest, which probably reduced migration pressure. In a heavy-pressure year, the *Bt* varieties may out-produce the non-*Bt* control, or at least perform equally, with fewer sprays. However, the non-*Bt* control could possibly maintain yields planted between alternating rows of *Bt* sweet corn. This could reduce the cost of plantings, while also combating insect resistance in a refuge-in-a-bag scenario used in field corn.

All varieties shared good height and disease resistance, and no lodging occurred in any variety (Table 1). BSS0761 was incredibly sweet, and held the highest sweetness ratings in both the raw and cooked evaluations (Table 2). Interestingly, this variety experienced the least amount of deer browse (Table 1).



SV9010SA

Obsession II

EX08767143*

BSS0761

Figure 1. Morphological characteristics of three *Bt sh2* sweet corn cultivars, and one non-*Bt sh2* cultivar*, at the Forgotten Harvest Ore Creek Farm, Fenton, Michigan. The trial was planted at 30 inches between rows and 8.5 inches in the row (25,000 plants/acre). All cultivars were harvested at 97 days after planting. Wrapper leaves on ears were longest on BSS0761, and shortest on SV90101SA.

Table 1. Measured characteristics of three *Bt sh2* sweet corn cultivars, and one non-*Bt sh2* cultivar*, at the Forgotten Harvest Ore Creek Farm, Fenton, Michigan. The trial was planted at 30 inches between rows and 8.5 inches in the row (25,000 plants/acre). All cultivars were harvested at 97 days after planting.

Variety	Co. ¹	Predicted Maturity (days)	Average Length (in.)	Average Diameter (in.)	L:D	Kernel Rows	%Tip Fill ²	%Worm Tip ³	%Deer Browsed	Ears/Plant	Bu/A	Lodging ⁴	Height ⁵	Disease Resistance ⁶
EX08767143*	SM	80	9.28	2.38	3.90	17.84	60	0	41.28	1.18	3,135.71	0/5	2.2	3
SV9010SA	SM	81	9.42	2.40	3.94	18.20	64	0	16.52	1.15	2,874.40	0/5	2.2	3
BSS0761	SY	81	8.56	2.38	3.59	17.76	64	0	6.58	1.09	2,874.40	0/5	2.2	3
Obsession II	SM	82	8.76	2.40	3.65	16.72	72	0	25.17	1.05	2,395.33	0/5	2.2	3

¹Seed companies: SM = Seminis, SY = Syngenta.

²Tip fill is the percentage of 5 ears with full tips.

³Worm tip is the percentage of 5 ears with worms in them.

⁴Lodging represents the quantity of the three plots in which lodging occurred.

⁵Height was a 3-category variable with 1 as the shortest, 2 and medium height, and 3 as the tallest.

⁶Disease Resistance was a 3-category variable with 1 as the high disease occurrence, 2 as medium disease occurrence, and 3 as low disease occurrence.

Table 2. Measured characteristics of three *Bt sh2* sweet corn cultivars, and one non-*Bt sh2* cultivar*, at the Forgotten Harvest Ore Creek Farm, Fenton, Michigan. The trial was planted at 30 inches between rows and 8.5 inches in the row (25,000 plants/acre). All cultivars were harvested at 97 days after planting.

Variety	Co. ¹	Sweetness ² Raw	Texture ³ Raw	Sweetness Cooked	Texture Cooked
EX08767143*	SM	6.5	5	6.5	8
SV9010SA	SM	6	5.5	6.5	7.5
BSS0761	SY	8	4.5	8	8
Obsession II	SM	6.5	5	6	7.5

¹Seed companies: SM = Seminis, SY = Syngenta.

²Sweetness was measured 1-9 with 1 as not sweet, and 9 as very sweet.

³Texture was measured 1-9 with 1 as not tender, and 9 as very tender.

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