Central NC Organic Bell and Hot Pepper Variety Trial, Summer 2014

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NC A&T Farm, Greensboro, NC

Objective

To evaluate the performance of some bell pepper and hot pepper varieties for organic production in central North Carolina.

Materials and Methods

The trial was conducted at the North Carolina A&T State University Farm, Greensboro, NC. The field was in year one of the three-year organic transition period. Seeds of all eight bell pepper and four hot pepper varieties were certified organic (Table 1).

Design: Field plots were organized in a randomized complete block design with twelve treatments (varieties) and three replications (blocks) per variety. Twenty-six plants were planted in each block. Data were collected from the center eight plants in each block.

Fertility: Certified organic compost (Brooks Contactor, Goldston, NC) was spread at 12,000 pounds per acre and tilled in before forming beds. Beds were made on May 7, 2014. After planting, certified organic fish emulsion (2-2-.25; SF Organics, Thomson, IL) was applied at 5 lbs/week/acre for 5 weeks starting July 1, 2014 at bloom set.

Plasticulture: Three-foot raised beds with black plastic mulch (1.25mil) and drip tape (5/8", 8 mil, 12" emitter spacing) were formed using a Rain-Flo raised bed plastic mulch layer. Soil moisture was monitored and plots were irrigated as needed to supply 1.5-2 inches of water per week (average 2 hours per day, 4 days per week).

Planting: All varieties were sowed on April 29, 2014 in a 1:1 (Sunshine No. 1 Natural and Organic: certified organic compost) planting mix in a greenhouse at the University Farm. Transplants at the 4-5 leaf stage were planted on June 11, 2014 in double rows with 18 inch between- and in-row spacing. A buckwheat cover crop was planted to the east and south of the pepper plots on May 21, 2014, to attract pollinators and natural insect predators.

Table 1. Pepper varieties and characteristics.

Variety		Type	Color	Source
Sweet Chocolate	OP	Bell	Brown	Johnny's Selected Seeds
Olympus	F1	Bell	(Green)/Red	High Mowing Organic Seeds
Sweet Sunrise	F1	Bell	Yellow/Orange	Johnny's Selected Seeds
King Crimson	OP	Bell	Red	High Mowing Organic Seeds
Cal Wonder	OP	Bell	Golden	High Mowing Organic Seeds
Melina	F1	Bell	Orange	High Mowing Organic Seeds
Sprinter	F1	Bell	Red	High Mowing Organic Seeds
Aura	F1	Bell	Orange	Johnny's Selected Seeds
Early Jalapeno	OP	Hot, Jalapeno	Green/(Red)	High Mowing Organic Seeds
Hungarian Hot Wax	OP	Hot, Hot Wax	Yellow/(Red)	High Mowing Organic Seeds
Highlander	F1	Hot, Anaheim	Green/(Red)	Johnny's Selected Seeds
Ancho 211	F1	Hot, Ancho	Green/(Red)	Johnny's Selected Seeds

OP: open pollinated; F1: hybrid.

Plant management: Plants were trellised using the Florida weave system. Weeds were controlled by the black plastic, although some weeds that grew in planting holes were hand pulled. Plots were monitored for Insect and disease pests. Insect pests were managed using an organic approved pesticide, PyGanic (pyrethrins).

Harvest and Data Collection: Harvest was conducted one to two times per week from August 4 to September 9, 2014 depending on growth. Fruit were graded to marketable and cull fruit, counted and weighed (lbs). Phenological data were collected on date and node of first flower and date of both green and mature fruit color. Bloom date is reported when 50% of plants in each cultivar had open flowers. Dates of fruit color are reported when 50% of fruit were green (full size) or the mature fruit color. Additional data were collected on disease infestation at the end of the season. Data were analyzed with XLSTAT using ANOVA. Statistical significance is determined at $\alpha \leq 0.05$.

Results and Discussion

Pests were a major issue, resulting in low marketable yields (Figs. 1 and 2). The main insect pest was stink bugs, resulting in loss of fruit marketability across all plots, particularly in the bell pepper varieties. Early maturing hot pepper varieties were less affected by stink bugs. Stink bug populations were not sufficiently managed using only PyGanic. Additionally, southern blight (*Sclerotium rolfsii*) was confirmed in the field and resulted in a high rate of plant loss (average 11.3

plants per plot) throughout the season (Table 4). All plots, except for Early Jalapeno, had greater than 50% infestation. Improved organic control of stink bugs is possible and marketability could be increased with lower insect pest pressure.

Varieties King Crimson, Sprinter, and Aura were the best performing bell pepper varieties in terms of yield and fruit number. 'Hungarian Hot Wax' outperformed the other hot pepper varieties in terms of yield, and 'Early Jalapeno' produced the greatest number of fruit (Table 2). All varieties reached 50% bloom around one month after planting (Table 3). Some of the earliest to bloom (King Crimson, Hungarian Hot Wax and Early Jalapeno) were also among the highest yielding. The hot pepper varieties were the fastest to reach fruit maturity, likely improving their yield over bell peppers by producing fruit before southern blight took over the field.

This report only reflects our first year trial results. Due to the severe damage by stink bugs and the high incidence of southern blight, we are not ready to recommend any of these varieties to farmers who grow organic peppers. We will continue this research with more varieties in 2015 with the goal of producing a list of recommended organic pepper varieties for central North Carolina.

Acknowledgements

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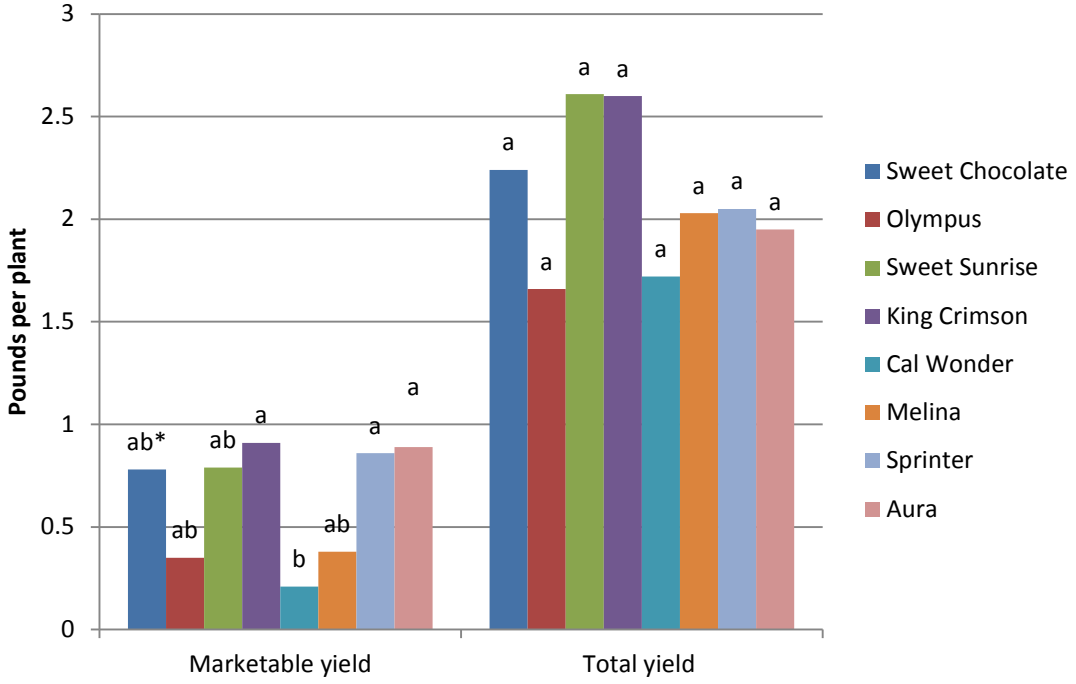
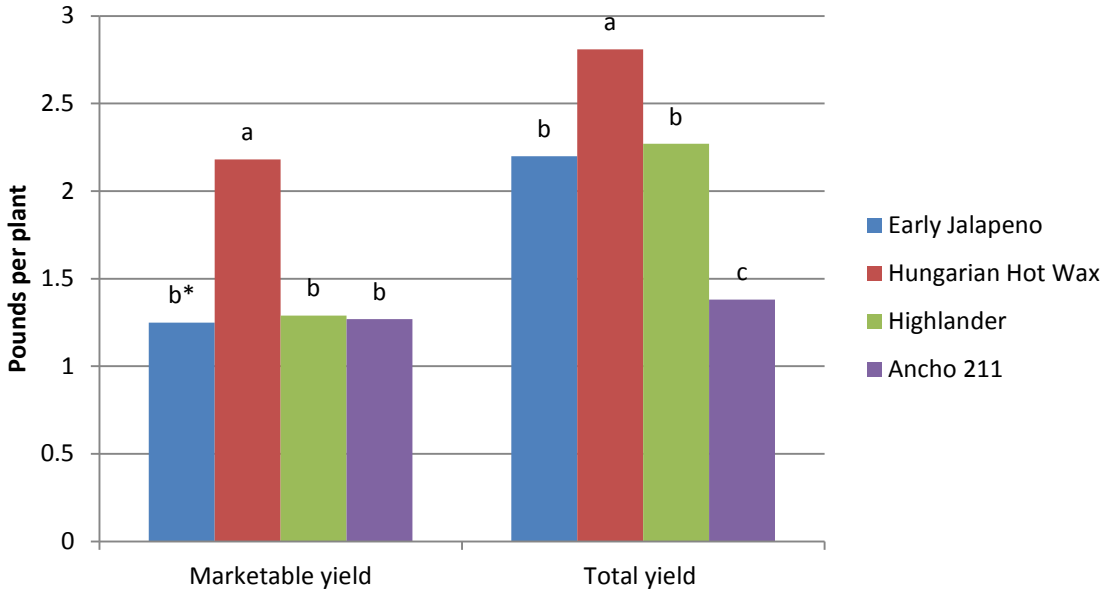
Figure 1. Bell pepper marketable and total yield.



*No statistical difference exists when two varieties share a same letter.

Figure 2. Hot pepper marketable and total yield.



*No statistical difference exists when two varieties share a same letter.

Table 2. Number of marketable and total fruit per plant for bell and hot pepper varieties.

	Variety	No. of marketable fruit per plant	No. of total fruit per plant
Bell Pepper	Sweet Chocolate	5.65 abc*	18.12 a
	Olympus	1.16 c	8.69 b
	Sweet Sunrise	4.28 abc	15.42 ab
	King Crimson	6.25 ab	15.53 ab
	Cal Wonder	1.36 c	8.07 b
	Melina	1.96 bc	8.56 b
	Sprinter	6.19 ab	15.84 ab
	Aura	7.27 a	16.18 ab
Hot Pepper	Early Jalapeno	40.53 a	69.43 a
	Hungarian Hot Wax	41.10 a	55.52 b
	Highlander	15.60 b	28.95 c
	Ancho 211	21.30 b	23.22 c

*Results with the same letter are not significantly different at α=0.05.

Table 3. Bell and hot pepper first flower node, first flower bloom date and fruit color date.

	Variety	The first flower node	Bloom[b] (DAT)[a]	Mature green[c] (DAT)	Full color (DAT)
Bell Pepper	Sweet Chocolate	6	29	58	68
	Olympus	7	34	58	75
	Sweet Sunrise	7	34	49	68
	King Crimson	6	29	58	68
	Cal Wonder	6	34	58	75
	Melina	7	34	58	75
	Sprinter	6	34	58	75
	Aura	6	34	49	68
Hot Pepper	Early Jalapeno	6	29	42	-
	Hungarian Hot Wax	6	29	49	54
	Highlander	7	34	42	-
	Ancho 211	8	34	68	-

[a]DAT: days after transplanting (June 11, 2014).
[b]When a variety had 50% bloom.
[c]When 50% fruit of a variety had reached the full size at green stage or reached full color stage.

Table 4. Plant loss and infestation due to *Sclerotium rolfsii*.

	Variety	No. of dead plants	Percent of plants infested per plot
Bell Pepper	Sweet Chocolate	12.0 ab*	61.3 ab
	Olympus	13.3 a	71.3 a
	Sweet Sunrise	13.3 a	56.0 b
	King Crimson	10.0 ab	75.0 ab
	Cal Wonder	6.7 b	66.3 ab
	Melina	9.3 ab	54.7 b
	Sprinter	11.7 ab	69.0 ab
	Aura	8.7 ab	66.3 ab
Hot Pepper	Early Jalapeno	6.7 b	17.3 b
	Hungarian Hot Wax	13.3 ab	77.7 ab
	Highlander	16.3 a	88.0 a
	Ancho 211	14.3 ab	71.3 ab

*Results with the same letter are not significantly different at α=0.05..

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