

Yield, Income, and Quality of Staked Tomato Cultivars in Central Kentucky

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Introduction

Currently, Kentucky growers produce approximately 1200 acres of staked, vine ripened tomatoes, which they sell at both local and national markets. Kentucky grown tomatoes have an excellent quality reputation among produce buyers. Therefore we continue to test new and existing commercial fresh market tomato varieties in order to identify varieties, which can be marketed as a premium “Kentucky tomato.” We evaluated cultivars for yield, appearance, and potential producer income and compared these with Mountain Spring and Mountain Fresh, which are two well established cultivars.

Materials and Methods

Fourteen determinate red-fruited tomato varieties were evaluated at the Horticulture Research Farm in Lexington, Kentucky. Mountain Spring and Mountain Fresh, two popular varieties were included as a comparison with newer cultivars (Table 1). Mountain Fresh Plus was also included. Mountain Fresh Plus is essentially the same as the older variety, Mountain Fresh except it has root knot nematode resistance. All trial cultivars were seeded in the greenhouse on 20 March and transferred to 38 cell plastic trays. Cultivars were transplanted 10 May. The experiment was a randomized complete block design with four replications. Each plot consisted of 8 plants spaced 18 inches apart in a single row. Rows (bed centers) were spaced 6.5 feet apart. Plants were grown on black plastic mulch with drip irrigation.

Drip irrigation was applied when needed using tensiometers to monitor soil moisture. All plants were staked and tied using a Florida weave system. Plants were pruned to two main stems. 148 lb/A of nitrogen and 130 lb/acre of potassium (K₂O) were applied to the field preplant. 81 lb/A of supplemental nitrogen was fertigated in nine applications during the season. Plots were sprayed weekly with protectant fungicides (fixed copper and Maneb were sprayed on alternating weeks with either fixed copper and Bravo or fixed copper and Quadris; Actigard was applied twice early in the growing season). There was only one application of the insecticide Pounce to control Colorado potato beetle and tobacco hornworm.

Tomatoes were harvested nine times between 18 July and 23 August. Fruit was sorted into the following size classes prior to weighing: Jumbo (>3.5 in. diameter), extra-large (>3.0 in. but <3.5 in.), large (>2.5 in., but <3.0 in.), medium and small (<2.5 in.), and culls. Fruit were also sorted using the U.S. No. 1 and No. 2 grades. Total marketable yield reported includes only large and above size categories. Yields of medium size tomatoes are reported with smalls because they are not considered marketable by most growers/shippers in the state. All the yields reported are of tomatoes, which were rated as a No. 1, while yields of No. 2's are reported separately. Means of all variables

measured were compared using the Waller-Duncan's K-ratio T-test ($P=0.5$).

Incomes per acre. In addition to reporting yields in pounds or boxes per acre we also expressed variety performance as income per acre. In order to estimate income we used 2006 USDA Food Distribution prices (Table 2). These market prices were multiplied by yields from the different size classes for each variety. Early and late maturing varieties may be favored due to higher prices received early and late in the season. Yields of No. 2 tomatoes were not used in calculations of expected income.

Fruit quality ratings. All ripe fruit of each variety harvested on 23 August (final harvest) were laid out on a table and photographed. All cultivars were rated for overall appearance as well as blotchy ripening.

Results and Discussion

The 2006 growing season was wet and relatively cool early in the season. This year although plants were seeded/transplanted on virtually the same day as last year it is notable that the first fruit harvest of 2006 (18 July) was a week later than that of 2005 (11 July). This may in part be due to cooler temperatures early in the season. Although the season was very wet there was no discernable disease pressure.

Yields and incomes/acre were much higher this year for all varieties retested from the 2005 tomato trial (Sunshine, Mtn Fresh Plus, Biltmore, Amelia, Crista, Mtn. Spring, Sunguard, Indy, Mtn. Crest, BHN 543, BHN 444). This is most likely due to the lack of disease pressure in the 2006 trial that occurred in 2005. This year the highest yielding variety was Crista, but this yield did not significantly differ from Phoenix, HMX 5826, Biltmore VFF, Mtn. Fresh Plus, Amelia, or BHN 444 (Table 2). Crista also had the highest marketable yield (47,260 lbs); however, this yield did not significantly differ from eleven of the other cultivars in the trial. Crista also had the largest average fruit weight (13.5 oz) and this was significantly different from all of the other cultivars except BHN 444. The main season variety Mtn. Fresh Plus had the fifth highest yield of jumbo and extra-large fruits and the sixth highest income. Incomes ranged from \$17,273/A for Phoenix to \$10,153/A for Sunguard. Sunshine, which had the highest yield in the 2005 growing season performed poorly in this year's trial, having one of the lowest yields and highest cull percentage (41.6).

Among the group of varieties exhibiting highest yields and incomes, Mtn. Fresh Plus and Biltmore VFF had the highest ratings for both overall appearance and lack of blotchy ripening (Table 3). Crista, which was the second highest in total income and exhibited the highest fruit weight and number of jumbo and extra-large fruit had a fairly poor rating for overall appearance and occurrence of blotchy ripening. Other varieties with high appearance scores (B or above) were Mtn. Spring, HMX 5826, Mtn. Crest, Phoenix, and Sunguard. Amelia and BHN 444 exhibited the worst overall visual rating, but did not have the highest blotchy ripening rating. It should be noted that in terms of fruit quality and appearance Sunguard, which again had a high fruit quality rating performed well in 2003, 2004, and 2005 (see 2003, 2004, and 2005 Research Reports). Mtn. Crest, which exhibited a higher rating for fruit appearance this year also rated highest for fruit

appearance in 2004 and 2005.

Acknowledgments

The authors would like to thank the following persons for their hard work and assistance in the successful completion of this trial: Matt Anderson, Jessica Ballard, Ryan Capito, Jessica Cole, Christopher Fuhr, Courtney Hart, Mary Lesen, Dave Lowry, Daniel McNatt, Claudia Meeks, Tyler Pierce, Natlanit Piyakarn, Charlie Neal, Kirk Ranta, Kiefer Shuler, Aren Spears, Wissarut Sukhaket, Joseph Tucker, Bonka Vaneva, and David Wayne.

Table 1. Actual USDA Food Distribution prices (per 25 lb box). Box yields of No.1 Jumbo, Extra Large and Large tomatoes were multiplied by these prices for the appropriate harvest dates to calculate “income per acre” for each cultivar.

Week Ending	No. 1 Jumbo, X-Large, and Large (\$/Box)
22 Jul	9.45
29 Jul	8.95
5 Aug	6.95
12 Aug	8.90
19 Aug	10.95
26 Aug	10.85

Table 3. Overall tomato fruit appearance ratings and rating of blotchy ripening from staked tomatoes from Lexington, Ky., 2006.

Variety	Visual Rating	Blotchy Ripening (1=none, 5=severe)
RFT 6153	A- (a little cracking)	1.5
Mt Fresh Plus	B+	1.5
Biltmore VFF	B+	1.5
Mountain Crest	B+ (a few water cracks)	2
Mountain Spring	B+ (a little cracking)	2
HMX 5826	B+ (some cracking)	2
Sunguard	B	2.5
Phoenix	B-	2.5
Crista	C+ (overwatered, cracked)	2
Indy	C (overwatered, cracked)	2
BHN 543	C (severe cracking)	2.5
Sunshine	C (rough fruit, cracking)	3
Amelia	D (overwatered, cracked)	2
BHN 444	D- (overwatered, cracked)	2

Table 2. Yields, fruit size, and income from staked tomato cultivars at Lexington, Ky., 2006.

Variety (Seed Co.)	# Jumbo + Extra Large ¹ Boxes/ Acre	Jumbo + X-Large Boxes/ Acre	XL Weight/ Acre	Total Market ² (Thousand lbs/Acre)	#2's ³ (Thousand lbs/Acre)	Culls (%) ⁴	Average ⁵ Fruit Wt. (oz.)	Income (\$/Acre)
Crista (SW)	1546 a	81 fg	9798 a	47.3 ab	3.2 abc	25 de	13 e	16661 ab
Phoenix (SW)	1278 ab	72 de	10622 a	43.3 a	5.2 abc	29 e	11 bcde	17273 a
HMX 5826 (SW)	1232 ab	71 ef	11798 a	43.2 abc	4.3 bc	24 cde	11 bcde	12460 abcd
Biltmore VFF (SW)	1209 ab	77 cde	8494 a	38.7abc	4.6 ab	28 de	12 bcd	15159 abc
Mtn. Fresh Plus (SW)	1204 ab	63 g	11457 a	47.3 abc	4.3 c	20 de	10 e	15868 abc
Amelia (SW)	1109 abc	63 de	11691 a	43.6 c	6.0ab	24 a	11 cde	8619 d
BHN 444 (SW)	1090 abc	77 a	9983 a	35.8 a	7.8 bc	33 cde	12 a	16830 ab
BHN 543 (SW)	917 bc	67 abc	7615 a	34.9 abc	5.3 a	33 abc	11 ab	12147 abcd
Mtn. Spring (SW)	841 bc	47 bcde	8413 a	44.8 abc	4.6 abc	23 abc	9 bc	11771 abcd
Mtn. Crest (SW)	802 bc	57 f	6461 a	35.0 abc	3.6 a	28 bcd	10 ed	11254 bcd
Sunshine (SW)	655 c	62 ab	7146 a	26.6 abc	6.5 abc	42 cde	10 b	13885 abcd
Sunguard (SW)	648 c	37 ef	8799 a	44.0 bc	2.2 abc	24 ab	9 ecd	10153 abcd
RFT 6153 (SW)	646 c	56 abcd	8586 a	28.4 abc	4.4 abc	38 cde	10 bcd	16005 abc
Indy (SW)	644 c	49 abcd	7123 a	32.4 abc	7.7abc	31 de	10 bcd	15604 abc

¹Yields of USDA No. 1 fruit of jumbo (>3.5 in. diameter) plus extra large (>2.5 in. but <3.5 in.) size classes; boxes/acre=number of 25 lb cartons per acre. “%”=percentage of the total of these two size classes of the total marketable yield.

²Total marketable yield=No. 1 fruit of jumbo +extra large+large size classes; mediums not included.

³Yield of USDA No. 2 fruit from all size classes.

⁴Percentage of culled fruit in total yield.

⁵Average fruit weight; includes jumbo, extra large, and large only.